

**XXXII Conferencia Latinoamericana de Informática  
(CLEI 2006)**

**XIV Congreso Iberoamericano de Educación Superior en Computación  
(CIESC 2006)**

**XIII Concurso Latinoamericano de Tesis de Maestría**

**Santiago de Chile**  
21-25 de Agosto de 2006

**Programa & Resúmenes  
Schedule & Abstracts**

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## PROLOGO

El Centro Latinoamericano de Estudios en Informática (CLEI) vuelve una vez más a su origen, a Chile. Esta vez acompañando al más importante Congreso Mundial de Computación auspiciado por IFIP (Internacional Federation for Information Processing). Juntos, IFIP y CLEI transforman a este evento en el más importante de todos los tiempos en la región.

Se recibieron más de 450 trabajos provenientes de más de 35 países del mundo para ser evaluados por un prestigioso comité de programa presidido por el Dr. Mauricio Marín. Esta 32<sup>a</sup> versión de la Conferencia Latinoamericana de Informática consiste de 177 trabajos cuidadosamente seleccionados y 32 posters. En la 14<sup>a</sup> versión del Congreso Iberoamericano de Educación Superior en Computación (CIESC) tendremos oportunidad de presenciar 20 trabajos seleccionados por un comité de programa co-presidido por la Dra. Angélica Urrutia y el Dr. Mauricio Marín.

El Concurso Latinoamericano de Tesis de Maestría tuvo la participación de más de 30 tesis, que fueron evaluadas por un comité presidido por el Dr. Benjamín Barán y que finalmente seleccionó los 3 ganadores del concurso: El primer y tercer lugar fue para estudiantes de postgrado de la Universidad de Sao Paulo (Brasil) y el segundo lugar para un estudiante de la Universidad de Chile. Felicitaciones a los ganadores.

Un agradecimiento público merecen los Drs. Angélica Urrutia, Mauricio Marín, Benjamín Barán y todos los miembros de los Comités de programa respectivos, que en total suman más de 100 personas. Gracias a todos ustedes por ayudar a mejorar la calidad de este prestigioso evento.

La programación de CLEI y CIESC y la presentación de los trabajos se encuentra planificada desde el lunes 21 de agosto hasta el jueves 24 en el Hotel Crowne Plaza. El viernes CLEI se realizará en el Centro de Extensión de la Universidad Católica de Chile (CEUC). La presentación de los posters será de lunes a jueves en el patio de exhibiciones del CEUC.

Finalmente, quisiera agradecer a los auspiciadores de este evento y a los patrocinadores por su apoyo. Este apoyo provino desde empresas multinacionales como IBM Research, Microsoft Research, Yahoo! Research, HP, Siemens, como de empresas nacionales: Colegio Interactivo, NIC Chile, Revista Informática, Tuxpan, 3Com, PGA Soluciones Audiovisuales, Metagroup, Nescafé, y Lan Chile. También al gobierno por su incondicional apoyo a través de CONICYT, Innova Chile (CORFO), y el Ministerio de Educación.

Dr. Mauricio Solar  
Presidente Comité Organizador  
19th IFIP World Computer Congress  
32<sup>a</sup> Conferencia Latinoamericana de Informática  
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*Silvia Menichetti* (Authors and this book)  
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*Catherine Parra* (this book)  
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*Carlos Gomez* (Proceedings CD production)



# CLEI 2006 Plenary Conferences

## **Tecnología y Microarquitectura de los Procesadores actuales y futuros**

Francisco Tirado  
Universidad Complutense de Madrid

Desde su aparición hace casi 50 años, los procesadores han doblado su velocidad cada 18 meses. Esto ha sido debido, por una parte, a los avances en la integración de circuitos que permiten duplicar el número de transistores cada 18 meses y una mayor velocidad del reloj y por otra, a mejoras de su arquitectura (organización interna de los diferentes módulos operativos) orientadas a ejecutar un número cada vez mayor de instrucciones por ciclo. En la actualidad, podríamos decir que la tecnología permite diseñar chips con más de 1000 millones de transistores, que trabajan a una frecuencia de reloj superior al Gigahertzio y que pueden ejecutar hasta múltiples instrucciones en cada ciclo de trabajo.

Monday (14:00 - 15:40) Hotel Crowne Plaza, Salón Bulnes

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## **HealthGrids: Retos y Oportunidades**

Vicente Hernández  
Universidad Politécnica de Valencia

El tratamiento electrónico de datos relacionados con la gestión de la salud comparte problemas, en lo relativo a las necesidades computacionales y de integración de datos, con otros ámbitos científicos como la física de altas energías, la astrofísica o la química computacional, en los que la adopción de las tecnologías Grid está reportando importantes beneficios. Sin embargo, la adopción de estas tecnologías, en lo que se ha venido a denominar HealthGrids, no ha tenido el mismo impacto, principalmente debido a la mayor complejidad de los datos biomédicos y el carácter, mucho más crítico, de su privacidad. El desarrollo de soluciones para estos importantes retos está abriendo nuevas oportunidades que permitirán avanzar en la gestión de terapias personalizadas al paciente o la mejora de los estudios epidemiológicos. Esta conferencia pretende revisar el estado del arte de las diferentes aplicaciones de los HealthGrids y analizar sus tendencias en el futuro próximo.

Thursday (16:00-18:00hrs) Hotel Crowne Plaza, Salón Bulnes

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# CLEI 2006 Tutorials

## **When Good Algorithms Yield Bad Software**

Ernst Leiss, University of Houston, USA

Hotel Crowne Plaza, Sunday, August 20th

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## **Multidimensional Raster Databases**

Peter Baumann, International University Bremen, Germany

Hotel Crowne Plaza, Sunday, August 20th

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## **Ontology Development in Database Systems and Software Engineering: A Hands-on Tutorial**

Karin Breitman, Marco Antonio Casanova, PUC-Rio, Brazil

Hotel Crowne Plaza, Sunday, August 20th

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## **Mobile Computer Supported Collaborative Learning (MCSCL)**

Miguel Nussbaum, Pontificia Universidad Católica de Chile

Hotel Crowne Plaza, Sunday, August 20th

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## **Practical Approaches to Enterprise Security Auditing & Compliance**

Vijay Masurkar, SUN Microsystems Inc.

Hotel Crowne Plaza, Sunday, August 20th

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## **Web Mining**

Ricardo Baeza-Yates, Universidad de Chile

Hotel Crowne Plaza, Sunday, August 20th

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## **Tecnologías para la GRID**

Elisa Heymann Pignolo, Universidad Autónoma de Barcelona

Ramón Doallo Biempica, Universidade da Coruña

Juan Touriño Domínguez, Universidade da Coruña

Aula Magna, Centro de Extensión, PUC, Friday (14:00-17:00hrs)

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# CLEI 2006 Schedule

## Full Papers

### Session 1 Monday morning (08:00 - 09:40 hrs)

#### Hotel Crowne Plaza, Sal3n Prieto

(1) *Dual Selective Code Compression*

**Authors:** Eduardo Wanderley Netto, Eduardo Billo, Rodolfo Azevedo

**Keywords:** Computer Architecture

(08:00 - 08:20)

(2) *Particionamento de Pinos de I/O e seu Impacto no Tamanho das Interconex3es e N3mero de Vias em Circuitos VLSI 3D*

**Authors:** Sandro Sawicki, Renato Hentschke, Marcelo Johann, Ricardo Reis

**Keywords:** Computer Architecture

(08:20 - 08:40)

(3) *Implementa33o em FPGAs dos Algoritmos Needleman-Wunsch e Smith-Waterman de Seq3enciamento de Gens*

**Authors:** Edward David Moreno

**Keywords:** Computer Architecture, Parallel Computing, Performance Evaluation

(08:40 - 09:00)

(4) *Usando Simula33o para Avaliar 3ndices de Carga em Ambientes Distribu3dos Heterog4neos*

**Authors:** Kalinka Castelo Branco, Regina H. C. Santana, Sarita Mazzini Bruschi, C3elia Leiko Ogawa Kawabata, Marcos Jos3 Santana

**Keywords:** Computer Architecture, Parallel Computing, Distributed Systems

(09:00 - 09:20)

(5) *VIP e PVIP: 3ndices de Desempenho para Avalia33o de Sistemas Heterog4neos*

**Authors:** Kalinka Castelo Branco, Regina Helena Carlucci Santana, Sarita Mazzini Bruschi, Jaquie Castelo Branco, Marco Jos3 Santana, C3elia Leiko Ogawa Kawabata

**Keywords:** Computer Architecture, Parallel Computing, Distributed Systems

(09:20 - 09:40)

### Coffee break (10:00-10:20)

#### Hotel Crowne Plaza, Sal3n Bulnes

(6) *Gerenciamento do Consumo de Energia Dirigido pela Aplicacao em Sistemas Profundamente Embarcados*

**Authors:** Arliones Stevert Hoeller Junior, Lucas Francisco Wanner, Ant3nio Augusto Fr3hlich

**Keywords:** Computer Architecture, Methodology and Software Architecture, Operating Systems

(08:00 - 08:20)

(7) *Una Aproximación Orientada a Servicios Grid para el Análisis Estático y Dinámico de Estructuras de Edificación*

**Authors:** Vicente Hernández, José M. Alonso, Roberto López, German Moltó

**Keywords:** Distributed Systems

(08:20 - 08:40)

(8) *Um Suporte para Adaptação Dinâmica de Arquiteturas Ubíquas*

**Authors:** André Santos, Diego Leal, Orlando Loques

**Keywords:** Distributed Systems

(08:40 - 09:00)

(9) *Projeto e Análise de Desempenho de um Protocolo de Difusão Atômica Personalizado*

**Authors:** Fabiola Goncalves Pereira Greve1, Jean-Pierre Le Narzul, Xiaojun Ma

**Keywords:** Distributed Systems

(09:00 - 09:20)

(10) *Optimización del cálculo del tiempo ocioso en planificadores DVS con tiempos de ejecución variables*

**Authors:** José Manuel Urriza, Javier Darío Orozco, Ricardo Cayssials, Julius C. B. Leite

**Keywords:** Operating Systems

(09:20 - 09:40)

**Coffee break (10:00-10:20)**

**Plenary Conference (14:00 - 15:40) Hotel Crowne Plaza, Salón Bulnes**

Tecnología y Microarquitectura de los Procesadores  
Actuales y Futuros

Prof. Dr. Francisco Tirado  
Universidad Complutense de Madrid

**Coffee break (15:40-16:00)**

**Session 2 Monday afternoon (16:00 - 19:00 hrs)**

**Hotel Crowne Plaza, Salón Prieto**

(11) *Avaliação do Impacto do Uso de Conversores em Redes Ópticas*

**Authors:** Anderson Costa, Denio Mariz, Ramide Dantas, Carlos Kamienski, Judith Kelner

**Keywords:** Networks

(16:00 - 16:20)

(12) *Técnicas de Diagramación de Tiempo-Real en Redes de Sensores*

**Authors:** Ricardo Cayssials, Diana Sanchez, Javier Orozco, José M. Urriza

**Keywords:** Networks

(16:20 - 16:40)

(13) *Managing Energy and Quality of Service in Heterogeneous Server Clusters*

**Authors:** Julius Leite, Raphael Guerra, Luciano Bertini

**Keywords:** Networks

(16:40 - 17:00)

(14) *Projeto Redes de Relacionamento*

**Authors:** Cesar Stradiotto, Everton Pacheco, Andre Bortolon, Hugo Hoeschl

**Keywords:** Networks

(17:00 - 17:20)

(15) *Estudo de Estimação de Banda Efetiva para Trafego Auto-Similar como Viariancia Infinita*

**Authors:** Firmiano Perlingeiro, Lee Luan Ling

**Keywords:** Networks

(17:20 - 17:40)

(16) *Uma análise sobre ataques de força bruta contra o protocolo SSH*

**Authors:** Clébio Dossa, Christian Perone, Marcos Antonio Sandini Trentin

**Keywords:** Networks

(17:40 - 18:00)

(17) *Increasing Communications Security through Protocol Parameter Diversity*

**Authors:** Elena Barrantes, Stephanie Forrest

**Keywords:** Networks, Security of Information and Criptography, Operating Systems

(18:00 - 18:20)

(18) *Análise da utilização de cluster SSI para o serviço de recepção de mensagens*

**Authors:** Marcelo Trindade Rebonatto, Cristofer Veloso, Carlos Schaeffer, Alexandre Zanatta

**Keywords:** Networks, Collaborative Systems, Distributed Systems

(18:20 - 18:40)

(19) *SERPI - System for Registration of Intellectual Property Production for Nuclei of Technological Innovation*

**Authors:** Glaucia Oenning, Evandro Nascimento, Hugo Cesar Hoeschl

**Keywords:** Networks, Collaborative Systems, Information Society

(18:40 - 19:00)

## **Hotel Crowne Plaza, Salón Bulnes**

(20) *LogMiddle: Uma Solução Eficiente para o Compartilhamento de Dados em Redes Móveis Ad Hoc*

**Authors:** Fabricio Diogenes, Nabor Mendonça

**Keywords:** Networks, Distributed Systems

(16:00 - 16:20)

(21) *Meta-Gerenciamento de Recursos em Sistemas Operacionais para Plataformas Embarcadas*

**Authors:** Roger Immich, Diego L. Kreutz, Antônio A. Fröhlich

**Keywords:** Operating Systems

(16:20 - 16:40)

(22) *Um Núcleo para Simulação Distribuída Otimista*

**Authors:** Renata Spolon Lobato, Rodrigo Porfírio da Silva Sacchi, Roberta Spolon Ulson

**Keywords:** Performance Evaluation

(16:40 - 17:00)

(23) *Abordagem Conservativa para Simulação Distribuída de Modelos de Redes de Fila*

**Authors:** Renata Spolon-Lobato, Geraldo Francisco Donegá Zafalon, Roberta Spolon Ulson, Marta Oliveira da Silva Balieiro

**Keywords:** Performance Evaluation

(17:00 - 17:20)

(24) *Modelos de Desempeño para las Aplicaciones de un Grid Basado en JAVA*

**Authors:** Mariela Curiel

**Keywords:** Performance Evaluation, Software Engineering, Distributed Systems

(17:20 - 17:40)

(25) *Una Estrategia de QoS para Tráfico HTTP basada en Políticas Token Bucket*

**Authors:** Salvador Alcaraz, Carlos Juiz, Katja Gilly, Ramon Puigjaner

**Keywords:** Performance Evaluation, Networks

(17:40 - 18:00)

(26) *La Heterogeneidad de los Índices de Prestaciones de la Prebúsqueda Web*

**Authors:** Josep Domènech, José A. Gil, Julio Sahuquillo, Johann Márquez, Ana Pont

**Keywords:** Performance Evaluation, Networks, Distributed Systems

(18:00 - 18:20)

(27) *Método de Avaliação de Qualidade de Serviço em Sistemas Multimídia Utilizando uma Rede Neural de Quantização Vetorial por Aprendizagem*

**Authors:** Sergio Donizetti Zorzo, Fabiana Cristina Bertoni

**Keywords:** Performance Evaluation, Networks, Distributed Systems

(18:20 - 18:40)

### Hotel Crowne Plaza, Salón Atacama (Computing in Education)

(28) *Simulador para o aprendizado de sistemas operacionais*

**Authors:** Gustavo Tonini, Sediane Carmem Lunardi

**Keywords:** Computer Architecture, Performance Evaluation, Operating Systems

(14:00 - 14:20)

(29) *Sistema Multiagente para el problema de Integración de Sistemas: El Caso de Servicios Educativos de Nivel Universitario*

**Authors:** Jorge Guerra

**Keywords:** Distributed Systems

(14:20 - 14:40)

(30) *Off-Shore Software Development in the Classroom*

**Authors:** Kay Berkling, Armin Zundel

**Keywords:** Software Engineering, Human Computer Interaction, Collaborative Systems

(14:40 - 15:00)

(31) *Agent-based architecture for auto-evaluation in e-learning context*

**Authors:** Francisca Losavio, Nicole Levy, Parinaz Davari

**Keywords:** Software Engineering, Methodology and Software Architecture

(15:00 - 15:20)

(32) *Una Metodología de desarrollo de Sistemas Tutores Inteligentes*

**Authors:** Marco Coral, David Mauricio

**Keywords:** Methodology and Software Architecture

(15:20 - 15:40)

### Coffee break (15:40 - 16:00)

(33) *Sistemas Colaborativos aplicados a la Educación*

**Authors:** Ana Alonso de Armiño

**Keywords:** Collaborative Systems

(16:00-16:20)

(34) *Comprendiendo las interacciones docentes en un entorno virtual de aprendizaje: Un caso en el contexto de la educación Chilena*

**Authors:** Juan Silva

**Keywords:** Collaborative Systems

(16:20 - 16:40)

(35) *Factores de éxito en estudiantes. Una propuesta que hace uso de redes neuronales*

**Authors:** María Angélica Pinninghoff, Ricardo Contreras, Jorge Silva, Pedro Salcedo

**Keywords:** Artificial Intelligence

(16:40 - 17:00)

(36) *Hybrid Intelligent e-Learning System*

**Authors:** Luis Alberto Alfaro Casas, Rafael Maldonado, Jose Herrera

**Keywords:** Artificial Intelligence, Human Computer Interaction

(17:00 - 17:20)

(37) *Model for the customization of an e-Learning system, using Case Based Reasoning and learning Styles*

**Authors:** Luis Alberto Alfaro Casas, Jose Herrera, Rafael Maldonado

**Keywords:** Artificial Intelligence, Human Computer Interaction

(17:20 - 17:40)

(38) *Utilizando Redes Bayesianas na Construção de um Modelo de Aluno para Ambientes de Ensino a Distância*

**Authors:** Michele Silva, Cecília Dias Flores, Joel Pinho Lucas, Beatriz Wilges, Ricardo Azambuja Silveira

**Keywords:** Artificial Intelligence, Human Computer Interaction, User Interfaces

(17:40 - 18:00)

(39) *Análise do Projeto Pedagógico de um Curso de Ciência da Computação através do Mapeamento Competência*

**Authors:** Luiziana Rezende, Lidia Micaela Segre, Gilda Helena B. Campos

**Keywords:**

(18:00 - 18:20)

## Session 3 Tuesday morning (08:00 - 12:00 hrs)

### Hotel Crowne Plaza, Salón Prieto

(40) *Base for Metacomputing Systems that Can Execute Parallel Java Bytecode Efficiently*

**Authors:** Eric Gamess

**Keywords:** Parallel Computing, Performance Evaluation

(08:00 - 08:20)

(41) *Model Checking Techniques applied to the design of Web Services*

**Authors:** Gregorio Diaz, M. Emilia Cambroner, Juan J. Pardo, Valentín Valero, Fernando Cuartero

**Keywords:** Networks, Collaborative Systems, Distributed Systems

(08:20 - 08:40)

(42) *Maximizando el Paralelismo: Ejecución de Tareas en Lote sobre PVM*

**Authors:** Francisco Torres-Rojas, Jorge Chaves, Alvaro Rivera

**Keywords:** Parallel Computing, Distributed Systems, Operating Systems

(08:40 - 09:00)

(43) *Modelado y Análisis Inicial del Establecimiento de una Conexión Bluetooth Usando las Redes de Petri Coloreadas*

**Authors:** Maria Elena Villapol

**Keywords:** Data Communication, Formal Specification, Networks

(09:00 - 09:20)

(44) *Wireless control of Bluetooth on/off switches in a smart home using J2ME in Mobile Phones and PDAs*

**Authors:** Luis Aceves, Og Jamir Ramos, Carlos Alberto Garza

**Keywords:** Data Communication, Human Computer Interaction, Programming Languages, Networks, Information Society

(09:20 - 09:40)

(45) *Avaliação dos mecanismos de Privacidade e Personalização na Web*

**Authors:** Sergio Zorzo, Luanna L. Lobato

**Keywords:** Data Communication, Human Computer Interaction, Security of Information and Cryptography

(09:40 - 10:00)

### Coffee break (10:00-10:20)

(46) *Implementación de un Motor de Búsquedas Paralelo con BSP*

**Authors:** Esteban Gesto, Daniel Lagúa, Natalia Trejo, Osiris Sofia, José Canumán

**Keywords:** Databases, Parallel Computing, Distributed Systems

(10:20 - 10:40)

(47) *Integration of Operational Planning and Energy Transactiones Systems*

**Authors:** Rafael Peralta, Favio Perales, Roberto Navarro

**Keywords:** Data Communication, Methodology and Software Architecture

(10:40 - 11:00)



(48) *Distributed Load Balancing Algorithms for Parallel Volume Rendering on Cluster of PCs*  
**Authors:** Cristiana Bentes, Alexandre Coelho, Andrei Gomes Lopes, Maria Clicia Stelling de Castro, Ricardo Farias

**Keywords:** Computer Graphics, Parallel Computing, Distributed Systems

(11:00 - 11:20)

(49) *MetaBiblioteca Digital Regional de Tesis y Disertaciones - BDRTD*

**Authors:** Edwin Montoya, Jorge Giraldo, Maryem Ruiz

**Keywords:** Information Retrieval, Distributed Systems

(11:20 - 11:40)

(50) *Um Modelo de Controle de Acesso Baseado em Contexto para Autorizações a Informações Médicas*

**Authors:** Gerson Soares, Raul Ceretta Nunes, Érico M. H. do Amaral

**Keywords:** Information Retrieval, Security of Information and Cryptography

(11:40 - 12:00)

### Hotel Crowne Plaza, Salón Bulnes

(51) *Acceso Seguro a Datos Confidenciales en Grids*

**Authors:** Carlos Figueira, Yudith Cardinale, Emilio Hernandez

**Keywords:** Security of Information and Cryptography, Distributed Systems

(08:00 - 08:20)

(52) *Um Sistema de Marca d'Água para Segurança de Dados Digitais*

**Authors:** Ivan Lopes, Celia Barcelos, Marcos Batista, Anselmo Silva

**Keywords:** Security of Information and Cryptography

(08:20 - 08:40)

(53) *Investigação de Algoritmos e Desenvolvimento Arquitetural para a Estimação de Movimento em Compressão de Vídeo Digital*

**Authors:** Marcelo Porto, Luciano Agostini, Sergio Bampi

**Keywords:** Algorithms and Data Structures, Computer Architecture, Computer Graphics

(08:40 - 09:00)

(54) *Iterative Bucket Inverted Files for Web Engines*

**Authors:** Graciela Veronica Gil Costa, Marcela Printista

**Keywords:** Algorithms and Data Structures, Parallel Computing, Information Retrieval

(09:00 - 09:20)

(55) *Estrategias de Paralelización para el EGNAT*

**Authors:** Roberto Uribe, Ricardo Barrientos

**Keywords:** Algorithms and Data Structures

(09:20 - 09:40)

(56) *Comparison between C, C++ and Java implementations of Branch-and-Bound Skeletons*

**Authors:** Isabel Dorta-González, Olga Francisco, Coromoto León

**Keywords:** Algorithms and Data Structures, Parallel Computing

(09:40 - 10:00)

## Coffee break (10:00-10:20)

(57) *Codificación y Decodificación Eficiente Utilizando Códigos Hamming*

**Authors:** Daniel Rosquete, Amadis Martinez, Freddy Perozo

**Keywords:** Algorithms and Data Structures, Data Communication, Networks

(10:20 - 10:40)

(58) *Developing secure architectures for middleware systems*

**Authors:** Eduardo B. Fernandez, Maria M. Larrondo-Petrie

**Keywords:** Software Engineering, Methodology and Software Architecture, Security of Information and Cryptography, Distributed Systems

(10:40 - 11:00)

(59) *Desenvolvimento Visual de Arquiteturas Distribuídas*

**Authors:** Cidcley T. de Souza, Robson G. F. Feitosa, Renato L. C. Lima

**Keywords:** Software Engineering, Distributed Systems

(11:00 - 11:20)

(60) *The RS Language for Distributed Automata*

**Authors:** Giovanni Librelotto, Simão Sirineo Toscani, Marcos Luís Cassal, Rogério Turchetti, Guilherme Dhein

**Keywords:** Programming Languages, Distributed Systems

(11:20 - 11:40)

(61) *Modelos de confiabilidad diámetro-acotada para optimizar búsquedas en redes P2P*

**Authors:** Héctor Cancela, Jorge Coll, Diego Costanzo, Manuel Rodríguez

**Keywords:** Methodology and Software Architecture, Networks

(11:40 - 12:00)

## Session 4 Tuesday afternoon (14:00 - 18:40 hrs)

### Hotel Crowne Plaza, Salón Prieto

(62) *Uma Infra-estrutura para Replicação Semi-Ativa em Arquiteturas Orientadas a Serviços*

**Authors:** Lau Lung, Giuliana Teixeira Santos, Joni da Silva Fraga, Carlos Barros Montez

**Keywords:** Methodology and Software Architecture, Distributed Systems

(14:00 - 14:20)

(63) *Uma Arquitetura para Suporte a Aplicações Sensíveis a Contexto Baseada em Componentes de Software*

**Authors:** Rossano Pablo Pinto, Eleri Cardozo, Alex Z. Lima, Paulo R. S. L. Coelho, Eliane G. Guimar aes, Rodrigo F. Sassi, Luis F. Faina

**Keywords:** Software Engineering, Methodology and Software Architecture, Distributed Systems

(14:20 - 14:40)

(64) *Reconocimiento de Eventos en Máquinas Robotizadas Usando Clusters Complejos de Patrones de Sonido*

**Authors:** Homero Latorre, Renato Salinas

**Keywords:** Programming Languages, Collaborative Systems, Distributed Systems, Complexity Theory

(14:40 - 15:00)

(65) *Estudio Comparativo De Técnicas De Educción De Requisitos Para Aplicar En Pueblos Indígenas De Bolivia*

**Authors:** Fátima Consuelo Dolz Salvador, Edmundo Tovar Caro

**Keywords:** Software Engineering

(15:00 - 15:20)

(66) *MDA View of Enterprise Architecture Frameworks*

**Authors:** Francisca Losavio, Dinarle Ortega, María Pérez

**Keywords:** Software Engineering

(15:20 - 15:40)

**Coffee break (15:40 - 16:00)**

(67) *Integrating different technologies for data semantics modeling*

**Authors:** Ma. Laura Caliusco, Ma. Rosa Galli, Omar Chiotti

**Keywords:** Software Design

(16:00-16:20)

(68) *Generación de Casos de Prueba Unitarias para Java Basados en la Técnica de McGregor y Sykes*

**Authors:** Jorge Bozo, Daniella Rojas

**Keywords:** Software Engineering

(16:20 - 16:40)

(69) *Caracterización de Sistemas Fiables basada en un modelo estándar de calidad*

**Authors:** Isi Castillo, Rafael Caldera, Francisca Losavio, Alfredo Matteo

**Keywords:** Software Engineering

(16:40 - 17:00)

(70) *Avaliação do Nível de Maturidade da Governança de Tecnologia da Informação em Empresas que Atuam em Mercados Globalizados: Estudo de Caso em Indústrias de Grande Porte*

**Authors:** José Bezerra da Silva Filho, Haroldo Nunes Menezes

**Keywords:** Software Engineering

(17:00 - 17:20)

(71) *A UML Extension to Specify Model Refinements*

**Authors:** Natalia Correa, Roxana Giandini

**Keywords:** Software Engineering

(17:20 - 17:40)

(72) *Checking OCL Expressions Using Colored Petri Nets*

**Authors:** Marta Calderón

**Keywords:** Software Engineering

(17:40 - 18:00)

(73) *Melhoria de Processo do Software Brasileiro (MPS.BR): um programa mobilizador*

**Authors:** Kival Weber, Eratóstenes Araújo, Ana Regina Rocha, Kathia Oliveira, Ana Cristina Rouiller, Christiane Gresse von Wangenheim, Renata Araújo, Clênio Salviano, Cristina Filipak Machado, Danilo Scalet, Odisnei Galarraga, Márcio Pecegueiro Amaral, David Yoshida

**Keywords:** Software Engineering

(18:00 - 18:20)

(74) *Gestión de Conflictos entre Aspectos mediante un Sistema Experto de Reglas*

**Authors:** Sandra Casas, J. Baltasar García Perez-Schofield, Claudia A. Marcos

**Keywords:** Software Engineering

(18:20 - 18:40)

### Hotel Crowne Plaza, Salón Bulnes

(75) *Patrón para la Especificación de Transformaciones*

**Authors:** Patricia Morantes Alfredo Matteo, Alfredo Matteo

**Keywords:** Networks, Distributed Systems

(14:00 - 14:20)

(76) *Uma análise do método ágil Scrum conforme as áreas de processo da categoria Engenharia do modelo CMMI*

**Authors:** Alexandre Lazaretti Zanatta, Jan Spenassato, Patricia Vilain

**Keywords:** Software Engineering

(14:20 - 14:40)

(77) *Implementação de um Repositório de Medições para os Níveis 2 e 3 do CMMI*

**Authors:** Solange Alcântara Araújo, Márcia G. S. Gonzalves, Carlo Giovano, Arnaldo Dias Belchior

**Keywords:** Software Engineering

(14:40 - 15:00)

(78) *Teoria Explanatória para Estimativa Baseada em Casos de Uso no Desenvolvimento Orientado a Objetos*

**Authors:** Everton Vieira, Raul Sidnei Wazlawick

**Keywords:** Software Engineering

(15:00 - 15:20)

(79) *CMMI guiando a integração de padrões organizacionais e de processo ao método ágil Scrum*

**Authors:** Edes Costa Filho, Rosângela Ap. D. Penteado, Júnia C. Anacleto

**Keywords:** Software Engineering

(15:20 - 15:40)

### Coffee break (15:40 - 16:00)

(80) *Processo de Software Livre em Ambiente Acadêmico: Experiências e Lições Aprendidas*

**Authors:** Debora Paiva, Marcelo Turine, Renata Pontin M Fortes

**Keywords:** Software Engineering

(16:00-16:20)

(81) *Modelación de Requisitos, Aspectos y Calidad de Software*

**Authors:** Rafael Caldera, Isi Castillo, Francisca Losavio, Alfredo Matteo

**Keywords:** Computer Architecture, Parallel Computing, Distributed Systems

(16:20 - 16:40)

(82) *Heurísticas para Identificação da Ordem de Integração das Classes em Testes Aplicados a Software Orientado a Objetos*

**Authors:** Gladys Lima, Arilo Cláudio Dias Neto, Guilherme Horta Travassos

**Keywords:** Software Engineering

(16:40 - 17:00)

(83) *Programação Orientada a Aspectos: Um Estudo de Caso em uma Multinacional*

**Authors:** Alessandro Filippetto, Daniel Callegari

**Keywords:** Software Engineering, Programming Languages

(17:00 - 17:20)

(84) *Especificação Hierárquica de Estilos Arquiteturais*

**Authors:** Cidcley T. de Souza

**Keywords:** Software Engineering, Programming Languages

(17:20 - 17:40)

(85) *Esboço de um Processo Ágil de Desenvolvimento baseado em Framework*

**Authors:** Franciene Duarte Gomes, José Carlos Maldonado, Maria Istela Cagnin

**Keywords:** Software Engineering, Methodology and Software Architecture

(17:40 - 18:00)

(86) *Metodología para desarrollo de aplicaciones con enfoque SOA (Service Oriented Architecture)*

**Authors:** Andrea Delgado

**Keywords:** Software Engineering, Methodology and Software Architecture

(18:00 - 18:20)

(87) *A Mexican Experience Redesigning a Software Development Process Using XP, FDD and RUP*

**Authors:** Luis Aceves, Enrique Canseco, Mauricio Ruanova

**Keywords:** Software Engineering, Methodology and Software Architecture

(18:20 - 18:40)

## Session 5 Wednesday morning (08:00 - 11:40 hrs)

### Hotel Crowne Plaza, Salón Prieto

(88) *Uso de Gramática de Grafos na Construção de um Modelo para Avaliação Adaptativa de Aprendizagem*

**Authors:** Priscilla Leão, Márcio Braga, Joseane Viana, Carla Alessandra Lima Reis, Breno França

**Keywords:** Formal Specification, Performance Evaluation, Software Engineering

(08:00 - 08:20)

(89) *A Framework for Optimizations in Abstract State Machines*

**Authors:** Kristian Magnani, Mariza A. S. Bigonha, Roberto S. Bigonha

**Keywords:** Formal Specification, Performance Evaluation, Programming Languages

(08:20 - 08:40)

(90) *Un lenguaje para Transformación de Modelos basado en MOF y OCL*

**Authors:** Roxana Giandini, Claudia Pons

**Keywords:** Formal Specification, Software Engineering

(08:40 - 09:00)

(91) *Comprensión de Algoritmos de Ruteo*

**Authors:** Mario Berón, Pedro Rangel Henriques, Maria João Varanada, Roberto Uzal

**Keywords:** Software Engineering

(09:00 - 09:20)

(92) *Especificación de Restricciones de un Supermercado utilizando Métodos Formales y Teoría de Colas*

**Authors:** Elizabeth Vidal, Ernesto Cuadros-Vargas

**Keywords:** Formal Specification, Software Engineering

(09:20 - 09:40)

(93) *Hacia un modelo de Interacción para Componentes basado en canales*

**Authors:** Silvia Amaro, Ernesto Pimentel

**Keywords:** Formal Specification, Software Engineering

(09:40 - 10:00)

#### Coffee break (10:00-10:20)

(94) *Exploring Process Calculi as a Mechanism to Define Dynamic Enumeration Strategies in Constraint Programming*

**Authors:** Carlos Olarte, Eric Monfroy, Camilo Rueda

**Keywords:** Formal Specification, Artificial Intelligence

(10:20 - 10:40)

(95) *Demostración de Teoremas vía Inducción por Reescritura*

**Authors:** Jorge Salas

**Keywords:** Formal Specification, Programming Languages

(10:40 - 11:00)

(96) *Automatización de leyes de fusión de programas*

**Authors:** Alberto Pardo, Facundo Dominguez

**Keywords:** Formal Specification, Programming Languages

(11:00 - 11:20)

(97) *JAVA-XSC: Estado da arte*

**Authors:** Benjamín Bedregal, José Enéas Montenegro Dutra

**Keywords:** Programming Languages

(11:20 - 11:40)

## Hotel Crowne Plaza, Sal3n Bulnes

(98) *GIRo (Grafcet - Industrial Robots): A Generic Environment for Programming Industrial Robots Off-Line*

**Authors:** Gustavo Arnold, Pedro Henriques, Jaime Fonseca

**Keywords:** Programming Languages, Methodology and Software Architecture

(08:00 - 08:20)

(99) *Probabilistic Cost Analysis of Logic Programs: A First Case Study*

**Authors:** Hector Soza Pollman, Manuel Carro, Pedro L3pez Garc3a

**Keywords:** Programming Languages, Complexity Theory

(08:20 - 08:40)

(100) *Processo de Software Livre em Ambiente Acad3mico: Experi3ncias e Li33es Aprendidas*

**Authors:** Debora Paiva, Marcelo Augusto Santos Turine, Renata Pontin de Mattos Fortes

**Keywords:** Hypermedia, Software Engineering

(08:40 - 09:00)

(101) *Inclus3o Digital via Servi3os de Sa3de para o Sistema Brasileiro de TV Digital*

**Authors:** Valdecir Becker, G3nter H. Herweg Filho, Carlos Montez

**Keywords:** Hypermedia, Human Computer Interaction, User Interfaces

(09:00 - 09:20)

(102) *Minera3o de uso em sites web para a descoberta autom3tica de classes de usu3rios*

**Authors:** Jos3 Palazzo M. de Oliveira, Sandro Jos3 Rigo

**Keywords:** Hypermedia, Human Computer Interaction, Information Retrieval

(09:20 - 09:40)

(103) *Desenvolvimento de Programas para TVDI: os Impactos do Canal de Retorno nos N3veis de Interatividade*

**Authors:** Tatiana Tavares, Thiago Rocha de Assis

**Keywords:** Hypermedia, User Interfaces

(09:40 - 10:00)

## Coffee break (10:00-10:20)

(104) *Um sistema de recomenda3o para ambientes virtuais de aprendizagem baseado em agentes e componentes de software*

**Authors:** Kelle Cristina Fortunato da Costa, Maria da Penha de Andrade Abi Harb, Eloi Luiz Favero, Tha3s Lira Tavares dos Santos, Silvana Rossy de Brito, Aleksandra do Socorro da Silva

**Keywords:** Hypermedia, User Interfaces, Information Retrieval

(10:20 - 10:40)

(105) *Pascal Pages for Web: Uma tecnologia de p3ginas Web din3micas baseada em Object Pascal*

**Authors:** Jo3o Werther, Celso A. Saibel Santos

**Keywords:** Hypermedia, Programming Languages

(10:40 - 11:00)

(106) *Aplicando Técnicas de Planejamento Apoiado em Inteligência Artificial Na Modelagem de Workflow*

**Authors:** Carlos Lopes, Lucas Bucci da Silveira, Jony Teixeira de Melo

**Keywords:** Office Automation, Artificial Intelligence, Collaborative Systems

(11:00 - 11:20)

(107) *Proposta de um Modelo para Workspaces Compartilhados em um Ambiente de Desenvolvimento Distribuído de Software*

**Authors:** Rogério Santos Pozza, Elisa Hatsue Moriya Huzita

**Keywords:** Software Engineering, Collaborative Systems

(11:20 - 11:40)

## Session 6 Wednesday afternoon (14:00 - 19:00 hrs)

### Hotel Crowne Plaza, Salón Prieto

(108) *Um Modelo de Comportamento e de Interação para Entidades em Ambientes de Realidade Virtual*

**Authors:** Glaudiney Mendonça-Junior, Creto A. Vidal, Joaquim B. Cavalcante-Neto

**Keywords:** Collaborative Systems

(14:00 - 14:20)

(109) *Exploración de la Literatura Científica en Sistemas de Información (1998-2004)*

**Authors:** Patricio Ramírez, Rosario García

**Keywords:** Information Society

(14:20 - 14:40)

(110) *Adopción Exitosa de Sistemas ERP: Propuesta de un Modelo Teórico para la Mediana Empresa Chilena*

**Authors:** Ramírez Patricio, Rosario García

**Keywords:** Information Society

(14:40 - 15:00)

(111) *Alineación entre la Oferta y la Demanda del Mercado de Outsourcing de Tecnologías de la Información en una Economía Emergente*

**Authors:** Jaime Andrés Caiceo Duque, Marcos Sepúlveda Fernández

**Keywords:** Information Society

(15:00 - 15:20)

(112) *Elicitación de Requerimientos Cognitivos y de Aprendizaje*

**Authors:** Nora Montaña, Nancy Zambrano, Amelia Soriano

**Keywords:** Methodology and Software Architecture

(15:20 - 15:40)



**Coffee break (15:40 - 16:00)**

(113) *A Usabilidade no Contexto de Usuários Inexperientes no Uso da Tecnologia da Informação: Um Estudo de Caso*

**Authors:** Jose Bezerra, Yara Maria Almeida Freire, Karina Marinho de Souza, Danielle Amorim

**Keywords:** Human Computer Interaction

(16:00-16:20)

(114) *Análise de Tecnologias de Interface de Aplicações para Dispositivos Móveis Associadas a Contextos de Usabilidade*

**Authors:** José Bezerra da Silva Filho, Felipe Cantal, Gerhard Sabóia, Diorgens Miguel Meira

**Keywords:** Human Computer Interaction

(16:20 - 16:40)

(115) *Constraint relaxing on topological operators in pictorial queries with null answer*

**Authors:** Fernando Ferri, Arianna D'Ulizia, Patrizia Grifoni, Maurizio Rafanelli

**Keywords:** Human Computer Interaction, User Interfaces

(16:40 - 17:00)

(116) *NiMo: un lenguaje gráfico para usuarios finales*

**Authors:** Silvia Clerici, Cristina Zoltan

**Keywords:** Human Computer Interaction, Programming Languages

(17:00 - 17:20)

(117) *Algoritmo Grasp para la distribución eficiente de objetos en una interfaz gráfica de usuarios*

**Authors:** Juan Zamudio, Luis Rivera, David Mauricio

**Keywords:** User Interfaces

(17:20 - 17:40)

(118) *A Proposal to Support Pervasive Learning*

**Authors:** Débora Barbosa, Jorge L. V. Barbosa, Iara Augustin, Cláudio F. R. Geyer

**Keywords:** User Interfaces, Methodology and Software Architecture, Information Society

(17:40 - 18:00)

(119) *Evolución de Relaciones de Credibilidad y Confianza entre Agentes*

**Authors:** Allan Berrocal, Gabriela Barrantes

**Keywords:** Artificial Intelligence, Information Society

(18:00 - 18:20)

(120) *Diseño de Topologías Virtuales en Redes Ópticas. Un enfoque basado en Colonia de Hormigas*

**Authors:** Carlos Antonio Insfran Dal Seno, Diego Pinto, Bejamín Barán

**Keywords:** Artificial Intelligence, Networks

(18:20 - 18:40)

(121) *A genus recognition system for the Costa Rica Lauraceae Family, using a Support Vector Machine.*

**Authors:** Juan Carlos Briceño Lobo, Carlos Travieso, Jesús Bernardino, Miguel Ángel Ferrer, Daniel Briceño

**Keywords:** Artificial Intelligence

(18:40 - 19:00)

## Hotel Crowne Plaza, Salón Bulnes

(122) *Sistema Experto con Inducción de Reglas para Apoyo a la Identificación de Géneros de Microorganismos*

**Authors:** Haydemar Núñez, Ivan Flores, Esmeralda Ramos, Juana Vitelli Flores, Vidal Rodríguez Lemoine

**Keywords:** Artificial Intelligence

(14:00 - 14:20)

(123) *Uma Proposta para Evoluir Classificadores Simbólicos Utilizando Algoritmo Genético*

**Authors:** Flavia Bernardini, Maria Carolina Monard

**Keywords:** Artificial Intelligence

(14:20 - 14:40)

(124) *Um Sistema Evolutivo para a Construção de Regras de Conhecimento com Propriedades Específicas*

**Authors:** Adriano Pila, Rafael Giusti, Maria Carolina Monard

**Keywords:** Artificial Intelligence

(14:40 - 15:00)

(125) *Neural Classifier for MicroScrew Shape Recognition in Micromechanics*

**Authors:** Anabel Martín, Tatiana Baidyk

**Keywords:** Artificial Intelligence

(15:00 - 15:20)

(126) *Aplicación de Algoritmos Genéticos en un Sistema Multiagente de Planificación en una Industria Manufacturera*

**Authors:** María de los Ángeles Solari, Ernesto Ocampo

**Keywords:** Artificial Intelligence

(15:20 - 15:40)

## Coffee break (15:40 - 16:00)

(127) *Optimización de funciones a través de Optimización por Enjambre de Partículas y Algoritmos Genéticos*

**Authors:** Nelson Guerra, Broderick Crawford

**Keywords:** Artificial Intelligence

(16:00-16:20)

(128) *Fuzzy Crossover Operators for the TSP*

**Authors:** Carlos Alberto Rossel-Jahaira, Nicolas Kemper Valverde

**Keywords:** Artificial Intelligence

(16:20 - 16:40)

(129) *Uma forma normal para lógicas fuzzy De Morgan implicativas estritas que preserva tautologias e contradições*

**Authors:** Benjamín Callejas Bedregal

**Keywords:** Artificial Intelligence

(16:40 - 17:00)

(130) *Aprendizado de Controladores Nebulosos Via Extração de Regras*

**Authors:** Fabiano Guedes, Karl H. Kienitz

**Keywords:** Artificial Intelligence

(17:00 - 17:20)

(131) *O LEABRA como ferramenta para modelagem conexionista de sistemas neurobiológicos*

**Authors:** Artur Versiani Scott Varella, Carlos Alberto da Silva Franco

**Keywords:** Artificial Intelligence

(17:20 - 17:40)

(132) *Applying Collaborative Intelligence to RoboCup*

**Authors:** Enrique Carrera

**Keywords:** Artificial Intelligence

(17:40 - 18:00)

(133) *Utilização da Lógica Fuzzy para inferir a Auto-Eficácia do Aluno*

**Authors:** Francine Bica, Regina Verdin, Rosa Vicari

**Keywords:** Artificial Intelligence

(18:00 - 18:20)

(134) *Particionamento de processos lógicos em simulação distribuída utilizando algoritmo genético*

**Authors:** Michel Pires da Silva, Sarita Mazzini Bruschi, Regina Helena Carlucci Santana, Marcos José Santana

**Keywords:** Artificial Intelligence

(18:20 - 18:40)

## Session 7 Thursday morning (08:00 - 12:40 hrs)

### Hotel Crowne Plaza, Salón Prieto

(135) *O Paradigma do Dilema do Prisioneiro Aplicado ao Método de Seleção Roleta dos Algoritmos Genéticos*

**Authors:** Otávio Teixeira, Felipe Houat de Brito, Artur Noura Teixeira, Roberto Célio Limão de Oliveira

**Keywords:** Artificial Intelligence

(08:00 - 08:20)

(136) *Extracción de Minucias en Huellas Dactilares*

**Authors:** Gabriel Sanchez, Gualberto Aguilar, Karina Toscano, Héctor Pérez, Mariko Nakano

**Keywords:** Artificial Intelligence

(08:20 - 08:40)

(137) *Algoritmos de Optimización Multi-objetivos basados en colonias de hormigas*

**Authors:** Julio Paciello, Héctor Martínez, Benjamín Barán, Christian Lezcano

**Keywords:** Performance Evaluation, Networks

(08:40 - 09:00)

(138) *Condicionamiento Operante y Aprendizaje Vicario en Agentes mediante Redes Neuronales en Entornos Virtuales Inteligentes*

**Authors:** Milton Martinez Luaces, Celina Gayoso Rocha

**Keywords:** Computer Architecture, Performance Evaluation, Operating Systems

(09:00 - 09:20)

(139) *Investigating Broad Phase Collision Detection Methods for 3D Scenarios Using Force Feedback Devices*

**Authors:** Rafael Rocha, Maria Andreia F. Rodrigues

**Keywords:** Computer Graphics

(09:20 - 09:40)

(140) *Image Fidelity Index Applied to Digital Mammography Texture Segmentation*

**Authors:** Carlos Mello, Angelica Mascaro

**Keywords:** Computer Graphics

(09:40 - 10:00)

#### Coffee break (10:00-10:20)

(141) *Reconstrucción de superficies de forma libre mediante funciones NURBS*

**Authors:** Ernesto Cuartas, Flavio Prieto

**Keywords:** Computer Graphics

(10:20 - 10:40)

(142) *Ajuste de Superficies de Objetos 3D a Partir de Imágenes de Rango Usando Superficies NURBS*

**Authors:** Nallig Leal Narváez

**Keywords:** Computer Graphics, Artificial Intelligence

(10:40 - 11:00)

(143) *Medición de tiempo y frecuencia en video digital usando un arreglo de luces intermitentes*

**Authors:** Juan Forero, Pablo Figueroa, Carlos Rodriguez

**Keywords:** Computer Graphics, Human Computer Interaction

(11:00 - 11:20)

(144) *Desarrollo de una plataforma para la administración de ejecuciones de workflows en un entorno de trabajo en bioinformática*

**Authors:** Gustavo Adolfo Salazar Orejuela, Fernando Barraza, Oscar Restrepo, Yesid Cuesta

**Keywords:** Databases, Software Engineering, User Interfaces

(11:20 - 11:40)

(145) *Schema-Matching with Neural Networks: A new Approach using Representing Schemas*

**Authors:** Milton Martinez Luaces, Carlos Luna, Sebastian Blanco

**Keywords:** Databases, Artificial Intelligence

(11:40 - 12:00)

## Hotel Crowne Plaza, Sal3n Bulnes

(146) *Realimenta33o de Relevantes via Algoritmo Gen3tico auto-adaptativa 3 subjetividade da Similaridade entre Imagens*

**Authors:** Sergio Silva, Celia A. Z. Barcelos, Mascos A. Batista

**Keywords:** Databases, Artificial Intelligence, Information Retrieval

(08:00 - 08:20)

(147) *Comparaci3n de Cuatro T3cnicas de Selecci3n de Caracter3sticas Envolvertes usando Redes Neuronales, Arboles de Decisi3n, M3quinas de Vector de Soporte y Clasificador Bayesiano.*

**Authors:** Samuel Oporto D3az, Iv3n Aquino Morales, Jacqueline K. Ch3vez Cuzcano, C3sar O. P3rez Pinche

**Keywords:** Databases, Performance Evaluation, Artificial Intelligence

(08:20 - 08:40)

(148) *Impacto de la Evoluci3n de la Base de Datos en el Dise3o de un Sistema de Informaci3n*

**Authors:** Daniel Calegari, Andr3s Vignaga, Daniel Perovich

**Keywords:** Databases, Software Engineering, Methodology and Software Architecture

(08:40 - 09:00)

(149) *Micro500: Un Sistema para Extracci3n de Conocimiento en Microorganismos*

**Authors:** Sergio Zepeda, Sergio V. Chapa

**Keywords:** Computer Graphycs

(09:00 - 09:20)

(150) *Recuperaci3n por similitud de forma de huellas digitales mediante una indexaci3n en espacio m3trico*

**Authors:** Omar Florez, Jose Mercado, Yordan Yampi

**Keywords:** Databases, Information Retrieval

(09:20 - 09:40)

(151) *Desempenho de Banco de Dados em modelo dimensionais*

**Authors:** Sueli de Fatima Poppi Borba, Aran Bey Tcholakian Morales, Edson Carlos da Silva

**Keywords:** Artificial Intelligence

(09:40 - 10:00)

## Coffee break (10:00-10:20)

(152) *Temporal Scenarios for Database Constraints: Data Integrity Modeling based on Contextual Predicates*

**Authors:** Luiz Camolesi Jr.

**Keywords:** Databases

(10:20 - 10:40)

(153) *ProDIWA: um Processo Automatiz3vel para Gera3o e Manuten3o de Vis3es de Contexto de Navega3o para Aplica3es DIWA*

**Authors:** V3nia Vidal, T3mara Lima, Fernando Lemos

**Keywords:** Databases

(10:40 - 11:00)

(154) *Investigando o Desempenho da Estrutura de Indexação MRS com base na Geração de Genomas Sintéticos*

**Authors:** Ricardo Ciferri, Mônica Nakano, Cristina Dutra de Aguiar Ciferri, Reginaldo Massanobu Kuroshu, José Júnior Lombardi Bariviera, Nielder Tarsus Honorato da Silva

**Keywords:** Databases

(11:00 - 11:20)

(155) *Análise da Linguagem SQL3 com relação à Especificação de Regras de Negócio*

**Authors:** Judith Pavón, Sidney Viana, Edit Grassiani Lino de Campos

**Keywords:** Databases

(11:20 - 11:40)

(156) *Data Warehousing na Saúde: Melhorando a Tomada de Decisão Médico-Analítica*

**Authors:** Cristina Ciferri, Ricardo Rodrigues Ciferri, Reinaldo Jiunji Ogata, André Moraes Paula Lima, Agma Juci Machado Traina

**Keywords:** Databases

(11:40 - 12:00)

(157) *O Catálogo de Padrões de Análise da Ferramenta ArgoCASEGEO*

**Authors:** Jugurta Lisboa, Alexandre Gazola, Marcus V. Alvim Andrade

**Keywords:** Information Retrieval, Distributed Systems

(12:00 - 12:20)

(158) *Análise da Expressão Gênica através de Cadeias de Markov extraídas a partir de RNRs*

**Authors:** Ígor Almeida, Denise R. Pechmann, Adelmo L. Cechin

**Keywords:** Information Retrieval

(12:20 - 12:40)

## Session 8 Thursday afternoon (14:00 - 15:40hrs)

### Hotel Crowne Plaza, Salón Prieto

(159) *Búsqueda de Páginas Web mediante una Ontología poblada por Clasificación Automática de Textos*

**Authors:** Ismael Ponce, José A. Zárate

**Keywords:** Information Retrieval

(14:00 - 14:20)

(160) *Sistema Inteligente para hacer Minería Web*

**Authors:** Jose Aguilar

**Keywords:** Software Engineering, Human Computer Interaction, Collaborative Systems

(14:20 - 14:40)

(161) *Un nuevo índice eficiente para resolver diversas consultas espacio-temporales*

**Authors:** Maria Gisela Dorzán, Edilma Olinda Gagliardi, Juan Guillermo Gómez Barroso, Gilberto A. Gutiérrez Retamal

**Keywords:** Software Engineering, Methodology and Software Architecture, Distributed Systems

(14:40 - 15:00)

(162) *Funciones de Discretización Basadas en Histogramas de Distancias*

**Authors:** Norma Herrera, Edgar Chávez, Carina Mabel Ruano, Ana Valeria Villegas

**Keywords:** Algorithms and Data Structures, Databases

(15:00 - 15:20)

(163) *Análisis de desempeño de EquipAsso: Un algoritmo para el cálculo de Itemsets frecuentes basado en operadores algebraicos relacionales*

**Authors:** Andres Calderon, Ivan Ramirez, Juan Carlos Alvarado, Fernando Guevara, Ricardo Timarán

**Keywords:** Distributed Systems

(15:20 - 15:40)

**Coffee break (15:40 - 16:00)**

**Hotel Crowne Plaza, Salón Bulnes**

(164) *Aplicación de Técnicas Invariantes en el Reconocimiento de Rostros*

**Authors:** César Julio Bustacara Medina, Camilo Andrés Sánchez Aldana, Jairo José Daza Portillo.

**Keywords:** Algorithms and Data Structures, Computer Graphycs

(14:00 - 14:20)

(165) *Selección de Centros de Interpolación de Funciones de Base Radial para la Reconstrucción de Superficies de Objetos de Forma Libre.*

**Authors:** German Sanchez, Sandra P. Mateus Santiago, John Willian Branch Bedoya, Pierre Boulanger

**Keywords:** Algorithms and Data Structures, Computer Graphycs

(14:20 - 14:40)

(166) *mPRIME: Solução Integrada para Gestão de Riscos*

**Authors:** Cristine Gusmão, Hermano Perrelli de Moura

**Keywords:** Software Engineering

(14:40 - 15:00)

(167) *Performance Modeling of Message-Passing Libraries on System Area Network Clusters*

**Authors:** Guillermo L. Taboada, Juan Touriño, Ramón Doallo

**Keywords:** Performance Evaluation, Distributed Systems

(15:00 - 15:20)

**Coffee break (15:40 - 16:00)**

**Plenary Conference, Hotel Crowne Plaza, Salón Bulnes (16:00-18:00hrs)**

HealthGrids: Retos y Oportunidades

Prof. Dr. Vicente Hernández  
Universidad Politécnica de Valencia

## Session 9 Friday morning (08:00 - 10:00 hrs)

### Aula Magna, Centro de Extensión, PUC

(168) *Geração Automática de Diagramas de Comunicação a partir de Contratos OCL*

**Authors:** Claumir Claudino dos Santos, Raul Sidnei Wazlawick

**Keywords:** Software Engineering, Programming Languages

(08:00 - 08:20)

(169) *A Concurrent Constraint Factor Oracle Model for Music Improvisation*

**Authors:** Camilo Rueda, Gerard Assayag, Shlomo Dubnov

**Keywords:** Software Engineering

(08:20 - 08:40)

(170) *Polyhedral Description Module a Cone and Gomory's Group Problems*

**Authors:** Julian Araoz, Ellis Johnson

**Keywords:** Algorithms and Data Structures, Complexity Theory

(08:40 - 09:00)

(171) *Algoritmos exatos para interseção de segmentos e para sobreposição de mapas incorporados à biblioteca TerraLib*

**Authors:** Vinicius Rodrigues, Marcus Vinicius Alvim Andrade, Jaudete Daltio, Gilberto Ribeiro de Queiroz

**Keywords:** Algorithms and Data Structures

(09:20 - 09:40)

(172) *Um Algoritmo Guloso Aleatorizado com Busca Local para o Problema de Programação de Tarefas em Sistemas de Produção Flowshop Bicritério*

**Authors:** Jose Elias Claudio Arroyo

**Keywords:** Algorithms and Data Structures

(09:40 - 10:00)

### Coffee break (10:00 - 10:20)

### Salón Colorado, Centro Extensión, PUC

(173) *Algorithm for Exhaustive and Non-Redundant Topographical Graph Generation*

**Authors:** Jose Alvarez, Leonor Contreras

**Keywords:** Algorithms and Data Structures

(08:00 - 08:20)

(174) *Distributed Spatial Approximation Tree (SAT\*)*

**Authors:** Jose Penarrieta, Patricio Morriberon, Ernesto Cuadros-Vargas

**Keywords:** Algorithms and Data Structures

(08:20 - 08:40)

(175) *Metodología, basada en Dinámica de Sistemas, para especificar los requisitos de una herramienta tecnológica enfocada al desarrollo de habilidades de argumentación*

**Authors:** Pablo Severin, Hernan Villanueva

**Keywords:** Algorithms and Data Structures, Software Engineering, Methodology and Software Architecture

(08:40 - 09:00)



(176) *Prueba de Concepto de Anahiz con base en la Problemática del Parque Nacional Natural Chingaza*

**Authors:** Leyla Jael García Castro, Germán E. Bravo Córdoba

**Keywords:**

(09:00 - 09:20)

(177) *Some typical classes of t-norms and the 1-Lipschitz condition*

**Authors:** Benjamin Bedregal, Ivan Pan

**Keywords:**

(09:20 - 09:40)

**Coffee break (10:00 - 10:20)**

**Aula Magna, Centro de Extensión, PUC, 10:20 - 13:00 hrs**

Premiación Concurso de Tesis de Maestría

1er premio:

Identificación de Regiones Codificantes de Proteínas Mediante la Transformada Modificada de Morlet

Jesús P. Mena-Chalco  
Universidade de São Paulo, Brasil

2do premio :

Manipulación de Estructuras Métricas en Memoria Secundaria

Roberto Uribe Paredes (Universidad de Magallanes, Chile)  
Universidad de Chile

3er premio :

Adaptação Dinâmica Utilizando Agentes Moveis em Computação Ubiqua

Roberto Speicys Cardoso  
Universidade de São Paulo, Brasil

## Tutorial, Aula Magna, Centro de Extensión, PUC (14:00-17:00hrs)

### Tecnologías para la GRID

#### Contenidos:

1. Conceptos fundamentales de la computación Grid, y visión general de proyectos internacionales de temática Grid.
2. La herramienta Globus Toolkit y sus componentes básicos para el despliegue de una infraestructura Grid.
3. Experiencias prácticas dentro de un proyecto interdisciplinar para el desarrollo de herramientas de soporte a la computación Grid.

#### Ponentes:

Dr. Juan Touriño Domínguez, Universidade da Coruña  
Dra. Elisa Heymann Pignolo, Universidad Autónoma de Barcelona  
Dr. Ramón Doallo Biempica, Universidade da Coruña

## Poster Papers

### Session A Monday afternoon (14:00 - 18:00hrs)

#### Patio de Exposiciones, Centro de Extensión, PUC

(178) *A Technique for Collecting Simultaneous Multithreaded Traces*

**Authors:** Augusto Vega, José Luis Hamkalo, Bruno Cernuschi-Frías

**Keywords:** Operating Systems

(14:00 - 18:00)

(179) *Incorporación de modelado dinámico a un generador de carga para la Web 2.0*

**Authors:** Raúl Peña-Ortiz, Julio Sahuquillo, Ana Pont, José Antonio Gil

**Keywords:** Computer Architecture, Parallel Computing, Distributed Systems

(14:00 - 18:00)

(180) *HECOPS: A Location System using cooperative calibration*

**Authors:** Ricardo Reghelin, Antonio Augusto Fröhlich

**Keywords:** Performance Evaluation, Networks, Distributed Systems

(14:00 - 18:00)

(181) *Diseñando Experimentos sobre Diseño de Software: Consideraciones y Lecciones.*

**Authors:** Rene Noel, Hernan Astudillo, Marcello Visconti, Gonzalo Valdes

**Keywords:** Performance Evaluation, Software Engineering

(14:00 - 18:00)

(182) *Negotiation algorithms in a web server model with QoS: A metric for performance evaluation*

**Authors:** Julio Cezar Estrella, Mario Meireles Teixeira, Marcos José Santana, Regina Helena Carlucci Santana, Sarita M. Bruschi

**Keywords:** Performance Evaluation, Distributed Systems

(14:00 - 18:00)

(183) *Portabilidade de sistemas operacionais no domínio de sistemas embarcados*

**Authors:** Hugo Marcondes, Arliones Stevert Hoeller Junior, Lucas Francisco Wanner, Antônio Augusto M. Fröhlich

**Keywords:** Operating Systems

(14:00 - 18:00)

(184) *Una biblioteca para la invocación remota de métodos en Ambientes Virtuales Distribuidos implementados con Java 3D*

**Authors:** Ildeberto Aparecido Rodello, José Remo Ferreira Brega, Antonio Carlos Sementille, Kalinka R. L. J. Castelo Branco, Edward D. M. Ordóñez.

**Keywords:** Data Communication, Networks, Distributed Systems

(14:00 - 18:00)

(185) *Um Framework Meta-Programado Para a Implementação de Protocolos Leves de Comunicação*

**Authors:** Thiago Robert Santos, Lucas Francisco Wanner, Antônio Augusto Fröhlich, Augusto Born de Oliveira

**Keywords:** Data Communication, Operating Systems

(14:00 - 18:00)

## Session B Tuesday afternoon (14:00 - 18:00hrs)

### Patio de Exposiciones, Centro de Extensión, PUC

(186) *Método para la Evaluación del Proceso de Desarrollo de Software con miras a una Certificación CMMI*

**Authors:** Bozo Jorge, Romina Ferretto, Jorge Bozo

**Keywords:** Software Engineering

(14:00 - 18:00)

(187) *Desarrollo de Software Seguro y su relación con el Cuerpo de Conocimiento para la Ingeniería de Software*

**Authors:** Vianca Vega, José Carrillo Verdún, Gloria Gasca Hurtado, Edmundo Tovar Caro

**Keywords:** Artificial Intelligence

(14:00 - 18:00)

(188) *Análise e Tomada de Decisão Formal Alinhada ao CMMI: Um Estudo de Caso*

**Authors:** Fca. Márcia Gonçalves, Solange A. Araújo, Fabiana G. Marinho, Tatiana C. Monteiro, Carlo G. S. Pires

**Keywords:** Software Engineering, Programming Languages

(14:00 - 18:00)

(189) *Aspectos en la Ingeniería de Requerimientos*

**Authors:** Claudia Marcos, Betina Haak, Miguel Diaz, Jane Pryor

**Keywords:** Software Engineering, Methodology and Software Architecture

(14:00 - 18:00)

(190) *Método para transformar el diseño de una aplicación basada en la arquitectura MVC++ a una aplicación*

**Authors:** Héctor Antillanca, Christian Sabja, Alejandro Soto

**Keywords:** Software Engineering, Methodology and Software Architecture

(14:00 - 18:00)

(191) *Modelo de Calidad para Aplicaciones Móviles Sensibles al Contexto*

**Authors:** Rodolfo Canelón, Alfredo Matteo, Francisca Losavio, Ledis Chirinos

**Keywords:** Software Engineering, Methodology and Software Architecture, Security of Information and Cryptography, Distributed Systems

(14:00 - 18:00)

(192) *Uma Proposta LPS no Domínio de Sistemas Web de Apoio a Gestão de Fomento*

**Authors:** Camilo Carromeu, Marcelo Augusto Santos Turine

**Keywords:** Hypermedia, Software Engineering

(14:00 - 18:00)

(193) *A Generic Framework to Model, Simulate and Verify Genetic Regulatory Networks*

**Authors:** Julian Gutierrez, Alejandro Arbelaez, Carlos Olarte, Camilo Rueda

**Keywords:** Formal Specification

(14:00 - 18:00)

## Session C Wednesday afternoon (14:00 - 18:00hrs)

### Patio de Exposiciones, Centro de Extensión, PUC

(194) *Influência do Tamanho das Assinaturas nos Sistemas de Verificação On-line*

**Authors:** Rodrigo Sineco Araujo, George D.C Cavalcanti, Edson C. de B. Carvalho Filho

**Keywords:** Artificial Intelligence

(14:00 - 18:00)

(195) *Aplicando Datamining com Redes SOM em Base de Dados de Execuções de Algoritmos Genéticos Utilizando os Novos Métodos de Seleção Hawk-Dove Roleta e Hawk-Dove Torneio*

**Authors:** Felipe Brito, Artur Noura Teixeira, Otávio Noura Teixeira, Roberto Célio Limão de Oliveira

**Keywords:** Artificial Intelligence

(14:00 - 18:00)

(196) *Desarrollo de un Sistema Multiagente de Manejo de Situaciones Anormales para un Pozo de Levantamiento Artificial por Gas*

**Authors:** Jose Aguilar, Frank Prato, César Bravo

**Keywords:** Artificial Intelligence

(14:00 - 18:00)

(197) *Cerrando Brechas entre la Información y sus Usuarios usando Agentes Inteligentes*

**Authors:** Vladimir Lara, Gabriela Marín

**Keywords:** Formal Specification, Programming Languages

(14:00 - 18:00)

(198) *Flexible Querying of XML Knowledge Base through the MIEL Language*

**Authors:** Marco Javier Suarez Barón

**Keywords:** Databases, Software Engineering, Artificial Intelligence, Information Retrieval, Complexity Theory

(14:00 - 18:00)

(199) *Técnicas de minería de datos para predecir la demanda de cursos*

**Authors:** Lina Torres, Jose Abasolo

**Keywords:** Computer Architecture

(14:00 - 18:00)

(200) *Modelagem multidimensional utilizando o paradigma orientado a objetos*

**Authors:** Sueli de Fatima Poppi Borba, Aran Bey Tcholakian Morales

**Keywords:** Information Society

(14:00 - 18:00)

(201) *Uso de la tecnología sobre la base de un modelo de innovación curricular en matemática*

**Authors:** Gonzalo Villarreal

**Keywords:** Collaborative Systems

(14:00 - 18:00)

## Session D Thursday afternoon (14:00 - 18:00hrs)

### Patio de Exposiciones, Centro de Extensión, PUC

(202) *Por que fragmentar verticalmente un data warehouse?*

**Authors:** Cristina Ciferri, Diogo Tuler Forlani, Ricardo Rodrigues Ciferri

**Keywords:** Databases

(14:00 - 18:00)

(203) *Towards Flexible Skyline Queries*

**Authors:** Marlene Goncalves Da Silva, Leonid Tineo

**Keywords:** Performance Evaluation

(14:00 - 18:00)

(204) *Automatic Vascular Tree Segmentation*

**Authors:** Juan Francisco Carrillo, Marcela Hernández Hoyos, Maciej Orkisz

**Keywords:** Algorithms and Data Structures, Computer Graphycs

(14:00 - 18:00)

(205) *Generalized Decision Function and Gradient Search Technique for NP-Complete Problems*

**Authors:** Jeffrey Duffany

**Keywords:** Algorithms and Data Structures, Complexity Theory

(14:00 - 18:00)

(206) *Segmentación de Arteriolas en la Microcirculación de Hemosustitutos para la Medición de la Variación en el Tiempo de su Diámetro Mediante el Procesamiento de Imágenes*

**Authors:** Sandra Cancino, Fernando Pastrana, Juan Carlos Briceño, Marcela Hernández Hoyos

**Keywords:** Computer Graphycs

(14:00 - 18:00)

(207) *Ambiente Virtual para Entrenamiento de Cirugía Mínima Invasiva del Abdomen*

**Authors:** Bricelis Urbina, Omaira Rodríguez, Miguel Cerrolaza, Rodolfo Miquilarena

**Keywords:** Computer Graphycs

(14:00 - 18:00)

(208) *Visualização de Páginas Web em Aparelhos Celulares: Um Caminho para Inclusão Digital*

**Authors:** Pablo Liporace, José Bezerra da Silva Filho

**Keywords:** Human Computer Interaction, User Interfaces, Information Society

(14:00 - 18:00)

(209) *Avaliação de desempenho do protocolo conservador de simulação distribuída CMB*

**Authors:** Célia Kawabata, Regina Helena Carlucci Santana, Marcos José Santana, Sarita Mazzini Bruschi, Kalinka R. L. J. Castelo Branco

**Keywords:** Undefined

(14:00 - 18:00)

# CIESC 2006 Schedule

## Full Papers

### Session 1 Tuesday morning (08:30 - 09:50 hrs)

#### Sala 3, Centro de Extensión, PUC (Chair: Angélica Urrutia)

(210) *El Camino hacia un Diseño Curricular Basado en Competencias: Caso Escuela de Ing. Informática PUCV*

**Authors:** Jorge Bozo Parraguez, Silvana Roncagliolo de la Horra, Pamela Hermosilla Monckton

(08:30 - 08:50)

(211) *Organización para un Curso de Programación en un Contexto de Masividad. Una Experiencia*

**Authors:** Carlos Luna, Martín Pedemonte, Marcos Viera, Eduardo Fraschini

(08:50 - 09:10)

(212) *Estudio para Alinear los Planes y Programas de Estudio de con las áreas Conocimiento y Competencias profesionales en Tecnologías de la Información*

**Authors:** Lourdes Sánchez Guerrero, Guillermo Rodríguez Abitia, Orge Kashiwamoto Yabuta, Mariem Henaine

(09:10 - 09:30)

(213) *Clases Orientadas al Aprendizaje en la Primera Asignatura de Computación*

**Authors:** Juan Alvarez

(09:30 - 09:50)

#### Coffee break (09:50-10:20)

### Session 2 Tuesday morning (10:20 - 13:00 hrs)

#### Sala 3, Centro de Extensión, PUC (Chairs: Jorge Bozo and Hector Soza)

(214) *Orientación en Línea de Trabajos Finales de Graduación en Computación: Propuesta de Componentes para Ambientes de Apoyo a Procesos de Enseñanza-Aprendizaje Mediados por Computadoras*

**Authors:** Ismar Frango Silveira, Luciano Silva, Denise Stringhini, Nizam Omar, Pollyana N. Mustaro

(10:20 - 10:40)

(215) *Resultados de una Investigación sobre Egresos de Alumnos por Carrera*

**Authors:** Héctor Soza Pollman

(10:40 - 11:00)

(216) *Guía de Taller de Tesis por Webquest*

**Authors:** Fátima Consuelo Dolz Salvador

(11:00 - 11:20)

(217) *Un Estudio sobre la Enseñanza de la Seguridad en las Escuelas de Informática Iberoamericanas*

**Authors:** David García Rosado, Eduardo Fernández-Medina, Mario Piattini

(11:20 - 11:40)

(218) *Modelo RHA: Extensão do Modelo de Munich Apoiada em Resultados de Avaliações de Aprendizagem, Estilos cognitivos e estratégias de aprendizagem*

**Authors:** Marília A. Amaral, Vania R. Ulbricht

(11:40 - 12:00)

(219) *Análisis del Rendimiento de los Alumnos Ingresantes a Carreras de Informática en la UNRC Asociado con los cursos de ingreso*

**Authors:** Marcelo Ariel Uva, Ariel Ferreira Szpiniak

(12:00 - 12:20)

(220) *Programando en JAVA APPLETs los Métodos Numéricos*

**Authors:** Gladys Mansilla Gómez

(12:20 - 12:40)

(221) *Aprender a Programar Disciplinadamente: Nuevos Desafíos*

**Authors:** Guillermo Ariel Rojo, Ariel Ferreira Szpiniak

(12:40 - 13:00)

### Session 3 Tuesday afternoon (14:00 - 15:40 hrs)

#### Sala 3, Centro de Extensión, PUC (Chair: Marcela Varas)

(222) *Significant Learning Evaluation: A Case Study*

**Authors:** Nelkis de la Orden Medina, Paulo José de Freitas Filho

(14:00 - 14:20)

(223) *Edumóvil: Propuesta de Incorporación de Dispositivos Móviles en la Educación Básica en México*

**Authors:** Gabriel Geronimo Castillo, Everth H. Rocha Trejo

(14:20 - 14:40)

(224) *Uso de Jogos Digitais como Estratégia para Ensino de Padrões de Projeto em Ciência da Computação*

**Authors:** Ismar Frango Silveira, Luciano Silva

(14:40 - 15:00)

(225) *Design de Jogos Digitais: Experiências de um Curso Superior Tecnológico no Brasil*

**Authors:** Luis Naito Mendes Bezerra, Luciano Silva, Ismar Frango Silveira, Carlos Fernando de Araújo Jr

(15:00 - 15:20)

(226) *Diplomado Aplicación de las TIC en la Docencia*

**Authors:** G. Garzon, G.I. Bautista Lasprilla, I. Zuñiga Silgado, L.E. Robles, M.E. Rincon Socha

(15:20 - 15:40)



Coffee break (15:40-16:00)

**Session 4 Tuesday afternoon (16:00 - 17:00 hrs)**

**Sala 3, Centro de Extensión, PUC (Chair: Ariel Ferreira)**

(227) *C-gen - Ambiente Educacional Para Ensino de Compiladores*

**Authors:** Jerônimo Backes, Alessandra Dahmer

(16:00 - 16:20)

(228) *Integrating Entrepreneurship with Engineering Education: The Integrated Tecnology Venture Program at the University of Florida*

**Authors:** Manuel E. Bermúdez, Keith Stanfill

(16:20 - 16:40)

(229) *AUTOEXPLC - Analisador de Explicações para Auxílio ao Ensino da Linguagem C*

**Authors:** Carlos M. Tobar Toledo, Cláudio L. V. Oliveira

(16:40 - 17:00)

**Session 5 Tuesday afternoon (17:00 - 18:00 hrs)**

**FORO PANEL, Sala 3, Centro de Extensión, PUC**

Innovación Académica en la Formación de Profesionales de Computación  
e Informática: Experiencias MECESUP en Chile

El objetivo es mostrar los distintos proyectos de "Mejoramiento de la Calidad y Equidad de la Educación Superior" (MECESUP) que se desarrollan a lo largo de Chile, en el contexto de curriculum por competencias.

Panelistas:

Marcelo Noel Lopez V., Analista, Programa MECESUP.

Marcela Varas C., Universidad de Concepción.

Jorge Bozo P., Pontificia Universidad Católica de Valparaiso.

Federico Meza, Universidad de Talca.

Moderadora: Angélica Urrutia, Universidad Católica del Maule

# CLEI 2006 Abstracts

## 1. Dual Selective Code Compression

Eduardo Wanderley Netto, Eduardo Billo, Rodolfo Azevedo

CEFET-RN, Dept. Informatics, Natal, Brazil, 59015-000

UNICAMP, Institute of Computing, Campinas, Brazil, 13084-971

**Abstract:** Code compression has been shown to be efficient in code size reduction and, recently, performance improvement and energy savings. In this paper we use a compression method, the ComPacket, which has selectively regions of the code to improve performance and complementary regions to sustain the code size reduction both at the same time. Using the leon (SPARC v8) platform and benchmarks from Mediabench and MiBench suites we reached, on average, 25% of code memory area reduction, and a speed-up of 1.5 simultaneously.

**Keywords:** Computer Architecture

**Contact e-mail:** braulio@cefetrn.br

**Schedule:** Hotel Crowne Plaza, Salón Prieto, Monday (08:00 - 08:20)

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## 2. Particionamento de Pinos de I/O e seu Impacto no Tamanho das Interconexões e Número de Vias em Circuitos VLSI 3D

Sandro Sawicki, Renato Hentschke, Marcelo Johann, Ricardo Reis

UFRGS - Universidade Federal do Rio Grande do Sul, PPGC - Instituto de Informática, Porto Alegre Brasil

UNIJUI Universidade Regional do Noroeste do Estado do Rio Grande do Sul DETEC - Departamento de Tecnologia, Ijuí Brasil

**Abstract:** The 3D Circuit technologies appear as a possible solution for interconnect optimization. For most of the 3D technologies, the 3D-Vias represent a very complex issue because of large pitch requirements and heavy usage of routing constraints. This paper studies the impact of I/O pins partitioning in 3D circuits. Previous works on 3D placement did not focus on the I/Os partitioning and placement. This work presents an algorithm based on the logic proximity of the pins, which is used as weights to a min-cut partitioning.

Our method calculates the area of the tiers while placing the I/Os on the boundaries. Initial whitespace and aspect ratio as well as the initial pins orientation and ordering are preserved. We compared to two other methods for pins partitioning. Our experimental results show that our method is efficient since it can balance the I/O pins distribution in the various tiers while leading to improvements in wire length and number of 3D vias.

**Keywords:** Computer Architecture

**Contact e-mail:** sawicki@inf.ufrgs.br

**Schedule:** Hotel Crowne Plaza, Salón Prieto, Monday (08:20 - 08:40)

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### 3. Implementação em FPGAs dos Algoritmos Needleman-Wunsch e Smith-Waterman de Seqüenciamento de Gens

Edward David Moreno

Ciência da Computação - Centro Universitário, Eurípides de Marília (UNIVEM) , Av Hygino Muzzi Filho 529, CEP 17525-901 Marília, SP Brasil

**Resumen:** O artigo tem como objetivo implementar em hardware os algoritmos que são considerados padrão para a comparação e o alinhamento global e local das seqüências genéticas de DNA utilizando a técnica de programação dinâmica. Esses algoritmos foram implementados e analisados em software (linguagem C) e em hardware (sendo descritos na linguagem VHDL e prototipados usando a tecnologia FPGA), visando conseguir um bom desempenho. Foram analisados os tempos de execução dos resultados alcançados tanto em software e hardware e, comparados com outros sistemas específicos para o seqüenciamento genético, mostrando bons resultados de nossa implementação em FPGAs

**Keywords:** Computer Architecture, Parallel Computing, Performance Evaluation

**Contact e-mail:** edmoreno@fundanet.br

**Schedule:** Hotel Crowne Plaza, Salón Prieto, Monday (08:40 - 09:00)

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## 4. Usando Simulação para Avaliar Índices de Carga em Ambientes Distribuídos Heterogêneos

Kalinka Castelo Branco, Regina H. C. Santana, Sarita Mazzini Bruschi, Célia Leiko Ogawa Kawabata, Marcos José Santana

Ciência da Computação - Centro Universitário

USP - Universidade de São Paulo, ICMC - Instituto de Ciências Matemáticas e de Computação , Av. Trabalhador São-carlense, 400, CEP 13560-970, CP 668, São Carlos - SP Brasil

UNICEP - Centro Universitário Central Paulista ,Rua Miguel Petroni, 5111 São Carlos, SP Brasil

**Abstract:** This paper describes and analyze of load index used in the evaluation of distributed computer systems, mainly in heterogeneous one. The purposed technique is the simulation that is used to evaluate the scheduling process when various scheduler, application and architecture platforms parameters are considered. Tests to validate the simulator were carried out using different load indices with relevant results.

**Keywords:** Computer Architecture, Parallel Computing, Distributed Systems

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**Schedule:** Hotel Crowne Plaza, Salón Prieto, Monday (09:00 - 09:20)

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## 5. VIP e PVIP: Índices de Desempenho para Avaliação de Sistemas Heterogêneos

Kalinka Castelo Branco, Regina Helena Carlucci Santana, Sarita Mazzini Bruschi, Jaquie Castelo Branco, Marco José Santana, Célia Leiko Ogawa Kawabata

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UNICEP - Centro Universitário Central Paulista, Rua Miguel Petroni, 5111 São Carlos, SP Brasil

**Abstract:** An evaluation of two new performance indices (PIV - Performance Index Vector and WPIV - Weighted Performance Index Vector) that are based on a Euclidian metric is presented in this paper. Aiming to maximize the use of the machines, the proposed indices are a combination of several usual indices

and the results of their evaluation through a simulator show an appropriate behavior for different kinds of applications.

**Keywords:** Computer Architecture, Parallel Computing, Distributed Systems

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**Schedule:** Hotel Crowne Plaza, Sal3n Prieto, Monday (09:20 - 09:40)

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## 6. Gerenciamento do Consumo de Energia Dirigido pela Aplicacao em Sistemas Profundamente Embarcados

Arliones Stevert Hoeller Junior, Lucas Francisco Wanner, Ant3nio Augusto Fr3hlich

Laborat3rio de Integra33o Software/Hardware Campus Universit3rio UFSC , P.O.Box 476, 88040-900 Florian3polis Brasil

**Abstract:** Deeply Embedded Systems are dedicated computational platforms. Usually, these platforms are simple and have its resources limited to those which are necessary to execute the specific applications for which it was designed. Very often non-functional requirements drive the design of such devices. Among these requirements, is energy consumption. It is very important to handle energy consumption of these devices in a non-restrictive and low-overhead way. Restrictions cannot avoid the use of the several low-power operating modes such devices often feature. However, the energy consumption management strategy cannot compromise large amounts of system resources (processing and memory). In this context, this paper proposes an API (Application Programming Interface) which allows applications for managing energy consumption of software and hardware components. This paper also presents a component message propagation mechanism. This mechanism allows applications to handle operating modes of subsystems and the whole system. A prototype was developed using a component-based operating system. It shows that energy consumption management was possible without the need for using costly techniques or strategies. A case study done over a sensing platform showed energy savings of almost 40% by only allowing applications to express when certain components are no longer being used.

**Resumen:** Sistemas Profundamente Embarcados s3o plataformas computacionais dedicadas. Estas plataformas s3o normalmente simples, com recursos limitados aos necess3rios para executar as aplica33es espec3ficas para as quais foi projetado. Muitas vezes, requisitos n3o funcionais s3o fatores predominantes no processo de desenvolvimento destes dispositivos. Um destes requisitos normalmente 3 o consumo de energia. Assim sendo, 3 muito importante que se possa tratar o consumo de energia destes dispositivos de uma maneira n3o-restritiva e eficiente. N3o se pode restringir o acesso da aplica33o aos variados modos de baixo consumo que dispositivos embarcados oferecem. Contudo, 3 necess3rio que a estrat3gia de ger3ncia de energia n3o comprometa grandes quantidades de recursos do sistema (processamento e mem3ria). Neste escopo, este artigo prop3e uma API (textitApplication Programming Interface) que possibilita que aplica33es gerenciem o consumo de energia de componentes de software e hardware. Al3m da API, uma estrutura de propaga33o

de mensagens entre componentes do sistema é apresentada, o que permite à aplicação controlar os modos de operação não só de componentes individualmente, mas também de subsistemas e do sistema como um todo. Através de um protótipo desenvolvido utilizando um sistema operacional baseado em componentes, mostra-se que a gerência do consumo de energia em sistemas embarcados foi possível sem a necessidade do uso de técnicas ou estratégias custosas em termos de processamento ou memória. Um estudo de caso executado sobre uma plataforma de sensoriamento mostrou economias de até 40% apenas por permitir que aplicações expressem quando certos componentes não estão mais sendo usados.

**Keywords:** Computer Architecture, Methodology and Software Architecture, Operating Systems

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Monday (08:00 - 08:20)

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## 7. Una Aproximación Orientada a Servicios Grid para el Análisis Estático y Dinámico de Estructuras de Edificación

Vicente Hernández, José M. Alonso, Roberto López, German Moltó

Universidad Politécnica de Valencia, Departamento de Sistemas Informáticos y Computación, Camino de Vera s/n, Valencia, 46022 Spain

**Abstract:** This paper exposes the implementation of a service oriented platform that performs an on demand 3D static and dynamic structural analysis of highrise buildings using a Grid Computing infrastructure. The Grid Service has been developed over the middleware Globus Toolkit 4, offering to the structural scientific community an on-line multi-user service. The requirements of high throughput and robustness needed, by such a system, have forced to integrate a highly liable Grid meta-scheduler that enables to share appropriately the computational resources. The developed system offers a multilevel fault tolerance that guarantees that every simulation request received in the Grid Service will be satisfactorily attended. Another important aspect that has been taken into account has been the security, offering user authorization and authentication, and data privacy and integrity mechanisms, critical issues in a system available in the network. In addition, an advanced GUI client that interacts with the Grid Service has also been implemented, assisting the client in the pre-process and post-processing stages, and in the structural analysis parameter definition.

**Resumen:** Este artículo presenta la implementación de una plataforma orientada a servicios que lleva a cabo un análisis 3D estático y dinámico de edificios de gran dimensión bajo demanda, empleando una infraestructura de computación Grid. El Servicio Grid ha sido desarrollado sobre el middleware Globus Toolkit 4, ofreciendo a la comunidad científica un servicio multiusuario on-line de cálculo estructural. Los requerimientos de alta productividad y fiabilidad de tal sistema han obligado a integrar un planificador Grid altamente robusto que permite compartir de manera equitativa los recursos computacionales. El sistema desarrollado presenta una tolerancia a fallos multinivel que garantiza que toda petición de cálculo recibida en el servicio será atendida satisfactoriamente. Otra característica importante que ha sido tenida en cuenta es la seguridad,

ofreciéndose mecanismos de autorización y autenticación de usuarios, así como de privacidad e integridad de datos, aspectos todos ellos imprescindibles en un sistema accesible a través de la red. Adicionalmente también ha sido desarrollado un cliente gráfico avanzado que interactúa con el Servicio Grid, asistiendo al usuario en la etapa de entrada de datos, en la definición de los parámetros de cálculo y en la interpretación de los resultados de salida.

**Keywords:** Distributed Systems

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Monday (08:20 - 08:40)

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## 8. Um Suporte para Adaptação Dinâmica de Arquiteturas Ubíquas

André Santos, Diego Leal, Orlando Loques

Instituto de Computação Universidade Federal Fluminense (UFF) , Rua Passos da Pátria, 156, Bloco E, 3º andar São Domingos Niterói RJ Brasil

**Abstract:** Ubiquitous computing environments are highly dynamic due to changes in the set of available resources and also because of changes of users demands in different operational contexts. Thus, applications for these environments require dynamic-adaptation support mechanisms in order to meet requirements that vary along their operational time. In this paper we present dynamic-adaptation support mechanisms based on technologies that are widely available and adopted by real world product developers. Some experiments demonstrate that the proposed mechanisms meet performance and flexibility requirements that are essential for the implementation of real pervasive systems.

**Keywords:** Distributed Systems

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Monday (08:40 - 09:00)

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## 9. Projeto e Análise de Desempenho de um Protocolo de Difusão Atômica Personalizado

Fabiola Goncalves Pereira Greve<sup>1</sup>, Jean-Pierre Le Narzul, Xiaojun Ma

Departamento de Ciência da Computação, Universidade Federal da Bahia (UFBA) Campus de Ondina , 40170-110, Salvador, Bahia Brasil

GET/ENST Bretagne and IRISA Campus de Rennes., 35512 Cesson-Sévigné France

IRISA Campus de Beaulieu , 35042 Rennes Cedex France

**Abstract:** This work provides an efficient and realistic atomic broadcast protocol which supports the loss of network messages sent by clients. It is designed as a specialization of a general agreement framework. As far as we know, there is no other consensus-based protocol proposed in the literature that deals directly with losses without using the reliable broadcast primitive as a resource to deliver messages in a reliable manner. We give details regarding its implementation and correctness proof. Moreover, we analyze its performance through the run of a number of experimental tests.

**Resumen:** A comunicação entre as cópias de um serviço replicado precisa ser orquestrada por uma primitiva de difusão atômica a fim de garantir o estado consistente das mesmas. A implementação de uma tal primitiva é desta maneira um fator crítico para o bom desempenho desse tipo de serviço. Com o intuito de conceber uma solução tão eficiente quanto modular, propomos neste artigo um protocolo de difusão atômica, obtido a partir de uma especialização de um serviço genérico de acordo, que apresenta as seguintes características inovadoras: ele possui mecanismos para lidar diretamente com a perda de mensagens da aplicação e implementa a entrega atômica das mesmas sem recorrer ao uso de uma primitiva de difusão confiável. Uma prova da correção do protocolo é fornecida e alguns detalhes relativos à sua implementação são apresentados. O seu desempenho foi ainda avaliado a partir da realização de testes experimentais, segundo a variação de alguns parâmetros significativos.

**Keywords:** Distributed Systems

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Monday (09:00 - 09:20)

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## 10. Optimización del cálculo del tiempo ocioso en planificadores DVS con tiempos de ejecución variables

José Manuel Urriza, Javier Darío Orozco, Ricardo Cayssials, Julius C. B. Leite

Universidad Nacional del Sur/Conicet Argentina

Universidade Federal Fluminense Brasil

**Abstract:** The consumption reduction of energy in mobile device is today a critical objective of design. This requirement not is limited an adequate realization of hardware, if not that, must be accompanied for a correct administration of available recourse for the software. The tasks scheduling in real time utilizing Dynamic Voltage Scheduling (DVS), permit minimize consume of energy, preserving the temporal restrictions and system functionality. This paper presents a task model for hard real time that permit the analysis and the implementations of methods types Servers or Slack Stealing with the purpose of permit the utilization the idle times of system by means of Dynamics Voltage Scheduling techniques. The model proposed include a tool that permit preserve the precision in the calculus of idle time even with variable execution times, with the finality the perform optimization of the DVS algorithms.

**Keywords:** Operating Systems

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Monday (09:20 - 09:40)

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## 11. Avaliação do Impacto do Uso de Conversores em Redes Ópticas

Anderson Costa, Denio Mariz, Ramide Dantas, Carlos Kamienski, Judith Kelner

Networking and Telecommunications Research Group (GPRT) Federal University of Pernambuco (UFPE) Brasil

Networking and Telecommunications Research Group (GPRT) Federal Center of Technological Education of Paraíba (CEFET-PB) Brasil

**Abstract:** In optical networks, wavelength converters can change the wavelength of any path passing through it allowing better utilization of available wavelengths. Since converters are a scarce resource, they must be placed strategically over the network. This work considers different topologies and heuristics for converter placement in order to evaluate the impact of using converters and different number of wavelengths in critical links in terms of blocking probability and network utilization. We observe that adding converters

does not imply in a linear gain in blocking probability and that distinguishing the number of wavelengths in critical links improves the network performance.

**Keywords:** Networks

**Contact e-mail:** anderson@gprt.ufpe.br

**Schedule:** Hotel Crowne Plaza, Salón Prieto, Monday (16:00 - 16:20)

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## 12. Técnicas de Diagramación de Tiempo-Real en Redes de Sensores

**Ricardo Cayssials, Diana Sanchez, Javier Orozco, José M. Urriza**

**Universidad Nacional del Sur, Departamento de Ingeniería Eléctrica y Computadoras Bahía Blanca, Argentina (8000)**

**Resumen:** Las redes de sensores son utilizadas en diversas aplicaciones con características muy disímiles. Cada implementación de redes de sensores debe considerar diferentes características propias como: área de cobertura, consumo de energía, calidad de las comunicaciones y robustez entre otras. Cualquier implementación involucra una decisión de compromiso entre ellas, priorizando la característica más relevante de la aplicación particular que se esté tratando.

En este trabajo se analizan las restricciones temporales de las redes de sensores y se proponen dos mecanismos de diagramación de tiempo real para redes de sensores móviles. Estos mecanismos proponen un uso eficiente de la energía de cada uno de los nodos al mismo tiempo que permite una encuesta frecuente de cada uno de ellos.

Se analizan las cuestiones que caracterizan las redes de sensores como un sistema con restricciones de tiempo y se refiere a trabajos de investigación recientes que tratan la problemática. Del análisis se modela una aplicación de red de sensores atendiendo sus características particulares y asumiendo el consumo de energía como la restricción más prioritaria. Finalmente, se proponen dos mecanismos de diagramación en tiempo real, EDF y Rueda Cíclica, y se concluye, respecto del análisis realizado, que una combinación de ambas arrojará los mejores resultados.

**Keywords:** Networks

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**Schedule:** Hotel Crowne Plaza, Salón Prieto, Monday (16:20 - 16:40)

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## 13. Managing Energy and Quality of Service in Heterogeneous Server Clusters

Julius Leite, Raphael Guerra, Luciano Bertini

Instituto de Computação Universidade Federal Fluminense Niterói, RJ, Brazil

**Abstract:** The development of energy-efficient server clusters requires the study of different request dispatch policies applied by the central access point of the cluster, and the application of hardware techniques that provide for the best usage of server resources. However, energy efficiency should not be attained at the expense of a poor quality of service. This paper describes a technique that tries to balance energy consumption and adequate application response times in heterogeneous server clusters. This proposal was evaluated through simulation and showed results that outperform state-of-the-art techniques.

**Keywords:** Networks

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**Schedule:** Hotel Crowne Plaza, Salón Prieto, Monday (16:40 - 17:00)

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## 14. Projeto Redes de Relacionamento

Cesar Stradiotto, Everton Pacheco, Andre Bortolon, Hugo Hoeschl

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**Abstract:** The Relationship Networks Project (RR - Redes de Relacionamento) is a project that intends to create a framework, which allows - through a fast data modeling - implementing interface elements that describe in a clearly visual way, in two-dimensional presentation, a relationship network among heterogeneous items. This environment also allows the machine to do operations over these relations, such as to find paths or sets, to help the implementation of AI algorithms, or data extraction by the final user. Through graph theory, with visual items, it is possible to find elements with specific characteristics and relationships between them, by the application of filters, refining searches inside an extreme large datasets, or showing differentiated connection maps. Two prototypes were created with this framework: A system which allows seeing telephonic calls sets and financial transactions, and a system for ontology viewing for a digital dictionary inside a semantic network. Another software, in prototypical phase, also for semantic network vision, is being constructed. This document will present the basic RR structure, showing and justifying the creation of the two referred software.

**Keywords:** Networks

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## 15. Estudo de Estimac3o de Banda Efetiva para Trafego Auto-Similar como Viariancia Infinita

**Firmiano Perlingeiro, Lee Luan Ling**

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**Abstract:** With up-coming Quality of Service requirements raised by a wide range of communications demands, the effective bandwidth estimation is one of the approaches to satisfy these QoS requirements. This work compares the effective bandwidth estimation based on Gaussian and non-Gaussian approximations, for aggregated traffic, taking the finite and infinite variance cases into account and evaluating its impacts on bandwidth estimation. We briefly describe the Norros approach based on fractional Brownian motion. Also, we present the generalization method proposed by N. Laskin based on fractional L3vy motion. Experimentally we compare the estimated effective bandwidth using real aggregated traffic traces providing benchmarks for both cases. We observed that Laskin model overestimates the effective bandwidth in some region, then we optimized the results in order to reduce this problem. For this end, analytical, heuristical and simulation methods were used jointly to validate this work. This study confirms that we have carefully differentiated the self-similar processes with finite variance from infinite variance cases, in order to estimate its effective bandwidth for aggregated traffic.

**Keywords:** Networks

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## 16. Uma análise sobre ataques de força bruta contra o protocolo SSH

Clébio Dossa, Christian Perone, Marcos Antonio Sandini Trentin

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**Abstract:** This paper describes an analysis and methodology for the capture of brute force attack data to protocol SSH in an environment of software and hardware previously prepared. The initial research, is part of a greater project of gSeg, a group of network security research from University of Passo Fundo, that has as objective to identify goals of the attacks and also to describe the personality of the responsible aggressors for the digital invasions. In this paper, are presented the main threats to the protocol in set with current forms of prevention, with the intention to assure that protocol SSH continues to be used, however, more safer.

**Keywords:** Networks

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## 17. Increasing Communications Security through Protocol Parameter Diversity

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**Abstract:** Pulsing attacks use carefully synchronized high-rate low-duration bursts of traffic that are injected into a network to induce denial-of-service. These attacks are effective because the bursts force protocols into low-performance states. The synchronization relies on the fact that most computers run protocols with identical parameter values. The use of diverse parameter value could make the attacks much less likely to succeed. This paper describes how parameters in TCP protocol implementations can be automatically diversified, introduces several evaluation metrics, and assesses the efficacy of this defense using Kuzmanovic's shrew pulsing attack. The experiments show that in a diversified environment under attack, some hosts can obtain near normal throughput, while average network throughput is improved for most (but not all) attack scenarios. Heterogeneity of parameter values among hosts is key to the defense.

**Keywords:** Networks, Security of Information and Criptography, Operating Systems

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## 18. Análise da utilização de cluster SSI para o serviço de recepção de mensagens

Marcelo Trindade Rebonatto, Cristofer Veloso, Carlos Schaeffer, Alexandre Zanatta

Universidade de Passo Fundo, ICEG, Curso de Ciência da Computação/Seção de Redes Passo Fundo, Brasil, 99001 970

**Abstract:** This paper presents an study of viability to use SSI clusters apply in receive messages. There were studies, resources comparasions and tests in two implementations of SSI clusters based in free software and operational system linux. These implementations are OpenMosix and OpenSSI. The tests of performance were realized in parts witch uses more CPU of mail service: the filter of virus and spam messages to mark or delete them.

**Keywords:** Networks, Collaborative Systems, Distributed Systems

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## 19. SERPI - System for Registration of Intellectual Property Production for Nuclei of Technological Innovation

Glaucia Oenning, Evandro Nascimento, Hugo Cesar Hoeschl

IJURIS Brasil

**Abstract:** This paper presents an study of viability to use SSI clusters apply in receive messages. There were studies, resources comparasions and tests in two implementations of SSI clusters based in free software and operational system linux. These implementations are OpenMosix and OpenSSI. The tests of performance

were realized in parts with uses more CPU of mail service: the filter of virus and spam messages to mark or delete them.

**Keywords:** Networks, Collaborative Systems, Information Society

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## 20. LogMiddle: Uma Solução Eficiente para o Compartilhamento de Dados em Redes Móveis Ad Hoc

Fabricio Diogenes, Nabor Mendonça

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**Abstract:** Recent advances in personal device technologies, together with the wide adoption of peer-to-peer (ad hoc) wireless networking technologies, have increased the demand for a new class of distributed mobile applications where opportunistic sharing of application data is a key requirement. However, many of the issues dealt with by classical wired distributed systems are not applicable in such environments. Developers have to deal with a new set of problems caused by mobility, such as low bandwidth and loss of connectivity. During disconnections, users typically update local replicas of shared data, possibly generated by peers. Possible inconsistencies need to be reconciled upon re-connection. To support building mobile applications that share data over ad-hoc networks, this paper presents LogMiddle, a middleware for mobile computing. LogMiddle belongs to class of solutions that focuses on replication as the key mechanism for sharing data over MANETs, and uses the concept of a single data log to reduce replica management and storage costs in each device.

**Keywords:** Networks, Distributed Systems

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## 21. Meta-Gerenciamento de Recursos em Sistemas Operacionais para Plataformas Embarcadas

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**Abstract:** Classical strategies for resource management in operating systems are often complex and inappropriate for embedded systems. Implementations for these strategies may use either virtual function tables or long conditional structures to provide transparent access to different resources. This overhead is unacceptable for embedded systems. The EPOS operating system provides flexible and transparent access to resources for applications without incurring in unnecessary overhead. Metaprogrammed structures are used to predict, according to application usage and in compile time, whether a resource must use a polymorphic representation or may be accessed through direct calls. This way, virtual function tables are only used in the system when strictly necessary, and thus saving resources. In this article, we show that this strategy is a viable alternative for resource management in embedded systems.

**Keywords:** Operating Systems

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## 22. Um Núcleo para Simulação Distribuída Otimista

Renata Spolon Lobato, Rodrigo Porfírio da Silva Sacchi, Roberta Spolon Ulson

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**Abstract:** This paper presents the Basic Extensible Time Warp Kernel (ETW), a kernel for optimistic distributed simulation based on the Time Warp protocol, which aims to allow the performance evaluation of discrete systems, especially computational systems, through the solution of models of queue nets. Some kernels features can be modified by the use of plugins. Each simulation process on ETW implements one logical process on Time Warp distributed simulation. Each sequential simulation is event-driven and uses



SMPL to manage the local queues. The LAM-MPI communication library is used for message exchanging among logical processes.

**Keywords:** Performance Evaluation

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## 23. Abordagem Conservativa para Simulação Distribuída de Modelos de Redes de Fila

Renata Spolon-Lobato, Geraldo Francisco Donegá Zafalon, Roberta Spolon Ulson, Marta Oliveira da Silva Balieiro

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**Abstract:** This work presents the CMB-Simulation tool, an extension for the C programming language, which can be used for synchronization of processes in the conservative distributed simulation. CMB-Simulation allows the use of null messages and on demand approach of queue nets simulation. The tool was developed based on thye SMPL structure, which is an extension of C programming language to event oriented sequential simulation, and it uses the MPI on Linux operating system for message exchange among the processes of a distributed simulation. The archetype generation by exploiting graphical user interfaces reduces the modeler´s effort by providing a set of pre-defined models. This paper shows the feasibility of queue models research through a tool for conservative synchronization.

**Keywords:** Performance Evaluation

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## 24. Modelos de Desempeño para las Aplicaciones de un Grid Basado en JAVA

Mariela Curiel

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**Abstract:** Advances in Internet and the availability of powerful computers and high-speed networks have propitiated the rise of Grids. Performance evaluation activities such as tuning of applications are complex in Grids due to factors like the heterogeneity of resources and changes in their availability. Performance models provide a way of performing repeatable and controllable experiments for evaluating user applications under different scenarios. This article describes the development of performance models for applications running in a Java based computational Grid. Our case study is SUMA, a distributed execution platform implemented on top of Grid services. The use of Software Performance Engineering techniques it was necessary for understanding and modeling the system. We applied a software performance methodology where Layered Queuing Network (LQN) models are derived from Use Case Maps (UCM). At the end we obtained some results derived of the application of the methodology.

**Resumen:** Los avances en la Internet y la disponibilidad de computadoras poderosas y de redes de alta velocidad han cambiado la manera en la que se realiza la computación distribuida y paralela a gran escala, dando paso a lo que hoy en día se conoce con el nombre de Grids. Un Grid es una infraestructura que agrupa recursos dispersos geográficamente para resolver problemas a gran escala que requieren de un procesamiento y/o de un manejo de datos intensivo. Uno de los aspectos más representativo de los Grid es su dinamismo: ciertas características de los recursos (ejem. carga y disponibilidad) pueden cambiar en el tiempo. Este dinamismo afecta actividades relacionadas con la evaluación del desempeño de las aplicaciones, debido, entre otros factores, a la dificultad de repetir experimentos bajo las mismas condiciones. El uso de modelos de rendimiento se presenta como una solución a este problema dado que ofrecen un ambiente idóneo para realizar experimentos de forma controlada. En este artículo se presentan modelos para las aplicaciones secuenciales y paralelas que se ejecutan en el Grid computacional SUMA. Los modelos se realizaron aplicando una metodología de Ingeniería del Rendimiento del Software. Se explica el proceso de construcción de los modelos, así como las debilidades y fortalezas de las herramientas asociadas a la metodología.

**Keywords:** Performance Evaluation, Software Engineering, Distributed Systems

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## 25. Una Estrategia de QoS para Tráfico HTTP basada en Políticas Token Bucket

Salvador Alcaraz, Carlos Juiz, Katja Gilly, Ramon Puigjaner

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Universitat de les Illes Balears, Dpto. De Ciències Matemàtiques i Informàtica, Palma de Mallorca, España, 07071

**Resumen:** Tradicionalmente, las estrategias DiffServ han sido utilizadas en el manejo de los diferentes tipos de tráfico en Internet, como son HTTP, FTP y CBR. El entorno DiffServ para tráfico HTTP, generalmente se utiliza para proporcionar un tratamiento preferencial a los flujos considerados cortos, por ser los más sensibles retardos y efectos de congestión, y que se traducen en una mala calidad del servicio HTTP, provocando una penalización de los flujos largos que son relegados a obtener una calidad de servicio basada en el mejor esfuerzo. Esta diferenciación puede producir un rendimiento global bajo, producido por una elevada penalización de los flujos largos. En este artículo, proponemos una política de gestión de tráfico, basada en DiffServ, que utiliza los conceptos de Token Bucket y que realiza un tratamiento preferencial de flujos largos, pero incluyen un mejor aprovechamiento del ancho de banda y una menor penalización de los flujos largos

**Keywords:** Performance Evaluation, Networks

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## 26. La Heterogeneidad de los Índices de Prestaciones de la Prebúsqueda Web

Josep Domènech, José A. Gil, Julio Sahuquillo, Johann Márquez, Ana Pont

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**Resumen:** Las técnicas de prebúsqueda en la Web se perfilan importantes para reducir la latencia percibida por el usuario. Sin embargo, no es posible realizar en general una comparación equitativa entre las técnicas propuestas debido principalmente a tres razones: el sistema subyacente difiere entre los estudios; se utilizan distintas cargas, y se cuantifican distintos índices de prestaciones.

Este trabajo persigue clasificar los índices utilizados, en la literatura abierta, cuando se estudian las prestaciones de las técnicas de prebúsqueda. Para ello, se propone una taxonomía basada en tres categorías que identifica analogías y diferencias entre los índices. Para realizar una correcta evaluación de prestaciones es de crucial importancia elegir adecuadamente los índices. La taxonomía sugiere qué índices

deben utilizarse para evaluar correctamente las prestaciones y de qué forma se ha alcanzado la mejora del rendimiento. Experimentalmente se muestra que dependiendo del índice utilizado, los resultados de prestaciones obtenidos, pueden no sólo diferir ostensiblemente entre ellos, sino llegar a conclusiones opuestas.

**Keywords:** Performance Evaluation, Networks, Distributed Systems

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## 27. Método de Avaliação de Qualidade de Serviço em Sistemas Multimídia Utilizando uma Rede Neural de Quantização Vetorial por Aprendizagem

Sergio Donizetti Zorzo, Fabiana Cristina Bertoni

Universidade Federal de São Carlos Departamento de Computação São Carlos-SP, Brasil, Caixa Postal 676 - 13565-905

**Abstract:** A new method is introduced to express the Quality of Service (QoS) of a multimedia connection. This method uses discrete values of QoS parameters, establishing a relationship among them through the use of a Learning Vector Quantization Neural Network (LVQ) to obtain a single value that expresses the QoS of the connection. This final value is classified within a predefined QoS specification standard consisting of three sets: Optimal, Acceptable and Unacceptable, resulting in a definition of the Quality of Service in a user-level language. The values obtained by the proposed method are compared with those obtained through other QoS quantification

**Keywords:** Performance Evaluation, Networks, Distributed Systems

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## 28. Simulador para o aprendizado de sistemas operacionais

Gustavo Tonini, Sediane Carmem Lunardi

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Universidade Comunitária Regional de Chapecó, Centro Tecnológico , Chapecó, 89809-000 Brasil

**Abstract:** This work presents the development of a simulator application for the learning of the discipline of operating systems, which seeks to supply an alternative to the teachers of the discipline of operating systems so that they use practical classes in the teaching of the content. This way, the student can observe the computational operation of some components of the modern operating systems in a clean and accessible way. The prototype was developed using the Java language and the construtivismo was indicated as more adjusted pedagogical strategy.

**Resumen:** Este trabalho apresenta o desenvolvimento de uma aplicação simuladora para o aprendizado da disciplina de sistemas operacionais, o qual visa fornecer uma alternativa aos professores da disciplina de sistemas operacionais para que utilizem aulas práticas no ensino do conteúdo. Desta forma, o aluno poderá observar o funcionamento computacional de alguns componentes dos sistemas operacionais modernos de uma forma clara e acessível. O protótipo foi desenvolvido utilizando a linguagem Java e o construtivismo foi indicado como fundamento das estratégias pedagógicas mais adequadas.

**Keywords:** Computer Architecture, Performance Evaluation, Operating Systems

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## 29. Sistema Multiagente para el problema de Integración de Sistemas: El Caso de Servicios Educativos de Nivel Universitario

Jorge Guerra

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**Abstract:** The services to the student in the today universities, as much in Peru as abroad, have experienced a progressive evolution, characterized by a change of model of services, initially based on a centralized scheme and organized in departments or isolated divisions, those that were constructed to develop activities

you specify; and which now they present/display a set to us of services that will be taken care of by multi-disciplinary equipment, pertaining to several areas that work in parallel form. Another important change is the increasing importance in the quality of the service to the student, which has transformed the perception that is had of the present information systems. Different forms exist to implement computer science applications of the type systems integration, reason why the present work shows the different solutions from this problem, which knows as far as methodology and techniques known in this field, defining itself in the end a comparative picture of the offered solutions to determine the technology of adapted information but of solution for the new paradigm of services that the Universities anywhere in the world are adopting and that defined in a key word: Quality.

**Keywords:** Distributed Systems

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## 30. Off-Shore Software Development in the Classroom

Kay Berkling, Armin Zundel

**Polytechnic University of Puerto Rico, Caribbean Artificial Intelligence Group CAIG Department of Electrical and Computer Engineering and Computer Science, San Juan, Puerto Rico, 00918**

**Abstract:** Off-shore development is common in larger industries with significant software development needs. After becoming common place in the US, Europe is following suit. Few companies however are equipped to handle this process. Software Processes within a company are often not standardized, nor do they include the virtual step to a variety of off-shore locations. Few employees have experience in this environment and new employees have not been trained properly for the virtual interaction with colleagues across distance, culture and language. The Master in Computer Science in Puerto Rico offers a Focus Area in IT-Management that contains components in Software Engineering where students are prepared for and practice off-shore development by using a collaborative software development environment. This paper describes our approach to teaching off-shore component within the Software Engineering courses.

**Keywords:** Software Engineering, Human Computer Interaction, Collaborative Systems

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## 31. Agent-based architecture for auto-evaluation in e-learning context

Francisca Losavio, Nicole Levy, Parinaz Davari

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**Abstract:** A multi-agent architecture for evaluation in e-learning situations is proposed. The idea is to enable auto-evaluation for e-learning students to detect their weaknesses in some goals within a course program. The flexibility to changes of the architecture is a major concern; the goals to be mastered are unknown a priori and are dynamically defined based on the results of the evaluations. The educational materials are searched on demand and can be located anywhere on the Web. The fitness of the architecture is analyzed and justified considering quality requirements specified using an adapted standard quality model from ISO/IEC 9126-1 for the educational domain in an e-learning context.

**Keywords:** Software Engineering, Methodology and Software Architecture

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## 32. Una Metodología de desarrollo de Sistemas Tutores Inteligentes

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Facultad de Ingeniería de Sistemas e Informática Universidad Nacional Mayor de San Marcos, Av. Germán Amézaga s/n, Lima Perú

**Resumen:** Un Sistema Tutor Inteligente (STI) utiliza sistemas inteligentes para asistir en forma personalizada al estudiante en el proceso de aprendizaje, siendo un software de naturaleza compleja y con objetivos educativos. El presente trabajo propone una metodología de desarrollo de STI basado en un modelo de enseñanza-aprendizaje soportado por un modelo de diseño instruccional, y la metodología RUP adaptada al modelo de enseñanza aprendizaje propuesto.

**Keywords:** Methodology and Software Architecture

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### 33. Sistemas Colaborativos aplicados a la Educación

Ana Alonso de Armiño

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**Abstract:** PEDCO collaborative system has been implemented to assist teaching courses. The Computer Science Department, National Comahue University, are working with such platform to provide collaboration, communication and content support in the deployment of the courses belong to informatics studies. Its use will be extended to other Faculties because the good result we obtained. With the intension of insidring positively on the reality we are leaving, to face social problems and to take care of real necessities which are generated by technological advances , have been deployment collaboration and reflection area. In this ambit has been designed and deployment education experience assisted by the informatics resource. Our intention is to use PEDCO, the implemented platform, as an experimentation resource for teachers. The objective teacher qualification is to offer a knowledge that allow to the teacher develop distance courses. In this work we try to base the project bases, and the TICs incorporation, collaborative system, to the learning process.

**Resumen:** El sistema colaborativo PEDCO, ha sido implementado para dar soporte en el dictado de materias. En el Departamento de Ciencias de la Computación de la Facultad de Economía y Administración de la Universidad Nacional del Comahue, se está trabajando con dicha plataforma para dar soporte de contenido, comunicación y colaboración, en el dictado de materias correspondientes a las carreras de informática de la Facultad. Debido a los resultados obtenidos su uso se está extendiendo a otras sedes de la Universidad. Con intención de incidir positivamente sobre la realidad en que vivimos, enfrentar los problemas sociales y atender las necesidades actuales que los avances tecnológicos han generado con su evolución, se ha desarrollado un espacio de colaboración y reflexión, en el que se han diseñado y desarrollado experiencias educativas apoyadas por el recurso informático. Se pretende utilizar la plataforma implementada, PEDCO, como medio de práctica y experimentación de los docentes que están siendo capacitados y preparados para, finalmente, desarrollar el dictado de las materias bajo la modalidad a distancia. En este trabajo se presentan los lineamientos que fundamentan el proyecto y su accionar sobre la incorporación de las TICs , en este caso puntual de los sistemas colaborativos, al proceso de enseñanza aprendizaje.

**Keywords:** Collaborative Systems

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## 34. Comprendiendo las interacciones docentes en un entorno virtual de aprendizaje: Un caso en el contexto de la educación Chilena

Juan Silva

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**Abstract:** The study of the interactions in the online environment for training is a research area that one has come developing along these last years with the purpose of knowing the type of interactions that take place in the discussion forums. These researches have been centred in University studies of pre and post grade. This paper presents the study of the interactions in a virtual learning environment developed for Chilean teachers training. The subject course was geometry, for second primary level (5th to 8th) grade. Methodologies quantitative and qualitative are used for the analysis of the interactions. The elements analyzed were: platform, the role of tutor, and mainly the interventions of the tutor and the participants. The messages and thematic units are utilized as units of analysis and percentage agreement with experts are utilized for the reliability.

**Keywords:** Collaborative Systems

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## 35. Factores de 3xito en estudiantes. Una propuesta que hace uso de redes neuronales

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Departamento de Ingenier3a Inform3tica, Universidad de Concepci3n , Concepci3n Chile

**Resumen:** En este trabajo, se presenta una experiencia desarrollada con la finalidad de buscar un mecanismo de predicci3n, enfocado a determinar el desempe3o futuro de un estudiante, identificando los factores que influyen de manera importante en el 3xito o fracaso alcanzados. Para el dise3o e implementaci3n de la soluci3n analizada se utiliz3 un software comercial, el cual ofreci3 un completo ambiente para la simulaci3n de redes neuronales y un adecuado soporte para el an3lisis. La serie de prototipos implementados permitieron concluir, a partir de sus resultados, qu3 red entregaba el mejor rendimiento en la clasificaci3n del dominio de entrada, lo cual a su vez permiti3 identificar en la fase de an3lisis, los factores m3s significativos o influyentes. Esto entreg3 informaci3n valiosa, lo que permite establecer a priori una estimaci3n del rendimiento acad3mico de un estudiante teniendo datos de su entorno familiar e individual.

**Keywords:** Artificial Intelligence

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## 36. Hybrid Intelligent e-Learning System

Luis Alberto Alfaro Casas, Rafael Maldonado, Jose Herrera

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**Abstract:** Distance education is characterized by develop independent learning of the student, in that facilitators and professors participate, but the learning is not very successful, due to the isolation. On the other hand, collaborative learning has a significant impact in the knowledge of the students, because it is learned of others and with others of responsible, cooperative, united, equitable way and with a great sensation of meeting and importance of the group; nevertheless, its design is complex and expensive for cognitive and time exigencies of as much for the beginner (each member of a collaborative group learns, instead of simply to divide the tasks and of assigning them to each student) like for the professor (the individual attention to each one of the students). The present work proposes a solution using artificial intelligence and intelligent agents, implementing a Multiagent system architecture, that integrate in an existing platform e-Learning, providing the necessary support to the students and the professors.

**Keywords:** Artificial Intelligence, Human Computer Interaction

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## 37. Model for the customization of an e-Learning system, using Case Based Reasoning and learning Styles

Luis Alberto Alfaro Casas, Jose Herrera, Rafael Maldonado

Universidad Nacional de San Agust3n , Arequipa Peru

**Abstract:** The e-Learning systems are static, homogeneously and hostile in spite of the heterogeneous amount of users, to personalize a system e-Learning is not part even of the development strategies, not

to exist a model or defined methodology. In addition the systems e-learning only administer information and to contents activities generated by teachers and students, not seeing the form in that the user faces and assimilates the new information, like relevant, creating dissatisfaction in the user. This investigation proposes a model for the customization of an e-Learning system to the student, using Case Based Reasoning (CBR) and learning Styles. The goal is optimize the learning process in virtual environments; causing that the educative materials and services are flexible and they adapt to the cognitive characteristics, styles and rate personnel of work of the users. The application of this model in an e-Learning system will improve the experience of the user; it will allow the customization of the curricular content into the personal learning style of the student, it will optimize the formation of collaborative groups, they will improve the performance of personal assistants, optimizing globally the learning process of the students, contributing to the optimization of the process of virtual atmosphere learning, approaching the system the user a future generalization of this model also will allow to personalize another type of systems Web like e-Commerce, Management systems of Contents, Vestibules, and other applicative; where the customization of the system to the user are medullar.

**Keywords:** Artificial Intelligence, Human Computer Interaction

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## 38. Utilizando Redes Bayesianas na Construção de um Modelo de Aluno para Ambientes de Ensino a Distância

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Universidade Federal de Pelotas, Instituto de Física e Matemática, Departamento de Informática Campus Universitário s/ nº, Pelotas RS, Brasil

Universidade Federal de Santa Catarina, Centro Tecnológico, Departamento de Informática e Estatística, Campus Universitário, Florianópolis SC, Brasil

**Resumen:** Este trabalho tem como objetivo a utilização de técnicas de Inteligência Artificial para inferir informações que possibilitem o enriquecimento das experiências de aprendizagem e melhorem a interação do aluno em ambientes de aprendizagem para Ensino a Distância. Para tal, é proposta a construção de um modelo de aluno a partir das informações obtidas na base de dados desses ambientes. O modelo do aluno proposto é construído por meio da utilização de Redes Bayesianas, responsáveis pela inferência de informações sobre o aluno. Para utilizar as informações representadas no modelo, foi desenvolvido o Agente do Modelo do Aluno. A interação entre esse agente e o usuário do ambiente é realizada por um personagem animado, capaz de estimular a imaginação e aumentar a motivação dos estudantes.

**Keywords:** Artificial Intelligence, Human Computer Interaction, User Interfaces

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## 39. Análise do Projeto Pedagógico de um Curso de Ciência da Computação através do Mapeamento Competência

Luiziana Rezende, Lidia Micaela Segre, Gilda Helena B. Campos

Universidade Federal do Rio de Janeiro, COPPE e Universidade Gama Filho Rio de Janeiro, Brasil

Universidade Federal do Rio de Janeiro, COPPE e Unigranrio Rio de Janeiro, Brasil

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**Abstract:** This article presents the implantation mapping competency stage proposed by the Iterative Method for Identification and Mapping of competences, created specifically for a research about development analysis and mobilization of competencies within Computer Science courses at Rio de Janeiro. The analyzed Course contains a curricular structure pedagogic plan becoming from the competencies model. The results presented are related to the percentage of types of competences and the weight of the competences at the course curricular structure, also a list of disciplines and curricular components that mobilizes / develops specifics competences. The may help providing indicators for future profile analysis from the Computer Science egresses (students), and utilized for Curriculum review and creation at the Computer Science Area.

**Keywords:**

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## 40. Base for Metacomputing Systems that Can Execute Parallel Java Bytecode Efficiently

Eric Gamess

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**Abstract:** There is a growing interest in using Java as a language for high performance computing, since it is platform independent, object oriented and safe. Nevertheless, Java has a poor performance when it is interpreted. For this reason, the modern JVMs (Java Virtual Machines) include a JIT (Just In time) compiler that translates the bytecode of Java classes into native code at execution time. It increases the startup time of an application, but can reduce the overall execution time significantly.

The technology of the JVM has improved considerably with the release of JIT compilers. However, the performance of a Java application is still inferior to the performance shown by similar applications written in more traditional languages (C, C++, Fortran). An alternative to obtain better performance consists in compiling the bytecode into native code in such a way a JVM is not necessary.

In this paper, we compare two alternatives to execute parallel Java applications based on MPI (Message Passing Interface), a famous message passing library. In the first alternative, we used a JVM with a JIT compiler. In the second, we generated native code using an open source bytecode compiler (gcj). Since there is no standard MPI package for Java, we used mpiJava that seems to be the more accepted object-oriented Java interface to MPI mpiJava is based on JNI (Java Native Interface) and can be used with a JVM. However, mpiJava can not be used with gcj (our bytecode compiler) since it is based on CNI (Cygnus Native Interface). So, we also developed mpiCNI, which has the same interface than mpiJava, and can be compiled into native code using gcj. Since mpiJava and mpiCNI have the same interface, they allow programmers to develop parallel applications based on MPI regardless of the packages used.

To compare the performance of the two alternatives, we wrote a parallel Java application that uses mpiJava (mpiCNI) and solves a system of linear equations with an LU factorization. Our experiments shown that mpiCNI can improve significantly the performance of a parallel Java application and can be used as the base of metacomputing systems that can execute parallel Java bytecode efficiently.

**Keywords:** Parallel Computing, Performance Evaluation

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## 41. Model Checking Techniques applied to the design of Web Services

Gregorio Diaz, M. Emilia Cambronero, Juan J. Pardo, Valentín Valero, Fernando Cuartero

Department of Computer Science, Univ. Of Castilla La Mancha, EPSA, Albacete, Spain

**Resumen:** Presentamos la generación conjunta de los documentos WS-CDL y WS-BPEL en el diseño de Servicios Web. El objetivo es generar documentos correctos sobre el esqueleto WS-BPEL utilizando para ello

Autómatas Temporizados como un modelo intermedio, a fin de garantizar la corrección usando técnicas de model checking. La herramienta que utilizamos es UPPAAL.

**Keywords:** Networks, Collaborative Systems, Distributed Systems

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## 42. Maximizando el Paralelismo: Ejecución de Tareas en Lote sobre PVM

Francisco Torres-Rojas, Jorge Chaves, Alvaro Rivera

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Artinsoft Costa Rica

Instituto Tecnológico de Costa Rica y Universidad de Costa Rica Costa Rica

**Abstract:** Parallel Virtual Machine (PVM) permite que una colección heterogénea de computadoras conectadas en red pueda ser vista como un solo recurso computacional o una gran máquina virtual. Este artículo muestra un mecanismo implementado sobre PVM para la ejecución de tareas en lote, capaz de establecer el momento en que cada una de las tareas invocadas termina su ejecución, permitiendo así un uso más eficiente de los recursos. Se detallan las funciones y mensajes nuevos introducidos en PVM que se mimetizan con la funcionalidad existente y permiten la coexistencia de demonios modificados con otros demonios PVM. Este artículo describe también con detalle los pasos a seguir para incluir nuevas funciones en el demonio PVM.

**Keywords:** Parallel Computing, Distributed Systems, Operating Systems

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## 43. Modelado y Análisis Inicial del Establecimiento de una Conexión Bluetooth Usando las Redes de Petri Coloreadas

Maria Elena Villapol

Universidad Central de Venezuela, Facultad de Ciencias, Escuela de Computación, Laboratorio de Redes Móviles, Inalámbricas y Distribuidas (ICARO) , av. Los Ilustres, Los Chaguaramos, Caracas Venezuela

**Abstract:** Bluetooth provides communication between devices via radio frequency in an area of around 10 meters. The Bluetooth specification includes a set of, adopted and fundamental, protocols hierarchically structured. Baseband is a fundamental protocol. Connection establishment is one of the functions of the baseband protocol. The protocol specification is not clear and ambiguous and hardly uses protocol specification tools such as state tables. In this paper, Coloured Petri Nets (CPNs), which are formal techniques, are used to model the baseband connection establishment procedure carried out in a master and a slave Bluetooth device. Then the model is validated and debugged using the state space. The initial analysis shows that the model is behaved as expected and according to the model and analysis assumptions. The main contribution of this work is a clear and precise specification of the baseband connection establishment procedure using CPNs.

**Resumen:** Bluetooth es una tecnología de comunicación que proporciona comunicación entre dispositivos vía radio frecuencias en un área de alrededor de los 10 metros. La especificación de Bluetooth incluye un conjunto de protocolos, adoptados y propios, organizados de forma jerárquica. Uno de los protocolos propios de esta tecnología es el de bandabase. El establecimiento de una conexión es parte de la funciones de dicho protocolo. La especificación de este procedimiento es poco clara y ambigua y hace poco uso de herramientas para la descripción de protocolos tales como las tablas de estado. En este trabajo, las Redes de Petri Coloreadas (Coloured Petri Nets, CPNs), las cuales son una técnica formal, se utilizan para modelar el establecimiento de una conexión en un dispositivo Bluetooth maestro y en uno esclavo. Dicho modelo es entonces validado y depurado usando la técnica del espacio de estado. El análisis inicial muestra que el modelo se comporta acorde a lo esperado dadas las asunciones del modelo y las hechas para fines del análisis. La mayor contribución de este trabajo es el haber logrado una especificación clara y precisa del procedimiento a través del uso de la CPNs.

**Keywords:** Data Communication, Formal Specification, Networks

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## 44. Wireless control of Bluetooth on/off switches in a smart home using J2ME in Mobile Phones and PDAs

Luis Aceves, Og Jamir Ramos, Carlos Alberto Garza

Universidad de Monterrey, Ciencias Computacionales , Av. Morones Prieto 4500 Pte, 66220 San Pedro Garza García, Nuevo León México

**Abstract:** This work focuses on the idea of manipulating a manufactured on/off switch with a Bluetooth receiver, using a JAVA compatible mobile device or PDA through the L2CAP protocol. The main goal is to remove wires from a smart home infrastructure.

**Keywords:** Data Communication, Human Computer Interaction, Programming Languages, Networks, Information Society

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## 45. Avaliação dos mecanismos de Privacidade e Personalização na Web

Sergio Zorzo, Luanna L. Lobato

Universidade Federal de São Carlos, Departamento de Computação São Carlos-SP, Brazil, 13565-905

**Abstract:** In the services of the Web should be considered two conflicting goals: the user's right to keep guaranteed her privacy and the benefits of providing personalized services. This paper proposes the construction of a system, capable to analyze the privacy and personalization tools, sites and use sceneries, in way to quantify the offered privacy and personalization. We also presents a taxonomy for classifying privacy and personalization in layers. This analysis of the privacy and personalization, by the proposed system, aims offering the user quantitative values that helps in her context of use of services.

**Keywords:** Data Communication, Human Computer Interaction, Security of Information and Criptography

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## 46. Implementación de un Motor de Búsquedas Paralelo con BSP

Esteban Gesto, Daniel Laguía, Natalia Trejo, Osiris Sofia, José Canumán

Universidad Nacional de la Patagonia Austral Rio Gallegos, Argentina

Universidad de Magallanes Punta Arenas, Chile

**Resumen:** El crecimiento de la cantidad de información que se pone a disposición en Internet a través de la Web presenta el desafío de satisfacer, en el menor tiempo posible, a los clientes que realizan búsquedas sobre esa información y a la vez mejorar el uso eficiente de los recursos. Los modelos de computación paralela permiten acercarse a este objetivo.

Este trabajo presenta una solución eficiente y de bajo costo basada en el modelo de computación Bulk Synchronous Parallel, para la implementación de un motor de búsquedas paralelo que utiliza bases de datos relacionales, en un entorno de acceso Web.

**Keywords:** Databases, Parallel Computing, Distributed Systems

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## 47. Integration of Operational Planning and Energy Transactions Systems

Rafael Peralta, Favio Perales, Roberto Navarro

Instituto de Investigaciones Eléctricas, Análisis de Redes, Cuernavaca, México, 62900

**Abstract:** This paper describes the conceptual model and architecture of a computing system developed to carry out the data management for the short-term operation planning software and the energy transactions applications of the National Energy Control Center in Mexico (CENACE). This new system, denominated OPDMS (Operational Planning Data Management System), allows to prepare, generate and transfer operational planning data towards real-time and electricity market applications in an efficient, reliable and automatic way.

**Keywords:** Data Communication, Methodology and Software Architecture

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**Schedule:** Hotel Crowne Plaza, Salón Prieto, Tuesday (10:40 - 11:00)

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## 48. Distributed Load Balancing Algorithms for Parallel Volume Rendering on Cluster of PCs

Cristiana Bentes, Alexandre Coelho, Andrei Gomes Lopes, Maria Clicia Stelling de Castro, Ricardo Farias

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**Abstract:** Distributed systems, such as clusters of PCs, are low-cost alternatives for running parallel rendering systems. Parallel rendering applications, however, usually suffer from high load imbalance during execution, and the high communication overhead of a cluster of PCs worsens this problem. In this paper we propose some general distributed load balancing algorithms that can be applied to tile-based parallel rendering system. Our goal is to provide distributed algorithms that do not overload the network with load balancing messages. We developed three different load balancing algorithms: Nearest Neighbor, Longest Queue, and Circular Distribution, providing dynamic redistribution of work in different ways. We implemented these three algorithms on top of PZSweep algorithm, and our experimental results show that the load balancing algorithms we proposed provides rendering with up to 80% of parallel efficiency and only 30% of load imbalance.

**Keywords:** Computer Graphics Parallel Computing, Distributed Systems

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## 49. MetaBiblioteca Digital Regional de Tesis y Disertaciones - BDRTD

Edwin Montoya, Jorge Giraldo, Maryem Ruiz

Universidad EAFIT, Departamento de Informática y Sistemas Medellin, Colombia, 3300

Politécnico Jaime Isaza Cadavid, Departamento de Informática Medellin, Colombia

**Abstract:** Digital Libraries are collections of structured digital objects that can be accessed by the users in a distributed way across networks such as Internet. The benefits of those libraries, however, are augmented

when the user can access this set of digital libraries in a unified way. This supposes schemes of integration or federation of autonomous digital libraries with their own architectures and systems. This integration is commonly referred as meta-library. This paper describes a proposal of a digital library of thesis and dissertations and its integration based on Digital Library of New Generation (DLNG) developed at EAFIT University. Based on DLNG, we are implemented several projects: BDEAFIT (Digital Library of Eafit University), BDEI (Digital Library of Interactive EAFIT), and MetaBD (Integration of Regional and National Digital/Referential Libraries. BDRTD uses the same principles of DLNG: open source, metadata models based on RDF and Dublin Core and native XML databases.

**Keywords:** Information Retrieval, Distributed Systems

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**Schedule:** Hotel Crowne Plaza, Salón Prieto, Tuesday (11:20 - 11:40)

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## 50. Um Modelo de Controle de Acesso Baseado em Contexto para Autorizações a Informações Médicas

**Gerson Soares, Raul Ceretta Nunes, Érico M. H. do Amaral**

**Universidade Federal de Santa Maria, PPGEP/DELCT/CT, Santa Maria, Brasil, 97105-900**

**Resumen:** Os avanços nas tecnologias de comunicação e computação estão possibilitando um número crescente de acessos às informações do Prontuário Eletrônico do Paciente (PEP). Entretanto, a disponibilização de informações clínicas em redes de computadores levanta questionamentos sobre a privacidade dos pacientes e a integridade e confidencialidade dos dados. O controle de acesso é um ponto chave para manter tais requisitos. Em geral, somente o paciente e seu médico são autorizados para acessar o PEP, exceto quando o acesso é necessário para fornecer cuidados de interesse do paciente. Adicionalmente, em hospitais também o contexto (hora, localização, atributo, etc) deveria ser considerado. Neste artigo propõe-se um modelo de controle de acesso baseado em contexto (CBAC), o qual considera o contexto de propriedades no instante do acesso e possibilita a análise de relações contextuais para definir a autorização. Estas características habilitam a implementação de políticas de acesso complexas que necessitam de separação de responsabilidades e delegação.

**Keywords:** Information Retrieval, Security of Information and Criptography

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## 51. Acceso Seguro a Datos Confidenciales en Grids

Carlos Figueira, Yudith Cardinale, Emilio Hernandez

Universidad Simon Bolivar, Departamento de Computacion y Tecnologia de la Informacion, Caracas 1080-A, Venezuela

**Resumen:** La tecnología grid permite compartir los recursos de almacenamiento y de cómputo de distintas organizaciones geográficamente distribuidas. Se establece un control de acceso a estos recursos a través de una plataforma de seguridad única basada, por ejemplo, en infraestructuras de Clave Pública y Organizaciones Virtuales. Existen escenarios en los que las fuentes de datos no son incorporadas al grid, o que los datos son confidenciales, pero para su procesamiento deben ser accedidos desde recursos computacionales del grid. Un ejemplo de esto es el caso de investigaciones sobre imágenes médicas, donde se necesita mucho poder de cómputo para el análisis de las imágenes, pero el acceso a los datos requiere un control muy estricto, tanto por razones éticas como legales. En este trabajo se describen varios escenarios de acceso a datos confidenciales en repositorios externos al grid. Se evalúa la capacidad de operación en estos contextos para dos tipos de plataformas grid: plataformas basadas en Globus y SUMA/G. Se presenta un esquema para el acceso seguro bajo el control del usuario, y se proponen mecanismos en ambas plataformas para el correcto manejo de todos los escenarios descritos.

**Keywords:** Security of Information and Criptography, Distributed Systems

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## 52. Um Sistema de Marca d'Água para Segurança de Dados Digitais

Ivan Lopes, Celia Barcelos, Marcos Batista, Anselmo Silva

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Universidade Federal de Goias, Faculdade de Matemática. CAC, Catalão, Brasil, 75700-000

**Abstract:** Digital watermarking is a potential method for copyright protection and image authenticity verification. The choice of an appropriate watermarking technique is not an easy task specially because there are several different methods presented in scientific literature. The proposed method aims at exploring texture levels or the amount boundary pixels present in the regions where the information will be inserted.

The selection of these regions aims at increasing the amount of inserted information making the method more robust without degradation of the visual quality of the watermarked image. The process consists of splitting the host image into blocks and sub-blocks according to the texture level or the amount of boundary pixels belonging to each block. In order to measure the performance of the proposed method several experiments were performed and a comparison to the Wu and Shih's method is presented.

**Keywords:** Security of Information and Criptography

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## 53. Investiga3o de Algoritmos e Desenvolvimento Arquitetural para a Estimaa3o de Movimento em Compress3o de V3deo Digital

Marcelo Porto, Luciano Agostini, Sergio Bampi

Universidade Federal de Pelotas (UFPel) DInfo Grupo de Arquiteturas e Circuitos Integrados (GACI)  
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Universidade Federal do Rio Grande do Sul (UFRGS) - II Grupo de Microeletr3nica (GME) Porto Alegre, Brasil

**Abstract:** This work investigates some motion estimation algorithms for video compression and it presents results from software implementations for the investigated algorithms. These results were used to define the motion estimation architecture presented in this paper. The designed architecture uses the 4:1 Pel Decimation algorithm with SAD, in blocks with 16x16 samples. The search area was defined as 64x64 samples. The synthesis results show that this architecture is able to processes more than 60 SDTV frames (720 x 480 pixels) per second. This result shows that the designed architecture is able to compress SDTV videos in real time.

**Keywords:** Algorithms and Data Structures, Computer Architecture, Computer Graphycs

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## 54. Iterative Bucket Inverted Files for Web Engines

Graciela Veronica Gil Costa, Marcela Printista

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**Abstract:** This article describes an iterative bucket strategy to improve the efficiency of a classical index data structure for parallel textual databases. The main interest is the queries parallel processing on a cluster of PCs, and therefore this paper is focused in the communication and synchronization optimization. The design of the server that processes the queries is effected on top of the Bulk Synchronous model of parallel computing, to study how query performance is affected by the index organization. Our results, which are based on the Chilean Web collection, indicate that the iterative bucket organization outperform the classical organizations.

**Keywords:** Algorithms and Data Structures, Parallel Computing, Information Retrieval

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## 55. Estrategias de Paralelizacion para el EGNAT

Roberto Uribe, Ricardo Barrientos

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**Resumen:** El EGNAT o GNAT evolutivo (Evolutionary Geometric Near-neighbor Access Tree) es una estructura de datos para búsquedas por similaridad en espacios métricos. Esta estructura ha demostrado buen desempeño en espacios de alta dimensión, es dinámica y ha sido optimizada para memoria secundaria. Estas características son muy poco frecuentes en estructuras de este tipo, lo que posibilita su utilización en aplicaciones reales. La necesidad de procesar grandes volúmenes de datos hace que las estructuras diseñadas originalmente en forma secuencial deban ser paralelizadas. El presente trabajo describe distintas estrategias de distribución de la estructura egnat en múltiples procesadores y la paralelización de sus algoritmos de búsqueda.

**Keywords:** Algorithms and Data Structures

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## 56. Comparison between C, C++ and Java implementations of Branch-and-Bound Skeletons

Isabel Dorta-González, Olga Francisco, Coromoto León

Universidad de La Laguna, Dept. de Estadística, Investigación Operativa y Computación, La Laguna, Spain, 38271

**Abstract:** This article presents skeletons to solve Optimization Problems using the Branch-and-Bound technique. The skeletons user is provided with the possibility to solve its problems, as much of sequential form as of parallel and distributed forms without having to modify its code. The skeleton has been implemented using three different programming languages: C, CPP and Java. The first part of our proposal compares the different languages implementations. The second part of our proposal consists of a comparison between the parallel and distributed tools to implement the parallel and distributed versions. An algorithm for the resolution of the classic 0-1 Knapsack Problem has been implemented using the three implementations of skeletons proposed. The parallel implementations have been made using MPI and Java Sockets. Some computational results of the comparison of the languages are presented.

**Keywords:** Algorithms and Data Structures, Parallel Computing

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## 57. Codificación y Decodificación Eficiente Utilizando Códigos Hamming

Daniel Rosquete, Amadis Martínez, Freddy Perozo

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**Abstract:** En telecomunicaciones, el código Hamming es un código detector y corrector de errores que lleva el nombre de su inventor, Richard Hamming. Los códigos Hamming pueden detectar errores en uno o en dos bits, y también corregir errores en un solo bit. Éstos siguen siendo los códigos correctores de errores más importantes desde diversos puntos de vista, tanto teóricos como prácticos. Han sido estudiados durante más de cuatro décadas y hasta ahora se han propuesto muchas propiedades relacionadas con ellos. En este artículo se presentan dos algoritmos, basados en una variante del método original de Hamming, para los procesos de codificación y decodificación utilizando códigos Hamming. Se demuestra que la complejidad computacional de ambos algoritmos es menor que la de enfoques clásicos basados en álgebra lineal. Los algoritmos propuestos

fueron probados sobre distintos conjuntos de datos. Los experimentos realizados confirman que los algoritmos desarrollados, en la práctica, son más rápidos.

**Keywords:** Algorithms and Data Structures, Data Communication, Networks

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## 58. Developing secure architectures for middleware systems

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**Abstract:** We increasingly rely on complex applications that are typically distributed and implemented in systems that must have high reliability and security. Some of these applications, e.g., medical, financial, military, and legal, additionally require compliance with regulatory standards. Integration of these applications is achieved using a Web Application Server, a type of middleware with a global enterprise model. We consider the security needed to support such type of middleware, present patterns that can be used to build secure middleware, and show how to combine them to provide security to specific functions. We see the secure architecture as a composition of functional (unsecured) patterns with patterns that provide specific security functions. We show in some detail how we can start from general distribution and component patterns and add security patterns to build a secure middleware architecture

**Keywords:** Software Engineering, Methodology and Software Architecture, Security of Information and Cryptography, Distributed Systems

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## 59. Desenvolvimento Visual de Arquiteturas Distribuídas

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**Resumen:** As vantagens fornecidas pela utilização dos conceitos de arquitetura de software e estilos arquiteturais distribuídos, muitas vezes, não são de fato aproveitadas pela carência de ferramentas que suportem esses conceitos. Além disso, as atuais linguagens de descrição de arquiteturas não fornecem as características requisitadas pelas principais infra-estruturas de middleware onde essas aplicações de fato serão executadas. Nesse sentido, apresentamos neste trabalho, um ambiente de desenvolvimento de aplicações distribuídas que permite a elaboração de complexos projetos arquiteturais e realiza a geração automática de códigos diretamente em infra-estruturas de middleware como CORBA.

**Keywords:** Software Engineering, Distributed Systems

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## 60. The RS Language for Distributed Automata

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**Abstract:** RS is a reactive synchronous programming language suited to the implementation of the control part of reactive systems. The RS source programs are compiled to finite automata, which are very fast at execution time. This paper describes: (1) the distribution of the RS language, (2) the design of an MDX kernel that implements the communication facilities for the distributed automata, and (3) the implementation of the resulting distributed model using the C language.

**Keywords:** Programming Languages, Distributed Systems

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## 61. Modelos de confiabilidad diámetro-acotada para optimizar búsquedas en redes P2P

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**Resumen:** Las redes P2P se han desarrollado como una manera eficiente de compartir recursos entre usuarios finales. En este trabajo se discute un modelo Confiabilidad Diámetro Acotada para representar la búsqueda de información en redes P2P basada en la inundación de paquetes, limitada por una profundidad máxima de re-envío. A partir de estos modelos, se busca elegir la profundidad de re-envío y la cantidad de conexiones simultáneas para optimizar la información accesible a los nodos participantes, teniendo en cuenta limitaciones en el ancho de banda disponible. El método propuesto se basa en propiedades de monotonía de las magnitudes involucradas, y consiste en una búsqueda en un conjunto discreto de soluciones. Los resultados numéricos obtenidos con dicho método sobre un conjunto de casos muestra una fuerte regularidad en la ubicación del óptimo.

**Keywords:** Methodology and Software Architecture, Networks

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## 62. Uma Infra-estrutura para Replicação Semi-Ativa em Arquiteturas Orientadas a Serviços

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**Abstract:** The web services architecture appeared as a reply to the interoperability search between applications. The last years has seen an increase interest in executing in the Internet environment applications with high availability and reliability requirements. However the technologies associates to this architecture still do not offer adequate support to these requirements. The proposed infrastructure in this paper is inserted in this context and provides a new software layer that acts as a proxy between the client request and suppliers services. The main goal is to guarantee transparent fault tolerance for the customer through

semi-active replication technique. This model supports the following faults: value, crash and omission. The characteristics and the results gotten with the infrastructure implementation are described in elapsing of this paper.

**Keywords:** Methodology and Software Architecture, Distributed Systems

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## 63. Uma Arquitetura para Suporte a Aplicações Sensíveis a Contexto Baseada em Componentes de Software

Rossano Pablo Pinto, Eleri Cardozo, Alex Z. Lima, Paulo R. S. L. Coelho, Eliane G. Guimarães, Rodrigo F. Sassi, Luis F. Faina

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**Abstract:** The ubiquity offered by networks and mobile terminals motivates the design and deployment of context-aware applications. These applications are able to “mold” themselves to the context in which they execute, taking into account, for instance, user profile, device type, geographic location, and time of day. This paper describes ACORD-CS, an architecture based on software components for the support of context-aware applications. A reference implementation of the architecture and an example of application in the area of remote accessible laboratories are presented as well.

**Keywords:** Software Engineering, Methodology and Software Architecture, Distributed Systems

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## 64. Reconocimiento de Eventos en Máquinas Robotizadas Usando Clusters Complejos de Patrones de Sonido

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**Abstract:** In this work an alternative method is presented for the control of a hammer it breaks rocks used in the underground mining applying recognition of sound patterns. In general, the analysis of the sound is carried out in the time or in the frequency, in this case a method is presented based on the space analysis of the sound to recognize sound patterns using the grouping in clusters related with the vicinity of complex patterns.

The programs have been generated that allow the capture of sounds from a standard format, either from the sound interface or from the associate videotape image that they allow in turn to digitize this sound and to obtain their complex representation in the frequency, and to leave of her to apply the denominated method "Vicinity of Complex" to generate the patterns of sounds that will form the recognition clusters.

**Keywords:** Programming Languages, Collaborative Systems, Distributed Systems, Complexity Theory

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## 65. Estudio Comparativo De Técnicas De Educación De Requisitos Para Aplicar En Pueblos Indígenas De Bolivia

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Universidad Politécnica de Madrid, Facultad de Informática, Dpto. de Lenguajes, Sistemas Informáticos e Ingeniería de Software , Madrid España

**Abstract:** In this work we propose a comparative study of techniques for which we can obtain Requirements applied in indigenous populations. Our comparative study is based on two components: The approach, that considers the techniques of Educación de Requisitos by direct communication with the user, and the criteria that talks about the advantages and disadvantages of each technique in relation to their use in indigenous population.

A preliminary work was made in rural populations, bibliographical revisions and participation in discussions with these people talking about their indigenous towns, and by guiding them to catch their attention on sociological and cultural features of these populations. Made the comparative study, of which we present a comparative study and doing the corresponding analyze, we got the conclusion that the most suitable technique is a combination of techniques including the technique of prototypes that helps the user to decide and think about his necessities, preferences, and requirements.

As soon as the material was prepared, we developed a prototype of educative software, and then a work of application of selected techniques was organized and carried out, by achieving the expected results that were shaped in a group of specification of requirements of software.

**Keywords:** Software Engineering

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## 66. MDA View of Enterprise Architecture Frameworks

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Universidad de Carabobo, Departamento de Computación , Valencia Venezuela

Universidad Simón Bolívar, Departamento de Procesos y Sistemas , Caracas Venezuela

**Abstract:** Model Driven Architecture (MDA) represents an effort towards standardization and integration of software development models. Different domains are now experimenting with MDA, in particular the Enterprise Application Integration (EAI) defined as the process of integrating heterogeneous software applications. Enterprise Architecture (EA) frameworks consider in general also the modeling of integration. In particular, the Enterprise Application Integration Framework (EAIF), developed by our research group, is an enterprise architecture framework which provides sound and unified definitions of the modeling elements involved in the EAI domain. The main goal of this work is to establish a mapping of the MDA models to the EAIF abstraction levels. Moreover, this correspondence is also defined for the elements of known EA frameworks that can be used for EAI modeling. The approach is illustrated with a Customer Relationship Management (CRM) case study. This work can help to improve the standardization efforts in the context of modeling engineering, facilitating the development of business applications with standard modeling techniques.

**Resumen:** La Arquitectura Dirigida por Modelos (del inglés, Model Driven Architecture, MDA) representa un esfuerzo hacia la estandarización y la integración de los modelos del desarrollo de software. En la actualidad, diversos dominios están experimentando con MDA, en particular la integración de Aplicaciones Empresariales (del inglés, Enterprise Application Integration- EAI) definida como el proceso de integrar aplicaciones de software heterogéneas. Los frameworks para la arquitectura empresarial se pueden utilizar

para modelar la integración. En particular, el Enterprise Application Integration Framework (EAIF), desarrollado por nuestro grupo de investigación, es un framework de arquitectura empresarial, el cual proporciona definiciones unificadas y consistentes de los elementos de modelación involucrados en el dominio de la EAI. El objetivo principal de este trabajo es establecer una correspondencia de los modelos de MDA con los niveles de abstracción de EAIF. Además, la misma correspondencia se define para los elementos de frameworks de arquitectura empresarial conocidos, que pueden ser utilizados para modelar la EAI. El enfoque se ilustra con un estudio de caso de un sistema de Gestión de Relación del Cliente (del inglés, Customer Relationship Management-CRM). Este trabajo puede ayudar a mejorar los esfuerzos de estandarización en el contexto de la ingeniería de modelos, facilitando el desarrollo de aplicaciones de negocio con técnicas de modelación estándar.

**Keywords:** Software Engineering

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## 67. Integrating different technologies for data semantics modeling

Ma. Laura Caliusco, Ma. Rosa Galli, Omar Chiotti

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**Abstract:** Nowadays, an increasing percentage of data is becoming available in eXtensible Markup Language (XML). Even small discrepancies in the way XML data is defined could cause misunderstanding problems. Consequently, being able to explicitly model the data semantics promises to move information integration technology to a new level of flexibility and automation. The main tools for data semantics specification are based on ontology definition from artificial intelligence techniques. Although these tools provide the functionalities that are necessary and enough for defining a well-conformed ontology, they have not been incorporated into the information system development as expected since these tools assume a certain amount of background knowledge that a lot of people working in ontology lack. This paper presents a tool that make the task of information semantics modeling friendly for people who has not background knowledge in artificial intelligence techniques.

**Keywords:** Software Design

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## 68. Generación de Casos de Prueba Unitarias para Java Basados en la Técnica de McGregor y Sykes

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**Resumen:** Las pruebas unitarias son importantes para disminuir las pruebas en las fases posteriores, pero son poco practicadas por el tiempo y costos que éstas representan, ya que los casos de pruebas se generan habitualmente de forma manual. En el caso de sistemas construidos bajo paradigma Orientado a Objetos, las pruebas unitarias se centran en la clase y una de las técnicas utilizada es la técnica de McGregor y Sykes. Basándose en ésta y además, en diseño por contrato y JML, se diseña y se construye un prototipo funcional de una herramienta que genere asistidamente casos de prueba unitarios, dirigiéndose al lenguaje de programación Java y utilizando JUnit para la ejecución de los mismos.

**Keywords:** Software Engineering

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## 69. Caracterización de Sistemas Fiables basada en un modelo estándar de calidad

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**Resumen:** La construcción de sistemas altamente confiables constituye aún un reto para la industria del software; las tecnologías y formalismos actuales no son suficientemente poderosos para asegurar la fiabilidad de los sistemas y para garantizar que éstos se adecuen a las complejidades técnicas propias del entorno donde se desempeñan. En consecuencia, es necesario manejar en los sistemas la ocurrencia de fallas, las faltas y los errores, así como los cambios en el entorno y en los requisitos de los usuarios, implicando un esfuerzo de desarrollo temprano y costoso. El objetivo principal de este trabajo es representar, a través de un modelo conceptual, los principales elementos y la terminología básica utilizada en el dominio de los sistemas fiables, así como las propiedades de calidad de este tipo de sistemas. Adicionalmente, en este trabajo se

presenta una correspondencia de los requisitos necesarios para la fiabilidad de uso común en el dominio, con el modelo de calidad estándar ISO/IEC 9126-1. Este trabajo es una propuesta para sentar las bases para un entendimiento común y consenso sobre las definiciones, como punto de partida para una ontología en el dominio de los sistemas fiables.

**Keywords:** Software Engineering

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## 70. Avaliação do Nível de Maturidade da Governança de Tecnologia da Informação em Empresas que Atuam em Mercados Globalizados: Estudo de Caso em Indústrias de Grande Porte

José Bezerra da Silva Filho, Haroldo Nunes Menezes

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**Abstract:** This paper is about the level of adherence of large-sized enterprises in the branch of industrial activity to the processes involved in IT Governance contemplated by each one of the 34 processes described in CobiT related to service management and infrastructure of IT. An evaluation was made of a sample of eighteen enterprises through a questionnaire structured into five sets, bringing together 39 questions. The results obtained suggest that the maturity levels of the processes involved in IT Governance are placed in the inexistent or Initial / Ad hoc categories. Within the sample, the indicators suggest a reactive behavior of managers in the IT area and ignorance of better practice guides and evaluation metrics.

**Keywords:** Software Engineering

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## 71. A UML Extension to Specify Model Refinements

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**Abstract:** The refinement technique allows us to capture the relationship between specification and implementation in software developments. The precise documentation of the refinement relationship makes it possible to trace the requirements through the refinement steps. Unfortunately, the standard modelling language UML suffers from a lack of notation to specify refinements in a precise way; in particular, compound refinements can be only partially specified, weakening the traceability potential. In this article , we present an extension of UML to express complex model refinements by means of a well defined composition of elementary refinements. Such extension includes an optional notation to specify complex refinements in an accurate and complete way, thus improving the traceability process.

**Keywords:** Software Engineering

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## 72. Checking OCL Expressions Using Colored Petri Nets

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**Abstract:** This paper describes an approach to checking OCL expressions of a UML-based system model using CPN state space tools. The OCL is the part of the UML standard used to specify invariant conditions that must always hold for a system model. An approach to transforming a UML-based system model into a CPN model is taken as basis. Some CPN state space functions traverse all nodes of a state space and can be used to demonstrate that a condition holds. In particular, when a UML-based system model is transformed into a CPN model, CPN traversing functions can be used to demonstrate that an OCL expression holds. OCL expressions are transformed into CPN state space functions. These functions list all nodes in which the OCL expression does not hold. Using this information, software engineers can verify the UML-based system model and detect the presence of defects causing the OCL expression violation. Function results depend on the CPN model initial marking. Two OCL expression examples are presented to show how transformation and checking are done.

**Keywords:** Software Engineering

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### **73. Melhoria de Processo do Software Brasileiro (MPS.BR): um programa mobilizador**

**Kival Weber, Eratóstenes Araújo, Ana Regina Rocha, Kathia Oliveira, Ana Cristina Rouiller, Christiane Gresse von Wangenheim, Renata Araújo, Clênio Salviano, Cristina Filipak Machado, Danilo Scalet, Odisnei Galarraga, Márcio Pecegueiro Amaral, David Yoshida**

**SOFTEX Associação para Promoção da Excelência do Software Brasileiro Brasil**

**COPPE/UFRJ Universidade Federal do Rio de Janeiro Brasil**

**UCB - Universidade Católica de Brasília Brasil**

**UFRPE Universidade Federal Rural de Pernambuco Brasil**

**UNIVALI Universidade do Vale do Itajaí Brasil**

**UNIRIO Universidade Federal do Estado do Rio de Janeiro Brasil**

**CenPRA - Centro de Pesquisas Renato Archer Brasil**

**CELEPAR Companhia de Informática do Paraná Brasil**

**SOFTSUL Associação Sul-riograndense de Apoio ao Desenvolvimento de Software Brasil**

**RIOSOFTE Sociedade Núcleo de Apoio a Produção e Exportação de Software do Rio de Janeiro Brasil**

**ITS Associação Instituto de Tecnologia de Software de São Paulo**

**Resumen:** Desde a década passada, busca-se melhorar continuamente a qualidade de software no Brasil. Assim, a Associação para Promoção da Excelência do Software Brasileiro (SOFTEX) iniciou um programa mobilizador denominado MPS.BR - um acrônimo da expressão Melhoria de Processo do Software Brasileiro. Este programa de abrangência nacional envolve: universidades; centros de pesquisa; organizações comprometidas com a melhoria de seus processos de software seja pequenas e médias empresas (PME) seja grandes empresas; instituições implementadoras (II); instituições avaliadoras (IA); e instituições organizadoras de grupos de empresas (IOGE). Este artigo descreve o Programa MPS.BR e seus principais resultados de dezembro de 2003 a junho de 2006. Também descreve o Modelo MPS, que tem três componentes: (i) Modelo de Referência (MR-MPS); (ii) Método de Avaliação (MA-MPS); e (iii) Modelo de Negócio (MN-MPS). Finalmente, apresenta os principais desafios para a disseminação regional do Modelo MPS em países latino-americanos a partir de 2006.

**Keywords:** Software Engineering

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## 74. Gestión de Conflictos entre Aspectos mediante un Sistema Experto de Reglas

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**Abstract:** The Aspect Oriented Programming is a new programming paradigm that aims to achieve a greater modularization and decomposition of units in the design and the implementation of software systems, the goal is that the applications will be easier to implement, maintain and reuse. The conflicts occurrence among aspects is a consequence of the decomposition of the software systems in the aspect oriented development. This phenomenon is independent to the tools and it requires special attention and treatment since the activation of certain conflicts could cause unwanted, inconsistency and inexactness behaviours in the software systems execution. The work herein outlines a rules expert system approach to solve the problem of conflicts among aspects in an integral and simultaneous form.

**Keywords:** Software Engineering

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## 75. Patrón para la Especificación de Transformaciones

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**Resumen:** Los modelos y las transformaciones son parte clave en el enfoque de Ingeniería de Modelos, en particular para MDA. La definición y/o especificación de las transformaciones entre modelos es un aspecto

fundamental dentro de este enfoque. En tal sentido, en este trabajo se propone un patrón de especificación como marco para la definición de transformaciones. Este patrón se fundamenta en un modelo de características de lenguajes de transformaciones basados en la propuesta MOF/QVT de la OMG. La especificación obtenida es independiente del lenguaje de transformación utilizado, y constituye una ayuda para la documentación y su implementación en el lenguaje de transformación seleccionado.

**Keywords:** Networks, Distributed Systems

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## 76. Uma análise do método ágil Scrum conforme as áreas de processo da categoria Engenharia do modelo CMMI

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**Abstract:** In this article we analyze the agile method Scrum in relation to the Engineering Process Areas of the CMMI model. The results obtained from this analysis indicate that Scrum does not meet all the required specific practices present in such process areas. We point out what is missing in Scrum to fully comply with these areas

**Keywords:** Software Engineering

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## 77. Implementação de um Repositório de Medições para os Níveis 2 e 3 do CMMI

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**Abstract:** It is a great challenge to establish a measurement program in a software organization. That measurement program has to be well structured and to be mostly supported to a tool that implements a measurement repository. These work objectives to propose a measurement repository that is adherent at the CMMI maturity levels 2 and 3. That repository treats of measurement project and organization's measurement, having been implemented through the tool MC2. That tool was adapted in this work for this purpose, and it contributed to the certification CMMI level 3 of a P and D organization in Brazil.

**Keywords:** Software Engineering

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Tuesday (14:40 - 15:00)

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## 78. Teoria Explanatória para Estimativa Baseada em Casos de Uso no Desenvolvimento Orientado a Objetos

Everton Vieira, Raul Sidnei Wazlawick

UFSC-CTC-INE - Universidade Federal de Santa Catarina Florianópolis, Brasil, 88040-900

**Abstract:** This paper presents an explanation on the Use Case Points (UCP) method for software effort estimation. Basically, the paper develops a theory that seeks to explain why the technique based on Mandatory Steps developed by the authors tend to produce better estimation than the technique based on straight counting of steps and their multiplication by environmental factors. The paper presents a theoretic analysis on the main factors that produce development effort on an object oriented development process. It separates effort estimation into factors that are dependent or independent on the complexity of the system. The main contribution of this paper is the explanation on the interference of dependent and independent factors in object oriented developing, because the original UCP method was developed as an evolution of the Function Points that was originally proposed for structured software development. The paper shows that

mandatory steps have a strong influence on effort and that environmental factors may not be dependent on the complexity of the system as in the original UCP method.

**Keywords:** Software Engineering

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## 79. CMMI guiando a integração de padrões organizacionais e de processo ao método ágil Scrum

**Edes Costa Filho, Rosângela Ap. D. Penteado, Júnia C. Anacleto**

**Universidade Federal de São Carlos, Departamento de Computação São Carlos, Brasil**

**Abstract:** Practices proposed by agile methods such as Scrum and Extreme Programming (XP) satisfy many CMMI goals. However, additional practices are needed to complement these agile methods to satisfy other CMMI goals. Organizational and process patterns provide proven solutions to recurring software development process problems and can be used to adapt Scrum and other agile methods according to CMMI. This article proposes the integration of some organizational and process patterns to Scrum so that more CMMI practices can be satisfied when Scrum are used.

**Keywords:** Software Engineering

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Tuesday (15:20 - 15:40)

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## 80. Processo de Software Livre em Ambiente Acadêmico: Experiências e Lições Aprendidas

Debora Paiva, Marcelo Turine, Renata Pontin M Fortes

Universidade de Sao Paulo, Dept. Computacao, Sao Carlos, Brasil, 13560-970

Universidade Federal do Mato Grosso do Sul, Dept. Computac, ao, Campo Grande, Brasil, 79070-900

**Abstract:** Development of free software in academic setting has been common in the last years. In this paper we present our experience and lessons learned with the SAFE (Software Engineering Available for Everyone) project, from the software process perspective.

We discuss the main issues regarding software process standards we have applied and the influences among them, research interests and OSS (Open Source Systems) characteristics. SAFE is a research project being developed by university and industrial sectors. We believe that researchers and free software community members can benefit from lessons learned and count on improvements in their own methodologies.

**Keywords:** Software Engineering

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## 81. Modelación de Requisitos, Aspectos y Calidad de Software

Rafael Caldera, Isi Castillo, Francisca Losavio, Alfredo Matteo

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Universidad Nacional Experimental Sur del Lago, Laboratorio de Informática Santa Bárbara de Zulia, Venezuela, 5448

**Resumen:** El desarrollo de software orientado a aspectos (Aspect-Oriented Software Development, AOSD), representa un nuevo paradigma de ingeniería de software basado en los conceptos de la Programación Orientada a Aspectos. Bajo este contexto, la investigación se centra en el tratamiento temprano de las incumbencias transversales o concerns transversales en combinación con los procesos clásicos de ingeniería de requisitos y diseño arquitectónico, donde las propiedades de calidad son relevantes. A pesar del reciente y creciente interés de esta línea de investigación, no es evidente la existencia de una visión compartida y homogénea que sirva de referencia para el razonamiento acerca de los términos utilizados. El objetivo de este trabajo es proponer un marco conceptual que permita representar y relacionar los principales términos del AOSD, asociados al proceso de ingeniería de requisitos y a la calidad de software, con el fin de establecer algunas bases para

un mejor entendimiento y consenso en el manejo de un vocabulario común en la disciplina emergente de la Ingeniería de Requisitos Orientada a Aspectos.

**Keywords:** Computer Architecture, Parallel Computing, Distributed Systems

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## 82. Heurísticas para Identificação da Ordem de Integração das Classes em Testes Aplicados a Software Orientado a Objetos

Gladys Lima, Arilo Cláudio Dias Neto, Guilherme Horta Travassos

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Universidade Federal do Rio de Janeiro COPPE/Sistemas Caixa Postal 68.511 CEP 21.941-972 Rio de Janeiro RJ Brasil

**Resumen:** Os ciclos de dependência entre componentes (classes) representam um problema prático para identificar a ordem de integração em software orientado a objetos. Abordagens clássicas de integração ascendente ou descendente (ou sua combinação) tornam-se menos aplicáveis devido à sua característica acíclica. As estratégias de teste de integração OO tratam das quebras destes ciclos, responsáveis diretas pela necessidade da implementação de stubs. O propósito das estratégias é reduzir o esforço de teste, minimizando o número de stubs produzidos. Este artigo apresenta uma estratégia aplicada diretamente em um nível alto de abstração de projeto OO diagrama de classes UML permitindo reduzir esforços extras de construção de diagramas adicionais ao projeto, empregados em outras estratégias pesquisadas na literatura. É apresentada a ferramenta FAROL que implementa a estratégia proposta.

**Keywords:** Software Engineering

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## 83. Programação Orientada a Aspectos: Um Estudo de Caso em uma Multinacional

Alexsandro Filippetto, Daniel Callegari

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Pontifícia Universidade Católica do Rio Grande do Sul, Faculdade de Informática, Porto Alegre-RS, Brasil, 90619-900

**Abstract:** This paper aims to provide a basement on the use of Aspect Oriented Programming (AOP) as well as reporting a case study in a multi site company. As we know, there is a persistent concern in companies when dealing with cost reduction and quality issues on software development. Normally a well-designed system is able to achieve good results from code reuse, greater simplicity and, by effect, better results on maintainability. The need of having modularized systems has made several object-oriented approaches insufficient to solve the separation of concerns in a suitable level. In this context, Aspect Oriented Programming is a new approach on software development. It proposes simplification in the development of some features that were once spread over the source code of the application. Here we present some encouraging results of the paradigm, in which we achieved near 90% of reduction in code interlacing.

**Keywords:** Software Engineering, Programming Languages

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## 84. Especificação Hierárquica de Estilos Arquiteturais

Cidcley T. de Souza

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**Resumen:** Estilos arquiteturais podem ser definidos com famílias de especificações arquiteturais obtidas a partir de generalizações de descrições arquiteturais específicas. Desse modo, a abordagem geral para a descrição de um estilo arquitetural é baseada na imposição de regras pré-estabelecidas às descrições arquiteturas seguindo o vocabulário e as restrições definidas para o estilo. Assim, a construção de um novo estilo requer a descrição de uma arquitetura que siga o estilo. Nesse artigo propomos uma abordagem inovadora para a descrição de estilos arquiteturais. Argumentamos aqui que estilos arquiteturais podem ser mais facilmente descritos se considerarmos uma abordagem hierárquica, onde a definição de novos estilos é baseada nas descrições de estilos já existentes. Para validar nossa abordagem apresentamos nesse artigo a linguagem

Xtyle, que é uma aplicação de XML para a especificação de estilos arquiteturais distribuídos utilizando o conceito de herança múltipla. Além disso, apresentamos uma taxonomia para estilos arquiteturais distribuídos baseado em reuso de especificações.

**Keywords:** Software Engineering, Programming Languages

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## 85. Esboço de um Processo Ágil de Desenvolvimento baseado em Framework

Franciene Duarte Gomes, José Carlos Maldonado, Maria Istela Cagnin

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**Abstract:** The use of development processes to guarantee the software quality is evident. Currently, there are several techniques that, when used in the development processes, collaborate for that. Pattern languages, frameworks and agile methods, which are the focus of this work, appear among them. This paper presents the sketch of an agile development process based on frameworks called PARFAIT/EA. This process is abstracted from the PARFAIT, used in the migration of legacy systems for the object oriented paradigm. Some PARFAIT activities will be kept, others will be removed or modified. There will be a need to add specific activities of this development process and, therefore, are not found in PARFAIT. A case study lead with PARFAIT will be used for the process sketch analysis and definition, which will only take care of forward engineering.

**Keywords:** Software Engineering, Methodology and Software Architecture

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## 86. Metodología para desarrollo de aplicaciones con enfoque SOA (Service Oriented Architecture)

Andrea Delgado

Universidad de la República, Instituto de Computación, Grupo de Ingeniería de Software, Montevideo, Uruguay

**Resumen:** El área de TI en las Organizaciones actuales se puede caracterizar por tener diversidad de sistemas que tienen entre sí dependencias complejas, que han ido creciendo en forma separada y heterogénea a lo largo de los años. Un desafío que se plantea es poder integrarlos para reaccionar ágilmente a los cambios en los requerimientos del negocio, principalmente en dos aspectos: los procesos de la Organización y las tecnologías disponibles. La definición y disponibilidad de estos servicios para toda la Organización es la base del enfoque SOA. El Grupo de Ingeniería de Software (Gris) del Instituto de Computación tiene un programa de construcción y prueba de modelos de proceso basado en una adaptación del RUP, para el que se definió una metodología para el desarrollo de aplicaciones con enfoque SOA.

**Keywords:** Software Engineering, Methodology and Software Architecture

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## 87. A Mexican Experience Redesigning a Software Development Process Using XP, FDD and RUP

Luis Aceves, Enrique Canseco, Mauricio Ruanova

Universidad de Monterrey, Ciencias Computacionales, Av. Morones Prieto 4500 Pte, 66220 San Pedro Garza García, Nuevo León México

**Abstract:** This work focuses on the process redesign for software development and management implemented at a Mexican steel manufacturing company. The main goal was to improve the software systems production, maintenance and support it was achieved by implementing artifacts and practices of Agile Methodologies like FDD, XP and RUP. Throughout this document we can identify the needs and problems faced by the steel manufacturer. To correct these, Business Process Reengineering was adopted, specifically Process Redesign (BPR). We also present some results on the implementation of BPR through a modeling and simulation using IDEF0 language.

**Keywords:** Software Engineering, Methodology and Software Architecture

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## 88. Uso de Gram3tica de Grafos na Constru3o de um Modelo para Avalia3o Adaptativa de Aprendizagem

Priscilla Le3o, M3rcio Braga, Joseane Viana, Carla Alessandra Lima Reis, Breno Fran3a

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**Abstract:** This paper proposes a model for learning assessment that includes some advances, as the proposal of a visual language for assessment modeling and the adaptation of assessment application depending on the students performance. A tool called AvaWeb was developed from this model. It allows management of questions, graphical edition of assessment for the teacher and also individualized assessment application for the students. Graph grammar formalism is adopted to specify the syntax and semantics of the proposed visual language.

**Keywords:** Formal Specification, Performance Evaluation, Software Engineering

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**Schedule:** Hotel Crowne Plaza, Sal3n Prieto, Wednesday (08:00 - 08:20)

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## 89. A Framework for Optimizations in Abstract State Machines

Kristian Magnani, Mariza A. S. Bigonha, Roberto S. Bigonha

Universidade Federal de Minas Gerais, Departamento de Ci3ncia da Computa3o, Belo Horizonte, Brazil, 31.270-901

**Abstract:** The Abstract State Machines methodology offers a powerful, easy-to-use mechanism to formally specify the semantics of algorithms. The klar framework adds to it optimization capability, allowing the

transformation of ASM specifications into efficient programs, which is important in order to use the specifications as realistic programs. Moreover, the optimizations are modules to be plugged-in “on the fly”, so that independent developers can develop their own optimizations without concerning about the internal details of the klar framework. Finally, the wide set of constructions of the language understood by the framework allows its use as a target for compilers aiming the ASM methodology.

**Keywords:** Formal Specification, Performance Evaluation, Programming Languages

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## 90. Un lenguaje para Transformación de Modelos basado en MOF y OCL

Roxana Giandini, Claudia Pons

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**Resumen:** La iniciativa MDD (Model Driven Development) cubre un amplio espectro de áreas de investigación como: lenguajes de modelado, definición de lenguajes de transformación entre modelos y construcción de herramientas de soporte. Actualmente, algunos de estos aspectos están siendo fundamentados y aplicados, mientras otros están en proceso de definición. Consecuentemente son necesarios esfuerzos que conviertan a MDD en una propuesta coherente, soportada por técnicas y herramientas maduras. Las transformaciones entre modelos requieren de lenguajes específicos para su definición. Estos lenguajes deben tener base formal, por ejemplo tener un metamodelo que los sustente, y permitir un tratamiento automatizado. En este trabajo presentamos un lenguaje declarativo para transformaciones de modelos inspirado en estándares de OMG. Nuestra propuesta constituye una extensión de especificaciones ya existentes en OMG y utiliza OCL para especificar relaciones de transformación.

**Keywords:** Formal Specification, Software Engineering

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## 91. Comprensión de Algoritmos de Ruteo

Mario Berón, Pedro Rangel Henriques, Maria João Varanada, Roberto Uzal

Universidad Nacional de San Luis - San Luis Argentina

Universidade do Minho - Braga Portugal

**Abstract:** The Program Comprehension is an area of Software Engineering that studies models and tools with the aim of facilitating the understanding and maintenance of large/complex computer applications. In this paper we present the work done to analyze the possibility of applying strategies of program comprehension to Routing Algorithms. The task was carried out following four steps. The first was the study of different program comprehension tools with the purpose of establishing a ranking between them; also we have analyzed the comprehension strategies underlying each one. The second was centered in the construction of an Evaluator for Routing Algorithms, with educative and investigation purposes. In the third step we analyzed the possibility to adapt the comprehension strategies to that algorithms evaluator with the objective of increasing its explanatory capabilities. Finally, the fourth applies and generalizes the result obtained with the evaluator to other systems.

**Keywords:** Software Engineering

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## 92. Especificación de Restricciones de un Supermercado utilizando Métodos Formales y Teoría de Colas

Elizabeth Vidal, Ernesto Cuadros-Vargas

Universidad Católica San Pablo, Dpto. de Ingeniería Informática Arequipa, Perú, 054

**Resumen:** Este trabajo presenta la especificación de restricciones del comportamiento de un supermercado. La intención es reducir la ambigüedad de la especificación de restricciones y soportar el reuso para casos similares mediante la identificación de patrones de comportamiento. Para ello hemos basado nuestro trabajo en la especificación formal de software (métodos formales) y en la teoría de colas.

**Keywords:** Formal Specification, Software Engineering

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## 93. Hacia un modelo de Interacción para Componentes basado en canales

Silvia Amaro, Ernesto Pimentel

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Dpto. de Lenguajes y Ciencias de la Computacion, Universidad de Malaga, España

**Resumen:** En el Desarrollo de Software basado en Componentes la construcción de aplicaciones por la integración de componentes, posiblemente distribuidas y heterogéneas requiere mecanismos para controlar las interacciones entre entidades activas, y así poder detectar de forma temprana posibles problemas de compatibilidad. En este sentido los lenguajes de coordinación pueden ser utilizados para especificar el comportamiento interactivo de componentes software.

Nuestra propuesta se orienta a definir un framework para describir el comportamiento de componentes en términos de modelos de coordinación. En particular, definimos una forma de complementar las descripciones de las interfaces de componentes, dando información del protocolo de interacción. Nuestro objetivo es definir un lenguaje de descripción de interacción basado en Reo para la coordinación de componentes.

**Keywords:** Formal Specification, Software Engineering

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## 94. Exploring Process Calculi as a Mechanism to Define Dynamic Enumeration Strategies in Constraint Programming

Carlos Olarte, Eric Monfroy, Camilo Rueda

Universidad Tecnica Federico Santa Maria, Valparaiso, Chile

Pontificia Universidad Javeriana, cali, Colombia

**Abstract:** Constraint programming (CP) has been extensively used to solve a wide variety of problems. Its declarative flavor makes possible to state conditions over variables and the solver finds solutions by applying generic and complete techniques. The process of computing a solution in CP consists mainly in two phases: propagation in which values that are not consistent w.r.t. the constraints are eliminated, and enumeration that chooses a variable and a value for this variable to continue the search when no further propagation is possible. Constraint based languages offer a set of static enumeration strategies. The strategy chosen may affect drastically the time required to find a solution. In this paper we propose a framework to model dynamic

enumeration strategies using a stochastic, non-deterministic timed concurrent constraint calculus. Thanks to the reactivity of the calculus, we are able to express strategies that dynamically change according to results observed. Additionally, the compositional approach of the calculus enables us to integrate external knowledge to adapt the strategy. In particular, we integrate knowledge from an incomplete solver to guide the enumeration process. Finally, strategies proposed are integrated with a constraint solver to make good choices when it explores the search tree allowing to find solutions quicker.

**Keywords:** Formal Specification, Artificial Intelligence

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## 95. Demostración de Teoremas vía Inducción por Reescritura

Jorge Salas

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**Resumen:** En este trabajo presentamos la base fundamental de un método para probar propiedades inductivas de programas funcionales: la inducción por reescritura. El método propuesto es una especialización del principio general de inducción noetheriana donde la relación bien fundada es la relación de reescritura de un sistema terminante. Se demuestra la corrección de esta forma de inducción con una definición particular de conjunto de cobertura adaptada a los sistemas de reescritura originados en programas funcionales que terminan. Se plantea la utilización de lemas auxiliares para recuperar demostraciones que no pueden continuar exclusivamente por el mecanismo de inducción por reescritura. Nuestra experiencia con el asistente de prueba p3f ha mostrado la utilidad del método para la demostración de teoremas sobre propiedades de programas funcionales.

**Keywords:** Formal Specification, Programming Languages

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## 96. Automatización de leyes de fusión de programas

Alberto Pardo, Facundo Dominguez

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**Resumen:** El empleo de componentes modulares en el paradigma de programación funcional acarrea la necesidad de manipular estructuras de datos que sirvan como medio de comunicación entre unas y otras. Este tipo de diseño puede ser ineficiente debido a la generación de muchas estructuras de datos intermedias. Existen técnicas de transformación de programas funcionales, que dado un programa escrito en forma modular, pueden combinar diferentes partes del mismo para construir un programa equivalente que no emplee estas estructuras intermedias. Una serie importante de trabajos apuntan a automatizar estas técnicas para su inclusión en compiladores. En el marco del desarrollo de un sistema que realiza automáticamente algunas de estas transformaciones sobre programas escritos en Haskell, nuestro objetivo es presentar una revisión de algunos de los algoritmos utilizados.

**Keywords:** Formal Specification, Programming Languages

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**Schedule:** Hotel Crowne Plaza, Salón Prieto, Wednesday (11:00 - 11:20)

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## 97. JAVA-XSC: Estado da arte

Benjamín Bedregal, José Enéas Montenegro Dutra

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Natal-RN, Brasil

**Abstract:** The Language Extensions Scientific Computation, XSC in short, were introduced in order to provide an appropriate environment programming to support scientific and interval computing. This class of languages provide important tools to development of numerical software. For example, provide an automatic control of numerical error, libraries with the main mathematical routines, dynamic arrays, data type not existent in traditional programming languages, such as complex numbers, real interval, etc. beyond of several other characteristic. The present work has as main goal to present the basic characteristic of our proposal of XSC library for JAVA programming language.

**Resumen:**

**Keywords:** Programming Languages

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## 98. GIRO (Grafcet - Industrial Robots): A Generic Environment for Programming Industrial Robots Off-Line

Gustavo Arnold, Pedro Henriques, Jaime Fonseca

Department of Informatics, University of Minho Braga, Portugal

Department of Industrial Electronic, University of Minho Braga, Portugal

**Abstract:** This paper presents GIRO (Grafcet - Industrial Robots), that is a generic environment for programming industrial robots off-line. GIRO focus on the modelling of the system, based on the Grafcet specification diagram, rather than on the robot details, improving the programming and maintenance tasks, allowing the reuse of source code. GIRO also allows the programmer to write programs in the robot language, if he is familiarized with the robot commands. With GIRO: the user can program robots in a high or low level; portability for the source code is granted; reuse of source code for different robots is allowed; programming task is facilitated. It is easy-to-use. So, GIRO is "giro" (Portuguese (Portugal) slang that means cool).

**Keywords:** Programming Languages, Methodology and Software Architecture

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Wednesday (08:00 - 08:20)

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## 99. Probabilistic Cost Analysis of Logic Programs: A First Case Study

Hector Soza Pollman, Manuel Carro, Pedro López García

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**Abstract:** Cost analyses of logic programs have been developed which make it possible to obtain automatically lower and upper bounds of runtime cost of computations. This information is very useful for a variety

of purposes, including granularity control, query optimization in databases, and program transformation and synthesis. However, current techniques suffer a loss accuracy in some cases which are quite representative (i.e., divide-and-conquer programs à la QuickSort). This paper describes an alternative probabilistic approach which makes it possible to figure out an estimate of the execution cost. One of its advantages is that it needs little changes over previously proposed schemes.

**Keywords:** Programming Languages, Complexity Theory

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## 100. Processo de Software Livre em Ambiente Acadêmico: Experiências e Lições Aprendidas

Debora Paiva, Marcelo Augusto Santos Turine, Renata Pontin de Mattos Fortes

Instituto de Ciencias Matematicas e de Computacao Universidade de Sao Paulo, Brazil

Universidade Federal do Mato Grosso do Sul, Brazil

**Abstract:** The development of free software in academic setting has been common in the last years. In this paper we present our experience and lessons learned with the SAFE project, from the process perspective.

SAFE is a research project developed by university and industrial sectors. Researchers and free software community members can benefit from lessons learned and improve their own methodologies.

**Keywords:** Hypermedia, Software Engineering

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## 101. Inclusão Digital via Serviços de Saúde para o Sistema Brasileiro de TV Digital

Valdecir Becker, Günter H. Herweg Filho, Carlos Montez

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**Abstract:** This work presents the results of the research group Digital Inclusion Through Health Services in Interactive TV Digital (named IDSTV), developed in the scope of the Brazilian System of Digital TV (named SBTVD). In this project a new vision for the interactive television was developed, where the current language of the TV is the starting point for the interactive applications. Also a relation of health topic was made with the objectives of social inclusion through digital TV intended by the Brazilian Federal Government.

**Keywords:** Hypermedia, Human Computer Interaction, User Interfaces

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## 102. Mineração de uso em sites web para a descoberta automática de classes de usuários

José Palazzo M. de Oliveira, Sandro José Rigo

UFRGS, PPGC, Instituto de Informática, Porto Alegre, Brasil

**Abstract:** The ever increasing information availability in the Web has created the serious information overload problem. One alternative to reduce this overload is the user-oriented site customization. The site customization approach is an implicit recommendation system where the content is selected for each kind of users classes. This paper describes the implementation of a Web usage acquisition mechanism that can be used in the generation of frequent patterns, association rules and clusterization. This information is to be employed in Web pages customization systems.

**Keywords:** Hypermedia, Human Computer Interaction, Information Retrieval

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## 103. Desenvolvimento de Programas para TVDI: os Impactos do Canal de Retorno nos Níveis de Interatividade

Tatiana Tavares, Thiago Rocha de Assis

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**Abstract:** Today, the TVDI (Digital and Interactive Television) promises to be a revolution in the communication resources, as the creation of the first colourful and analogical television sets was some decades ago. A lot of issues have been discussed and researched in this area, but the practical results have been too shy in South America. At the final stage of discussion on TVDI its crucial to bring essential and technical aspects in the decision making process. Thus, we approach key points to the future decisions in this article: the impacts of the return channel at the levels of interactive. For that we are based on the final results that were obtained through the development of a pilot program to TVDI. The developed program is focused on the educational context and was created for kids. Our pilot program explores different levels of interactive by using basically resources of interactive that need a return channel and resources that dont require this infra-structure. Besides, we discuss the aspects that illustrate how technical decision of adopting or not a return channel may have an impact on the options of interactive. On the other hand, it is important to reaffirm that a TVDI program can use different kinds of interactive with different levels. And finally, were going to use the pilot program to demonstrate the appliance of the strategic use of different levels of proposed interactive and then we are going to show the obtained results.

**Keywords:** Hypermedia, User Interfaces

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## 104. Um sistema de recomenda3o para ambientes virtuais de aprendizagem baseado em agentes e componentes de software

Kelle Cristina Fortunato da Costa, Maria da Penha de Andrade Abi Harb, Eloi Luiz Favero, Tha3s Lira Tavares dos Santos, Silvana Rossy de Brito, Aleksandra do Socorro da Silva

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**Abstract:** This paper argues a solution for adaptation of learning stations in learning virtual environments by recommendations. Our propose aims to support the student in the process of knowledge construction by

the retrieval of artefacts by means of implicit consultations in accordance with the strategy of teach-learning defined by the teacher and with the tasks executed by the student. We use techniques of information retrieval, agents and software components with the objective to represent, to organize and to retrieve artefacts (texts, sounds, images, messages, learning objects, links) considered relevant for the student. Thus, the considered model aims to potencializate the perception of the student for the learning process, besides facilitating the information access, reducing the time of access and the cognitive load.

**Keywords:** Hypermedia, User Interfaces, Information Retrieval

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## 105. Pascal Pages for Web: Uma tecnologia de p3ginas Web din4micas baseada em Object Pascal

Jo3o Werther, Celso A. Saibel Santos

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Universidade Salvador (UNIFACS), Mestrado em Sistemas e Computa33o (NUPERC) Brasil

**Abstract:** This paper introduces a technology based on Object Pascal for building dynamic Web pages. This technology is supported by an execution environment similar to the standard CGI (Common Gateway Interface). Using this technology solution, called PPW (Pascal Pages for Web), Web developer's build dynamic pages for including Pascal code enclosed by scriptlets into the HTML tags. The purpose of this paper is show that PPW can provide a development environment for dynamic Web pages like ASP or JSP, obtaining similar performance to CGI.

**Keywords:** Hypermedia, Programming Languages

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## 106. Aplicando Técnicas de Planejamento Apoiado em Inteligência Artificial Na Modelagem de Workflow

Carlos Lopes, Lucas Bucci da Silveira, Jony Teixeira de Melo

Faculdade de Computação, Universidade Federal de Uberlândia Brasil

**Abstract:** In this paper we describe a new approach that uses Artificial Intelligence Planning techniques in the development of a Workflow System. Our approach allows the automatic generation of process diagrams applying the recent developments in the planning field. Based on this approach we developed SisMAP, a system for automatic workflow modeling and showed its application in a case study.

**Keywords:** Office Automation, Artificial Intelligence, Collaborative Systems

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## 107. Proposta de um Modelo para Workspaces Compartilhados em um Ambiente de Desenvolvimento Distribuído de Software

Rogério Santos Pozza, Elisa Hatsue Moriya Huzita

Universidade Tecnológica Federal do Paraná(UTF-PR), Coordenação de Informática, Cornélio Procópio, Paraná, Brasil

Universidade Estadual de Maringá (UEM), Departamento de Computação, Maringá, Paraná , Brasil

**Resumen:** Em ambientes de trabalho em grupo, onde determinada meta a ser alcançada depende da interação entre seus membros, e encontrando-se estes grupos situados em lugares geograficamente distintos, sejam em departamentos, cidades, países, etc., pode tornar indispensável a cooperação entre esses grupos para a realização de tarefas. Este artigo apresenta a proposta de um modelo para cooperação entre workspaces compartilhados para o domínio de um ambiente de desenvolvimento de software distribuído, apoiando-se em três características: comunicação, sincronização e percepção.

**Keywords:** Software Engineering, Collaborative Systems

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## 108. Um Modelo de Comportamento e de Interação para Entidades em Ambientes de Realidade Virtual

Glaudiney Mendonça-Junior, Creto A. Vidal, Joaquim B. Cavalcante-Neto

Universidade Federal do Ceará, Dept. de Computação, Fortaleza, Brasil, 60455-760

**Abstract:** Virtual Environments join users to interact among themselves and with the world to accomplish tasks. All elements in virtual environments that interact are called entities. The set of interactions among entities modify the virtual environment and themselves. These interactions, along with personal entities behaviors, enrich virtual environments making them more efficient. This paper introduces a model, called BeE Model, intended to design behaviors, aiming at providing rich behaviors for entities in virtual environments and games.

**Keywords:** Collaborative Systems

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## 109. Exploración de la Literatura Científica en Sistemas de Información (1998-2004)

Patricio Ramírez, Rosario García

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Universidad de Sevilla, Departamento de Administración de Empresas y Marketing Sevilla, España

**Abstract:** This paper presents the results of an analysis of the literature published between 1998 and 2004 in four of the journals of greater ISI impact factor in the area of information systems (Information Systems Research, Journal of Information Technology, Journal of Strategic Information Systems, and MIS Quarterly). Based on the method of exploration proposed by García and Ramírez, the study used citation analysis, keywords analysis, words analysis, co-citation analysis, co-keywords analysis, and social networks analysis. The number of analyzed articles was 665. The main conclusions indicate a significant relation between published articles, and a knowledge structure constituted of a core and some peripheral groups. In general, this study confirms the strong direction of the research towards organization, management and business subjects, and in particular, emphasizes the research topics: performance, implementation, innovation and strategy.



**Keywords:** Information Society

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## 110. Adopción Exitosa de Sistemas ERP: Propuesta de un Modelo Teórico para la Mediana Empresa Chilena

Ramírez Patricio, Rosario García

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**Resumen:** Basado tanto en la revisión de la literatura científica como en los resultados de un estudio empírico sobre implantación de sistemas ERP, este artículo propone un modelo teórico de la adopción exitosa de sistemas ERP para la mediana empresa chilena. Primero, justifica la necesidad científica y práctica del estudio con enfoques cuantitativos de la implantación exitosa de sistemas ERP. Segundo, expone el modelo inicial y el resumen de los resultados de su validación empírica utilizando PLS (Partial Least Square). La validación empírica del modelo inicial se realizó en un conjunto de 72 organizaciones chilenas usuarias de sistemas ERP. Los resultados de esta validación indican la fiabilidad y validez de las escalas de medida del modelo. Y tercero, presenta un modelo teórico revisado. El modelo teórico revisado propuesto se compone de seis antecedentes del éxito de la adopción de un sistema ERP que impactan en cuatro dimensiones que miden las consecuencias de esta adopción. Los seis antecedentes del éxito son: compromiso ejecutivo; habilidades en tecnologías de información; habilidades en procesos de negocio; entrenamiento en ERP; aprendizaje; y predisposición para el cambio. Las cuatro dimensiones que miden el éxito de la adopción del sistema ERP son: calidad de sistema; calidad de información; calidad de servicio; y beneficios netos.

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## 111. Alineación entre la Oferta y la Demanda del Mercado de Outsourcing de Tecnologías de la Información en una Economía Emergente

Jaime Andrés Caiceo Duque, Marcos Sepúlveda Fernández

Pontificia Universidad Católica de Chile, Escuela de Ingeniería, Departamento de Computación Santiago, Chile

**Abstract:** The advances in information technologies together with increasingly competitive markets have had a significant impact on the structures of organizations, leading companies to consider outsourcing certain IT-related services. This paper presents an analysis of the main characteristics of supply and demand for outsourcing services in the Chilean market. The main results indicate that IT outsourcing does not necessarily contribute to greater profitability of IT projects, nor does it allow IT managers to devote more time to strategic tasks. They further show that the degree of adoption of IT outsourcing is fundamentally related to the clients perception of the providers quality of service and compliance with service levels. Also demonstrated is the importance of the degree of alignment between clients and providers strategic visions.

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## 112. Elicitación de Requerimientos Cognitivos y de Aprendizaje

Nora Montaña, Nancy Zambrano, Amelia Soriano

Universidad Central de Venezuela Centro de Ingeniería del Software y Sistema (ISYS) Escuela de Computación Caracas-Venezuela

**Resumen:** La captura de requerimientos sobre la usabilidad de un sistema es un tema actual de investigación en el área de Interacción Humano Computador, en particular los aspectos cognitivos y de aprendizaje son importantes para determinar las características de usabilidad del sistema. Este artículo presenta un enfoque para la captura de requerimientos cognitivos y de aprendizaje, el aporte esencial se encuentra en la concepción del modelo de casos de uso como la estructura receptora de los requerimientos funcionales, a la cual se le asocia un conjunto de escenarios, que sirven de base para la captura de estos requerimientos. Se presenta un conjunto de actividades que se insertan dentro de la fase de elicitación de requerimientos que permiten definir los objetivos cognitivos y de aprendizaje deseados en el sistema, para ello es necesario organizar el modelo de casos de uso como un conjunto de unidades de abstracción y validación, que reflejan el sistema en relación directa con la perspectiva del usuario.

**Keywords:** Methodology and Software Architecture

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## 113. A Usabilidade no Contexto de Usuários Inexperientes no Uso da Tecnologia da Informação: Um Estudo de Caso

Jose Bezerra, Yara Maria Almeida Freire, Karina Marinho de Souza, Danielle Amorim

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**Abstract:** Usability, prototyping and user profile have been subjects of a variety of researches related to the human-computer interface. Usability considers aspects as effectiveness, efficiency and satisfaction of the user concerning to the interaction between the user and the system. Contemplating this topic, a case study will be present, which will expose a proposal of a new model of interface for a specific system that is already in use. This case study deals with aspects related to user, whose is composed basically for people from the countryside of Brazil without much familiarity with the computers. The evolution of proposal and the comments obtained from the representative of the user will be explained, as well as the reasons of the changes during the gradual development of the proposal and the advantages of the final version. The results reached through this article suggest that using prototypes focusing the user profile is extremely important for the success and approval of the system by the user.

**Keywords:** Human Computer Interaction

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## 114. Análise de Tecnologias de Interface de Aplicações para Dispositivos Móveis Associadas a Contextos de Usabilidade

José Bezerra da Silva Filho, Felipe Cantal, Gerhard Sabóia, Diorgens Miguel Meira

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**Abstract:** With the proliferation of the most varied mobile communications devices, jointly with new technologies of transmission, as Bluetooth and GSM, each day has been more evident the marriage of powerful computation services with resources in small dimensions screens and usability limitations. This article presents five technologies of interfaces amongst several related in a robust study of applications for mobile devices currently in use, looking for to tie them to specific applicability contexts.

**Keywords:** Human Computer Interaction

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## 115. Constraint relaxing on topological operators in pictorial queries with null answer

Fernando Ferri, Arianna D’Ulizia, Patrizia Grifoni, Maurizio Rafanelli

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**Abstract:** This paper proposes an approach for relaxing constraints of a pictorial query when the answer returns a null value. In particular this approach, similarly with the 9-intersection matrix between two sets point, proposes to extend the representation of the symbolic graphical objects (SGO) in terms of interior, boundary, and complement points, applied to any configuration of two SGO. The suggested method considers three matrices: the first for representing the points cardinality of the intersection of interior, boundary and exterior of a polyline with the analogous three intersections of a polygon, the second for representing the polylines cardinality of the same intersection sets and the third for representing the polygons cardinality of the same intersection sets. Moreover, in order to relax topological constraints of any configuration, conceptual neighbourhood graphs between topological operators valid for the different pairs of SGO are proposed, as well as the connected complex matrices which enlarge the above mentioned 9-intersection matrix. A computational model for determining relations that are conceptually more similar for each configuration is also proposed and the polyline-polygon relation is studied.

**Keywords:** Human Computer Interaction, User Interfaces

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## 116. NiMo: un lenguaje gráfico para usuarios finales

Silvia Clerici, Cristina Zoltan

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**Abstract:** In this paper we present a visual programming language inspired in process networks, with simple constructs well suited to end users and totally graphic. The language has a very clear semantics, and the fact that programs can be executed step by step, modifying code without starting again execution, seeing all the way the program transformation during execution, makes programming and program tuning an easy task. The language hierarchical structure allows construction of rather complex applications. In functional programming literature we see very often that textual programs are described as process networks, as a visual aid to its understanding. NiMo (Nets in Motion) is an extension from process networks to a complete programming language, with an environment acting as a workbench for program development and testing. The power of its algorithmic primitives, very intuitive also, combined with the data flow model graphical expressiveness turns NiMo into a simple and safe language for end users.

**Keywords:** Human Computer Interaction, Programming Languages

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## 117. Algoritmo Grasp para la distribución eficiente de objetos en una interfaz gráfica de usuarios

Juan Zamudio, Luis Rivera, David Mauricio

**Abstract:** In the present times the human interacts with the computer using the graphical user interface. The success of that interaction depends, in good part, of the efficiency of the interface. In this work, we considered that the efficiency of the graphic user interface directly depends on the time in the accomplishment of a task by a user operating a applicative. We propose a method based on Heuristic Grasp to measure the efficiency of a propose interface.

**Keywords:** User Interfaces

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## 118. A Proposal to Support Pervasive Learning

Débora Barbosa, Jorge L. V. Barbosa, Iara Augustin, Cláudio F. R. Geyer

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Federal University of Santa Maria Santa Maria, RS Brazil

Federal University of Rio Grande do Sul Porto Alegre, RS Brazil

**Abstract:** The idea of pervasive learning is to create a network of devices, people and situation that allow learning experiences to play out. This idea is attractive, but is not easily implemented. This paper presents a pervasive learning architecture called GlobalEdu which is composed by Educational Services (ES) and Pervasive Personal Pedagogical Agent (P3A) implemented above the ISAM large-scale pervasive environment. A pervasive environment is being created using the resources make available by Unisinos University. This activity will encompass the organization of the physical support to execute pervasive learning applications around the campus. With this, it will be possible for users to change of context keeping continuous computing.

**Keywords:** User Interfaces, Methodology and Software Architecture, Information Society

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## 119. Evolución de Relaciones de Credibilidad y Confianza entre Agentes

Allan Berrocal, Gabriela Barrantes

Universidad de Costa Rica. Escuela de Ciencias de la Computación e Informática. San José, Costa Rica.

**Abstract:** Computer modeling of human behavior in social groups is used in social sciences because it allows visualizing and experimenting on phenomena that are very difficult to study otherwise.

This paper presents a stochastic, non-spatially explicit model of the formation and temporal evolution of credibility and trust relationships among agents based on a few simple interactions. A prototype based on the model is described. The prototype is capable of simulating diverse situations in reasonable running times.

The results of a basic experiment are shown to exemplify the ease of use of the prototype and its potential for qualitative predictions on groups of agents.

**Keywords:** Artificial Intelligence, Information Society

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## 120. Diseño de Topologías Virtuales en Redes Ópticas. Un enfoque basado en Colonia de Hormigas

Carlos Antonio Insfran Dal Seno, Diego Pinto, Bejamín Barán

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**Resumen:** La creciente necesidad de proveer gran ancho de banda, hace crítica la resolución del problema de Diseño de Topologías Virtuales para la obtención del máximo desempeño de las redes ópticas. Dicho problema es conocido como Routing and Wavelength Assigantion (RWA). Este trabajo propone un novedoso enfoque de resolución del RWA basado en colonia de hormigas (Ant Colony Optimization-ACO), proponiendo una conversión del problema RWA original a un problema de enrutamiento tradicional, modificando el grafo que representa la red óptica. Para la resolución del problema en cuestión, se proponen nuevas versiones del MultiObjective Ant Colony System MOACS y del Multiobjective Max-Min Ant System M3AS. Ambos algoritmos simultáneamente minimizan el número total de saltos (hop count) y el número total de longitudes de onda conmutadas (wavelength switching) al atender un conjunto conocido de demandas. De esta manera,

un conjunto de soluciones óptimas de compromiso, conocido como conjunto Pareto, es calculado por los algoritmos en una sola corrida, sin restricciones a priori.

**Keywords:** Artificial Intelligence, Networks

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## 121. A genus recognition system for the Costa Rica Lauraceae Family, using a Support Vector Machine.

Juan Carlos Briceño Lobo, Carlos Travieso, Jesús Bernardino, Miguel Ángel Ferrer, Daniel Briceño

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**Abstract:** We present a novel system for automatic recognition of simple and regular tree leaves, based on a hybrid classification method by means of a Support Vector Machine (SVM). Using a Fisher kernel, calculated from a Hidden Markov Model (HMM), and a sequence of angles as the parameterization element extracted from the leaves contour; successful rates higher than 99% have been obtained. Such rates have been obtained according to the number of employed leaves in the training process, which have been from one to so on, and the number of defined states in the HMM model. The angular vectorial coding description makes these parameters: rotational, movement and size invariant. The HMM transformation encodes the sequencing characteristic of border description. Automatic parametric extraction have been implemented over colour images of scanned tree leaves at 300 dpi. The application of these algorithms has been focused on the implementation of a leaves genus classifier of endemic trees from the Costa Rica Lauraceae Family.

**Keywords:** Artificial Intelligence

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## 122. Sistema Experto con Inducción de Reglas para Apoyo a la Identificación de Géneros de Microorganismos

Haydemar Núñez, Ivan Flores, Esmeralda Ramos, Juana Vitelli Flores, Vidal Rodríguez Lemoine

Laboratorio de Inteligencia Artificial, Centro de Ingeniería de Software y Sistemas, Facultad de Ciencias, Universidad Central de Venezuela, Caracas Venezuela

(Centro Venezolano de Colecciones de Microorganismos, Instituto de Biología Experimental, Universidad Central de Venezuela, Caracas Venezuela

**Abstract:** In this work, a Web based Expert system (ES) for the identification of genders of gram-negative glucose nonfermenting bacilli is presented. These microorganisms are considered important agents in nosocomial infections, but its identification is a very complex process. The expert systems knowledge base is conformed by two types of rules: primary rules, generated with the decision tree induction algorithm C4.5, but with some modifications to make one first classification in small groups of genders; and complementary rules, to characterize the gender. In order to handle the uncertainty, the certainty factor scheme was used. Tests made with isolated bacteria of different origin, show that the system allows a reliable characterization of the genders of a form simplified.

**Resumen:** En este trabajo se presenta un Sistema Experto (SE) en ambiente Web para la identificación de géneros de Bacilos Gram Negativos No Fermentadores de la Glucosa (BGNNF). Los BGNNF son considerados agentes importantes en cuadros clínicos de infecciones nosocomiales y su identificación es un proceso de alta complejidad debido a la variedad de ensayos bioquímicos a realizar y al análisis de resultados de muchas pruebas comunes. La base de conocimientos de este SE está conformada por dos tipos de reglas: las primarias, generadas con el algoritmo de inducción de árboles de decisión C4.5 pero con algunas modificaciones, para hacer una primera clasificación en pequeños grupos de géneros; y las complementarias, para caracterizar el género en particular. Para tratar la incertidumbre inherente al problema se utilizó el esquema de Factores de Certeza. Las pruebas realizadas con bacterias aisladas de diferente origen, muestran que el sistema permite la caracterización de los géneros de una forma simplificada con un alto grado de confiabilidad.

**Keywords:** Artificial Intelligence

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## 123. Uma Proposta para Evoluir Classificadores Simbólicos Utilizando Algoritmo Genético

Flavia Bernardini, Maria Carolina Monard

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**Abstract:** Data Mining applications generally use learning algorithms in order to induce knowledge. In domains where explanation about classification decisions is essential, symbolic supervised learning algorithms are appropriated. To scale up learning algorithms to deal with large databases, data sampling techniques can be applied. Afterwards, learning algorithms can be used on each sample to induce a set of classifiers which can be combined into an ensemble of classifiers or into a unique classifier. In this work we consider the latter approach and propose the use of a genetic algorithm. We have implemented the genetic algorithm and several evaluation functions into a computational environment for evolving sets of knowledge rules, described in this work as well as experiments carried out on several datasets. Good experimental results were obtained by the genetic algorithm.

**Keywords:** Artificial Intelligence

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## 124. Um Sistema Evolutivo para a Construção de Regras de Conhecimento com Propriedades Específicas

Adriano Pila, Rafael Giusti, Maria Carolina Monard

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**Abstract:** The storage of great amount of data is nearly useless unless efficient computational methods are provided to analyze the data. Symbolic supervised learning algorithms are capable of generating set of knowledge rules, i.e. classifiers, to explain the data. From this set of rules is not always possible to extract rules that represent novel knowledge to the domain specialist. In this work, we propose a system based on evolutionary algorithms, designed for constructing individual knowledge rules with specific properties. We propose a representation for knowledge rules which has shown to be appropriated in the context of evolutionary algorithms. Based on that representation we also introduce rule recombination and evaluation

methods implemented in a consistent way with the evolutionary paradigm. Finally, we present preliminary experimental results related to the system's adequability.

**Keywords:** Artificial Intelligence

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Wednesday (14:40 - 15:00)

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## 125. Neural Classifier for MicroScrew Shape Recognition in Micromechanics

Anabel Martín, Tatiana Baidyk

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National Autonomous University of Mexico, CCADET Mexico, Mexico, 04510

**Abstract:** We propose a neural network based vision system for attending micropieces manufacturing process in micromechanics. The system permits us to recognize the shape of the micropieces (3mm diameter screws) in order to get information for controlling and improving the manufacturing process. The neural classifier used for the shape recognition task is termed Limited Receptive Area Grayscale (LIRA Grayscale). The developed vision system has recognition rate of 96.88%. This work is motivated by the idea of obtaining an automated control system for micromachines. This paper contains a detailed description of the model and learning rules, and discusses future perspectives.

**Keywords:** Artificial Intelligence

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Wednesday (15:00 - 15:20)

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## 126. Aplicación de Algoritmos Genéticos en un Sistema Multiagente de Planificación en una Industria Manufacturera

María de los Ángeles Solari, Ernesto Ocampo

Universidad Católica del Uruguay, Facultad de Ingeniería y Tecnologías, Montevideo, 11600 Uruguay

**Abstract:** This work presents the research about the application of Genetic Algorithms to a scheduling multi-agent system on a textile manufacturing industry. Manufacturing industries competitiveness greatly depends on their ability to plan and schedule their processes in the most efficient way, as it impacts on production cost and time. Assigning jobs to scarce resources is not an easy to resolve task, mainly in the complex industrial processes context. This research's objective is to assess the applicability of Genetic Algorithms - a technique with an important development in the last years - to a multiagent production scheduling system aiming to obtain higher performance levels. The paper first introduces the state of the art about the stated problem and the currently applied technologies. Industrial manufacturing systems, agents technologies, scheduling techniques and the current scheduling platform used as a basis, are described, as well as with the Genetic Algorithms technique. Finally, the proposed solution and its simulation are described, and conclusions are derived from them.

**Keywords:** Artificial Intelligence

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Wednesday (15:20 - 15:40)

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## 127. Optimización de funciones a través de Optimización por Enjambre de Partículas y Algoritmos Genéticos

Nelson Guerra, Broderick Crawford

Pontifical Catholic University of Valparaiso, School of Computer Science Engineering, Valparaiso, Chile, 237-1099

**Abstract:** This paper presents a comparison of experimental results between Particle Swarm Optimization (PSO) and Genetic Algorithms (GAs) for the numerical optimization problems. The idea was to implement a PSO algorithm, to see its real behavior by comparing it with the performance that presents GAs in the optimization of classical benchmarking nonlinear functions. Moreover, the effects of different parameters values of the PSO and GAs algorithms are presented. Computational results showed that the optimization by particle swarm has a better behavior than genetic algorithms in most of the used benchmarks

**Keywords:** Artificial Intelligence

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Wednesday (16:00-16:20)

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## 128. Fuzzy Crossover Operators for the TSP

Carlos Alberto Rossel-Jahuira, Nicolas Kemper Valverde

Universidad Nacional Autónoma de México, IIMAS, México D.F. México

**Abstract:** In this paper, we present a Hybrid Genetic Algorithm (HGA) for the TSP. We propose two new crossover operators based on the Minimal Spanning Tree Algorithm (MST), which allows exploiting problem information. Both operators work under the idea of transmitting good chromosomes segments. We propose a parameterized method, which exploits problem information in order to create individuals. A mutation operator based on swap mutation was also proposed. Genetic operators are driven by a fuzzy logic control, which allows reducing computational effort. We used a tool for scientific visualization in order to build a visual environment, which allows seeing how HGA is working. Latest experiments allowed us to find better solutions than current solutions for some TSP instances.

**Keywords:** Artificial Intelligence

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Wednesday (16:20 - 16:40)

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## 129. Uma forma normal para lógicas fuzzy De Morgan implicativas estritas que preserva tautologias e contradições

Benjamín Callejas Bedregal

Universidade Federal do Rio Grande do Norte Departamento de Informatica e Matematica Aplicada  
Laboratorio de Logica e Inteligencia Computacional Campus Universitario s/n, Lagoa Nova, Natal-  
RN, Brasil, CEP 59.072-970

**Abstract:** The most normal forms for fuzzy logics are versions of conjunctive and disjunctive classical normal forms. Unfortunately, they do not always preserve neither tautologies nor contradictions which is fundamental for automatics theorem provers based on refutations methods.

De Morgan implicative systems are triples like to De Morgan system, but considering fuzzy implications instead of t-conorms. These systems can be used to evaluate the formulas of a propositional language based on the logical connectives of negation, conjunction and implication. Therefore, determines different fuzzy logics, called of De Morgan implicative.

In this paper, we will introduce a normal form for that language and we will show that for the case of fuzzy logics De Morgan implicative whose t-norms are strict, that normal form preserve contradictions as much as tautologies.

**Keywords:** Artificial Intelligence

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**Schedule:** Hotel Crowne Plaza, Sal3n Bulnes, Wednesday (16:40 - 17:00)

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## 130. Aprendizado de Controladores Nebulosos Via Extra3o de Regras

**Fabiano Guedes, Karl H. Kienitz**

Instituto Tecnol3gico de Aeron3utica, Departamento de Sistemas e Controle S3o Jos3 dos Campos  
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**Abstract:** In this paper, we discuss a method to build a fuzzy controller, which uses a reduced fuzzy rule basis, generated by a fuzzy rule extraction, from clusters of input-output numerical data and elimination of redundant rules. This method is illustrated by an example where the fuzzy controller is applied on an attitude control system using actuators with switching-time restrictions and delays.

**Keywords:** Artificial Intelligence

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**Schedule:** Hotel Crowne Plaza, Sal3n Bulnes, Wednesday (17:00 - 17:20)

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## 131. O LEABRA como ferramenta para modelagem conexionista de sistemas neurobiológicos

Artur Versiani Scott Varella, Carlos Alberto da Silva Franco

Universidade Federal do Rio de Janeiro, Instituto de Matemática Rio de Janeiro, Brasil

**Resumen:** O amadurecimento das pesquisas das neurociências e da própria modelagem de estruturas e sistemas cerebrais torna possível e necessária a criação de modelos neurocomputacionais que ajudem a entender e exemplificar comportamentos complexos cerebrais.

A utilização do LEABRA (Local, Error-driven and Associative, Biologically Realistic Algorithm) como algoritmo regente da dinâmica e do aprendizado de um sistema de redes neurais pode ajudar na árdua tarefa da modelagem neurocomputacional.

Assim, a fim de demonstrar a utilidade e a abrangência da modelagem computacional utilizando o LEABRA foi desenvolvido um estudo envolvendo os circuitos da memória emocional, tendo como base o estado da arte das neurociências.

**Keywords:** Artificial Intelligence

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## 132. Applying Collaborative Intelligence to RoboCup

Enrique Carrera

Systems Engineering Department, University San Francisco of Quito

**Abstract:** This paper describes the implementation of a soccer team for the RoboCup Simulator League using techniques based on Swarm Intelligence. The main idea of using Swarm Intelligence is to simplify the codification of each agent (player) and, at the same time, to get complex cooperative behaviors using very simple heuristics. In addition to describe the general structure of each agent, this paper also analyzes the main algorithms implemented by our swarm strategies. Although the size of our code is very small, the evaluation of our soccer team demonstrates that robust and competitive performances can be expected from the proposed methodology. This paper also describes our plans to extend the functionality of the current team in order to make it as good as previous champion teams.

**Keywords:** Artificial Intelligence

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Wednesday (17:40 - 18:00)

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### 133. Utilização da Lógica Fuzzy para inferir a Auto-Eficácia do Aluno

Francine Bica, Regina Verdin, Rosa Vicari

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Programa de Pós-Graduação em Informática na Educação- Universidade Federal do Rio Grande do Sul (UFRGS) Av. Paulo Gama, s/nº - Prédio 12.201 - 7º andar - 90.046-900 - Porto Alegre- RS Brasil

**Abstract:** This paper presents a computational model of Self-Efficacy. Self-efficacy means the students belief on his own capacity of performing a task. This belief affects his behavior, motivation, affectivity and the choices he makes. We design an e-Learning System, called InteliWeb, this environment is composed by the Self-Efficacy Monitor Agent and offers instruction material on Biological sciences. We use fuzzy theory for dealing with uncertainty in the assessment of the students and the incomplete knowledge about his Self-Efficacy.

**Keywords:** Artificial Intelligence

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Wednesday (18:00 - 18:20)

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### 134. Particionamento de processos lógicos em simulação distribuída utilizando algoritmo genético

Michel Pires da Silva, Sarita Mazzini Bruschi, Regina Helena Carlucci Santana, Marcos José Santana

Instituto de Ciências Matemáticas e de Computação(ICMC), Universidade de São Paulo (USP), São Paulo Brasil

**Abstract:** When distributed simulation is considered, several optimization problems can be identified, such as: partitioning, load balancing and communication among processes. Aiming at reducing the impact of these



factors in the simulation running time, a genetic algorithm (AG-Partition) is proposed in order to provide partitions to distributed simulations aiming at reduces the interprocess communication. This paper presents the algorithm, its implementation and its efficiency and performance considering hypothetical models. The results indicate that its usage can provide several benefits depending on the factors used in the simulation.

**Keywords:** Artificial Intelligence

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Wednesday (18:20 - 18:40)

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## 135. O Paradigma do Dilema do Prisioneiro Aplicado ao Método de Seleção Roleta dos Algoritmos Genéticos

Otávio Teixeira, Felipe Houat de Brito, Artur Noura Teixeira, Roberto Célio Limão de Oliveira

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Programa de Pós-Graduação em Engenharia Elétrica PPGEE, Departamento de Engenharia Elétrica e Computação DEEC, Universidade Federal do Pará UFPA, Caixa Postal 8619 66.075-900, Belém Pará Brasil.

MEC2A Movimento Evolucionário e Cooperativo para a Construção do Artificial, Av. 16 de Novembro, 881, Ap. 801 Cidade Vel

**Abstract:** Este artigo apresenta uma proposta de um novo método de seleção roleta para os Algoritmos Genéticos (AG) baseado no Paradigma do Dilema do Prisioneiro (DP) o mais clássico dos jogos de duas pessoas soma não-zero não-cooperativos da Teoria dos Jogos , originando assim o método de seleção Dilema do Prisioneiro Roleta (DPR), que permite aos indivíduos da população disputarem por recursos disponibilizados pelo jogo. Dessa forma, eles têm a possibilidade de alterar a sua adaptabilidade, o que conseqüentemente influência na geração de descendência. Além disso, os resultados de algumas simulações são apresentados e comparados com os seguintes métodos de seleção: Roleta e Hawk-Dove Roleta (HDR).

**Keywords:** Artificial Intelligence

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## 136. Extracción de Minucias en Huellas Dactilares

Gabriel Sanchez, Gualberto Aguilar, Karina Toscano, Héctor Pérez, Mariko Nakano

Instituto Politécnico Nacional, Sección de Estudios de Posgrado e Investigación MEXICO

**Abstract:** Fingerprint recognition is one of the most popular methods used in people identification and with the greater degree of success. The fingerprint has unique characteristics called minutiae, which are points where a curve track finishes, intersects with other one or branches off. Identification systems using fingerprints biometric patterns are called AFIS (Automatic Fingerprint Identification System). In this work a novel method of minutiae extraction is considered as well as the image improvement using Fast Fourier Transform (FFT) in an image that has been captured using a UareU 4000© fingerprint reader of Digital Persona, Inc.

**Keywords:** Artificial Intelligence

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**Schedule:** Hotel Crowne Plaza, Salón Prieto, Thursday (08:20 - 08:40)

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## 137. Algoritmos de Optimización Multi-objetivos basados en colonias de hormigas

Julio Paciello, Héctor Martínez, Benjamín Barán, Christian Lezcano

Universidad Nacional de Asunción, Facultad Politécnica San Lorenzo, Paraguay, Casilla de Correos 1439

**Abstract:** Este trabajo realiza una comparación utilizando tres problemas de prueba bi-objetivos, el QAP, TSP y el VRPTW, de diversos algoritmos ACO existentes en la actualidad que constituyen el estado del arte en la resolución de problemas multi-objetivos utilizando la teoría basada en colonias de hormigas. Se propone un nuevo algoritmo ACO multi-objetivo, el Multiobjective Ant System, y se verifica un buen comportamiento empírico. Se demuestra empíricamente que la estrategia de utilizar una única tabla de feromonas y múltiples visibilidades supera a otras propuestas.

**Keywords:** Performance Evaluation, Networks

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**Schedule:** Hotel Crowne Plaza, Salón Prieto, Thursday (08:40 - 09:00)

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## 138. Condicionamiento Operante y Aprendizaje Vicario en Agentes mediante Redes Neuronales en Entornos Virtuales Inteligentes

Milton Martinez Luaces, Celina Gayoso Rocha

Facultad de Ingeniería Universidad ORT Uruguay Cátedra de Teoría. Cuareim 1451, Montevideo, Uruguay. CP 11600

**Resumen:** Los Entornos Virtuales son frecuentemente utilizados para simulación de situaciones en las cuales interactúan muchos agentes, con o sin interacción del usuario. En muchos casos, se requiere que los agentes que interactúan sean inteligentes, no sólo en el sentido de sentir su entorno, tomar decisiones y reaccionar en consecuencia, sino también incorporando capacidades de aprendizaje. Por otra parte, en el campo de la Psicología, se han realizado numerosos estudios que han incluido tanto observación de conductas humanas como también experimentación en animales - los cuales han dado lugar a diversas teorías sobre el aprendizaje, tales como el condicionamiento clásico, el condicionamiento operante, el aprendizaje cognitivo y el aprendizaje vicario, entre otros. El presente trabajo tiene como objetivo la aplicación de algunos de los mencionados conceptos de la Psicología al campo de los Agentes Virtuales Inteligentes. Con este fin, se desarrolló un Entorno Virtual en el que tiene lugar la interacción de diversos agentes a los cuales se incorporan capacidades de aprendizaje mediante Redes Neuronales. Finalmente, se presentan resultados obtenidos y se extraen conclusiones.

**Keywords:** Computer Architecture, Performance Evaluation, Operating Systems

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**Schedule:** Hotel Crowne Plaza, Salón Prieto, Thursday (09:00 - 09:20)

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## 139. Investigating Broad Phase Collision Detection Methods for 3D Scenarios Using Force Feedback Devices

Rafael Rocha, Maria Andreia F. Rodrigues

Universidade de Fortaleza (UNIFOR), Centro de Ciências Tecnológicas, FortalezaCE, Brazil, 60811905

**Abstract:** Crowded interactive environments composed of a high number of objects (such as those in Figure 1) need an efficient mechanism for collision detection. Recently, sophisticated devices have been used to interact with graphical elements in dynamic environments. Besides providing realism during interaction, collision detection makes the surrounding objects of a scene feel solid. This work presents a detailed performance analysis of four broad phase collision detection algorithms for interactive environments we have implemented. Extensive tests were conducted and the performance of the detection methods was evaluated in

terms of output quality and running time, by applying a usability criteria. The results show that interactive frame rates for environments composed of 1000 dynamic objects can be successfully developed with a good level of user satisfaction using the sweep and prune algorithm.

**Keywords:** Computer Graphics

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## 140. Image Fidelity Index Applied to Digital Mammography Texture Segmentation

Carlos Mello, Angelica Mascaro

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**Abstract:** Several studies are being developed nowadays in the search for algorithms to find cancerous cells in a mammogram. By the other hand, the definition of measures for image quality or fidelity is still a challenge. In this paper, a variation of a fidelity index is proposed aiming the segmentation of mammograms based on textures similarities. This segmentation can be used in the analysis of images of mammograms in means to reduce the areas to be searched for findings. It is particularly very suitable to the problem of detecting edge breast.

**Keywords:** Computer Graphics

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**Schedule:** Hotel Crowne Plaza, Sal3n Prieto, Thursday (09:40 - 10:00)

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## 141. Reconstrucción de superficies de forma libre mediante funciones NURBS

Ernesto Cuartas, Flavio Prieto

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**Resumen:** El modelado 3D es uno de los campos de investigación con más auge en el área de visión por computador. La reconstrucción de objetos del mundo real en un ordenador ha cobrado un nuevo significado gracias al avance en los digitalizadores 3D, que rastrean la geometría de un objeto con una mayor precisión en cada nueva generación. El problema de convertir una densa nube de puntos desorganizados en un modelo útil es uno de los campos de mayor interés. Este trabajo ofrece un método de reconstrucción efectivo empleando funciones paramétricas NURBS y técnicas de optimización para la obtención de modelos livianos y realísticos de objetos del mundo real.

**Keywords:** Computer Graphycs

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**Schedule:** Hotel Crowne Plaza, Salón Prieto, Thursday (10:20 - 10:40)

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## 142. Ajuste de Superficies de Objetos 3D a Partir de Imágenes de Rango Usando Superficies NURBS

Nallig Leal Narváz

Universidad de Antioquia, Departamento de Sistemas, Medellín, Colombia

**Abstract:** The 3D reconstruction is the process by which objects are reproduced in the computers memory, keeping its physical characteristics (dimensions, volume and shape). The 3D reconstruction is a difficult task that covers, in general terms, five stages: data acquisition, registration, integration, segmentation and surface fitting. In the last stage, the computational model of the object is obtained.

There are several methods that can be used to construct surface models of 3D objects like triangular meshes, Radial Basis Functions, NURBS surfaces, etc. The present study focuses on NURBS surface fitting from range data. Modeling with NURBS surfaces has become a standard in CAD/CAM systems due to its stability, flexibility, and local modification properties. It is well known the advantage of fitting with NURBS surfaces, but it is also known NURBS surfaces have several lacks. A NURBS surface can not be fitted over

an unorganized and scattered set of points and the representation of sharp features like edges, corners and high curvatures is poor.

The main focus of this work is the NURBS surfaces fitting over unorganized and scattered clouds of points. Fitting clouds of points using NURBS surfaces allows processing of raw range data, which is considered the main information source in the 3D reconstruction, by using the standards and potential of NURBS surfaces. Normally, a cloud of points contains millions of points, so that it is important to use simplification methods to reduce the computational cost of processing of such clouds of points. This research presents a new simplification method that maintains both local and global distribution of the original cloud of points.

Generally, a cloud of points of range data is noisy and such a noise may cause invalid reconstructed surfaces if none previous processing of the points is applied. This research presents a weighted variant of the principal components analysis to reduce the noise of the data. Finally, an optimization method of NURBS surfaces to preserve sharp features is presented.

**Keywords:** Computer Graphics Artificial Intelligence

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## 143. Medición de tiempo y frecuencia en video digital usando un arreglo de luces intermitentes

**Juan Forero, Pablo Figueroa, Carlos Rodriguez**

**Abstract:** The study of movement based on video processing is a common tool in different fields. One reason for measuring errors in these type of installations is frame synchronization, specially when several cameras are used. This problem can be solved with the use of cameras with genlock mechanism, but such a solution could be expensive or not possible if the available cameras do not have such feature. This work shows a new method for capturing each frames time of capture, which also takes into account processing units speed as an extra source of measurement errors. Our method uses an array of synchronized lights, which add temporal information to each frame. Our system has been evaluated with several videos, and we show its effectiveness as well as its future use as a solution for synchronization of multiple cameras without genlock, possibly at different frame rates.

**Keywords:** Computer Graphics Human Computer Interaction

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**Schedule:** Hotel Crowne Plaza, Salón Prieto, Thursday (11:00 - 11:20)

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## 144. Desarrollo de una plataforma para la administración de ejecuciones de workflows en un entorno de trabajo en bioinformática

Gustavo Adolfo Salazar Orejuela, Fernando Barraza, Oscar Restrepo, Yesid Cuesta

ParqueSoft, Laboratorio de Bioinformática, Santiago de Cali, Colombia, 057

**Abstract:** With the incoming of the massive data generation Technologies, used in projects such as the human genome sequencing, the need to automates and simplify the routine processes to obtain, integrate and analyze great amount of data has emerged, in order for it to be constituted in true support information within the applications in bioscience. Possible solutions have been met through platforms implantation in bioinformatics where one of the most important elements to handle it is the workflows systems. Relative this matter, this document analyzes the particular characteristics of these platforms and as a result it presents an architectural proposal inspired in the reference model of the WfMC (Workflow Management Coalition) which was adapted with the necessaries considerations about bioinformatics. Also it is described its implementation in a real case, where a web interface stands out which allows the execution and functional extension of workflow engines applied to bioinformatics.

**Keywords:** Databases, Software Engineering, User Interfaces

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**Schedule:** Hotel Crowne Plaza, Salón Prieto, Thursday (11:20 - 11:40)

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## 145. Schema-Matching with Neural Networks: A new Approach using Representing Schemas

Milton Martinez Luaces, Carlos Luna, Sebastian Blanco

Universidad ORT Uruguay, Facultad de Ingeniería

**Abstract:** The great effort needed for manual schema matching, in data migration, data warehousing and real-time query translating, has induced some researchers to look forward for an automatic mapping procedure among heterogeneous databases. These methodologies use rule-based systems, fuzzy-logic, mathematical calculations, algorithmic solutions and also Artificial Neural Networks (ANN). In the case of ANN, especially a tool called SemInt developed by Li and Clifton, which performs a one-to-one mapping, can be considered as a pioneer work in this area. In this paper, our goal is to propose an alternative methodology to SemInt, on a Backpropagation ANN basis, but using a representing schema, which allows a many-to-many cardinality, a feasible alternative in case of well-known and stable domains. Data pre-process, relevant

input definitions, and a sample reference schema are considered. Topologic-level concept is introduced and its application showed by examples from real practice. A backpropagation neural network is developed, and trained following the methodology described in this work.

**Keywords:** Databases, Artificial Intelligence

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**Schedule:** Hotel Crowne Plaza, Salón Prieto, Thursday (11:40 - 12:00)

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## 146. Realimentação de Relevantes via Algoritmo Genético auto-adaptativa à subjetividade da Similaridade entre Imagens

Sergio Silva, Celia A. Z. Barcelos, Mascos A. Batista

Universidade Federal de Uberlandia, Faculdade de Computacao Uberlandia, Brasil

Universidade Federal de Goias, Departamento de Computacao Catalao, Brasil

**Abstract:** Nowadays the main hurdles facing Content-based Image Retrieval Systems are: 1) the semantic gap between the low-level visual features and the high-level semantic concepts and 2) human subjectivity in regard to visual content. This work is inspired on the WLSP-C image similarity model, proposed by Stejic (2003). The main characteristics are: the region-based image comparison, the use of feature combinations, and the image similarity measure's adaptation to the users criteria using weights that reflect their relevance and irrelevance concepts and, also the undesirability of similarities. The main objectives of this work are: to improve the retrieval precision and to increase the method's speed. Experiments have shown that the proposed method provides a better performance when compared to Stejiæ's model which was affirmed to as having a greater efficiency than many of the existing methods, as observed by the authors. Tests in a database of 4200 images have shown that the system is very efficient, indicating the possibility of World Wide Web application, using the force of parallel computation to minimize search time.

**Keywords:** Databases, Artificial Intelligence, Information Retrieval

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## 147. Comparación de Cuatro Técnicas de Selección de Características Envolventes usando Redes Neuronales, Árboles de Decisión, Máquinas de Vector de Soporte y Clasificador Bayesiano.

Samuel Oporto Díaz, Iván Aquino Morales, Jacqueline K. Chávez Cuzcano, César O. Pérez Pinche

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**Resumen:** La selección de características consiste en la búsqueda del subconjunto óptimo de características que disminuya el error de un algoritmo de aprendizaje. Existen dos tipos de algoritmos de selección de características: los de filtro y los envolventes; los primeros escogen el subconjunto de características independiente del algoritmo de aprendizaje y los últimos usan los algoritmos de aprendizaje para escoger el mejor subconjunto de características. En este trabajo realizamos una comparación de 4 algoritmos de selección de características envolventes para clasificación con búsquedas: Búsqueda Aleatoria Optimizada (BAO), Mejor Primero, Búsqueda Genética y Búsqueda Aleatoria. Para medir la calidad del subconjunto usaremos el error del clasificador. Los clasificadores usados son: Red Neuronal de Retropropagación, Arbol de Decisión C4.5, Máquina de Vector de Soporte y el clasificador bayesiano NaiveBayes. En los experimentos, usaremos 3 Bases de Datos extraídos del Repositorio UCI. Para estas pruebas se demuestra que la Búsqueda Aleatoria Optimizada produce, en promedio, el menor error de clasificación.

**Keywords:** Databases, Performance Evaluation, Artificial Intelligence

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## 148. Impacto de la Evolución de la Base de Datos en el Diseño de un Sistema de Información

Daniel Calegari, Andrés Vignaga, Daniel Perovich

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**Resumen:** Los sistemas de información son sistemas complejos que procesan y persisten gran cantidad de datos. Estos sistemas pueden ser estructurados siguiendo un estilo de arquitectura en tres capas: presentación, dominio e infraestructura, organizando cada capa en base a patrones. La evolución de estos sistemas tiene fuerte impacto en la organización estructural de los mismos, implicando la adecuación de la lógica del dominio,

del módulo de acceso a datos, y la estructura de la propia base de datos. El artículo presenta un estudio cualitativo del impacto que tiene la evolución estructural de la base de datos en un sistema de información, cuya lógica de dominio y módulo de acceso a datos están estructurados utilizando patrones. Además, se presentan lineamientos que involucran generación automática de código para minimizar el impacto.

**Keywords:** Databases, Software Engineering, Methodology and Software Architecture

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Thursday (08:40 - 09:00)

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## 149. Micro500: Un Sistema para Extracción de Conocimiento en Microorganismos

**Sergio Zepeda, Sergio V. Chapa**

**Centro de Investigacion y de Estudios Avanzados del I.P.N. Ingenieria Electrica, Seccion de Computacion Mexico, D.F., Mexico. 07360**

**Resumen:** Los datos biológicos son muy complejos para construir eficientes bases de datos y modelos que permitan obtener conocimiento. Nosotros trabajamos con una base de datos llamada CDBB500 que contiene información biológica de la colección nacional de cepas y cultivos microbianos. Nuestras investigaciones analizan correlaciones, descripciones, y descubrimiento de conocimiento a diferentes niveles como: fisiología, morfología y datos genómicos. Desarrollamos un sistema web con datos biológicos con información publica. Actualmente estamos adicionando nuevas características modificando el modelo para permitirle interactuar con diferentes bases de datos; el sistema es llamado Micro500. En este documento mostramos como la arquitectura del sistema original está siendo modificada para incluir el proceso de análisis.

**Keywords:** Computer Graphycs

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## 150. Recuperación por similitud de forma de huellas digitales mediante una indexación en espacio métrico

Omar Florez, Jose Mercado, Yordan Yampi

Departamento de ciencias de la computacion Universidad Nacional de San Agustin de Arequipa

**Resumen:** Existen actualmente varios modelos de recuperación de información en audio, video, imagen, que están basadas en características tales como el color, textura, forma y relaciones espaciales. A pesar de que la mayoría de estos trabajos está orientada a la extracción vectorial de características, sólo se ha dado una limitada atención a la combinación de técnicas de caracterización vectorial y modelos de similitud de formas indexadas en espacios métricos. En este paper, presentamos la recuperación por similitud de forma utilizando características locales e indexación en estructuras métricas de huellas dactilares. La forma es tratada en dimensiones que están relacionadas con la dirección  $y$ , vecindades radiales de puntos característicos. La indexación de las huellas dactilares es implementada a través de la inserción de vectores dentro de un M-tree. Para resolver problemas relacionados a la baja calidad de la imagen utilizamos la transformada y la inversa de la transformada de Fourier con filtros paso bajo Gaussianos.

**Keywords:** Databases, Information Retrieval

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Thursday (09:20 - 09:40)

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## 151. Desempenho de Banco de Dados em modelo dimensionais

Sueli de Fatima Poppi Borba, Aran Bey Tcholakian Morales, Edson Carlos da Silva

Universidade Paranaense Unipar, Instituto Superior de Ciências Exatas, Agrárias, Tecnológicas e Geociências. Brasil

Universidade Federal de Florianópolis, Departamento de Engenharia da Produção Brasil

**Abstract:** This paper talks about the paradigm of the orientation to objects and database. The work presents a benchmark between relational database and object-oriented models, in an application of data warehouse environment, using the multidimensional modelling. The work presents a benchmark proposal based on stages for the generation of the model and procedures for the application of the tests. Following the determination of the related procedures in each one of the stages, the work simulates real data, testing the measures for both database models.

**Resumen:** Este artigo insere-se no contexto atual do paradigma da orientação a objetos e banco de dados. O trabalho apresenta um benchmark entre modelo de banco de dados relacional e modelo orientado a objetos, em uma aplicação de ambiente de data warehouse, seguindo a modelagem multidimensional. O trabalho apresenta uma proposta de benchmark baseada em etapas para a geração do modelo e procedimentos para a aplicação dos testes, relacionando ambiente e medidas. Seguindo a determinação dos procedimentos relacionados em cada uma das etapas, o trabalho realiza uma simulação a partir de dados reais, testando as medidas para ambos os modelos de banco de dados.

**Keywords:** Artificial Intelligence

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## 152. Temporal Scenarios for Database Constraints: Data Integrity Modeling based on Contextual Predicates

**Luiz Camolesi Jr.**

Universidade Metodista de Piracicaba UNIMEP, Faculdade de Ciências Exatas e da Natureza, Piracicaba, São Paulo Brasil

**Abstract:** Modern database systems manage very large volume of database constraints. The cost spent in maintenance constraints is quite expensive because most of integrity specifications have dynamic parameters from applications domain with irregular and intermittent changes. Thus, data constraints can be considered dynamic requirements and therefore demanding all the associated cares. In recent evolution, the representation models of database constraints uses predicates group without a classification, becoming poor and inflexible to represent the rules which are usually found in real problems and still, demanding a great effort from the teams of software database for their maintenance. The constraints maintenance can be motivated to real world changes that reach the integrity conditions of applications, being the time a dimension to represent the boundary of applicability in constraints. This article defines a temporal modeling of variability features in database constraints to represent efficiently the moment (instant or interval) when assertions must be used to enforce the data integrity. Using the scenarios modeling, both constraint variability features (survivability and applicability) are represented by time predicates, using the extended temporal logic incorporated in Object Constraint Language (OCL), and thus resulting in the modeling extension for dynamic constraints involved in database updating.

**Keywords:** Databases

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## 153. ProDIWA: um Processo Automatizável para Geração e Manutenção de Visões de Contexto de Navegação para Aplicações DIWA

Vânia Vidal, Tâmara Lima, Fernando Lemos

Universidade Federal do Ceará Brasil

**Abstract:** Web applications for accessing and maintaining large amounts of structured data, typically stored as records in a database management system, are called "data-intensive Web applications" (DIWA applications). In this work, the content requirements for each page of the application are specified through a view, denominated Navigation Context View (VCN). We consider that VCNs data are stored in a relational database, which does already exist, or, otherwise, must be specifically designed for the application. In this work we propose a process for generating and maintaining VCNs for DIWA applications. One advantage of our approach is that the implementation and maintenance of the VCNs can be done in an automatic way based on the VCNs conceptual specifications. We consider that the VCNs can be implemented either as object views or as XML views

**Keywords:** Databases

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Thursday (10:40 - 11:00)

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## 154. Investigando o Desempenho da Estrutura de Indexação MRS com base na Geração de Genomas Sintéticos

Ricardo Ciferri, Mônica Nakano, Cristina Dutra de Aguiar Ciferri, Reginaldo Massanobu Kuroshu, José Júnior Lombardi Bariviera, Nielder Tarsus Honorato da Silva

Universidade Federal de São Carlos Brasil

Fundação FAFIMAN Brasil

Universidade de São Paulo Brasil

University of Tokyo Japón

Universidade Estadual de Maringá Brasil

**Abstract:** In this paper we address the similarity search of sequences in biological databases using the MRS index structure. We propose and automate the following activities aimed at generating synthetic genomes from real ones: (i) to obtain real genomes of bacteria and plasmids; (ii) to analyse the obtained genomes

focusing on identifying which characteristics of them should be extracted and consequently reproduced; and (iii) to generate synthetic genomes that have similar characteristics to those identified in real ones. We also investigate the influence of the data volume in the performance of the MRS. The performance tests showed that the MRS is able to manage different volumes of biological data, as its search time keeps a linear variation with regard to the data volume growth.

**Resumen:** Este artigo enfoca a pesquisa de similaridade de seqüências em bancos de dados biológicos com o auxílio da estrutura de indexação MRS. Para tanto, propõe e automatiza as seguintes atividades voltadas à geração de genomas sintéticos a partir de genomas reais: (i) obtenção de genomas reais de bactérias e plasmídeos; (ii) análise dos genomas reais obtidos, visando-se identificar quais características destes genomas devem ser extraídas e, conseqüentemente, reproduzidas; e (iii) geração de genomas sintéticos, com características similares às identificadas nos genomas reais. O artigo também investiga a influência específica do volume de dados no desempenho da MRS. Os testes de desempenho mostraram que a MRS é adaptada para gerenciar diferentes volumes de dados biológicos, desde que o seu desempenho mantém uma variação linear com relação ao crescimento do volume.

**Keywords:** Databases

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## 155. Análise da Linguagem SQL3 com relação à Especificação de Regras de Negócio

Judith Pavón, Sidney Viana, Edit Grassiani Lino de Campos

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Centro Universitário FIEO UNIFIEO, Departamento de Ciência da Computação, São Paulo Brasil

Instituto de Pesquisas Tecnológicas do Estado de São Paulo IPT, Engenharia de Computação, São Paulo Brasil

**Abstract:** An Active Database Management System (ADBMS) is a conventional Database Management System (DBMS) extended with the capability to execute Event-Condition-Action (ECA) rules, which allow defining actions to be executed in response to events. Triggers, as defined in the SQL3 (Structured Query Language) standard, are typical examples of ECA rules. However, despite the importance ADBMSs attach to these rules, they usually provide limited support for business rules implementation, which go beyond the restricted view of just imposing integrity constraints on data, since they determine the modus operandi of a business, which can be very complex. This paper analyzes the SQL3 support for specifying business rules in order to identify limitations related to the definition of each rule type frequently used in information systems.

**Resumen:** Um Sistema Gerenciador de Banco de Dados Ativo (SGBDA) é um Sistema Gerenciador de Banco de Dados (SGBD) convencional, acrescido da capacidade de executar regras Evento-Condição-Ação (ECA), que permitem definir ações a serem executadas em resposta a eventos. Os triggers, mecanismos presentes na linguagem padrão SQL3 (Structured Query Language), são exemplos típicos de regras ECA. No entanto, apesar da importância atribuída às regras pelos SGBDAs, eles não provêem um modelo apropriado para a especificação de regras de negócio, visto que, em geral, dão suporte a regras apenas como artefatos que impõem restrições de integridade aos dados. Porém o âmbito das regras de negócio é muito mais amplo, uma vez que elas determinam o modus operandi de um negócio, que pode ser bastante complexo. Este artigo analisa a linguagem SQL3 quanto a seu suporte para a especificação de regras de negócio, com a finalidade de identificar suas limitações quanto à definição de cada tipo de regra frequentemente usado nos sistemas de informação.

**Keywords:** Databases

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## 156. Data Warehousing na Saúde: Melhorando a Tomada de Decisão Médico-Analítica

Cristina Ciferri, Ricardo Rodrigues Ciferri, Reinaldo Jiunji Ogata, André Moraes Paula Lima, Agma Juci Machado Traina

Universidade de São Paulo Brasil

Universidade Federal de São Carlos Brasil

Universidade Estadual de Maringá Brasil

**Abstract:** In this paper we investigate the use and the importance of the data warehousing technology in the healthcare area. We propose five multidimensional schemas focusing on the most interesting business processes of three medical institutions: monthly costs of products by sector, occupation of facilities, disease treatment, costs of medical procedures and pregnancy control. The proposed schemas consider data granularity regarding different dimensions and are aimed at the three levels of information of any healthcare institution. Besides, these schemas can be used as a basis for creating new healthcare data warehousing applications. In this paper we also describe aspects related to the implementation of the monthly costs of products by sector multidimensional schema.

**Resumen:** Este artigo enfoca a aplicação e a importância da tecnologia de data warehousing na área de saúde. Sua principal contribuição é a proposta de cinco esquemas multidimensionais referentes aos assuntos de maior interesse para três instituições médicas: custo mensal de produtos por setor, ocupação de instalações, tratamento por doença, custo dos procedimentos e controle de gestantes. Os esquemas propostos tratam a

granularidade dos dados considerando-se diferentes dimensões e enfocam os três níveis de informação de uma instituição de saúde. Ademais, estes esquemas servem de base para a criação de novas aplicações de data warehousing para a área de saúde. O artigo também descreve aspectos de implementação do esquema multidimensional custo mensal de produtos por setor.

**Keywords:** Databases

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## 157. O Catálogo de Padrões de Análise da Ferramenta ArgoCASEGEO

Jugurta Lisboa, Alexandre Gazola, Marcus V. Alvim Andrade

Universidade Federal de Viçosa (UFV), Departamento de Informática Viçosa, MG, Brasil, 36570-000  
Brasil

**Abstract:** An analysis pattern is any part of a requirement analysis specification that can be reused in the design of new information systems. When starting the design of a new application, the designers can benefit from previously constructed schemas that are truly efficacious, reducing thus the costs and increasing the productivity and quality of the project. This article describes the implementation of an analysis patterns catalog in a CASE tool for geographic database modeling.

**Keywords:** Information Retrieval, Distributed Systems

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**Schedule:** Hotel Crowne Plaza, Salón Bulnes, Thursday (12:00 - 12:20)

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## 158. Análise da Expressão Gênica através de Cadeias de Markov extraídas a partir de RNRs

Ígor Almeida, Denise R. Pechmann, Adelmo L. Cechin

Universidade do Vale do Rio dos Sinos - UNISINOS, São Leopoldo, RS, Brasil

**Abstract:** Microarrays have made it straightforward to monitor simultaneously the expression pattern of thousands of genes. Thus, a lot of data is being generated and the challenge now is to discover how to extract useful information from them. Microarray data is highly specialized, involves several variables in a non-linear and temporal way, demanding nonlinear recurrent free models, which are complex to formulate and to analyze. Markov Chains are easily visualized in the form of graphs of states, showing the influences among the gene expression levels and their changes in time. In this work, it is proposed a new approach to microarray data analysis by extracting a Markov Chain. Important aspects to be analyzed are the time evolution of the genic expression and their mutual influence in the form of regulatory networks.

**Keywords:** Information Retrieval

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## 159. Búsqueda de Páginas Web mediante una Ontología poblada por Clasificación Automática de Textos

Ismael Ponce, José A. Zárate

Centro Nacional de Investigación y Desarrollo Tecnológico

**Resumen:** Encontrar información en la Web sigue siendo una tarea complicada, especialmente si la información buscada pertenece a un tema específico. Como alternativa, sugerimos usar una ontología temática para realizar consultas sobre un dominio particular, considerando sus ejemplares como enlaces Web, aprovechando el orden y las relaciones entre los conceptos que el uso de una ontología permite.

Describimos los pasos seguidos para utilizar una ontología temática y las actividades para poblarla siguiendo técnicas de clasificación automática, incluyendo la representación de las páginas Web dentro del modelo del espacio vectorial, así como pruebas efectuadas usando los algoritmos Naive Bayes, k-vecinos más cercanos y máquinas de soporte vectorial. Finalmente, para guiar al usuario a través de los conceptos de la ontología, seguimos una interfaz que aprovechara la técnica de lenguaje natural acotado.

**Keywords:** Information Retrieval

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## 160. Sistema Inteligente para hacer Minería Web

Jose Aguilar

Universidad de Los Andes, Facultad de Ingeniería, Escuela de Ingeniería de Sistemas Mérida, Venezuela, 5101

**Abstract:** The Web Mining arises like an appropriate tool to exploit the derived knowledge of the web-user interaction, describing models that use patterns and characterize the profiles of the different groups of users which use Internet. To achieve this, currently there are numerous techniques. Some of these techniques are integrated in this work to build a Hybrid System of Web Mining that allows to extract useful information of the web users. In this way, we try to exploit the capabilities of each one. Specifically, three techniques of the area of Web Mining were used: Sequential Patterns, Path Analysis and Cubes. The System obtains a group of access patterns from the users to a website, to arrange them in a multidimensional structure, called Cube. Using that, the system can discover correlations between the web pages and users' groups, behaviors of the web users, among other things.

**Keywords:** Software Engineering, Human Computer Interaction, Collaborative Systems

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## 161. Un nuevo índice eficiente para resolver diversas consultas espacio-temporales

Maria Gisela Dorzán, Edilma Olinda Gagliardi, Juan Guillermo Gómez Barroso, Gilberto A. Gutiérrez Retamal

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Universidad del Bío-Bío Facultad de Ciencias Empresariales, Departamento de Auditoría e Informática, Chillán, Chile

**Abstract:** Spatio-temporal databases deal with objects that change their location and/or shape over time. Numerous researches have been done in developing spatio-temporal access methods as auxiliary structures

to support spatio-temporal queries. The main interest of most applications is to efficiently store and query the positions of these objects. We can find a related rich literature on the subject about the methods for supporting a subset of the following TimeSlice, Events, Interval and Trajectory queries. In this paper we propose a new index structure, the D\*R-Tree to efficiently store and retrieve spatio-temporal objects. The main objective of this work is to show a suitable method for supporting all mentioned queries types, with an optimal performance. We propose the index in terms of the basic algorithms for querying. We test our proposal in an extense experimental evaluation with generated data sets. In our tests, the D\*R-Tree showed good scalability when increasing the number of objects and time units in the data sets, as well as in query processing, compared with a similar structure.

**Keywords:** Software Engineering, Methodology and Software Architecture, Distributed Systems

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## 162. Funciones de Discretización Basadas en Histogramas de Distancias

Norma Herrera, Edgar Chávez, Carina Mabel Ruano, Ana Valeria Villegas

Escuela de Ciencias Físico-Matemáticas Universidad Michoacana Morelia México

Departamento de Informática Universidad Nacional de San Luis Argentina

**Resumen:** El modelo de Espacios Métricos permite formalizar el concepto de búsqueda por similitud en bases de datos no tradicionales. El objetivo es construir índices que permitan reducir el tiempo necesario para resolver una búsqueda por similitud. Uno de los enfoques para la construcción de índices es el usado por los algoritmos basados en pivotes. Un pivote es un elemento distinguido del espacio métrico que puede o no pertenecer a la base de datos. Los algoritmos basados en pivotes tienen dos parámetros que afectan su desempeño: la cantidad de pivotes y la cantidad de bits usada por cada pivote. Dado un pivote  $p$ , una función de discretización clasifica a los objetos del espacio según su cercanía a dicho pivote. La función de discretización usada influye tanto en el espacio usado por el índice como en el tiempo requerido para resolver una búsqueda. En este trabajo abordamos el diseño de funciones de discretización tomando como base la información brindada por el histograma de distancias del espacio. Mostramos dos métodos que utilizando sólo un bit por pivote obtienen una alta eficiencia.

**Keywords:** Algorithms and Data Structures, Databases

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## 163. Análisis de desempeño de EquipAsso: Un algoritmo para el cálculo de Itemsets frecuentes basado en operadores algebraicos relacionales

Andres Calderon, Ivan Ramirez, Juan Carlos Alvarado, Fernando Guevara, Ricardo Timarán

Departamento de Sistemas, Universidad de Nariño Ciudad Universitaria Torobajo San Juan de Pasto, Nariño, Colombia

**Abstract:** The task of searching for interesting relationships among data has been always a researching focus in data mining. The overall performance of mining association rules is determined by discovering large itemsets, i.e., sets of itemsets that have their support above a pre-determined minimum support. The different algorithms proposed for association rules task show different approaches to generate all large itemsets: Apriori, AprioriTid, AprioriHybrid, DHP, DIC, Partition, FP-Growth and EquipAsso.

In this paper, the performance of EquipAsso, an algorithm for discovering large itemsets, based on two new operators of relational algebra, is evaluated in relation with Apriori and FP-Growth algorithms, on Tariy, a tool for the Association task loosely coupled with a DBMS.

**Keywords:** Distributed Systems

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## 164. Aplicación de Técnicas Invariantes en el Reconocimiento de Rostros

César Julio Bustacara Medina, Camilo Andrés Sánchez Aldana, Jairo José Daza Portillo.

Pontificia Universidad Javeriana

**Abstract:** This paper presents one approximation to solve the face recognition problem within color images. The solution is based on the needs to support flexibility in biometric systems to verify and identify an individual. The proposed system does not require that the individual to be identified has a specific position before the biometric system camera, the system verifies and to identifies one individual independently of his position, scale and orientation within the captured image, meaning that, the system uses an invariance approach for face recognition.

**Keywords:** Algorithms and Data Structures, Computer Graphycs

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## **165. Selección de Centros de Interpolación de Funciones de Base Radial para la Reconstrucción de Superficies de Objetos de Forma Libre.**

**German Sanchez, Sandra P. Mateus Santiago, John Willian Branch Bedoya, Pierre Boulanger**

**Universidad Nacional de Colombia, Facultad de Minas Medellín, Colombia**

**University of Alberta Edmonton, Canada**

**Resumen:** En este paper se presenta un procedimiento rápido para la selección automática de centros de interpolación de funciones de base radial. El procedimiento se basa en la clusterización de la superficie del objeto en regiones con características geométricas homogéneas tales como: la estimación de curvatura. Este enfoque de clusterización garantiza que la totalidad de las variaciones de la superficie serán representadas en la construcción del interpolante. Posteriormente, un conjunto de reglas es aplicado a cada uno de los cluster, para seleccionar finalmente los puntos del cluster que deberán ser utilizados como centros de interpolación. Las reglas fueron extraídas de soluciones óptimas obtenidas mediante una Estrategia Evolutiva. Excelentes resultados sobre datos de rango reales son mostrados.

**Keywords:** Algorithms and Data Structures, Computer Graphycs

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## 166. mPRIME: Solução Integrada para Gestão de Riscos

Cristine Gusmão, Hermano Perrelli de Moura

Universidade Federal de Pernambuco (UFPE), Centro de Informática, Recife (PE), Brazil

**Resumen:** A indústria de software enfrenta muitos tipos de riscos que fazem com que os projetos de desenvolvimento de software sejam desviados de seu planejamento original, cronograma, prazo de entrega e qualidade final. Portanto, é preciso gerenciar riscos. Nestes ambientes é importante a utilização de processos e ferramentas de suporte ao gerenciamento efetivo dos riscos. Dentro deste contexto, este artigo apresenta ferramenta de gestão de riscos de múltiplos projetos - mPRIME.

**Keywords:** Software Engineering

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## 167. Performance Modeling of Message-Passing Libraries on System Area Network Clusters

Guillermo L. Taboada, Juan Touriño, Ramón Doallo

Computer Architecture Group Dep.. of Electronics and Systems University of A Coruña, Spain

**Abstract:** This paper presents an analytical performance modeling of message-passing overhead on System Area Network (SAN) clusters. Communication performance is critical for the overall SAN-based system performance. In order to analyze the communication overhead, a linear model is used for its characterization. Performance models have been derived using our own micro-benchmark suite on MPI C and Java message-passing libraries. These models predict satisfactorily the experimentally measured performance. Representative performance metrics have also been obtained in order to evaluate message-passing performance and establish comparisons among different message-passing libraries and clusters. Besides the evaluation process, taking communication models into account has shown its usefulness in order to optimize parallel applications.

**Keywords:** Performance Evaluation, Distributed Systems

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## 168. Geração Automática de Diagramas de Comunicação a partir de Contratos OCL

Claumir Claudino dos Santos, Raul Sidnei Wazlawick

UFSC-CTC-PPGCC

**Abstract:** This paper presents a set of rules that can be applied to contracts of system operations to allow automatic generation of UML (Unified Modeling Language) communication diagrams. Those diagrams may then be used for automatic code generation.

A blind search algorithm was defined and implemented to find diagrams that carry through a contract in accordance with GRASP design patterns (General Responsibility Assignment Patterns Software).

The contracts are written in a language that consists in an OCL (Object Constraint Language) adaptation that represents the five types of possible semantic post-conditions in object-oriented models.

The blind search algorithm is defined by set of four rules that allow the generation of communication diagrams for a large number of contracts. The system was implemented and tested in several typical contracts for information systems from actual projects, and in all cases produced the expected results. Because of the structure of those kinds of contracts, the results can be generalized to arbitrary complex systems.

**Keywords:** Software Engineering, Programming Languages

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## 169. A Concurrent Constraint Factor Oracle Model for Music Improvisation

Camilo Rueda, Gerard Assayag, Shlomo Dubnov

IRCAM, Paris, France and Universidad Javeriana, Cali, Colombia

IRCAM, Cnrs UMR Stms, Paris, France

University of California, San Diego, USA

**Abstract:** Stylistic learning applies machine learning methods to musical sequences in order to capture salient musical features and organize these features into a model. The Stylistic simulation process browses the model in order to generate variant musical sequences that are stylistically consistent with the learned material. If both the learning process and the simulation process happen in real-time, in an interactive system where the computer "plays" with musicians, then Machine Improvisation is achieved. Improvisation models

have to cope with a trade-off between completeness (all the possible patterns and their continuation laws are discovered) and incrementality (the completeness is ensured only asymptotically for infinite sequences). In a previous work we devised a complete and incremental model based on the Factor Oracle Algorithm. In this paper we propose a concurrent constraints model for the Factor Oracle and show how it can be used in a concurrent learning/improvisation situation. Our model is based on a non-deterministic concurrent constraint process calculus (NTCC). Such an approach allows the system to respond in a faster and more flexible manner to real-life performance situations. In addition, the declarative nature of constraints greatly simplifies the expansion of the system with improvisation rules at a higher musical level. We also describe the implementation of our model in a NTCC interpreter written in Common Lisp that is capable of real time performance.

**Keywords:** Software Engineering

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**Schedule:** Aula Magna, Centro de Extensión, PUC, Friday (08:20 - 08:40)

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## 170. Polyhedral Description Module a Cone and Gomory's Group Problems

**Julian Araoz, Ellis Johnson**

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**Georgia Tech, Atlanta, U.S.A.**

**Abstract:** For many combinatorial polyhedra a characterization of the non-trivial facets has been given, meaning in general as trivial the non-negativity conditions.

For Group, Semigroup Problems and Additive Systems the non-trivial facets have been characterized as the minimal extreme rays of the Subadditivity Cone or minimal vertices of related polyhedra. For Group and Semigroup Problems the Subadditivity Cone had been proved polyhedral but not for Additive Systems.

We prove this here by extending the minimal definition to minimal respect to a cone and proving that a cone is polyhedral if and only if there exists a polyhedral cone contained in it and containing all the minimal vectors. Then, we apply this results to Gomory's Group Problems and extensions.

**Keywords:** Algorithms and Data Structures, Complexity Theory

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**Schedule:** Aula Magna, Centro de Extensión, PUC, Friday (08:40 - 09:00)

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## 171. Algoritmos exatos para interseção de segmentos e para sobreposição de mapas incorporados à biblioteca TerraLib

Vinicius Rodrigues, Marcus Vinícius Alvim Andrade, Jaudete Daltio, Gilberto Ribeiro de Queiroz

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**Abstract:** This paper describes an implementation of exact algorithms, that is, roundoff error free, to compute the intersection between sets of segments and the map overlay. The aim is to incorporate these algorithms to TerraLib. Both algorithms are based on homogeneous coordinates using rational (integer) numbers to avoid rounding errors. An interesting consequence of this work is that the overlay algorithm returns all polygons (regions) resulting from the overlay and not only the polygons (regions) corresponding to some set operation (union, intersection or difference). So, in many situations, this algorithm could produce a general result more efficiently.

**Keywords:** Algorithms and Data Structures

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**Schedule:** Aula Magna, Centro de Extensão, PUC, Friday (09:20 - 09:40)

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## 172. Um Algoritmo Guloso Aleatorizado com Busca Local para o Problema de Programação de Tarefas em Sistemas de Produção Flowshop Bicritério

Jose Elias Claudio Arroyo

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**Abstract:** This paper addresses the  $n$  jobs and  $m$  machine flowshop scheduling problem, minimizing simultaneously two criteria: the total completion time and the maximum tardiness. We propose a GRASP algorithm with the goal of to find a good approximation of the Pareto optimal solutions of the problem. The algorithm is based on the optimization of a weighting function defined as the linear combination of the criteria. In order to find a variety of nondominated solutions, we use scalarizing vectors which are distributed uniformly on the Pareto optimal surface. The algorithm uses also the concept of Pareto dominance in order

to select nondominated solutions to be explored by the local search. The proposed algorithm is compared with a Branch-and-Bound algorithm (for two machines problems) and with four genetics algorithms, all they proposed in the literature.

**Keywords:** Algorithms and Data Structures

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**Schedule:** Aula Magna, Centro de Extensión, PUC, Friday (09:40 - 10:00)

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## 173. Algorithm for Exhaustive and Non-Redundant Topographical Graph Generation

Jose Alvarez, Leonor Contreras

Universidad de Santiago, Departamento de Ingeniería Informática. Santiago Chile

Universidad de Santiago, Departamento de Ciencias del Ambiente Chile

**Abstract:** An algorithm for exhaustive and non-redundant generation of topographical isomers of molecular graphs containing isolated, spiro, condensed, and nested cycles based on a weighted and bipartite tree-construction is described. As input, a manual or automatically generated graph textfile in canonical or noncanonical N-tuple format is used. Total procedure is composed by the following steps: i) bipartite tree construction with nodes constituted by vertex (atoms) and edges (bonds) of a graph representing an organic molecule, ii) weight assignment to all tree nodes, iii) the refinement of weight assignment on the basis of spatial considerations, iv) detection of symmetrical groups (SG) considering topological and even topographical differences, v) computation of SG identification parameters for detection of redundant structures avoiding its generation and vi) generation of topographical graphs. Test results are presented that illustrate algorithm application to a wide number of cases

**Keywords:** Algorithms and Data Structures

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## 174. Distributed Spatial Approximation Tree (SAT\*)

Jose Penarrieta, Patricio Morriberon, Ernesto Cuadros-Vargas

San Pablo Catholic University Peru

Peruvian Computer Society Peru

**Abstract:** The problem of classifying elements by similarity has many applications. In this paper we propose a new Metric Access Method (MAM) called "Distributed Spatial Approximation Tree (SAT\*)" based on the "Spatial Approximation Tree (SAT)" which is based on approaching spatially the searched objects. However, this MAM cannot assure an optimal distribution because it chooses its root randomly. For example, it can choose an extreme of the dataset as the root, so the remaining objects would be on the other extreme of the dataset, heading to very inefficient queries. We present as a possible solution to this problem, an algorithm called Centroid Selection Algorithm (CSA) which is based on the idea of choosing the center of the dataset as the root. The advantage of SAT\* is that it assures a much better distribution of the data structure, heading to more efficient queries. Experiments show that distance calculations are reduced up to 48 percent compared with SAT.

**Keywords:** Algorithms and Data Structures

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## 175. Metodología, basada en Dinámica de Sistemas, para especificar los requisitos de una herramienta tecnológica enfocada al desarrollo de habilidades de argumentación

Pablo Severin, Hernan Villanueva

Universidad Diego Portales, Escuela de Ingeniería Informática, Santiago, Chile

**Abstract:** Este trabajo presenta una metodología, basada en Dinámica de Sistemas, para especificar los requerimientos del diseño de una herramienta tecnológica enfocada al desarrollo de habilidades de argumentación. Se muestran los pasos para obtener, desde la teoría socio-constructivista de Vygostky, un modelo que hace posible describir y optimizar los elementos implicados en el desarrollo de las habilidades antes mencionadas. Los valores óptimos de estos elementos llevan a la especificación de los requisitos de la herramienta tecnológica.

**Keywords:** Algorithms and Data Structures, Software Engineering, Methodology and Software Architecture

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## 176. Prueba de Concepto de Anahiz con base en la Problemática del Parque Nacional Natural Chingaza

Leyla Jael García Castro, Germán E. Bravo Córdoba

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**Abstract:** ANAHIZ is a proposal to support the decision making process in natural and protected areas by means of critical-handling zones identification and it offers 3 functionalities: (i) Generation of Initial Situation, (II) Registry of Actions and Effects and (III) Support the Decision Making Process using Diagnosis and Rules Based Simulation. Currently, ANAHIZ is being implementing in Chingaza National Natural Park in Colombia, whose problematic includes forest fires, hunting and conservation among others. In order to facilitate the implementation, ANAHIZ-GIS is being used, it is a computer application that uses JUMP-GIS (see [10]) and covers the main aspects of ANAHIZ.

Throughout this article each one of the 3 functionalities of ANAHIZ has been developed using some management data of the last years in Chingaza and some data of a previous study (see [4]). At the end, some commentaries appear on the found results, the future work and the possibilities that offer ANAHIZ and ANAHIZ-GIS, a tool that supports it.

**Resumen:** ANAHIZ es una propuesta para apoyar la toma de decisiones en áreas naturales y protegidas mediante la identificación de zonas críticas de manejo y para ello ofrece 3 funcionalidades: (i) Generación de la Situación Inicial, (ii) Registro de Acciones y Efectos y (iii) Apoyo a la Toma de Decisiones Mediante Diagnóstico y Simulación Basado en Reglas. ANAHIZ se encuentra bajo una prueba de concepto mediante su implementación en el Parque Nacional Natural Chingaza en Colombia, cuya problemática incluye incendios forestales, cacería y conservación entre otros. Para facilitar la implementación se está utilizando ANAHIS-GIS, un software que utiliza JUMP-GIS (ver [10]) y cubre los principales aspectos de la propuesta hecha.

A lo largo de este artículo se presenta el desarrollo de cada una de las tres funcionalidades de ANAHIZ y se ilustran con datos tomados de los informes de manejo de los últimos años en Chingaza y datos obtenidos de un estudio previo (ver [4]). Al final, se presentan algunos comentarios sobre los resultados encontrados, el trabajo futuro y las posibilidades que ofrecen ANAHIZ y ANAHIZ-GIS, la herramienta que la soporta.

Palabras claves: Sistemas de información geográfica, sistemas de decisión, redes bayesianas, manejo de parques naturales, mapas conceptuales.

**Keywords:**

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## 177. Some typical classes of t-norms and the 1-Lipschitz condition

Benjamin Bedregal, Ivan Pan

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**Abstract:** This paper studies the relation between the satisfaction of the Lipschitz condition by t-norms for constant 1 (1-Lipschitz condition) and some other properties of t-norms. In this sense, we will consider some well know classes of continuous t-norms, such as Archimedean and non

Archimedean, and the nilpotent and strict subclasses of Archimedean t-norms. Also will be proved that the unique automorphism which preserves the 1-Lipschitz condition of any t-norm is the identity.

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## 178. A Technique for Collecting Simultaneous Multithreaded Traces

Augusto Vega, José Luis Hamkalo, Bruno Cernuschi-Frías

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(ARGENTINA)

**Abstract:** This paper presents a public tool for generating and collecting traces in multithreaded environments, which are suitable for simulating and studying Simultaneous Multithreading (SMT) cache organizations. In order to build this environment, we have developed a new module for Valgrind, an open-source debugging and profiling tool. The new module, that is called Tracegrind, collects each memory reference

being performed by each thread in the user application, and stores them in a single compressed trace file, including the thread id, the referenced memory address, and the access type (read/write).

**Keywords:** Operating Systems

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## 179. Incorporación de modelado dinámico a un generador de carga para la Web 2.0

Raúl Peña-Ortiz, Julio Sahuquillo, Ana Pont, José Antonio Gil

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**Resumen:** La Web 2.0 está totalmente orientada a servicios; esta generación de la WWW es rica en peticiones de contenido dinámico y personalizado, el cual representa un importante segmento del tráfico actual en Internet. Comprender las características de la carga generada por sus usuarios es importante a la hora de diseñar nuevos servicios web. La mayoría de las técnicas empleadas en la caracterización de esta carga presentan limitaciones cuando tratan de representar el dinamismo. Esto implica que la mayor parte de los generadores de carga actuales están modelando el dinamismo de un modo simple e inapropiado. Este artículo se centra en el dinamismo de las aplicaciones de la Web 2.0, así como de las técnicas para caracterizar la carga de sus usuarios. Nuestro trabajo actual se orienta a desarrollar un generador de carga dinámica para la Web 2.0, que tenga en cuenta el dinamismo en sus contenidos y en el comportamiento de sus usuarios.

**Keywords:** Computer Architecture, Parallel Computing, Distributed Systems

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**Schedule:** Patio de Exposiciones, Centro de Extensión, PUC, Monday (14:00 - 18:00)

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## 180. HECOPS:A Location System using cooperative calibration

Ricardo Reghelin, Antonio Augusto Fröhlich

Laboratory for Software/Hardware Integration (LISHA) Federal University of Santa Catarina (UFSC)  
88049-900 Florianopolis - SC - Brazil

**Abstract:** This paper studies the problem of determining the nodes locations in a wireless sensor networks. We describe a fully decentralized algorithm called HECOPS where every node estimates its own position after interactions with other nodes. A limited fraction of nodes, have knowledge of position coordinates, however any node can be elected as a reference. A ranking system is proposed to determine reliability of each estimated position. This makes possible a novel approach by using fewer but more reliable landmarks for position calculation. This results in some benefits such as decreasing data communication and blocking error propagation. In order to reduce measurements errors, this system presents some improvements using heuristics. The most important is a scheme to calibrate range measurements by comparing, when it is possible, the estimate distance with the actual distance between a pair of nodes. Experimentations demonstrate that the algorithm is superior to a previously proposed method in terms of its ability to compute correct coordinates under a wider variety of conditions and its robustness to measurement errors.

**Keywords:** Performance Evaluation, Networks, Distributed Systems

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## 181. Diseñando Experimentos sobre Diseño de Software: Consideraciones y Lecciones.

Rene Noel, Hernan Astudillo, Marcello Visconti, Gonzalo Valdes

Universidad Técnica Federico Santa María, Departamento de Informática Valparaíso, Chile

**Abstract:** Históricamente, la comparación de enfoques de diseño ha sido retórica más que científica, pero las técnicas de la Ingeniería de Software Experimental permiten validar conocimiento científicamente. El diseño de un estudio experimental incluye definición, planificación, operación, análisis/interpretación de resultados, y empaquetamiento para replicación.

Este artículo presenta consideraciones y lecciones prácticas y metodológicas de un estudio experimental diseñado para comparar el impacto de incorporar prácticas de diseño planeado en proyectos que usan Extreme Programming (XP) sobre la productividad del proceso y la calidad del producto de software.

Este estudio arrojó varias lecciones para futuros estudios experimentales, algunas válidas para todo experimento en Ingeniería de Software, como tratamiento de las características de los participantes, selección

de individuos, y apoyo logístico requerido; y otras específicas a estudios sobre Diseño de Software, como selección de métricas, diseño del problema que los participantes deben resolver, y consideración de actividades que involucren decisiones de diseño.

**Keywords:** Performance Evaluation, Software Engineering

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## 182. Negotiation algorithms in a web server model with QoS: A metric for performance evaluation

Julio Cezar Estrella, Mario Meireles Teixeira, Marcos José Santana, Regina Helena Carlucci Santana, Sarita M. Bruschi

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Federal University of Maranhão, Department of Informatics São Luis - MA ,65085-580 Brazil

**Abstract:** Although the Internet has been presented modifications in the last years with an increase of applications and traffic, it still follows the best effort model. All packets in the network are treated uniformly without traffic differentiation. The web servers also present limitations, because they process all the requests according to a FCFS (First Come - First Served) policy. These problems have been treated with the development of web servers' models with quality of service, since they are the responsible by processing the requests of the users on the Internet. In this context, the purpose of this article is the description of negotiation mechanisms, a technical used in web server architectures with differentiated services to improve the quality of service perceived by the users. Two algorithms for mandatory negotiation are proposed and implemented in a web server model with and without client's participation. The results of this article had been obtained by means of simulation using for this a queuing network model representing a web server with QoS. The experiments confirm that negotiation is an essential feature to enhance the quality of service provided to the clients, being an aid in the process of request admission and dropping.

**Keywords:** Performance Evaluation, Distributed Systems

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## 183. Portabilidade de sistemas operacionais no domínio de sistemas embarcados

Hugo Marcondes, Arliones Stevert Hoeller Junior, Lucas Francisco Wanner, Antônio Augusto M. Fröhlich

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**Abstract:** Aplicações embarcadas geralmente precisam ser portadas de um sistema para outro. Isto ocorre por diversos motivos, tais como a necessidade do uso de um hardware mais barato ou pela necessidade de recursos adicionais. A portabilidade da aplicação pode ser alcançada através do uso de uma interface software/hardware independente de arquitetura, contudo a concepção de tal interface não é uma tarefa trivial de ser atingida no domínio de sistemas embarcados, visto que estes apresentam plataformas bem específicas. Este trabalho mostra como um sistema operacional orientado a aplicação e baseado em componentes foi desenvolvido para facilitar a portabilidade da aplicação e sistema. Os estudos de caso apresentam dois sistemas embarcados executando em plataformas de hardware diferentes, mostrando que o código fonte da aplicação é livre de dependências arquiteturais da plataforma.

**Keywords:** Operating Systems

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## 184. Una biblioteca para la invocación remota de métodos en Ambientes Virtuales Distribuidos implementados con Java 3D

Ildeberto Aparecido Rodello, José Remo Ferreira Brega, Antonio Carlos Sementille, Kalinka R. L. J. Castelo Branco, Edward D. M. Ordonez.

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**Abstract:** This paper describes a library for remote methods invocation offering message exchange support to Distributed Virtual Environments implementation. It was implemented using the Java platform and aims at maintaining the same programming paradigm and reach low costs.

**Keywords:** Data Communication, Networks, Distributed Systems

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## 185. Um Framework Meta-Programado Para a Implementação de Protocolos Leves de Comunicação

**Thiago Robert Santos, Lucas Francisco Wanner, Antônio Augusto Fröhlich, Augusto Born de Oliveira**

**Laboratorio de Integracao Software/Hardware (LISHA) Universidade Federal de Santa Catarina (UF-SC) C.P. 476 88049-900 Florianopolis, SC, Brazil**

**Abstract:** This article describes a communication system comprised by a meta-programmed framework, responsible for providing mechanisms to select, configure and combine communication protocols according to application requirements, and a basic communication kernel over which the protocols are projected. The basic premise for this communication system is that it is possible to maintain modularity for lightweight protocols, enhancing reusability and, at the same time, supporting highly efficient implementation techniques, using an explicit composition mechanisms instead of layer-based encapsulation.

**Keywords:** Data Communication, Operating Systems

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## 186. Método para la Evaluación del Proceso de Desarrollo de Software con miras a una Certificación CMMI

**Bozo Jorge, Romina Ferretto, Jorge Bozo**

**Pontificia Universidad Católica de Valparaíso. Escuela de Ingeniería Informática. Valparaíso - Chile.**

**Abstract:** Para poder poner en práctica un plan de mejora de procesos, es necesario realizar una evaluación que refleje el estado actual de los procesos que se llevan a cabo en la organización, para así determinar las principales debilidades que debe cubrir la mejora de ellos. Considerando el modelo CMMI, se propone un

método para desarrollar una evaluación inicial del proceso de desarrollo de software llevado a cabo en la organización, con el fin de utilizar los resultados para elaborar un plan de mejora, con miras a alcanzar una certificación CMMI, particularmente del nivel de madurez 2. Una vez definido el método de evaluación se presenta un caso práctico de aplicación, con el fin de validar la propuesta.

**Keywords:** Software Engineering

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## 187. Desarrollo de Software Seguro y su relación con el Cuerpo de Conocimiento para la Ingeniería de Software

Vianca Vega, José Carrillo Verdún, Gloria Gasca Hurtado, Edmundo Tovar Caro

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Universidad Politécnica de Madrid, Departamento de Lenguajes y Sistemas Informáticos e Ingeniería de Software Spain

**Resumen:** Este documento, presenta y analiza la Guía del Cuerpo de Conocimiento de la Ingeniería de Software SWEBOK del 2004, enmarcando y resaltando la importancia de la seguridad a lo largo del proceso de desarrollo de software, para presentar una serie de sugerencias relacionadas con la seguridad, teniendo como base el marco que plantea SWEBOK de las diferentes Áreas de Conocimiento. Dentro de las sugerencias se plantean estándares, métodos, modelos, metodologías y diferentes propuestas para utilizar en el proceso, las cuales buscan apoyar el desarrollo de software seguro, considerando siempre la importancia que tienen en esta área.

**Keywords:** Artificial Intelligence

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## 188. Análise e Tomada de Decisão Formal Alinhada ao CMMI: Um Estudo de Caso

Fca. Márcia Gonçalves, Solange A. Araújo, Fabiana G. Marinho, Tatiana C. Monteiro, Carlo G. S. Pires

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**Abstract:** One of the difficulties in the CMMI-SW level 3 implementation consists in defining and institutionalizing the Decision Analysis and Resolution process area because it is new and not commonly used in many organizations. The formal analysis reduces the subjectivity and move towards the selection of a solution that maximizes the attendance of stakeholders necessities. In this context, this work shows the experience of an organization in Decision Analysis and Resolution process definition and implementation.

**Keywords:** Software Engineering, Programming Languages

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## 189. Aspectos en la Ingeniería de Requerimientos

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**Abstract:** The Aspect-Oriented Software Requirements identifies the possible aspects from the first steps of the system life cycle. The early-aspects identification improves the requirements and artifacts traceability, improves the change impact estimation and, mainly, decreases the problem of non-expected changes in the system functionality by the identification of aspects and the possible conflict situations among them. Aspects Extractor is an aspect-oriented requirements engineering model that defines a set of tasks for the automatic identification of candidate aspects and the possible conflict situations among them from the software development beginning. Aspect Extractor Tool is a tool supporting the previous tasks in an automatic way, helping in the development of aspect-oriented systems.

**Keywords:** Software Engineering, Methodology and Software Architecture

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**Schedule:** Patio de Exposiciones, Centro de Extensión, PUC, Tuesday (14:00 - 18:00)

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## 190. Método para transformar el diseño de una aplicación basada en la arquitectura MVC++ a una aplicación

Héctor Antillanca, Christian Sabja, Alejandro Soto

Departamento de Ingeniería Informática Universidad de Santiago de Chile Chile

**Abstract:** This paper presents a method that provides a guideline for transforming an application which has been designed to comply with the MVC++ architecture into a Web application. The method is focused on solving problems that arise due to the technological and conceptual differences when migrating an MVC++ based application into a Web application. The method starts defining the final Web application components, and then guides the transformation of each of the original MVC++ components. In order to illustrate the method, the transformation of an example MVC++ based application is shown.

**Resumen:** Este artículo presenta un método para guiar la transformación de una aplicación cuyo diseño está basado en la arquitectura MVC++ a una aplicación Web. Este método está enfocado a resolver los problemas que surgen al migrar una aplicación de escritorio diseñada bajo el paradigma MVC++ a una aplicación Web, debido a las diferencias conceptuales y tecnológicas que hay entre las respectivas plataformas de implantación. El método define las partes de la aplicación Web resultante y guía la transformación de cada una de las componentes de la aplicación original. Con el fin de ilustrar el método, se presenta la transformación de una aplicación de ejemplo, basada en MVC++.

**Keywords:** Software Engineering, Methodology and Software Architecture

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## 191. Modelo de Calidad para Aplicaciones Móviles Sensibles al Contexto

Rodolfo Canelón, Alfredo Matteo, Francisca Losavio, Ledis Chirinos

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Laboratorio LaTecS , Centro ISYS Universidad Central de Venezuela

**Abstract:** ABSTRACT

Context-aware mobile applications show special features that can affect the software development process. These systems must run on heterogeneous computing platforms, must adjust to the capacities of different access devices and adapt to different contexts of use. The quality of service to the user is guaranteed by the way the environment is responding, which is facilitated by the context of use. This aspect is crucial in mobile applications, often wireless, demanding the quality of these services. The service level is specified by a quality model. The goal of this work is to define the quality model for the context-aware mobile applications domain. The importance of this model is the specification of the quality requirements for the final software product and it can be used for a quantitative evaluation of all the software products obtained during the development process. A taxonomy called RECLAMO (Requirements Classification Model) and the new standard ISO/IEC 25030 are used to define the quality model.

**Keywords:** Software Engineering, Methodology and Software Architecture, Security of Information and Criptography, Distributed Systems

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## 192. Uma Proposta LPS no Domínio de Sistemas Web de Apoio a Gestão de Fomento

**Camilo Carromeu, Marcelo Augusto Santos Turine**

**Departamento de Computação e Estatística Universidade Federal de Mato Grosso do Sul Brazil**

**Abstract:** This work considers a process of Software Products-Line (SPL) development guided to family of products in domain of Web Systems of Promotion Management Support (in portuguese Sistemas Web de Apoio a Gestão de Fomento). The process is based on three steps (Domain Qualification, Domain Engineering and Application Engineering), emphasizing the use of patterns and frameworks, and defines a set of changeable Web systems that share a similar characteristics group and that satisfies the specific necessities of the support domain for promotion management. To automatize the SPL process a tool called Fênix is being implemented, that allows to instantiate and generate Web applications in order to assist the management (submission, evaluation, monitoring and finishing) of projects electronic proposals to be evaluated for promotion agencies. The Fênix tool is based on the free software technologies: Java (JSP, Struts and Hibernate), SVG (Scalable Graphics Vector) and PostgreSQL. To validate the process and the tool is being realized three case studies.

**Keywords:** Hypermedia, Software Engineering

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## 193. A Generic Framework to Model, Simulate and Verify Genetic Regulatory Networks

Julian Gutierrez, Alejandro Arbelaez, Carlos Olarte, Camilo Rueda

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**Abstract:** Process calculi are formalisms to model concurrent systems. Their mathematical basis and compositional style make possible to decompose a system into simple and well defined processes. Interaction among them is formally defined by the semantic of the calculi. These characteristics allow to study systems coming from different areas such as arts, engineering and sciences. In this paper we propose a generic framework to model, simulate and verify genetic regulatory networks based on a non-deterministic timed concurrent constraint calculus.

This framework provides a set of process definitions to model generic/parametric components in a biological context, a simulator to observe the system evolution in time and some insights to perform formal proofs to verify and make inferences over the systems. An instantiation of the framework is presented by modeling the lactose operon.

**Keywords:** Formal Specification

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## 194. Influência do Tamanho das Assinaturas nos Sistemas de Verificação On-line

Rodrigo Sineco Araujo, George D.C Cavalcanti, Edson C. de B. Carvalho Filho

Universidade Federal de Pernambuco, Centro de Informática, Recife - PE, Brasil, 50.740-540

**Abstract:** A great number of studies concerning on-line verification systems have been conducted by researchers in the last years. However, investigations on the influence of different signature sizes on the process of signature formation are little. In fact, this kind of analysis for on-line signature verification system is been made for the first time. In this paper, in order to investigate this influence, a database containing signatures of three different sizes was created. The experimental results show that signatures of different sizes are statistically different and they can influence the feature extraction techniques. Thus, a special attention has to be taken in the implementation of global applications that use databases with signatures of different sizes.

**Keywords:** Artificial Intelligence

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## 195. Aplicando Datamining com Redes SOM em Base de Dados de Execuções de Algoritmos Genéticos Utilizando os Novos Métodos de Seleção Hawk-Dove Roleta e Hawk-Dove Torneio

Felipe Brito, Artur Noura Teixeira, Otávio Noura Teixeira, Roberto Célio Limão de Oliveira

**Abstract:** Algoritmos Genéticos têm apresentado diversas aplicações práticas e obtido grande destaque dentre as técnicas de otimização. Grande parte dos métodos e parâmetros adotados na sua implementação são bastante aleatórios, e nem sempre oferecem uma eficiente exploração da superfície adaptativa de problemas complexos. Trabalhos recentes têm apresentado a inserção da Teoria dos Jogos Evolucionários junto ao Operador de Seleção, alcançando resultados significativamente melhores, e deixando bases de dados com padrões e informações que precisam ainda ser encontrados. Este artigo busca através da mineração de dados utilizando Redes Neurais do tipo SOM encontrar alguns destes padrões.

**Keywords:** Artificial Intelligence

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## 196. Desarrollo de un Sistema Multiagente de Manejo de Situaciones Anormales para un Pozo de Levantamiento Artificial por Gas

Jose Aguilar, Frank Prato, César Bravo

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Universidad de los Andes, Fac. de Ingeniería CEMISID, Mérida, Venezuela

**Abstract:** En automatización industrial el manejo de situaciones anormales es un área que cada día cobra mayor importancia. El disponer de aplicaciones que puedan detectar, aislar y tratar situaciones anormales en



instalaciones industriales, puede resultar en ahorro de grandes cantidades de dinero invertido en reparaciones y/o perdido en paradas de plantas injustificadas. En este trabajo se desarrolla un Sistema de Manejo de Situaciones Anormales para un Pozo de Levantamiento Artificial por Gas basado en agentes (AMSA), el cual forma parte de la Arquitectura de Automatización Industrial Basada en Sistemas Multiagentes (SADIA).

**Keywords:** Artificial Intelligence

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## 197. Cerrando Brechas entre la Información y sus Usuarios usando Agentes Inteligentes

Vladimir Lara, Gabriela Marín

**Director de la Escuela de Ciencias de la Computación e Informática UCR**

**Directora del Programa de Postgrado en Computación e Informática UCR**

**Abstract:** We describe a demonstrator application that has the ability to offer personalized eco-tourism and cultural services thru the Internet, by the way of the interaction of intelligent agents distributed over the world, acting on a wireless communication platform.

The demonstrator is being built to evaluate the feasibility of using artificial intelligence techniques, in order to create a different framework where small and medium size tourism companies can promote the Latin American cultural heritage.

In a society of distributed and continuously expanding information, where the construction and use of knowledge by its users are complex activities, we present a technical proposal to confront the problem and search to close existing gaps.

**Keywords:** Formal Specification, Programming Languages

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## 198. Flexible Querying of XML Knowledge Base through the MIEL Language

Marco Javier Suarez Barón

Laboratoire de Recherche en Informatique, LRI France

**Abstract:** This paper presents a new subsystem of the "E.dot" knowledge base. This knowledge base contains information useful to help experts in the field of predictive microbiology. The information has several specific properties: it is incomplete, imprecise and heterogeneous. In the pre-existing "E.dot" knowledge base, stable data are stored in a relational database. The data which does not fit the relational structure are stored in a conceptual graph knowledge base. The MIEL language permits to scan simultaneously both bases in a transparent way for the user, using fuzzy queries. The new subsystem described in the paper contains information found on the Web to complete the knowledge base. This information is stored in XML format. Firstly, I extend the XML model of the knowledge base to represent imprecise data as possibility distributions. Secondly, I present the mapping process used to translate a MIEL query into an XML query to scan the XML knowledge base.

**Keywords:** Databases, Software Engineering, Artificial Intelligence, Information Retrieval, Complexity Theory

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## 199. Técnicas de minería de datos para predecir la demanda de cursos

Lina Torres, Jose Abasolo

Maestría en Ingeniería de Sistemas y Computación Universidad de los Andes Bogotá, Colombia

**Abstract:** En este trabajo se explora el uso de técnicas de minería de datos para resolver el problema de determinar la demanda de los cursos que tendrá lugar en un período futuro, en una universidad que se caracteriza por la gran autonomía que tienen sus estudiantes en la elaboración de sus horarios. En particular, se aplicaron técnicas de modelaje descriptivo, lo que permitió particionar el espacio del problema, aplicándose a cada partición una estrategia de modelaje predictivo diferente y adaptada a las características particulares de cada una. En general los resultados del modelaje descriptivo son útiles para hacer mercadeo de cursos. En lo predictivo, la minería dio resultados poco satisfactorios, pero se propuso una herramienta de auditoría de currículos que ayuda en ciertos casos de cursos tomados como obligatorios.

**Keywords:** Computer Architecture

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## 200. Modelagem multidimensional utilizando o paradigma orientado a objetos

Sueli de Fatima Poppi Borba, Aran Bey Tcholakian Morales

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Universidade Federal de Florianópolis. Departamento de Engenharia da Produção Brasil

**Abstract:** The object orientation paradigm is a modeling standard to information system and the UML diagrams have been used for computation professionals. The data warehousing can use object features in order to make more flexible multidimensional modeling applications. This paper presents a methodology whose purpose is to introduce multidimensional model in object-oriented database, using UML diagrams and ODMG standard.

**Resumen:** O paradigma da orientação a objetos apresenta-se como um padrão para a modelagem de sistemas de informação e a representação através dos diagramas da UML são utilizados pelos profissionais da área. A utilização das propriedades de persistência de objetos pode ser utilizada em ambientes de gerenciamento, como o data warehouse, fornecendo flexibilidade na aplicação do modelo multidimensional. O presente artigo apresenta uma proposta de metodologia para implantar o modelo multidimensional em banco de dados orientado a objetos, seguindo a representação através dos diagramas da UML e o padrão da linguagem de definição de objetos da ODMG.

**Keywords:** Information Society

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## 201. Uso de la tecnología sobre la base de un modelo de innovación curricular en matemática

Gonzalo Villarreal

Universidad de Santiago de Chile, Centro Comenius, Santiago, Chile

**Abstract:** The following article gathers antecedents on the use of the technology, within the framework of three lines of investigation and development, that is to say: doctoral thesis of the author of this proposal ; the project Enlaces Matemática ; and interactive whiteboard.

Although the technological resources are important and cause effects, it within the framework requires of a curricular model that integrates them, of different strategies and resources that are arranged to the classroom, involving to professors and students. On individual, methodology and didactics, that sustains the proposals that appear, are within the framework based of the project Fondef D00I1073 "Aprender matemática creando soluciones", of the Comenius Center of the University of Santiago of Chile, with the modelo interactivo para el aprendizaje matemático®.

It has been observed a base of profits common in the learning, abilities and required competitions of the area of the mathematical one, which allows to give to some principles and strategies with respect to the use of the technology.

**Keywords:** Collaborative Systems

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## 202. Por que fragmentar verticalmente um data warehouse?

Cristina Ciferri, Diogo Tuler Forlani, Ricardo Rodrigues Ciferri

Universidade Estadual de Maringá Brasil

Universidade de São Paulo Brasil

Universidade Federal de São Carlos Brasil

**Abstract:** In this paper we focus on the vertical fragmentation of the data warehouse. Our main contribution is the proposal of two algorithms aimed at fragmenting vertically data warehouses organized in different levels of aggregation: the FVM-G and the FVMA-G algorithms. While the former produces fragments with all aggregations of the data warehouse under fragmentation, the latter produces fragments whose aggregations correspond to the frequently queries of the workload. The performance tests carried out with the FVM-G algorithm using the TPC-H benchmark showed that the fragmentation provides a huge improvement on the

query performance, with a reduction in response time and disk accesses. We also investigate the applicability of the proposed algorithms to distributed data warehousing environments.

**Resumen:** Este artigo enfoca a fragmentação vertical dos dados em ambientes de data warehousing. Sua principal contribuição é a proposta de dois algoritmos voltados à fragmentação vertical de data warehouses organizados em diferentes níveis de agregação: algoritmo FVM-G e algoritmo FVMA-G. Enquanto o algoritmo FVM-G gera fragmentos que contêm todas as agregações presentes no data warehouse sendo fragmentado, o algoritmo FVMA-G gera fragmentos cujas agregações correspondem às consultas frequentemente requisitadas pela carga de trabalho. Os testes de desempenho realizados com o algoritmo FVM-G utilizando o benchmark TPC-H mostraram que a fragmentação melhorou significativamente o desempenho, reduzindo o tempo de resposta das consultas e o número de acessos a disco. O artigo também investiga a aplicabilidade dos algoritmos propostos a ambientes de data warehousing distribuídos.

**Keywords:** Databases

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## 203. Towards Flexible Skyline Queries

Marlene Goncalves Da Silva, Leonid Tineo

Universidad Simon Bolivar, Departamento de Computacion y T.I., Caracas, Venezuela

**Abstract:** Some different approaches have been proposed in order to provide flexible querying capabilities. Skyline is one operator for expressing user preferences in multicriteria query. It is intended to retrieve a Pareto s curve. This operator is based on a crisp quantifier. On the other, fuzzy sets has been proposed to be used in expression of user preferences in a general way. SQLf is an extension of SQL based on this approach that allows the use of fuzzy quantifiers. We propose here a more flexible skyline operator based on SQLf s fuzzy quantification. We present an evaluation mechanism for this extension and an experimental study.

**Keywords:** Performance Evaluation

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## 204. Automatic Vascular Tree Segmentation

Juan Francisco Carrillo, Marcela Hernández Hoyos, Maciej Orkisz

Universidad de los Andes, Grupo Imagine, Grupo de Ingeniería Biomédica, Departamento de Ingeniería de Sistemas y Computación Bogotá, Colombia

**Abstract:** This article describes a method for automated extraction of branching structures in 3D medical images. The algorithm recursively tracks branches and detects bifurcations by analyzing the binary connected components on the surface of a sphere that moves along the vessels. Local segmentation within the sphere is performed using a clustering algorithm based on both geometric and photometric information. The originality of the method mainly resides in : 1) the local segmentation method that emphasizes the cylindrical structures and 2) a vesselness criterion based on a geometric model, which determines whether the segmented content of the sphere is a part of a vessel. The algorithm was applied to 16 MRA and 12 CTA 3D images of different anatomic regions. Its accuracy was assessed by comparing the resulting axes with those extracted by a reference algorithm. Its capability of extracting all the branches and avoiding spurious detections was evaluated by comparing the number of extracted branches to the number of branches found by visual inspection of the datasets.

**Keywords:** Algorithms and Data Structures, Computer Graphics

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## 205. Generalized Decision Function and Gradient Search Technique for NP-Complete Problems

Jeffrey Duffany

Universidad del Turabo Gurabo, PR USA 00778

**Abstract:** A method is described for solving np-complete problems by using a power-series expansion to represent a generalized decision function. The coefficients of the terms in the power-series are then used in a gradient search to find an optimal solution. Several factors are investigated including the effect of the number of terms used in the decision function, the initial region of space selected for the search and the amount of computation required.

**Keywords:** Algorithms and Data Structures, Complexity Theory

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## 206. Segmentación de Arteriolas en la Microcirculación de Hemo-sustitutos para la Medición de la Variación en el Tiempo de su Diametro Mediante el Procesamiento de Imágenes

Sandra Cancino, Fernando Pastrana, Juan Carlos Briceño, Marcela Hernández Hoyos

Universidad de los Andes, Grupo Imagine

Grupo de Ingeniería Biomédica , Bogotá-Colombia

**Abstract:** The following article presents a vessel segmentation method in the presence of blood substitutes, in a sequence of micrometric images, to determine the variation of diameter over time in order to measure the effects of the blood substitute inside the vessel. The central axis of a vessel portion is initially obtained by applying an extensible skeleton, which is based on the analysis of the inertia moments of the micrometric image and on an iterative predicting and estimative process. In a next step, multiple perpendicular lines to the vessel central axis are plotted to search the local maximum of the gradient in the image smoothed with a gaussian filter in order to detect points that belong to the vessel contour and determine its diameter. Finally, the obtained axis is superposed on every filtered image of the sequence to calculate vessels diameter variation over time.

**Keywords:** Computer Graphycs

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## 207. Ambiente Virtual para Entrenamiento de Cirugía Mínima Invasiva del Abdomen

Bricelis Urbina, Omaira Rodríguez, Miguel Cerrolaza, Rodolfo Miquilarena

Universidad Central de Venezuela, Centro de Bioingeniería. Caracas Venezuela

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**Resumen:** La laparoscopia o Cirugía Mínima Invasiva del abdomen requiere que el cirujano interprete un espacio tridimensional correspondiente a la cavidad abdominal de acuerdo a la imagen desplegada por un

monitor. Esto implica que el cirujano entrene sus habilidades de percepción y orientación espacial, coordinación mano ojo y manejo de instrumental. En este trabajo se presenta un ambiente virtual para entrenamiento de las habilidades laparoscópicas y las pruebas aplicadas para medir la efectividad del mismo. El sistema está integrado a un simulador mecánico desarrollado por nuestro grupo y un sistema de rastreo. El sistema virtual se desarrolló utilizando tecnologías simples de computación grafica tridimensional y realidad virtual. Este se usa actualmente como parte del entrenamiento para médicos del postgrado de Cirugía Mínima Invasiva de la Facultad de Medicina de la UCV.

**Keywords:** Computer Graphycs

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**Schedule:** Patio de Exposiciones, Centro de Extensión, PUC, Thursday (14:00 - 18:00)

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## 208. Visualização de Páginas Web em Aparelhos Celulares: Um Caminho para Inclusão Digital

Pablo Liporace, José Bezerra da Silva Filho

Universidade de Fortaleza (UNIFOR), Mestrado em Informática Aplicada (MIA) Fortaleza, Brasil, 60811-905

**Abstract:** The proliferation of mobile phones in lower social classes in Latin American is a reality. This fact is a new opportunity to access the Web for those people without personal computer. Although many mobile phones access the Web, this access is made difficult by the small screens of these devices. The mobile phone Web access is especially disappointing by small size screens and high cost of data conection.

A low-cost network infra-struture is given to avoid the high cost data acess of the mobile phone operators. This network use the built-in features of modern mobile phones.

We detail and enhance the MobiZoom tool that clain to speed web browser. Mobizoom has a server side to transform HyperText Markup Language (HTML) Web page in a Scalable Vector Graphics (SVG) for information visualization using a Zoomable User Interface (ZUI).

**Keywords:** Human Computer Interaction, User Interfaces, Information Society

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## 209. Avaliação de desempenho do protocolo conservador de simulação distribuída CMB

Célia Kawabata, Regina Helena Carlucci Santana, Marcos José Santana, Sarita Mazzini Bruschi, Kalinka R. L. J. Castelo Branco

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UNIVEM - Centro Universitário Eurípides de Marília Av Higinio Muzzi Filho 529, CEP 17525-901, Marília, SP Brasil

**Abstract:** This paper presents a distributed simulation performance evaluation, more closely, the conservative protocol CMB. This approach evaluate each of logical processes that compose the simulation, where it's possible to detect bottlenecks in simulation like problems in parametrization or in the model partitioning. Some models were simulated in an implementation of a conservative protocol (CMB Chandy-Misra-Byrant) called ParSMPL. The results obtained showed that in the same simulation each process has a different behavior, or in other words, a different performance. While some processes show a good performance others show that could have a better performance if another protocol was used.

**Keywords:** Undefined

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# CIESC 2006 Abstracts

## 210. El Camino hacia un Diseño Curricular Basado en Competencias: Caso Escuela de Ing. Informática PUCV

Jorge Bozo Parraguez, Silvana Roncagliolo de la Horra, Pamela Hermosilla Monckton

Pontificia Universidad Católica de Valparaíso Escuela de Ingeniería Informática Valparaíso Chile

**Abstract:** Now a days a curriculum based in capabilities establishes a profile and the definition of the capabilities that should be achieved. Also it has to define the modules that are part of the structure of the new curriculum, which support the profile of the career. This paper documents the trail that is being followed by the Escuela de Ingeniería Informática, from Pontificia Universidad Católica de Valparaíso (PUCV), in its effort in order to reach the desired curriculum based in capabilities for the career that is being offered (Ingeniería Civil Informática). Besides is included a brief summary of the ACM overview in its Computing Curricula Document.

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**Schedule:** Sala 3, Centro de Extensión, PUC (Chair: Angélica Urrutia), Tuesday (08:30 - 08:50)

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## 211. Organización para un Curso de Programación en un Contexto de Masividad. Una Experiencia

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**Abstract:** Teaching programming for a very large group might be a hard task. This work shows a new experience, made by a group of teachers, to improve the knowledge transmission in such courses. The main improvements were: to define specific roles for each teacher; to prioritize practical training by means of lab work, making it the central part of the course; to improve the usability of the web page and the newsgroup, thus allowing working with a big number of online students. The results, extracted from the final evaluation of this course and later ones, seem encouraging to further follow this path and apply this proposal to other courses of similar characteristics.

**Resumen:** Enseñar programación en un curso masivo es una tarea compleja. Este trabajo presenta la experiencia realizada por un grupo de docentes para mejorar el nivel de conocimiento transmitido en un curso

de las características mencionadas. Se definieron roles claves para cada integrante del equipo; se profundizó en la utilización de trabajos de laboratorio obligatorios para la enseñanza de programación, haciéndolos eje central del curso; y se potenció la utilización de distintos medios informáticos, como una página web y un newsgroup, para, en particular, lograr atender a un alto porcentaje de estudiantes no presenciales. Los resultados, extraídos de la evaluación final del curso y de otros posteriores, resultan alentadores para seguir trabajando en la misma dirección y expandir la propuesta a otros cursos de características similares.

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## 212. Estudio para Alinear los Planes y Programas de Estudio de con las áreas Conocimiento y Competencias profesionales en Tecnologías de la Información

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**Abstract:** The National Association of Informatics Education Institutions (ANIEI in Spanish), is the coordinating organism of strategy 2 of the National Program for the Development of the Software Industry (PROSOFT), related to the generation of qualified human resources. ANIEI proposed undertaking a study to look at the supply and demand of IT specialized professionals. This study was coordinated by the Ministry of Economics of Mexico. From this research, recommendations are obtained for updating and aligning the informatics curricula, so that the required human capital for this national competitiveness strategy can be provided.

**Resumen:** La Asociación Nacional de Instituciones de Educación en Informática (ANIEI) como coordinador de la estrategia 2 del programa nacional para el desarrollo de la industria de software (PROSOFT), que se refiere a la formación de recurso humano calificado, tomó la iniciativa de proponer la realización de un estudio de la oferta y demanda de profesionales especializados en TI, coordinado por la Secretaría de Economía. De este estudio se obtienen recomendaciones para la actualización y alineación de planes de estudio de las carreras de informática que permita proveer el capital humano requerido para esta estrategia nacional de competitividad.

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## 213. Clases Orientadas al Aprendizaje en la Primera Asignatura de Computación

**Juan Alvarez**

**Departamento de Ciencias de la Computación Facultad de Ciencias Físicas y Matemáticas Universidad de Chile Chile**

**Abstract:** The lectures of a first computing course are usually teaching oriented, that is, they are centered in the contents presented by the teachers. However, a learning oriented approach, centered in students and goals, is more effective and amusing.

The lecture, whose main objective is that each student writes a program to solve a problem, is structured in three parts. Initially, the teacher presents contents solving a problem. Secondly, the students solve a new problem. Finally, the teacher presents at least two solutions.

This approach has been successfully applied to first year engineering and science university students and high school students of a summer school. The methodology is also applied in the first lecture, replacing the traditionally large and discursive lecture without student participation.

**Resumen:** Habitualmente las sesiones de clases de una primera asignatura de Computación están orientadas a la enseñanza, es decir, están centradas en los contenidos presentados por el profesor. Sin embargo, resulta más efectivo, y entretenido, un enfoque orientado al aprendizaje, esto es, asegurando que los estudiantes logren objetivos.

La clase, cuyo principal objetivo es que cada uno de los alumnos escriba un programa que resuelva un problema, se estructura de manera que al comienzo el profesor presenta los contenidos resolviendo un problema y al final analiza las principales soluciones de los alumnos. El esquema ha probado su efectividad en alumnos de primer año de todas las especialidades de ingeniería y en estudiantes de enseñanza media de un curso de verano en computación. La metodología se aplica incluso en la primera clase, reemplazando la tradicional clase introductoria, discursiva y sin participación de los estudiantes, por una clase en que los alumnos trabajan activamente resolviendo un problema.

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## 214. Orientación en Línea de Trabajos Finales de Graduación en Computación: Propuesta de Componentes para Ambientes de Apoyo a Procesos de Enseñanza-Aprendizaje Mediados por Computadoras

Ismar Frango Silveira, Luciano Silva, Denise Stringhini, Nizam Omar, Pollyana N. Mustaro

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**Abstract:** The velocity of XXI century's socio-cultural changes is pushing society to have a more accelerated rhythm, besides requiring new educational proposals, able to follow such rhythm. This might be perceived mainly at Exact Sciences' field, directed to the formation of autonomous, inquirer professionals capable of not only detecting, but also solving problems in a satisfactory and creative manner. A way to incentive this posture alongside an undergraduate course is to institute elements for the development of oriented research and, more specifically, for the advising process of final term's Work. This advising could be improved through the usage of communication and information technologies. In this sense, this paper presents a proposal for the development and implementation of specific modules for collaborative virtual environments, aiming to help in this process.

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## 215. Resultados de una Investigación sobre Egresos de Alumnos por Carrera

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**Abstract:** This article shows the results of a data-mining model for data applied to the incoming students at the University Catholic of North (UCN), Antofagasta in Chile that applied for different careers that have influence in the rate of outcoming students at the titulation degrees in their respective careers. The results obtained with the proposal model indicate that given the conditional independent variables in the model (Average Grades for high school, Average PAA, type of High School and college) allowed to classified the students according to its conditions of admissions. This article use predicative analysis initially for the preliminary evaluation of the data obtained in the teaching area. Later we use modeling tools such as decision

tree and Bayesian classifier. The results obtained with these tools were encouraging if we considered the grade of success classifications of the model.

**Resumen:** Este artículo muestra los resultados de aplicar un modelo de minería de datos para establecer las variables de ingreso que influyen en el egreso y titulación de alumnos de las distintas carreras de la Universidad Católica del Norte (UCN), Antofagasta. Los resultados obtenidos con el modelo propuesto indican que las condiciones analizadas como variables independientes en el modelo (Promedio Notas Enseñanza Media, Promedio PAA, Tipo de Educación media y Tipo de Colegio) permiten categorizar a los estudiantes de acuerdo a sus condiciones de ingreso. Este estudio utilizó análisis predicativo inicialmente (regresión y análisis discriminante en SPSS) para la evaluación preliminar de los datos obtenidos en el área de docencia. Posteriormente se usaron herramientas de modelamiento, árboles de decisión y clasificación bayesiana. Los resultados obtenidos con estas herramientas fueron positivos si se considera el grado de clasificaciones acertadas del modelo.

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## 216. Guia de Taller de Tesis por Webquest

Fátima Consuelo Dolz Salvador

Universidad Mayor de San Andrés Facultad de Ciencias Puras y Naturales Carrera de Informática La Paz Bolivia

**Abstract:** This work shows the problem of numerous courses in the public University. Specially the Course of Workshop of Thesis of Degree at the Career of Computer Science of the Universidad Mayor de San Andrés in La Paz Bolivia, situation that we try to solve it by means of Activities of Learning Based on the Network.

Before the difficulty to face to works of 102 students and to guiding them with direction tasks, revision and control of advance of their theses of degree, the Educational Professor or subscribed Tutor has considered the convenience to do her activity by leading them through the activity of direction by means of Web sites, thus it has been very successful to use a generator of webquest that presents a great facility to prepare very didactic, attractive, and simple pages easy to maintain, and of easy automatic installation.

With the help of the WebQuest prepared for that purpose, the Professor can direct the activity of investigation in a virtual way, by using the hours of class in the revision and control of the recommended student works. Therefore, the students can advance in a better manner in their investigating works by having a constant guide since it facilitates them to consult some web sites.

**Resumen:** Este trabajo encara el problema de cursos numerosos en la Universidad pública. En especial la asignatura de taller de Tesis de Licenciatura en la carrera de Informática de la Universidad Mayor de San Andrés de La Paz Bolivia, situación que se intenta resolver mediante Actividades de Aprendizaje Basadas en la Red.

Ante la dificultad de atender a 102 alumnos con tareas de orientación, revisión y control de avance de sus tesis de grado, la suscrita docente o tutora colectiva ha visto por conveniente realizar la actividad de orientación mediante sitios Web, por lo cual se ha optado por utilizar un generador de webquest que presenta una gran facilidad para preparar páginas muy didácticas, atractivas, sencillas de mantener, y de instalación automática.

Con la ayuda de la WebQuest preparada para tal fin, la docente puede guiar la actividad de investigación en forma virtual, y utilizar las horas de clase en la revisión y control de las tareas encomendadas. Y los estudiantes pueden avanzar mejor en sus investigaciones teniendo una guía constante que les facilita algunos sitios de consulta.

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## 217. Un Estudio sobre la Enseñanza de la Seguridad en las Escuelas de Informática iberoamericanas

**David García Rosado, Eduardo Fernández-Medina, Mario Piattini**

**Grupo Alarcos Departamento de Tecnologías y Sistemas de Información Centro Mixto de Investigación y Desarrollo de Software UCLM-Soluziona Escuela Superior de Informática. Universidad de Castilla-La Mancha Paseo de la Universidad nº 4. 13071. Ciudad Real España**

**Resumen:** La seguridad informática ha venido cobrando mayor importancia dado el marcado crecimiento de los negocios vía Internet. En este sentido, las organizaciones se preguntan hasta qué punto son seguras sus aplicaciones, infraestructuras y cuál es el nivel de seguridad actual de los sistemas que gestionan su información. A estas cuestiones se responde garantizando una adecuada seguridad en los sistemas de información que consista en una correcta confidencialidad, integridad y disponibilidad de los datos que gestionan y que son uno de los activos más importantes de las organizaciones. En este artículo se hace un estudio de los principales currículos internacionales y de varias escuelas de informática para analizar cómo consideran la materia de la Seguridad. Como presentamos en este artículo, la situación no es muy favorable a día de hoy, aunque podemos afirmar que esta situación está mejorando progresivamente, y podemos llegar a tener profesionales de los SI, con un alto grado de formación en temas de seguridad.

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## 218. Modelo RHA: Extensão do Modelo de Munich Apoiada em Resultados de Avaliações de Aprendizagem, Estilos cognitivos e estratégias de aprendizagem

Marília A. Amaral, Vania R. Ulbricht

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Universidade Anembi Morumbi Docente do Programa de Pós-Graduação Stricto Sensu Mestrado em Design e Docente Voluntária do Programa de Pós Graduação em Engenharia e Gestão do Conhecimento da UFSC Brasil

**Resumen:** A WWW tornou real a disponibilização de material instrucional, e a cada dia mais usuários acessam esses conteúdos. Diante da grande diversidade de usuários, torna-se necessário personalizar a apresentação e a navegação nestes conteúdos. Por este motivo a área de Sistemas Hiperídia Adaptativos vem se destacando. O desenvolvimento sistemático de um Sistema Hiperídia Adaptativo pressupõe a utilização de um Modelo de Referência, modelo este que trabalha com as abstrações existentes e cria um método formal que serve como base para a modelagem e implementação deste tipo de sistema. Este artigo tem como objetivo apresentar o modelo RHA, uma extensão do modelo de referência de Munich. O modelo RHA é apoiado em resultados de avaliações de aprendizagem, estilos cognitivos e estratégias de aprendizagem para prover adaptabilidade em sistemas hiperídia.

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## 219. Análisis del Rendimiento de los Alumnos Ingresantes a Carreras de Informática en la UNRC Asociado con los cursos de ingreso

Marcelo Ariel Uva, Ariel Ferreira Szpiniak

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**Abstract:** The success of the new students to an university career depends on diverse factors. The previous knowledge are fundamental for a good yield. The initiation courses have as objective the leveling and the new



students' preparation. The following work analyzes the pursuit made to new students of careers in Computer Sciences developed in the Universidad Nacional of Río Cuarto (UNRC). This analysis was carried out in the subject "Introduction to the Algorithmic and Programming", first year-old subject, in the period that he/she understands from the beginning of the initiation course until the second exam. It is wanted to determine which the problems are possible to detect in this instance and these will affect to the acting of the students along their career in what grade. By way of conclusion, a strong correlation is observed among students that approve the entrance course and the quantity of students that regularize the first year-old subjects. On the other hand it is significant the percentage of students that you/they desert without draining all the evaluation instances. We believe that the phenomenon of the desertion is closely linked with the creation of false expectations, ignorance of the profile and the professional field of the career. For we understand it that it is of supreme importance to maintain this type of activities like preparatory instance.

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## 220. Programando en JAVA APPLETS los Métodos Numéricos

Gladys Mansilla Gómez

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**Abstract:** The present work tries to show how the students of "Ingeniería Civil en Informática" to the Universidad Austral de Chile, face the numerical methods a subject of second cycle of undergraduate degree program, named "Numerical Software." and which are the results if we incorporate the use of Matlab and the programming tasks in Java applet. The students integrate concepts of Numerical Methods with the knowledge acquired in the first cycle, they use for the practical works knowledge of Programming, Algebra of Matrices, Calculus and Differentials equations. In general they must program the diverse algorithms taking into account the efficient handling of memory, good practice of programming and display.

**Resumen:** El presente trabajo pretende mostrar como los alumnos de Ingeniería Civil en Informática de la Universidad Austral de Chile enfrentan una asignatura de segundo ciclo como es el Software numérico y cuales son los resultados obtenidos al incorporar el uso de Matlab y la programación de tareas en Java applets. Los alumnos integran conceptos de Métodos Numéricos con los conocimientos adquiridos en el primer ciclo, es así como utilizan para los trabajos prácticos conocimientos de Programación, Álgebra de Matrices, Cálculo y Ecuaciones diferenciales. En general deben programar los diversos algoritmos tomando en cuenta el manejo eficiente de memoria, buenas practicas de programación y despliegue gráfico

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## 221. Aprender a Programar Disciplinadamente: Nuevos Desafíos

Guillermo Ariel Rojo, Ariel Ferreira Szpiniak

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**Abstract:** The technological advances and scientists taken place in the last years impacted in the educational environment. In particular, the teaching of the programming should adapt at the new times, intruding in new paradigms, methods and programming languages. One of the most recent changes has consisted on the introduction of formalism to guarantee correction of the programs. This approach was adopted in our races of computation by the end of the '90 and applied during a five year period for the teaching during the first programming course. The lack of positive results motivated that from 2004 a different strategy was implemented in the first subject dedicated to the programming. The changes consisted basically of adopting the formalism like part of the stage of analysis of a problem, to be able to understand it better, but it does not stop to derive a solution to the same one. For that reason we intended to put more attention to other aspects like the descending design, outline design, algorithm concept like heart of the solution, programming styles and test methods. This work comes to report how it has been developed and in that has consisted this experience.

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## 222. Significant Learning Evaluation: A Case Study

Nelkis de la Orden Medina, Paulo José de Freitas Filho

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**Abstract:** This paper describes the experimental case study carried out in order to analyse and compare the behavior of two groups during the process of knowledge construction in two collaborative learning scenarios: one traditional and the other based on the use of the EquiTtext collaborative editor. We demonstrated which results could be obtained in collaborative learning environments in terms of critical thinking development, particularly in collaborative writing scenarios.

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## 223. Edumóvil: Propuesta de Incorporación de Dispositivos Móviles en la Educación Básica en México

Gabriel Geronimo Castillo, Everth H. Rocha Trejo

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**Abstract:** This paper presents the project Edumovil, which has the objective to improve the teaching and learning processes in Mexican primary schools by integrating mobile technology into the classroom. Edumovil aims to investigate the benefits and assets that can be obtained by using mobile technology in education: low costs, mobility, individual responsibilities and the opportunity to work in a collaborative manner. Both finalized applications as well as applications that are developed will be presented.

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## 224. Uso de Jogos Digitais como Estratégia para Ensino de Padrões de Projeto em Ciência da Computação

Ismar Frango Silveira, Luciano Silva

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**Abstract:** Nowadays, a growing demand for some updates and changes in curricula of Software Engineering-related syllabi is being noticed in CS and IT undergraduate courses, in order to include modern software development techniques. In this sense, inclusion of Design Patterns in such curricula is being considered as an urgent necessity. However, Design Patterns' learning process demands students to have a high level of abstract reasoning, besides a certain degree of maturity on Software Engineering issues, which makes this task a non-trivial effort to be performed. The present paper discusses some experiences of Design Patterns teaching in a Computer Science undergraduate course, using as a motivation factor the modeling of digital games.

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## 225. Design de Jogos Digitais: Experiências de um Curso Superior Tecnológico no Brasil

Luis Naito Mendes Bezerra, Luciano Silva, Ismar Frango Silveira, Carlos Fernando de Araújo Jr

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**Abstract:** [WINDOWS-1252?]In digital games development area, the demand for multidisciplinary professionals is growing, since such professionals would be able to act in the whole development process. This paper shows the structure of an Undergraduate Technology Course at Cruzeiro do Sul University, in São Paulo - Brazil, which is an two year long course which aims to prepare professionals to fulfil the requirements of such a growing market. The course's structure is shown, as well as some current experiences with ongoing classes

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## 226. Diplomado Aplicación de las TIC en la Docencia

G. Garzon, G.I. Bautista Lasprilla, I. Zuñiga Silgado, L.E. Robles, M.E. Rincon Socha

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**Abstract:** La formación permanente se entiende como un proceso continuo, a través del cual se busca ampliar y fortalecer el horizonte conceptual del docente, cualificar su práctica pedagógica y el dominio de su campo del saber, mediante el desarrollo de actividades teóricas y prácticas de diferente orden desde las cuales sea posible la tematización y transformación de sus representaciones sobre la educación, el conocimiento, la sociedad, la escuela, la infancia, la juventud, la enseñanza, el aprendizaje y la tecnología informática. Desde esta visión la Universidad Tecnológica de Bolívar es una de las dos instituciones seleccionadas por el MEN1 para ejecutar el Proyecto de Cualificación en Tecnología de la Comunicación y la Informática en el Distrito de Cartagena, con la responsabilidad de crear y poner en funcionamiento la Academia Tecnológica Informática TI para la Región Caribe Colombiana. El primer Proyecto denominado DIPLOMADO APLICACIÓN DE LAS TIC EN LA DOCENCIA, se inscribe dentro de la línea de formación de la pedagogía y la didáctica, que tiene en la informática educativa, un mediador para el desarrollo de competencias en los docentes, además, les permite entender a la tecnología, no como un instrumento para manejar información, sino como recurso metodológico en el aula para la aprehensión del conocimiento, el desarrollo de las inteligencias y el fomento de la investigación.

**Schedule:** Sala 3, Centro de Extensión, PUC (Chair: Marcela Varas), Tuesday (15:20 - 15:40)

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## 227. C-gen - Ambiente Educacional Para Ensino de Compiladores

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**Abstract:** The compiler s di scipline is considered complex d ue to the various techniques involved. Boun ded with this factor, practically no tools are available with an exclusively educational approach on this subject, that could enable s t u dent s to explore and visualize the entire compilation process. To supply this need, the C-gen tool was developed, offering an us able graphical user interface, allowing the user to define the main phases of a compilation, exhibiting the recognition process step-to-step. It is possible to explore the lexical, syntactical and semantic phases of a compilation, by defining the operation of each step with the appropriate editors. Its environment has expansion capabilities via plugins, which greatly widens the capacity of a quick and clear application of various concepts, which are of ten complex and laborious. I expect that this Project can satisfactorily help teachers and students in the learning process and theory elucidation.

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## 228. Integrating Entrepreneurship with Engineering Education: The Integrated Tecnology Venture Program at the University of Florida

Manuel E. Bermúdez, Keith Stanfill

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**Abstract:** The Integrated Technology Ventures (ITV) program at the University of Florida combines three successful university activities: (1) the commercialization of faculty inventions by the University Office of Technology and Licensing, (2) business innovation by the Center for Entrepreneurship and Innovation in the College of Business, and (3) industry-sponsored engineering education by the College of Engineering, primarily through the Integrated Product and Process Design (IPPD) pr ogram, in which engineering student teams design and build authentic industry-sponsored products. As a result, ITV projects immerse engineering and business students in an intense, entrepreneurial experience of real” product development, with real” business considerations. We describe the activities and the pedagogical components of the ITV program, and the structure of the virtual start-up companies formed under its auspices. We also describe one particularly promising current ITV project, which consists of developing a robotic X-ray video imaging system, in which robotic arms will track, follow and produce X-ray video of a human joint in motion. We believe that this

educational model can be emulated by other universities elsewhere, in university outreach mode, rather than the university-sponsored technology-commercialization mode of our ITV program.

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## 229. AUTOEXPLC - Analisador de Explicações para Auxílio ao Ensino da Linguagem C

Carlos M. Tobar Toledo, Cláudio L. V. Oliveira

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**Abstract:** Intelligent Tutoring Systems (ITS) have assisted engineering students in several domains, such as geometry, chemistry and programming. Those domains are considered ideal because they contain easily represented issues in computational form and allow the interaction type between student and ITS be limited to a restricted set of words, symbols, and numbers. This paper proposes to exploit intelligent system technology to support an explanation process in the context of ITS. A system was developed to support explanations of examples to assist the learning process of basic programming. Examples of C programs, previously elaborated by a teacher, are presented to a student from who are expected explanations to source-code regions. Using techniques of approximate natural language understanding, the system tries to recognize explanation contents to send the result to a module that classifies explanations as correct, incorrect, or incomplete according to the context of the proposed activity. The context can be configured by the teacher. After explanation processing, an ITS could determine the subsequent stages according to its educational strategy.

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**Schedule:** Sala 3, Centro de Extensión, PUC (Chair: Ariel Ferreira), Tuesday (16:40 - 17:00)

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