CLEI2015

XLI Conferencia Latinoamericana de Informática
http://clei.org/clei2015

Octubre/Outubro/October 19th-23rd, 2015, Arequipa, Perú
Hosted by: SPC, UNSA, UCSM, UCSP, ULS

Editors:
Hector Cancela
Alex Cuadros-Vargas
Ernesto Cuadros-Vargas

Abstracts

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Arequipa, Octubre/Outubro/October 19th-23rd, 2015

Local Organizers:

- Sociedad Peruana de Computación
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Abstracts of the XLI Conferencia Latinoamericana de Informática
Arequipa, Perú, Octubre/Outubro/October 19th-23rd

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Latin American Symposium on Theoretical Computer Science
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The VI Latin American Women in Computing Congress (LAWCC 2015)
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Message from Conference and General Program Chairs

CLEI (Centro Latinoamericano de Estudios en Informática) is an organization composed of aproximatly ninety institutions granting Computing degrees from all countries in the Latin American region.

CLEI has promoted annual meetings on Computing in the Latin American region for more than four decades. These meetings promote the exchange of knowledge and progress in research on different fields of Computing. The CLEI events have a high impact in the Latin American region, and also in other parts of the world. They have consolidated a number of symposia in different domains of computing, and have created others in new research areas.

Throughout the years, the successful development of each meeting has enabled the CLEI organization to consolidate a prestigious trajectory in the Computer Science community in Latin America as well as in other regions.

This is the second time Peru hosts the CLEI annual meeting. The first time was in 2004, both in Arequipa. The present edition is a very special one, as it marks the 41st CLEI conference, and it is coorganized by more that 10 Peruvian institutions: ▪ Sociedad Peruana de Computación ▪ Universidad Nacional de San Agustín (Arequipa) ▪ Universidad Católica de Santa María (Arequipa) ▪ Universidad Católica San Pablo (Arequipa) ▪ Universidad La Salle (Arequipa) ▪ Universidad Nacional de Ingeniería (Lima) ▪ Universidad Nacional Mayor de San Marcos (Lima) ▪ Universidad Ricardo Palma (Lima) ▪ Universidad Nacional San Cristóbal de Huamanga (Ayacucho) ▪ Universidad Nacional del Altiplano (Puno) ▪ Universidad Nacional Micaela Bastidas (Abancay) ▪ Asociación Peruana de Productores de Software (APESOFT) ▪ EDDAS (Arequipa) ▪ IEEE Peru Section and ▪ ACM UCSP Chapter showing the cooperation and strenght of the Peruvian academic community.

For the last several years, the Latin American Computing Conference has been organized in a number of symposia: 1) Latin American Symposium on Computer Graphics, Virtual Reality, and Image Processing, 2) Latin American Symposium on Software Engineering, 3) Latin American Symposium on Informatics and Society, 4) Latin American Symposium on Operational Research and Artificial Intelligence, and 5) Latin American Symposium on Infrastructure, Hardware, and Software, 6) Latin American Symposium on Large Scale Information Systems, 7) Latin American Symposium on Data and Information Management, 8) Latin American Symposium on Theoretical Computer Science. 9) XXII Iberoamerican Symposium on Higher Education in Computing (SIESC 2015)

Additionally, CLEI 2015 includes the following associated events: 1) XXI Latin American Master Thesis Competition(CLTM 2015) 2) I Latin American PhD Thesis (CLTD 2015) 3) The VI Latin American Women in Computing Congress (LAWCC 2015) 4) The IV Workshop on Nomenclature and Accreditation of Computing Programs

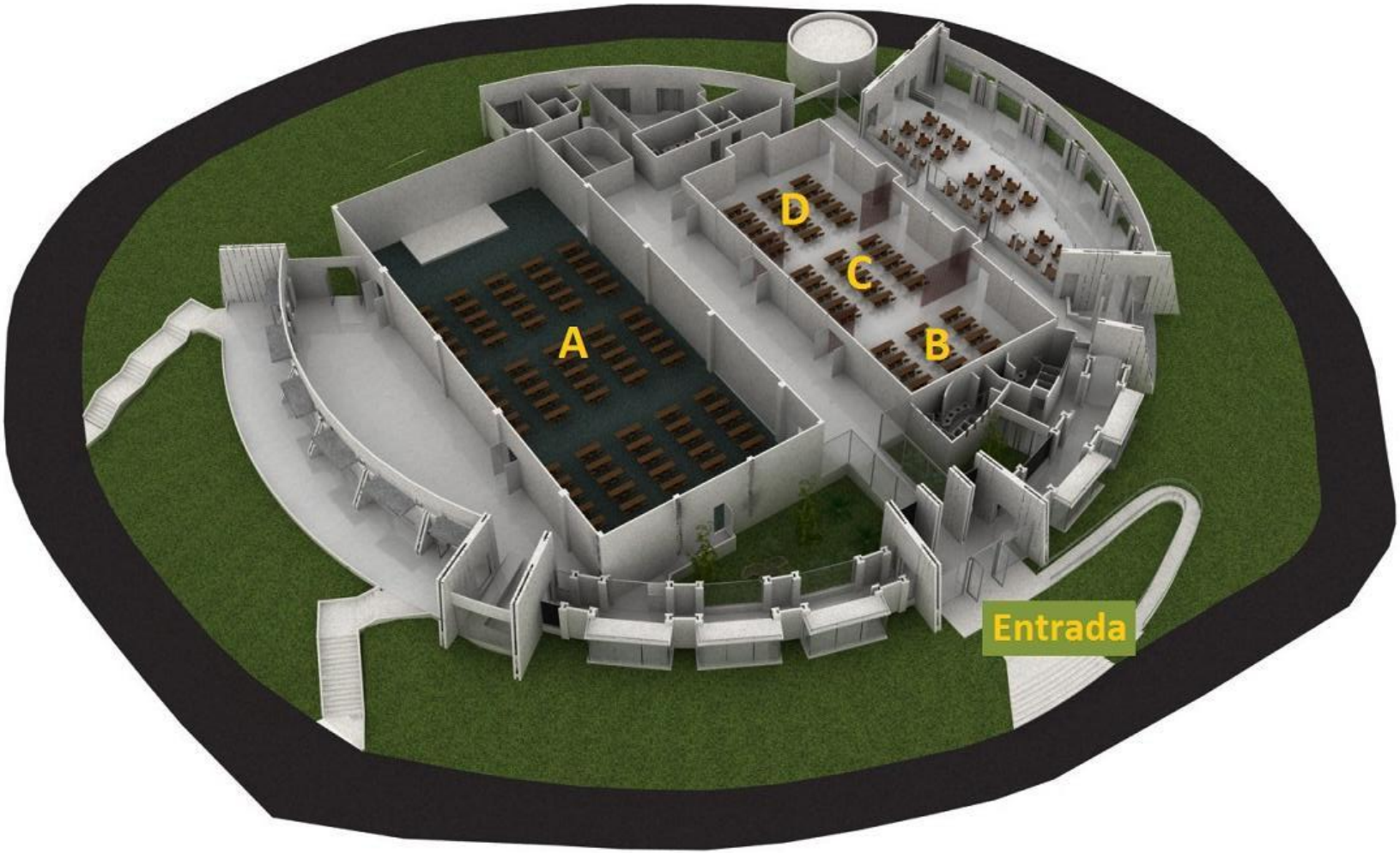
Over 400 contributions were received from different parts of America and Europe. All contributions were subject to a rigorous review process, resulting in 120 accepted papers. The main proceedings of the conference are included and indexed in IEEE Xplore; at the same time, the best papers presented at CLEI 2015 symposia and SIESC 2015 were invited to be published in the Electronic Notes in Theoretical Computer Science (ENTCS) journal and the CLEI Electronic Journal (CLEIej).

CLEI 2015 is sponsored by EDDAS, APESOFT and Oracle Academy. A conference like CLEI is only possible by the involvement of a large community; we want to thank the CLEI steering committee, members of the program committees and the organizing committee, invited lectures and speakers, authors, teachers, students, administrative staff, and many other people who contributed towards the success of the event.

Héctor Cancela
Universidad de la República (Uruguay)
Chair of the Program Committee

Alex Cuadros-Vargas
Universidad Católica San Pablo (Peru)
Chair of the Program Committee

Ernesto Cuadros-Vargas
Universidad Católica San Pablo (Peru)
Chair of the Organizing Committee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Keynote

Next Generation of GPUs

Esteban Clua[1]
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Schedule: Mon 19th@09:00, **Room:** A

GPUs were initially developed for solving real time graphics pipeline. Due their massively parallel architectures and the creation of a unified architecture, they became an important alternative for high performance computing. Modern GPUs have more than 3000 cores and may achieve up to 7TFlops, which is dozens of times the amount of a CPU based architecture. This talk will briefly show the hardware architecture of a modern GPU, will discuss about trends and the future of the next generation of GPUs and will present how different areas are being enhanced by this technologies, such as video-games, deep-learning and self-driving cars.

Short Biography

Esteban Walter Gonzalez Clua is graduated in Computer Science at Universidade de São Paulo and has master's and PhD degree in Computer Science. Has experience in Computer Science and has being acting in the following subjects: game engine architectures, 3D games, GPU Computing, education with games, real time computer graphics and digital entertainment. Today Esteban is associated professor at the computer science of Universidade Federal Fluminense, in Rio de Janeiro, and director of UFF Medialab. Esteban is one of the founders of SBGames - Brazilian Symposium of Digital Entertainment and Video Games (the largest conference in the subject in South America), president of the Brazilian Computing Society Game Committee and member of program committees of many conferences in Video Games. In 2007 received the prize of the personality which most contributed for the growth of the video game industry in Brazil and in 2009 and 2013 received the prize of Young Scientist of the State of Rio de Janeiro. Esteban is the coordinator of the first Latin America NVIdia Center of Excelence, which is in UFF Medialab and is a NVIDIA Fellow professor.

Los procesadores en el final de la ley de Moore

Francisco Tirado[1]
[1]Universidad Complutense. Madrid Spain
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Schedule: Mon 19th@14:00, **Room:** A

Desde su aparición, 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. La dedicación de recursos para incrementar el rendimiento de un procesador ha llegado a un punto donde el retorno que se obtiene en rendimiento es pequeño. Hoy en día, factores como la potencia y disipación térmica son factores determinantes en el diseño de los chips. La explotación, por tanto de estos recursos adicionales se ha orientado a la implementación en el chip de múltiples niveles de paralelismo. Además, nos encontramos en el posible fin de la Ley de Moore, y esto plantea problemas adicionales en el escalado tecnológico, dejándose de cumplir la reglas que ha funcionado por más de 50 años

Short Biography

Francisco Tirado es Catedrático de Arquitectura y Tecnología de Computadores en la Universidad Complutense de Madrid desde 1986. Ha trabajado en diferentes áreas de investigación dentro de la arquitectura de sistemas, computación de altas prestaciones y arquitectura del procesador. Hasta la actualidad es coautor de más de 250 publicaciones en revistas y conferencias internacionales. Ha participado en la organización de más de 90 Congresos Internacionales como General Chair, Program Chair, miembro del Comité de Programa, Chair de Sesión, Conferenciante Invitado y revisor de artículos. Ha impartido más 80 conferencias en congresos internacionales y universidades. Es Premio Nacional de Informática 2013 y Doctor Honoris Causa por la Universidades de San Agustín (Perú) y la Nacional de Asunción (Paraguay). Ha ocupado diferentes puestos en organismos de investigación y evaluación. Gestor en el Programa Nacional de I+D, Presidente de la Comisión Nacional de Evaluación de Actividad Investigadora, Director del Parque Científico de Madrid. En la actualidad es Vicerrector de Investigación de la UCM, Presidente de Honor de la Sociedad Científica Informática de España (SCIE) y miembro de la Comisión Ejecutiva de la Confederación de Sociedades Científicas de España (COSCE)

Service Quality Assurance in Context-Aware Systems

Nelly Condori-Fernandez[1]
[1]VU University Amsterdam. The Netherlands
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Schedule: Tue 20th@09:00, **Room:** A

Context-aware computing and associated technologies are becoming part of daily life. In fact, context-aware computing is considered to be a game-changing opportunity for enterprises to improve both productivity and profits. However, this positive economic growth will also bring a number of issues related to social sustainability (e.g. perceived enjoyment, resilience, privacy).

Given that evidence has corroborated that feelings and emotions dictate to a large extent our actions and decisions, sustainability of context aware systems is approached from the perspective of one of its ingredients, namely social acceptance. In this talk, I will introduce a sustainability assurance framework that exploit emotional information to adjust service quality levels at runtime.

Inteligencia Artificial en el Siglo XXI

Nicolas Kemper[1]
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Schedule: Tue 20th@14:00, **Room:** A

En ésta conferencia se trata de proporcionar una perspectiva apropiada y moderna de la inteligencia artificial (IA). Revisamos lo que hemos sido y lo que se ha logrado, se comentan los logros de la IA en el medio siglo pasado en lo que se refiere a búsqueda, representación de conocimiento, razonamiento, aprendizaje, planeación, etc. Se hace un recuento de la IA considerando el paradigma inicial como Inteligencia Artificial Simbólica, pasando por lo que se denomina Inteligencia Computacional y se culmina con el enfoque de Inteligencia Artificial Bioinspirada. También sopesamos nuestras perspectivas actuales bajo la meta de lograr el nivel de una IA más humana. En todo este panorama reflexionamos si la creación de un nivel humano de IA es imposible, o se darán creaciones exitosas en un futuro muy cercano.

Short Biography

Ingeniero Industrial, Universidad Nacional de Trujillo de Perú, Maestría en Ingeniería, especialidad sistemas expertos aplicados en la industria eléctrica y Doctorado en Ingeniería, especialidad en Inteligencia Artificial aplicada en sistemas energéticos, ambos grados en la Universidad Nacional Autónoma de México. Sus líneas de investigación y desarrollo tecnológico son: Desarrollo de sistemas inteligentes aplicados. Gestión del Conocimiento y Organizaciones Inteligentes. Manufactura Inteligente, Instrumentación Virtual Inteligente y Robótica Adaptativa. Minería de datos e Inteligencia de Negocios. Dispositivos de vuelo no tripulados autónomos para monitoreo espacial. Jefe del Departamento de Tecnologías de la Información y del Grupo de Sistemas Inteligentes de este Centro de Investigación. Profesor y Tutor del Postgrado en Ciencias e Ingeniería de la Computación en la misma UNAM. Tiene alrededor de 30 artículos en memorias de eventos y revistas internacionales y regionales, alrededor de 60 reportes técnicos de proyectos de desarrollo tecnológico, ha desarrollado diversos prototipos tecnológicos y software inteligente. Ha publicado el libro "Sistema Inteligente para la Gestión de una Planta Geotermoelétrica", y está en proceso de publicación los libros "Manual para el Desarrollo de Sistemas Expertos", "Desarrollo de Sistemas Difusos", "Inteligencia Artificial Aplicada", "Desarrollo de Proyectos de Minería de Datos" y "Evaluación de Proyectos Energéticos". Miembro del Technical Committee on Artificial Intelligence and Expert System, periodo 2000-2005, de la International Association of Science and Technology for Development (IASTED) de Canadá. Miembro del International Program Committee (IPC) de diversos eventos internacionales. Miembro de la Asociación Mexicana de Economía en Energía; del International Association of Science and Technology for Development (IASTED), Canadá; Miembro Fundador de la Academia Mexicana de Tecnología; Miembro del Institute for Systems and Technologies of Information, Control and Communication de Portugal (INSTICC) y es Miembro Fundador de la Sociedad Peruana de Inteligencia Artificial. Ha tenido diversas distinciones como la Medalla Gabino Barreda por el mejor promedio en sus estudios de maestría en Ingeniería. Así fue honrado con el grado de Doctor Honoris Causa por la Universidad Nacional de Piura, Perú.

Deep Learning for Multimedia Data: Teaching Computers to Sense

Omar Florez[1]
[1]Intel Labs. California USA
email: *omar.u.florez@intel.com*

Schedule: Wed 21st@09:00, **Room:** A

For the past few years, deep learning has been making rapid progress in both techniques and applications; significant performance gains were reported using deep learning in automatic speech recog-

nition and image recognition over hand-optimized feature representations.

Advances in smartphones, tablets, and wearables have made possible to sense a rich collection of user data, examples include audio, images, and video. This information allows us to infer user contexts such as faces, semantic locations, activities, and mood states enabling better and personalized user experiences. This explains the growing interest of industry (Intel, Facebook, Google, NVIDIA, Spotify, Netflix, Baidu, etc.) trying to take advantage of deep learning capabilities in recent years.

In several image and speech tasks, the success of deep learning is due to its ability to learn representations from noisy and unstructured data. Context sensing faces the same problem therefore we believe applications of deep learning in this domain can be advantageous. During this talk we will try bringing together researchers and applicants to discuss some of the deep learning algorithms and capabilities for multimedia and context domains as well as explore possible new research areas.

Short Biography

Dr. Omar U. Florez is a Research Scientist at the Anticipatory Computing Group at Intel Labs (California, USA). He graduated from Universidad Nacional de San Agustin, Peru in 2007 and received his Ph.D. in Computer Science at Utah State University in 2013. He is a recipient of an Innovation Award on Large-Scale Analytics by IBM Research, and the organizer of the NSF-funded Broader Participation in Data Mining workshop at KDD in 2014, which for first time funded the attendance of under-represented researchers worldwide. He is also the co-founder of South Americans in Computing. Dr. Florez's research interests cover statistical machine learning, recommender systems, and deep learning for multimedia data. He has 20+ academic publications and journals in ACM, IEEE, and Springer.

Compact Data Structures

Gonzalo Navarro[1]
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Schedule: Wed 21st@14:00, **Room:** A

Compact Data Structures is a new and exciting research area that lies in the intersection of Algorithms and Data Structures, Information Theory, and Data Compression. It has gained much attention in recent years due to the sharp increase in the sizes of the datasets available to applications and the widening gap in the memory hierarchy, which makes it much faster to process data in main memory than in external storage. Compact Data Structures seek for compressed data representations that can be manipulated and queried directly in compressed form, therefore enabling the representation of much larger datasets in main memory. I will describe the main ideas of the area and the two most relevant success stories: the representation of n-node trees in 2n bits and the representation of powerful text indexes within the space of the compressed text.

Short Biography

Gonzalo Navarro completed his PhD in Computer Science in 1998 at the University of Chile, where he is currently full professor. His areas of interest include algorithms and data structures, text searching, compression, and metric space searching. He has directed the Millennium Nucleus Center for Web Research, RIBIDI (an Ibero American project funded by CYTED), and a project funded by Yahoo! Research, apart from smaller projects. He has participated in various research projects, such as the Millennium Institute for Cell Dynamics and Biotechnology, an ECOS/CONICYT project (Chile-France cooperation), AMYRI (a CYTED project), and a Fondef project. Currently, he participates in the Millennium Nucleus Information and Coordination in Networks and in the Center for Biotechnology and Bioengineering.

He has been PC (co-)chair of several conferences: SPIRE 2001, SCCC 2004, SPIRE 2005, SIGIR 2005 Posters, IFIP TCS 2006, a track of ENC 2007, SISAP 2008, SISAP 2012, and LATIN 2016. He co-created SISAP on 2008, and was Steering Committee member of SPIRE, LATIN, and SISAP. He is a member of the Editorial Board of the journals Information Retrieval, ACM Journal of Experimental Algorithmics, and Information Systems. He has been guest editor of special issues in ACM SIGSPATIAL and Journal of Discrete Algorithmics. He has been PC member of more than 50 international conferences and reviewer for about 40 international journals. He has given around 50 invited talks in several universities and international conferences, including 10 plenary talks and 3 tutorials in international conferences. He created in 2005 the Workshop on Compression, Text, and Algorithms, which has become a permanent satellite of SPIRE.

He has coauthored a book published by Cambridge University Press, about 20 book chapters, 7 proceedings of international conferences (editor), more than 130 papers in international journals, and more than 200 in international conferences.

He is one of the most prolific and highly cited authors in Latin America.

Combining Matching Dependencies and Machine Learning via Datalog for Entity Resolution in Databases

Leopoldo Bertossi[1]
[1]Carleton University. Ottawa Canada
email: *bertossi@scs.carleton.ca*

Schedule: Thu 22st@09:00, **Room:** A

In this presentation we give an introduction to the combination of matching dependencies for entity resolution and support-vector machines, a classification method in machine learning. We show that they can be used to address the problems of identifying duplicate representations in data sources and merging them into single representations. The logical glue is provided by Datalog, a logical query language for relational databases, in its incarnation as LogiQL, which has been developed by LogicBlox. This presentation emphasizes the current trend of logically combining different techniques for addressing different interrelated problems in data management.

The presentation will be given in Spanish.

Short Biography

Leopoldo Bertossi has been Full Professor at the School of Computer Science, Carleton University (Ottawa, Canada) since 2001. He is also a Faculty Fellow of the IBM Center for Advanced Studies (IBM Toronto Lab). He has been a professor at the Department of Computer Science, PUC-Chile (until 2001); and also the President of the Chilean Computer Science Society (SCCC). His research interests include data management in general, database theory, business intelligence, data quality, semantic web data, logic-based knowledge representation, and machine learning. He obtained a PhD in Mathematics from the PUC-Chile in 1988.

Learning to select learning algorithms

Andre de Carvalho[1]
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Schedule: Thu 22st@14:00, **Room:** A

A large number of learning algorithms have been developed in the last decades and they have been applied to several tasks in different application domains, with different performance levels. According to empirical and theoretical results, no single algorithm can outperform the others in every task. Thus, when using learning algorithms to solve a new task, we are faced with the question of which algorithm to use. Metalearning provides a general framework for the selection of the most suitable algorithm for a new task. This talk will discuss how metalearning can be used for algorithm selection in different learning tasks.

Short Biography

André C. P. L. F. de Carvalho is Full Professor in the department of Computer Science, University of São Paulo, Brazil. His main research interests are data mining, data science and machine learning. Prof. André de Carvalho has more than 300 peer reviewed publications, including 10 best papers awards from conferences organized by ACM, IEEE and SBC. He is a member of the International Association for Statistical Computing (IASC) Council and director of the Center of Machine Learning in Data Analysis of the University of São Paulo.

XML Semantic Disambiguation: Background, Applications, and Ongoing Challenges

Richard Chbeir[1]
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Schedule: Thu 22st@17:15, **Room:** A

Since the last two decades, XML has gained momentum as the standard for Web information management and complex data representation. Also, collaboratively built semi-structured information resources such as Wikipedia have become prevalent on the Web and can be inherently encoded in XML. Yet most methods for processing semi-structured information in general and XML in particular handle mainly the syntactic properties of the data, while ignoring the semantics involved. To devise more intelligent applications, one needs to augment syntactic features with machine-readable semantic meaning. This can be achieved through the computational identification of the meaning of data in context, also known as automated semantic analysis and disambiguation, which is nowadays one of the main challenges at the core of the Semantic Web. XML semantic-analysis processing and disambiguation become crucial in an array of applications ranging over semantic-aware query rewriting, semantic document clustering and classification, schema matching, as well as blog analysis and event detection in social networks and tweets. This talk provides a concise and comprehensive review of the methods related to XML-based semi-structured semantic analysis

and disambiguation. It will be composed of four parts. First, I will briefly cover traditional word sense disambiguation methods for processing flat textual data. Second, I will describe and categorize disambiguation techniques developed and extended to handle semi-structured and XML data. Third, I will describe current and potential application scenarios that can benefit from XML semantic analysis. Fourth, I will discuss ongoing challenges and future directions.

Short Biography

Richard Chbeir received his PhD in Computer Science from the University of INSA DE LYON-FRANCE in 2001 and then his Habilitation degree in 2010 from the University of Bourgogne. He is currently a Full Professor in the Computer Science Department in IUT de Bayonne in Anglet -France. His current research interests are in the areas of social networks, multimedia semantics, XML and RSS similarity, and digital ecosystems. Richard Chbeir has published in international journals, books, and conferences, and has served on the program committees of several international conferences. He is currently the Chair of the French Chapter ACM SIGAPP.

Testing Based on Finite State Machines: Past, Present and Future

Adenilso Simao[1]
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Schedule: Fri 23th@09:00, **Room:** A

State machines are among the simplest behavioral models which can be used for system modelling. Nonetheless, they are very expressive and have a long history in computing science. The first testing techniques based on this kind of models are from 50ties. Since then, several contributions have been proposed, including some recent results. In this talk, we are going to introduce the main concepts of testing based on state machines, in special, finite state machines. The main generation methods will be discussed. The state-of-the-art methods will be presented and future directions on this research area will be pointed out.

Short Biography

Possui graduação em Bacharelado em Ciência da Computação pela Universidade Estadual de Maringá (1997), mestrado em Ciências da Computação e Matemática Computacional pela Universidade de São Paulo (2000) e doutorado em Ciências da Computação e Matemática Computacional pela Universidade de São Paulo (2004). Realizou estágio de pós-doutoramento no Centre de Recherche Informatique de Montreal (2008-2010). Desde 2004 é Professor da Universidade de São Paulo (atualmente, é Professor Associado Nível 2). Tem experiência na área de Ciência da Computação, com ênfase em Engenharia de Software, atuando principalmente nos seguintes temas: teste de software, métodos formais e linguagens de programação.

Cloud Security and Forensics

George J. Proeller[1]
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Schedule: Fri 23th@10:15, **Room:** A

Cloud Computing offers an opportunity to increase capability with a promise of decreasing overall IT costs. The Cloud is also increasingly coupled with the ubiquity of mobile computing and its advantages. Both are now a part of everyday life - Amazon, Google, Dropbox, iTunes Cloud, RealAudio Cloud, etc. However the "Benefits.ºf the Cloud cause us to forfeit aspects of control, visibility, and tracking data origin, source, and attribution. Traditional Computer Forensics requires physical access to systems for processes such as disk imaging something not readily available when working in the Cloud. Further the physical location of data can be very difficult to determine in a private cloud and a near impossible task in a public cloud where the data may not even reside in the same country as the user. This talk discusses the challenges and opportunities within the emerging areas of cloud and mobile forensics.

Short Biography

Thirty-plus years' experience in Information Technology Systems (ITS) focusing on life-cycle Information Assurance/Computer Network Security for the Enterprise. He holds multiple security certifications including the Certified Information Systems Security Professional (CISSP) credential, the Certified Information Security Manager, and the GIAC Security Leadership Certification and Certified Information Forensics Investigator and is a pioneer in the transition of information security to academia. His awards include being named a Distinguished Fellow of the Information Systems Security Association (ISSA) and to the ISSA Hall of Fame.

Tutorial

Planificación Óptima de Sistemas Multinúcleo conrestricciones de calidad de servicio, recursos y energía

Rodrigo Santos[1]
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Bahía Blanca Argentina
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Schedule: Tue 20th@15:15, **Room:** A

Dos hechos fundamentales contribuyeron al desarrollo de los sistemas móviles. Por un lado el abaratamiento del hardware y la expansión de la memoria disponible. Por el otro la evolución de las arquitecturas. De hecho practicamente cualquier microcontrolador, aún aquéllos económicos tienen características multicore. Si bien puede que la unidad de procesamiento sea única, cuentan con dispositivos periféricos para las comunicaciones, el tratamiento de señales de entrada/salida y el manejo de tiempos como mínimo.

La consolidación de las tecnologías de comunicación inalámbrica permitió el establecimiento de redes de sensores y actuadores que miden, evalúan y controlan procesos a distancia. Estos procesos abarcan áreas tan diversas como la industria de procesos continuos al monitoreo ambiental, las redes sociales, la administración del sistema de transporte público o la atención temprana de incidentes urbanos o ambientales. En esta clase de sistemas la validación temporal de la información administrada y la coherencia de los mismos son aspectos centrales para el funcionamiento del sistema.

Un adecuado análisis del comportamiento temporal de esta clase de sistemas requiere de políticas de planificación que puedan garantizar el cumplimiento de los requerimientos. Se suma al problema de la planificación, las restricciones que la calidad de servicio requerida y el consumo de energía imponen en la actualidad sobre los sistemas.

En el curso se presenta la teoría de planificación clásica, los mecanismos de verificación y validación de las mismas, los criterios de optimalidad para sistemas de cómputo y comunicaciones. El modelado adecuado de esta clase de problemas permite transferir resultados de un área a otra.

Short Biography

Dr. Rodrigo Santos es Prof. del Departamento de Ingeniería Eléctrica y de Computadoras de la Universidad Nacional del Sur e Investigador Adjunto del CONICET. Su área de interés es la planificación de sistemas de tiempo real, el análisis de requerimientos, los sistemas colaborativos y los sistemas embebidos. Fue presidente de CLEI entre 2008 y 2012, miembro del IEEE. Autor de varios artículos en revistas y congresos de la especialidad.

Seguridad en la Web

Ernst Leiss[1]
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Schedule: Wed 21st@15:15, **Room:** A

Empezamos con métodos para la protección de contenido digital, desde criptografía hasta marcas de agua digitales. Después hablamos sobre control de acceso, incluyendo contraseñas y métodos biométricos. De ahí pasamos a crímenes que involucran o dependen de la web. Terminamos con algunos comentarios sobre privacidad y los efectos de la tecnología en el mundo cotidiano.

Short Biography

Ernst Leiss obtuvo grados académicos en ingeniería (Dipl.-Ing., TU Viena, 1975), ciencia de la computación (M. Math., U. Waterloo, 1974), y matemática (Dr. techn., TU Viena, 1976). Trabajó como post doc en la Universidad de Waterloo (1976/7) y como profesor investigador en la Universidad de Chile en Santiago (1978). Empezó en el departamento de ciencias de la computación en 1979 donde todavía trabaja. Sus intereses incluyen teoría de lenguajes formales, computación de alto desempeño, y seguridad. Ha sido supervisor de 17 disertaciones doctorales y de mas de 100 tesis de maestría. Es autor de seis libros y mas de 160 trabajos científicos en conferencias y revistas.

Leiss ha participado en cada conferencia CLEI desde 1992. Se involucró con LANC, para definir un modelo sostenible para la conferencia. Ha participado en numerosos comités de programa, en particular como General Program Chair de la conferencia en Quito en 2011, donde se usó por primera vez el modelo de simposios. Ha participado en un ECI curso en Buenos Aires y dos ERTIC cursos en Asuncion. Además, ha dictado cursos en Siria, Brasil, Italia, España, Alemania, Finlandia, Tunisia, y Marruecos. Hasta la fecha, ha dado seminarios en 32 diferentes paises.

Leiss ha participado en la acreditación de programas en informática. Ha sido un ACM Distinguished Lecturer desde 1991. Ha ocupado puestos

administrativos en su Universidad y actuado como presidente de varios comités; en particular, en 1994 como presidente del Senado de su universidad, inició una mayor reestructuración administrativa de la Universidad de Houston. En 2014, fue premiado con la Distinción CLEI al Mérito Latinoamericano en Informática.

Digital Disruption

Juan Pablo Guizado Serrano[1]
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Schedule: Fri 23th@10:15, **Room:** B

Existe una latente necesidad de innovación de las organizaciones para garantizar su éxito en la era digital, y hacer de la disrupción digital una oportunidad para la innovación.

Tendencias como el Cloud Computing, Big Data, el Internet de las cosas, redes sociales y la movilidad se han revelado como los principales ejes de la transformación de las empresas. Por ello consideran que el uso de estas tecnologías está ocasionando una disrupción digital masiva en las empresas. Debemos estar consientes que la tecnología aún no ha llegado a su más alto nivel de desarrollo, al contrario estamos recién entrando al momento en donde el despliegue correcto de ésta mostrará su verdadero valor.

Short Biography

Con casi 15 años de experiencia en Tecnologías de la Información, el Ingeniero Juan Pablo Guizado desde hace 3 años es Consultor en Soluciones de Capa Media en Oracle Perú, especialista en productos de Automatización de Proceso de negocio y Optimización de integración de sistemas empresariales, anteriormente ha sido Administrador de Plataforma de Misión Crítica para Aplicaciones Java y Arquitecto de Aplicaciones multiplataforma, conocedor además de construcción de sistemas participando en múltiples proyectos de envergadura nacional.

Simposio Latinoamericano de Computación Gráfica, Realidad Virtual y Procesamiento de Imágenes (SLCGRVPI)

Indexación de Imágenes Faciales mediante Algoritmo basado en Permutaciones

Christian von Lucken[1], Liz González[1]
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Schedule: Wed 21st@15:15, **Room:** D

In face recognition systems that work with databases of thousands of images it is not practical to compare the query image against each image in the database to determine similarity. The increasing use of facial recognition in various fields and larger databases creates the need to explore mechanisms for efficient and effective search in terms of use of computing resources and percentage of hits. In order to ease the load of these systems and improve response time, several alternatives to reduce or eliminate the need for the exhaustive search of images were developed. Indexing methods are one of these alternatives. This paper presents a new indexing technique based on permutations, which in combination with a Principal Component Analysis algorithm, optimizes storage of images and accelerates the search process to predict the similarity between objects. The proposed method shows improved behaviour when compared against other techniques representing the state of the art using the FERET database.

A heuristic model for determining the sperm motility grade by video tracking

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Schedule: Wed 21st@15:45, **Room:** D

Sperm motility analysis is an important part in the fertility analysis and at the same time is a good example of the tracking multiple objects and video surveillance problem from a computational point of view. Currently the most used method for this analysis is the direct inspection which is inaccurate, subjective, a not repeatable procedure, and difficult to teach. This article attempts to overcome these barriers using computer vision techniques and also proposes a heuristic model based on movement direction and Euclidean distance to track sperm in videos obtained from an artificial sperm cells simulator.

Automatic Detection of Glaucoma Using Disc Optic Segmentation and Feature Extraction

Maila Claro[1], L. Santos[1], Wallinson Silva[1], Flávio Henrique[1], Alcilene Sousa[2], Andre Macedo Santana[1]
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Schedule: Wed 21st@16:15, **Room:** D

Digital image processing is highlighted in the medical setting for automatic diagnosis of diseases. Glaucoma has no cure, and is the second leading cause of blindness wordwide. Currently there are treatments to prevent vision loss, but the disease must be discovered still in the early stages. Thus, this study aims to develop an automatic detection method of Glaucoma in retinal images. The methodology used in the study was: image acquisition, segmentation of the optic disc area (DO) in retinal images, color feature extraction and entropy in the targeted area and shortly after the selection of attributes. Finally, classification of images was conducted to determine wether or not glaucoma was present.

Revisiting the Visibility Problem with a Hybrid Structure Paradigm

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Schedule: Wed 21st@16:15, **Room:** B

We revisit the problem known as the visibility problem, for computing a potentially visible set of primitives, proposing a solution that can be used to accelerate the processing in real-time 3D visualization applications. We come up with a resulting dry structure in the sense of data reduction that can be used for on-line, interactive applications. Our main goal is to load the minimum amount of primitives from the scene during the rendering

stage, as possible. For this purpose, our algorithm executes the culling by using a hybrid paradigm based on viewing-frustum, back-face culling and occlusion models. Results have shown a substantial improvement over these traditional approaches if applied separately. This novel approach can be used in devices with no dedicated processors or with low processing power, as cell phones or embedded displays, or to visualize data through the internet, as in virtual museums applications.

3D Mesh Interest Point Detection using GISIFs and Heat Diffusion

Jan José Hurtado Jauregui[1], Cristian López del Alamo[1,2], Madeley Karina Coaquira Congona[1]
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Schedule: Wed 21st@16:45, **Room:** D

To facilitate processing of 3D objects it is common to use high-level representations. The interest points are one of them. An interest point should possess a distinctive feature regarding its locality and should be stable in different instances of the object. This article proposes a descriptor based on symmetry (GISIFs) and heat diffusion (HKS). From this features, we select a set of representative points. The GISIFs referenced in this article has not been used to extract local features. We compare our results with the results of other techniques, which make up the state of the art in interest point detection. We use a benchmark that evaluates the accuracy of the selected points with respect to an ideal set of interest points.

Detecção Automática do Glaucoma pelo uso de Descritores Locais, Matriz GLCM e Aprendizado de Máquina

Wallinson Silva[1], Maila Claro[1], L. Santos[1], Flávio Henrique[1], Alcilene Sousa[1], Nayara Moura[1]
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Schedule: Thu 22st@10:15, **Room:** D

Glaucoma is an asymptomatic disease and is considered the second greater cause of blindness in the world, it attacks the optic nerve causing irreversible damage to the visual field. Although there is no cure there exist treatments, which can be facilitated from a early diagnosis. Thus, this work consists of methods for feature extraction in retinal images from the use of descriptors for the automatic detection of glaucoma. These methods are constructed from the use of bag of words, which are robust forms of representation, and the texture descriptors Binary Pattern Place and Grey Level Co-occurrence Matrix (GLCM).

A Texture and Curvature Bimodal Leaf Recognition Model for Identification of Costa Rican Plant Species

Erick Mata-Montero[1], Jose Carranza-Rojas[1]
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Schedule: Thu 22st@10:45, **Room:** D

In the last decade, research in Computer Vision has developed several algorithms to help botanists and non-experts to classify plants based on images of their leaves. LeafSnap is a mobile application that uses a multiscale curvature model of the leaf margin to classify leaf images into species. It has achieved high levels of accuracy on 184 tree species from Northeast US. We extend the research that led to the development of LeafSnap along two lines. First, LeafSnap's underlying algorithms are applied to a set of 66 tree species from Costa Rica. Then, texture is used as an additional criterion to measure the level of improvement achieved in the automatic identification of Costa Rica tree species. A 25.6 % improvement was achieved for a Costa Rican clean image dataset and 42.5 % for a Costa Rican noisy image dataset. In both cases, our results show this increment as statistically significant.

An Open Source Framework To Manage Kinect On The Web

Francisco Moreno[1], Esmitt Ramírez[1], Francisco Sans[1], Rhadamés Carmona[1]
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Schedule: Thu 22st@11:15, **Room:** D

Human-computer interaction has had continuous changes in recent year, with a significant improvement in touch screens and motion sensors. New

sensing technologies, like Microsoft Kinect, provide a low-cost way to add interactivity with gestures and postures. The current tendency is to develop software for the web. Interactions through the Kinect can be an additional benefit for these applications. While there is a solution to use the Kinect in the web, it is only supported on Windows platform by using Internet Explorer browser. In this paper, we propose a robust, interoperable, elegant and efficient server-client open source framework which allows interacting with the Kinect or similar capture device from browsers. The tests support our hypothesis, resulting in a low consumption of memory/time in different modern browsers. Also, an experimental test was performed to prove its usefulness, getting a rate of 30fps successfully.

An Efficient approach for interest points detection in non-rigid shapes

Cristian López del Alamo[1], Luciano Arnaldo Romero Calla[2], Lizeth Joseline Fuentes Pérez[2]
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Schedule: Thu 22st@15:15, **Room:** D

Due to the increasing amount of data and the reduction of costs in 3D data acquisition devices, there has been a growing interest, in developing efficient and robust feature extraction algorithms for 3D shapes, invariants to isometric, topological and noise changes, among others. One of the key tasks for feature extraction in 3D shapes is the interest points detection; where interest points are salient structures, which can be used, instead of the whole object. In this research, we present a new approach to detect interest points in 3D shapes by analyzing the triangles that compose the mesh which represent the shape, in different way to other algorithms more complex such as Harris 3D or HKS. Our results and experiments of repeatability, confirm that our algorithm is stable and robust, in addition, the computational complexity is O(nlogn), where n represents the number of faces of the mesh.

Computerized Diagnosis of Melanocytic Lesions Based on the ABCD Method

Deysi Leguizamón[1], Laura Bareiro[1], José Luis Vázquez Noguera[1], Diego P. Pinto-Roa[1], Liza A. Salgueiro Toledo[1]
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Schedule: Thu 22st@15:45, **Room:** D

Melanoma is a type of skin cancer and is caused by the uncontrolled growth of atypical melanocytes. In recent decades, computer aided diagnosis is used to support medical professionals; however, there is still no globally accepted tool. In this context, similar to state-of-the-art we propose a system that receives a dermatoscopy image and provides a diagnostic if the lesion is benign or malignant. This tool is based on next modules: Preprocessing, Segmentation, Feature Extraction and Classification. Preprocessing involves the removal of hairs. Segmentation is to isolate the lesion. Feature extraction is considering the ABCD dermoscopy rule. The classification is performed by the Support Vector Machine. Experimental evidence indicates that the proposal has 90.63 % accuracy, 95 % sensitivity and 83.33 % specificity on a dataset of 104 dermatoscopy images. These results are favorable considering the performance of diagnosis by traditional progress in the area of dermatology.

Simposio Latinoamericano de Infraestructura, Hardware y Software (SLIHS)

Scratchpad Memory Management Using Data-Prefetching

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Schedule: Mon 19th@10:15, **Room:** D

Nowadays, multicore processors including dozens of cores are a reality and the challenge of designing microprocessors with hundreds of cores does not appear far from being achieved. However, some questions remain open, despite the proposals found in the literature. Memory latency, data locality and programmability are some of the more critical ones. As the number of cores in multi-core processor architectures increases, so does the need of more efficient memory hierarchy and resource management scheme. The design of efficient memory hierarchy and memory management policy becomes a very important research subject in multi core architecture field. The usage of resource allocation strategies becomes increasingly necessary. This paper presents the design and implementation of a multi-core node with support to memory configuration and hardware-based scratchpad memory management. The node consists of 9 cores (8 slave cores and a master core) and a configurable local memory. The proposed architecture was implemented with VHDL and prototyped with FPGA development boards. Experimental results show that the proposed hardware-based scratchpad memory management unit can achieve 99,0 of hits in data address prediction and 97.1 % of hits when searching data-frames in the local memory.

Cloud Elasticity for HPC Applications: Observing Energy, Performance and Cost

Vinicius Facco Rodrigues[1], Gustavo Rostirolla[1], Rodrigo da Rosa Righi[1], Cristiano André da Costa[1], Jorge Luis Victória Barbosa[1]
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Schedule: Mon 19th@10:45, **Room:** D

Elasticity is one of the most known capabilities related to cloud computing, being largely deployed using thresholds. In this way, limits are used to drive resource mangement actions, leading to the following problem statements: How can cloud users set the threshold values to enable elasticity in their cloud applications? And what is the impact of the application's load pattern on the elasticity? This article answers these questions for iterative high performance computing applications, showing the impact of both thresholds and load patterns on application performance and resource consumption. To accomplish this, we developed a reactive and PaaS-based elasticity model called AutoElastic and employed it over a private cloud to execute a numerical integration application. Here, we are presenting an analysis of best practices and possible optimizations regarding the elasticity and HPC pair. Considering the results, we observed that the upper threshold influences the application time more than the lower one.

Optimal Cloud Resource Allocation by Means of the Analytic Hierarchy Process

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Schedule: Mon 19th@11:15, **Room:** D

Improving resource provisioning for applications hosted in the cloud is a major research challenge. This is because is necessary to address two conflicting objectives: meet customer requirements; and save money. As there is a delay, which can take minutes, between the request for a new resource and it been ready for use, it is necessary to predict the future demand for each time interval. However, there is not a prediction model that is appropriate in all cases. To resolve this problem, this paper proposes the combination of different forecasting models by the analytic hierarchy process. In this way, we intend to create a generic solution, able to optimize the allocation of resources to several applications types, with different demand types. The results obtained by simulation show that our proposal achieves this goal.

A Multi-Objective Approach for Virtual Network Embedding

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Schedule: Mon 19th@11:45, **Room:** D

Network Virtualization is a key technology for the Future Internet, as it allows the deployment of independent virtual networks using resources of the same basic infrastructure. An important challenge in the dynamic provision of virtual networks resides in the optimal assignment of physical resources (nodes and links) to requirements of virtual networks. This problem is known as Virtual Network Embedding (VNE). For the resolution of this problem, previous research has focused on designing algorithms based on the optimization of only one objective. On the contrary, in this work we present a multi-objective algorithm called VNE-MO-ILP for solving dynamic VNE problem, which calculates an approximation of the Pareto Front considering simultaneously resource utilization and load balancing. Results of experiments, using a network simulator, probe that the proposed algorithm is better or at least comparable to the state-of-the-art algorithm.

An Experimental Study on the Effectiveness of Trilateration and Probabilistic Multilateration for Position Estimation in MANETs

Anabel Pineda-Briseño[1], Rolando Menchaca-Méndez[2]
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Schedule: Mon 19th@15:45, **Room:** D

In this paper we present an experimental study of trilateration and probabilistic multilateration. Both methods are techniques aimed at estimating the location of a point, based on the position of three or more references and distances to them. To asses the effectiveness of the aforementioned methods, we present a characterization of the various error conditions, a sensitivity analysis of the trilateration and probabilistic multilateration to measure the level of collinearity among references, and a simulation-based analysis describing the results of detailed simulation experiments used to study the performance of DV-Hop that use trilateration as method to estimate the position of their nodes, as well as the version of DV-Hop that use probabilistic multilateration for the same purpose. DV-Hop is the most representative range-free positioning algorithms in the context of mobile ad hoc networks (MANETs). Our experimental results show that the probabilistic multilateration method is superior to the traditional trilateration method.

gr-isdbt: An ISDB-T 1-segment Receiver Implementation on GNU Radio

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Schedule: Mon 19th@16:15, **Room:** D

Several countries in the world are undertaking an immensely challenging task: successfully perform the so-called "analogical blackout" of television. In Latin America in particular, the chosen transmission scheme is, in most cases, ISDB-T (the Japanese standard, later adapted by Brazil). Key to the success of this blackout is a thorough understanding of the technology of choice. The present paper intends to be a contribution to this understanding: an open, free and software-based ISDB-T 1-segment receiver. Such receiver may for instance be used to evaluate improvements to the standard (or different algorithms for the receivers), or even be used as a measurement tool (since one has access to the whole receiving chain). In addition to presenting our implementation, we discuss the technology that enables the software-based receiver: Software Defined Radio, and in particular the software framework GNU Radio.

MultiObjective Robust Network Design under Uncertain Traffic. An approach based on Evolutionary Algorithms

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Schedule: Mon 19th@16:45, **Room:** D

Given the importance and complexity of the problem of robust network design, this work, studies the robust network design subject to guarantee certain level of quality of service, so that with the

reservation of an adjustable bandwidth for each node, the network is not negatively influenced by traffic from the rest of the network. Therefore a MultiObjective Evolutionary Algorithm (MOEA) is proposed to solve and find the robust network design, inspired by the concept of price of robustness, which simultaneously minimizes the cost of network, inequity traffic and maximizes the traffic service in the worst case scenario. Finally, experimental results show the benefits of the proposed approach to get a set of non-dominant solutions on which it can make, a better decision.

Auction-based Resource Provisioning in Cloud Computing. A Taxonomy

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Schedule: Mon 19th@17:15, **Room:** D

Amazon Web Services marketizes its idle computing resources through its spot instances offer. These resources are offered through an auction-based scheme at extremely low prices. A running instance can be shutdown whenever the spot price rises above the user bid. Several challenges and opportunities emerge from this new computing paradigm. This work proposes for the first time a taxonomy on auction-based cloud computing resource provisioning, based on the study of the most relevant literature. The studied works are classified according to: (1) provider or user perspective, (2) problem solved, (3) optimization approach, (4) objective functions and (5) solution techniques. Finally, new prospective research subjects are identified and proposed for this promising research area.

GAIA Infrastructure: a Framework for the Management of Information and Communication Technology Infrastructure

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Schedule: Mon 19th@17:45, **Room:** D

Organizations have experienced a significant dependence on their Information and Communication Technology (ICT) infrastructure. To manage this infrastructure, they should follow several standards and good practices, which makes this task a challenge. In this paper, we propose the framework GAIA Infrastructure, that aims to support the ICT infrastructure management under different perspectives such as configuration, structured cabling, fault identification and mitigation and information security. The framework is composed by a Diagnostic Assessment Questionnaire, a Maturity Model and seven Assessment Axes. The framework was applied in three organizations and, therefore, they could identify strong and weak points of their infrastructure management practices.

Protection with Quality of Service in optical WDM networks using Many-Objective Ant Colony Optimization

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Schedule: Mon 19th@18:15, **Room:** D

This paper presents a new many-objective formulation of the Routing and Wavelength Assignment (RWA) problem in wavelength-routed optical WDM networks with protection, considering Quality of Service (QoS). A modification of the Multi-Objective Ant Colony System (MOACS) algorithm is proposed to solve the problem. Experimental results show that the proposed approach is a promising alternative compared to the original MOACS. The proposed algorithm is also compared to a Mixed Integer Linear Programming (MILP) implementation proving the results obtained are very pretty closed, with a significant decrease in runtime.

The Use of Different Strategies of Search Space Reduction in Mitigation of Optimization Selection Problem

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Schedule: Mon 19th@18:45, **Room:** D

Compiler optimizations are transformations that are applied on the source code to improve its performance. Many times its a complex task to choose which optimizations set must be used, so, usually

there are chosen optimization levels given by the compiler. However, these optimization levels are not always good enough for all programs. Thus, it is needed to search for sets to improve specific programs. Currently the Best10 algorithm is one of the best algorithms to mitigate the optimizations selection problem. This algorithm requires one reduced search space to infer which are the optimization sets that must be applied during the compilation of programs. This work presents the impact of the use of different search space creation strategies used by the Best10 algorithm. The results shows that sophisticated strategies do not always provide the best results.

Improved Batch Elimination: A Fast Algorithm to Identify and Remove Harmful Compiler Optimizations

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Modern compilers provide several optimizations that can be applied to the source code, in order to increase its performance. Due to the complex relationship between various optimizations, discovering harmful compiler optimizations is a problem in the context of compilers. Strategies based on iterative compilation try to solve this problem evaluating the performance of the compiled program using different sets. In this context, Combined Elimination is an efficient iterative compilation strategy. The purpose of Combined Elimination is to identify the harmful optimizations and remove them in an iterative compilation process. Combined Elimination provides good results, which are close to those founded by an exhaustive search approach. However, its drawback is the number of program runs. In this paper, we proposed an iterative compilation algorithm, named Improved Batch Elimination. This algorithm is based on the first step towards Combined Elimination, the Batch Elimination algorithm. The goal of Improved Batch Elimination is to produce results similar to Combined Elimination, with a complexity similar to Batch Elimination. In other words, the goal is to produce good results and to be faster than Combined Elimination. We evaluate our algorithm by measuring the performance of SPEC CPU 2006, POLYBENCH and CBENCH benchmarks under a set of 63 LLVM compiler optimizations. The results indicate that Improved Batch Elimination is a good strategy to remove harmful compiler optimizations, using few program runs.

HTTP-WS-AD: An Anomaly Detector oriented to web applications and web services

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Schedule: Tue 20th@10:15, **Room:** D

Web applications have become the most popular systems to be developed today. This is because they have several advantages compared to "desktop" systems. Due to massive use of web applications they have become one of the main targets for cyberattacks. They are also used as the principal vectors for more sophisticated attacks. In this paper we present an online anomaly based detector for web applications which implements various detection models proposed in the literature. Our proposed detector includes new anomaly models for HTTP requests based on XML or JSON which are formats that usually used in web services and AJAX applications. We also present a framework to include and to evaluate new anomaly models in the detector.

Solving dense linear systems with hybrid ARM+GPU platforms

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Schedule: Tue 20th@10:45, **Room:** D

The necessity of reducing the energy consumption while improving the computational performance has encouraged the development of new hardware platforms. In this line, hybrid architectures that integrate ARM processors with graphics accelerators offer a positive balance between computing capabilities and energy requirements. However, in order to make an efficient use of this hardware, it is necessary to develop new methods and computational kernels, as well as to adapt existing ones. The solution of linear systems of equations is a basic operation in the solution of different problems. Its relevance and computational cost has motivated an important amount of work, and in consequence, it is possible to find high performance

solvers for most hardware platforms. In this work we study the solution of dense linear systems of equations in an NVIDIA Jetson TK1 device via the Gauss-Huard method. The experimental evaluation shows that the new solvers outperform the ones available in the MAGMA library for systems of dimension n <= 6000.

Network Virtualization in Optical Networks with Traffic Grooming

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Schedule: Tue 20th@11:15, **Room:** D

The Virtual Optical Network Embedding problem, also called VONE, deals with the efficient mapping of virtual resources onto opticals networks. This study proposes a heuristic algorithm called Sd-Mapping to resolve the VONE problem using traffic grooming techniques to carry several lower traffic requirements onto a single wavelength. The proposed algorithm it is compared with an reference algorithm of the literature with the following four metrics: Number of used wavelengths, Weighted number of lightpaths, Average number of physical hops and Grooming ports usage. The experimentals results show that the proposed algorithm can be regarded as a valid alternative based on promising results obtained in the following metrics over three test networks: Number of wavelengths, Weighted number of lightpaths and Average number of physical hops. In addition, this work compares five different grooming policies and the conclusion of this analysis is that the policy that minimizes the number of physical hops (MinThp) is the preferred policy considering the four metrics simultaneously.

A New Approach to the Massive Processing of Satellite Images

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Schedule: Tue 20th@11:45, **Room:** D

Technological advances in the field of Remote Sensing generate large volumes of geospatial data. Current geographic information systems (GIS) doesn't support the massive processing of satellite imagery, two examples of this kind of software are: (i) the Brazilian Spring project, GIS and remote sensing image processing system (ii) QGIS, a free and open source GIS. To achieve massive processing, we have the HIPI framework, it provides a solution for how to store a large collection of images and works on the Hadoop Distributed File System. Currently, HIPI only supports specific image formats, such as, JPEG, PNG and PPM. This article is presentes a new approach to distributed processing of considerable amounts of satellite images. We make an extension of HIPI to support satellite images format, TIFF, this fact helps to preserve the information, process and analyze satellite images massively to have results faster than the traditional approach.

Simposio Latinoamericano de Investigación de Operaciones e Inteligencia Artificial (SLIOIA)

Optimización de Enjambre de Partículas para Problemas de Muchos Objetivos

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Schedule: Mon 19th@10:15, **Room:** A

The difficulty to solve problems with many, possibly conflicting, objectives logically increases with the number of objectives, what makes them difficult to solve using multi-objective algorithms like the well known NSGA-II. Therefore, this work proposes the use of a particle swarm optimization (PSO) algorithm to solve many-objective problems. The main premise of this work is that MOPSO may be a good option for solving many-objective problems, presenting experimental evidence that supports this premise using the well known DTLZ benchmark with different performance metrics such as hypervolume, coverage and generational distance, among others.

HGVPRLB: a hybrid algorithm for solving binary problems

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Schedule: Mon 19th@10:45, **Room:** A

In this paper it is proposed a hybrid algorithm, so-called HGVPRLB, for solving generic binary problems. The algorithm HGVPRLB combines the heuristic procedures GRASP, Variable Neighborhood Descent, Constraint Propagation and Local Branching Cuts. It was tested in a set of binary problems from MIPLIB 2010 in order to check both its ability to obtain feasible solutions as its ability to improve the value of these solutions varying the processing time. Computational experiments showed that when the processing time increases the algorithm can increase the number of feasible solutions found in the set as well the quality of the solutions. Besides it, the proposed algorithm outperforms another algorithm of literature, as well as two other open source solvers.

Active learning algorithms for multi-label data

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Schedule: Mon 19th@11:15, **Room:** A

The iterative supervised learning setting, in which learning algorithms can actively query an oracle for labels, e.g. a human annotator that understands the nature of the problem, is called active learning. As the learner is allowed to interactively choose the data from which it learns, it is expected that the learner would perform better with less training. The active learning approach is appropriate to machine learning applications where training labels are costly to obtain but unlabeled data is abundant. Although active learning has been widely considered for single-label learning, this is not the case for multi-label learning, in which objects can have more than one class label and a multi-label learner is trained to assign multiple labels simultaneously to an object. There are different scenarios to query the annotator. This work focuses on the scenario in which the evaluation of unlabeled data is taken into account to select the object to be labeled. In this scenario, several multi-label active learning algorithms were identified in the literature. These algorithms were implemented in a common framework and experimentally evaluated in two multi-label datasets which have different properties. The influence of the properties of the datasets in the results obtained by the multi-label active learning algoritm is highlighted.

Conditional Monte Carlo with Intermediate Estimations for simulation of Markovian systems

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Schedule: Mon 19th@15:45, **Room:** A

For systems that are suitable to be modelled by continuous Markov chains, dependability analysis is not always straightforward. When such systems are large and complex, it is usually impossible to compute their dependability measures exactly. An alternative solution is to estimate them by simulation, typically by Monte Carlo simulation. But for highly reliable systems standard simulation can not reach satisfactory accuracy levels (measured by the variance of the estimator) within reasonable computing times. Conditional Monte Carlo with Intermediate Estimations (CMIE) is a simulation method proposal aimed at making accurate estimations of dependability measures on highly reliable Markovian systems. The basis of CMIE is introduced, the unbiasedness of the corresponding estimator is proven, and its variance is shown to be lower than the variance of the standard estimator. A variant of the basic scheme, that applies to large and highly reliable multicomponent systems, is introduced. Some experimental results are shown.

A Tabu Search based heuristic for police units positioning

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Schedule: Mon 19th@16:15, **Room:** A

Public safety is one of most demanding areas in public administration, having direct consequences on people welfare. Creating crime containment strategies or providing a fast answer to emergency situations when they occurs is a challenge. In this paper, we use Operations Research techniques to solve a police units positioning problem, in order to maximize the profit associated with police coverage in a city. We propose a model to describe the problem, heuristic methods based on Tabu Search and a penalty function for infeasible solutions. The tests are performed using instances with real street network of three different cities. The results show the efficacy of the penalty method, increasing the number of feasible solutions found, the good quality of the solutions generated by the Tabu Search, and a low convergence time, even for large instances

Improving Subjectivity Detection for Spanish Texts using Subjectivity Word Sense Disambiguation based on Knowledge

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Schedule: Mon 19th@16:45, **Room:** A

In this paper, we present a Sentence-level Subjectivity Detection method for Spanish using Subjectivity Word Sense Disambiguation (SWSD) based on Knowledge. We use a classic method of Word Sense Disambiguation, using the Spanish WordNet included in Mutilingual Central Repository 3.0 and the WordNet-Pr as Knowledge base. Because of the alignment between the WordNet and the SentiWordNet, we use this latter as semantic resource annotated with polarity values to determine when a word expresses subjectivity and objectivity, defining subjectivity levels using a fuzzy clustering algorithm previously. Due to the few resources focused on Sentiment Analysis for Spanish, the Semcor corpus was used for analyzing the attributes to be used. Finally, a Rule-based classifier was created to detect subjective sentences. This method was executed over a Spanish corpus, created in this work. The results show that our approach contributes positively to Subjectivity Detection task, despite of using resources created for English.

Logical Analysis of Multi-Class Data

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Logical Analysis of Data (LAD) is a two-class learning algorithm which integrates principles of combinatorics, optimization, and the theory of Boolean functions. This paper proposes an algorithm based on mixed integer linear programming to extend the LAD methodology to solve multi-class classification problems, where One-vs-All (OvA)

learning models are efficiently constructed to classify observations in predefined classes. The utility of the proposed approach is demonstrated through experiments on multi-class benchmark datasets.

Performance metrics in multi-objective optimization

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Schedule: Mon 19th@18:15, **Room:** A

In the last decades, a large number of metrics has been proposed to compare the performance of different evolutionary approaches in multi-objective optimization. This situation leads to difficulties when comparisons among the output of different algorithms are needed and appropriate metrics must be selected to perform those comparisons. Hence, no complete agreement on what metrics should be used exists. This paper presents a review and analysis of 54 multi-objective-optimization metrics in the specialized literature, discussing the usage, tendency and advantages/disadvantages of the most cited ones in order to give researchers enough information when choosing metrics is necessary. The review process performed in this work indicates that the hypervolume is the most used metric, followed by the generational distance, the epsilon indicator and the inverted generational distance.

Semantic Mining in Clusters from Signaling Pathways Networks

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This paper describes how to semantically enrich clusters from signaling pathways networks . The study is divided into two phases, the first is the detection of clusters in signaling pathways networks , after getting these clusters , they are passed to an extraction process of centrality within each one , so the second phase can enrich them semantically. The centrality chosen for the case study is the measure of closeness to other nodes, and it is who is enriched semantically in each cluster. The selected case study is the signaling pathway of TGF-β, and the central nodes found were enriched with the Gene Ontology.

A Sanction-Application Mechanism considering Commitment Levels in Hierarchical Organizations

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Schedule: Mon 19th@19:15, **Room:** A

The coordination and the control of autonomous agent's behavior, in Normative Multi Agent Systems, are important for the achievement of systems' global goal. However, the agents' preferences may not reflect the preferences expected in the organizational system specification. Then, the occurrence of this conflict causes a decrease in system performance. In this context, organizational models and their social structures (norms and sanctions) have been proposed to improve the agent's management and agent's behavior. However, specify and apply appropriate sanctions, taking account each agent's level of responsibility, requires an approach that considers individual and collective commitments and their execution. The aim of this work is to propose a mechanism to apply sanctions based on contracts and the hierarchical organization specification, able to be adapted in different application domain. The approach is based in commitment trees, contracts and sanctions in individual and collective levels.

Dynamic Approach for a Demand Responsive Transport Service

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Schedule: Tue 20th@10:15, **Room:** A

Demand Responsive Transport is a flexible transportation service that provides transport on demand by a fleet of vehicles, being especially useful in sparsely inhabited areas, which deal with a lack of transportation service. Users formulate

requests specifying desired locations and times of pickup and delivery. Given a set of requests, the vehicle routes are to be planned and scheduled in order to minimize both the number of vehicles used and the journey durations, while respecting a set of constraints imposed by the service, the passengers and the vehicles. In a dynamic environment, requests arrive gradually along the day, and the routes must be adjusted in real time to accommodate the new demand. In this work we propose an approach that simulates a dynamic service using mixed linear programming models to produce good solutions. The obtained results for a set of instances are significative when compared to a static approach.

Discrete Choquet integral based method for criteria synergy determination

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Schedule: Tue 20th@10:45, **Room:** A

In multi-criteria decision-making processes, a set of criteria that can act independently or have some kind of relation between them are considered. When this latter appears, the process cannot be a simple problem due to complexity to model such synergy relations. To deal with these issues, a Choquet integral based method has been developed to determine the most appropriate ranking of alternatives. Therefore, a fuzzy measure that models considerations of an expert in the problem domain must be identified. The proposed model is a novel and efficient algorithm for determining a non-additive fuzzy measure guided by linguistic attributes. Finally, an illustrative example and a comparison with other aggregation operators is presented.

A TrueSkill approach for movies recommendation

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Schedule: Tue 20th@11:15, **Room:** A

In this work a probabilistic approach based on TrueSkill for Preference Elicitation is presented. This approach allow us to tackle the "cold start" problem because relies on a content based recommendation system. In addition, it is valuable for handling high uncertainty due there is no dependency on the number of products and users. The only dependency is on ratings given by users on products. The proposal is highly scalable due to user preferences get richer as they are added.

Bird Species Classification Using Spectrograms

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Schedule: Tue 20th@11:45, **Room:** A

This paper describes a system for automatic bird species classification based on features taken from the textural content of spectrogram images. The texture features are extracted using three of the most common texture operators described in the Digital Image Processing literature: Local Binary Pattern (LBP), Local Phase Quantization (LPQ) and Gabor Filters. Aiming to perform more fare comparisons, the experiments were performed over a database already used in other works presented in the literature. In the classification step, SVM classifier was used and the final results were taken using 10-fold cross validation. The experiments were performed over a challenger dataset composed of 46 classes, and the best accuracy rate obtained is about 77.65 %.

Forecast flows in a section of the Bogotá River by Artificial Intelligent Systems

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Schedule: Wed 21st@10:15, **Room:** A

This article presents a comparison between two types of intelligent models: Artificial Neural Networks - ANN and Adaptative Neuro-Fuzzy Interference System - ANFIS, for forecasting flows in a section of Bogotá (Colombia) river, looking for the most efficient. The simulation was performed in the Matlab computer software, with data collected by hydrological stations of the Corporación Autónoma Regional of Cundinamarca (CAR), from September 2009 to October 2013. The findings

suggest that by using artificial intelligence models you can reach a successful outcome, with Correlation Coefficients above 90 % (CC), Mean Absolute Percentage Error (MAPE) below 12 %, Concordance Correlation Coefficient to 84 %, six other statistical evaluating precision and accuracy, suggesting that forecasts will be labeled as good and could think of the use of these techniques in Colombia.

An Application of ILS heuristic to Periodic Vehicle Routing Problem with Heterogeneous Fleet and Fixed Costs

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Schedule: Wed 21st@10:45, **Room:** A

This paper addresses the Periodic Vehicle Routing Problem (PVRP) which is a variation of the classical Vehicle Routing Problem. The PVRP consists of assigning a combination of visiting days to each customer, and defining the set of routes for each day of a planning horizon. The objective of the problem is the minimization of the total length of the routes travelled by the vehicles and the fixed costs of using the vehicles on the time horizon. To solve the problem, we present an Integer Programming Model and two heuristic algorithms based on the meta-heuristic Iterated Local Search (ILS). The mathematical model is solved by using the CPLEX optimization solver and optimal solutions are obtained for small and medium-sized instances of the problem. The computational experiments show that the heuristic algorithms determine high quality approximate solutions at a low computational time. The results are validated by statistical tests.

A Variable Neighborhood Search Heuristic for the Traveling Salesman Problem with Hotel Selection

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Schedule: Wed 21st@11:15, **Room:** A

This work deals with the Traveling Salesman Problem with Hotel Selection (TSPHS), a variant of the classic Traveling Salesman Problem (TSP). In the TSPHS, a set of hotels can be visited in strategic points of the route, dividing it in a minimum number of trips. Each trip must not exceed a given time limit, minimizing also the total time traveled. The TSPHS is NP-Hard, being a generalization of the TSP, so the main approaches in literature are based in Mathematical Programming and Metaheuristics. The metaheuristics are generic heuristics capable of escaping from local optima, usually obtaining good quality solutions in low computational time. It is developed a heuristic based on Variable Neighborhood Search, compared with the best algorithms in literature using classic instances. Computational results indicate that the proposed algorithm finds solutions with fewer trips in low computational time, with a traveled total time comparable to the best known solutions.

Simposio Latinoamericano de Informática y Sociedad (SLIS)

DICREVOA: A Proposal for the Design, Creation and Evaluation of Learning Objects

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Schedule: Mon 19th@10:15, **Room:** C

This article describes a methodological proposal for the design, creation and evaluation of Learning Objects (LO). This work arises from the compilation and analysis of several LO design methodologies currently used in Ibero-America. This proposal, which has been named DICREVOA, defines five different phases: analysis, design (instructional and multimedia), implementation (LO and metadata), evaluation (from the perspective of the LO producer and consumer) and publication. The methodology is focused not only on the teaching inexperienced but also on those having a basic understanding of the technological and educational aspects related to the design of LO, therefore, the proposal emphasizes LO design activities centered in the Kolb cycle and the use of the ExeLearning tool in order to implement the LO core. Additionally, DICREVOA was used in a study case, which demonstrates how it provides a viable mechanism for the LO design and implementation within different contexts. In this paper, we present DICREVOA, the case study to wich it was applied, and the obtained results.

Vulcanus: A Recommender System for Accessibility based on Trails

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Schedule: Mon 19th@10:45, **Room:** C

The use of recommender systems is widespread in several everyday systems. People are now exposed to different offerings, based on their interests, in order to anticipate decisions. However, in a different way recommender systems for accessibility domain require further studies and researches. In order to provide resources for people with special needs, we developed the Vulcanus, a recommender system designed for people with disabilities, offering access to resources according user's needs. The recommender system approaches concepts from ubiquitous computing, such as user profiles, context awareness, trails management, and similarity analysis. Vulcanus uses two different approaches: resources patterns and categories patterns; where different systems can use it, for example as a Web Service. Vulcanus was evaluated in different scenarios. These scenarios used more than 800 thousands of trails that simulate wheelchair users using resources along six months. The obtained results show that both approaches are able to provide relevant recommendations, providing resources that in fact can support users' needs.

Explorando o Conceito de Internet das Coisas Sociais em um Ambiente Universitario utilizando NFC

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Schedule: Mon 19th@11:15, **Room:** C

Abstract The use of characteristics of smart objects that have interactions features with humans, gave rise to the Internet of Things (IoT). Numerous derivations from this concept have been proposed. In this article, we focus on one of those called Social Internet of Things (SIoT). SIoT prioritizes the relationship between smart objects, where the objects can establish a connection among themselves without the interference of their owners. The purpose of this article is to explore the concept of SIoT in a University Campus, offering direct communication between intelligent devices. These devices share information based on an academic criteria and preferences informed by their owners. To evaluate the proposal, we developed a case study. The preliminary results show the viability of the proposal.

Web Accessibility: Study web accessibility in public places of the Colombian State

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Schedule: Mon 19th@15:45, **Room:** C

En el presente artículo se socializan los resultados obtenidos del proceso de análisis del nivel de accesibilidad web en los sitios que fueron seleccionados dentro del marco de la estrategia de Gobierno en Línea del Estado Colombiano. Inicialmente se revisan los estándares y recomendaciones que en materia de accesibilidad web provee la organización internacional W3C en sus dos versiones de WCAG, a continuación se contextualiza acerca de la Estrategia de Gobierno en Línea y de la metodología implementada para el desarrollo del proceso de análisis del nivel de accesibilidad web en los sitios seleccionados, y finalmente se presentan los resultados obtenidos en el desarrollo de la investigación realizada.

Uso del Comercio Electrónico para la Venta de Café Tostado de Costa Rica: Estudio de Casos de Torrefactores de Café Costarricenses

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Schedule: Mon 19th@16:15, **Room:** C

Este artículo presenta los resultados de un estudio de casos múltiple exploratorio sobre el uso del comercio electrónico para la venta de café tostado por parte de cuatro empresas torrefactoras costarricenses. Este estudio se utiliza para contestar las preguntas de por qué utilizan estas empresas utilizan el comercio electrónico y cómo lo hacen. Con base en los resultados obtenidos, se proponen posibles factores de éxito para el uso del comercio electrónico por parte de las empresas torrefactoras. Aunque los resultados de este estudio no pueden ser generalizados, debido a su naturaleza cualitativa, los factores propuestos pueden ser utilizados para guiar estudios similares en Costa Rica y en otros países productores de café. La investigación contribuye al estudio del uso del comercio electrónico en países desarrollados, y en particular con relación a productos propios de estos países, con lo cual ayuda a entender cómo la tecnología de información puede apoyar un mayor desarrollo económico y social de estos países.

Emancipation of Access to Wheelwright's Financial Information

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Schedule: Mon 19th@16:45, **Room:** C

This work directly addresses issue of access to financial information in a Community Development Committee. The strategy involves the implementation of a technical artifact direct availability to stakeholder in information according to their interests. Technical and procedural resources determine access to information as a first class object belonging to a technical, methodological and conceptual infrastructure. Information necessary for efficient utilization through its implementation in a real case of access to community building and collaborative information is provided.

PICTOAPRENDE: Application that contributes to the personal autonomy of children and youth with Autism Spectrum Disorder in Ecuador

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Schedule: Mon 19th@17:45, **Room:** C

This paper describes the PICTOAPRENDE application, which is designed to improve verbal communication and development of personal autonomy in children and youth with moderate autism spectrum disorder (ASD) in Ecuador. PICTOAPRENDE is an application on Android platform, which provides options to children and young people to learn basic routines, emergency numbers and more. Facilitating integration into society through the use of digital communicators and pictograms. The area of intervention presents basic concepts related to ASD, as well as various problems both in behavior and in the development of the beneficiary population. Finally impact measurement was performed in a large sample reaching important results for research.

Meneduca - Social School Network to Support the Educational Environment

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Schedule: Mon 19th@18:15, **Room:** C

Abstract— Information and Communication Technologies(ICTs) have changed the way of interacting and how knowledge is transmitted. In addition, the last decade represented a revolution in the way the society interacts, due to the intense use of social networks. Social networks could also be considered a Big Data application due to the volume, variety and velocity of data that are created on them. Meneduca, a social network focused on educational environments, is intended to increase communication among teachers, students and parents in order to improve students' performance. The system also aims to provide data to help to form groups for school tasks, based on the students' personalities; for this, the Big Five Test is used. The results of the application of the Big Five allows forming working groups, whose members have heterogeneous personalities, i.e., with greater variety of ideas and skills. In addition, teachers can propose different themes for academics works, based on the preferences of their students captured from networks such as Facebook. The Meneduca was proposed to investigate two aspects about social networks: (1) as a data source for other applications, as recommender systems; (2) as an educational aid tool.

Time series analysis of agro-meteorological data through algorithms in a scalable data mining case: Chili river watershed, Arequipa

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Schedule: Mon 19th@18:45, **Room:** C

The paper proposes a model for predicting climate change, using algorithms in mining techniques based on approximate data, applied to agrometeorological data, by identifying groups search of motifs and time series forecasting. To achieve the goal you work with the water balance components: flow, precipitation and evaporation; also took into account the climatic variety seasons marked by humidity (December, January, February, March) and dry (other months) providing better to abstract sub-classification for temporary data processing three classification techniques: linear regression, Naive Bayes and neural networks, where the results of each algorithm are compared with other results. Then the mathematical method of linear regression predicting water balance components for a period of approximately 12 months on the data of dams Pane and Fraile Water Resources in River Basin Chili, Arequipa is performed.

Cooperative estimation of Vehicular Traffic using Mobile Applications

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Schedule: Mon 19th@19:15, **Room:** C

The increasing amount of vehicles in developing countries, where its cities do not have a well-planned road infrastructure nor installed technology to monitor traffic conditions, tends to make difficult the daily traffic and to reduce the quality of life. Because of this, collect and analyze traffic information in an inexpensive and easy manner becomes necessary. This paper presents the implementation details of a system called Autotracks, which collects information from vehicular traffic through mobile devices in order to approximate the traffic conditions in real time. A Floating Car Data approach is used in combination with activity recognition to monitor the location of users in moving vehicles. The real path of the vehicles is approximated by using a Map Matching process. Then, all the trajectories are aggregated in order to approximate the traffic condition in the last period of time and finally the traffic status information in real time is obtained.

Quality and maturity model for open data portals

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Schedule: Tue 20th@10:15, **Room:** C

Open Government concept is experiencing an upswing. Open Government is based on three concepts (transparency, participation and collaboration) that require accessing data. To provide this access, Open Data Portals are being implemented around the world by every kind of organizations, mainly in the public sector. The aim of an Open Data Portal is exposing data in such a way that reusing is facilitated. Therefore, it is necessary to define a quality and maturity model to evaluate the characteristics of an Open Data Portal, considering different factors that can contribute to reusing potential, such like visualization, usability, granularity, data integration, reputation, relevancy, availability and reutilization. Also, effectively promoting data reusing implies setting specific norms to promote standardization among institutions, ministries and central governments' offices into the same country. This paper presents a formal proposal to evaluate – based in expert criteria – the quality and the maturity of an open data portal.

Cooperative Live Coding as an instructional model

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Schedule: Tue 20th@10:45, **Room:** C

The advances on technologies have provided many tools that inspired new instructional models. Learners and instructors are experiencing a diverse environment where everyone can participate from anywhere in the world and share the same learning platforms. Although we already have some manuals, tutorials, and also MOOCs that can be useful for people who wants to learn Computer Music languages, the musical interaction is not offered in these solutions. In this paper we present an instructional model for computer music and live coding based on a cooperative live coding environment where participants can teach and learn through distributed pair programming. We also discuss the fundamental ideas and the tool used on this work during the first experiments.

Predictive model of dengue focus applied to Geographic Information Systems

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Schedule: Tue 20th@11:15, **Room:** C

Dengue is a viral disease transmitted by the aedes aegypti mosquito. In Paraguay - South America, health authorities carry out entomological surveillance activities in order to monitor the vector density in endemic and non-endemic areas through techniques based on the use of traditional index. Currently there are numerous methods and most practical, efficient and economic indicators to determine the populations of aedes aegypti mosquito as larvitraps and ovitraps. The regionalized information obtained from the sampling procedures can be combined with environmental, demographic or epidemiological information in order to obtain detailed models that have the ability to monitor, simulate the behavior of the vector and therefore predict a possible outbreak of dengue. This paper presents the design and implementation of a predictive model to identify outbreaks of dengue vector infestation and the representation of its spread in a geographical information system. The model is implemented as a simulator of the evolutionary process of vector ecology, composed of a set of sub-models that seek to estimate the rate of development, mortality, reproduction and spread of the dengue vector exposed to simulations of climatic variations, where the initial population is generated from data obtained from larvitraps geographically referenced, in order to generate enough alphanumeric and geographical information to contribute to the early detection of potential disease outbreaks.

Using the Kinect Sensor with Open Source Tools for the Development of Educational Games for Children on Pre-school Age

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Schedule: Tue 20th@11:45, **Room:** C

The Kinect sensor is a device that can recognize the user's hands and body movements without controllers or marks. Although Kinect was originally designed for the Xbox 360 game console, programming tools for PC appeared shortly after its release. As a result, many papers and applications explore Kinect's technology nowadays, in areas such as robotics and medicine. Kinect can be specially useful for pre-school education, since the human-computer interaction with hand movements supports the concept of hand-eye coordination, an ability to be developed during the pre-school age. This work presents a prototype that uses Kinect and includes educational games

for pre-schoolers. This prototype was tested in an educational center for pre-school children, and was evaluated positively. From this experience we concluded that these kind of tools has a high potential in the educational field, whereas there is a need of interaction standards to aid the development of such kind of applications.

Sumo Sensei: Design, Implementação e Teste com Usuários de uma Ferramenta Móvel para Apoiar o Estudo de Kanjis Básicos

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Schedule: Tue 20th@15:15, **Room:** C

O estudo da língua japonesa por latino americanos vem crescendo, e possui vários desafios devido à sua forma de escrita. Kanjis são caracteres logográficos muito presentes na gramática japonesa e, por isso, conhecê-los se torna essencial para quem almeja aprender japonês. O uso de ferramentas computacionais que apóiem o estudo desse idioma é cada vez mais difundido, porém há poucas ferramentas computacionais que ensinam japonês a partir de idiomas latinos, como espanhol e português, limitando o uso para os nativos dessas línguas. Este trabalho apresenta Sumo Sensei, uma ferramenta móvel desenvolvida com design contextualizado a uma popular luta japonesa. A ferramenta tem o intuito de apoiar o estudo de 103 kanjis básicos através de centenas de palavras de vocabulário formadas a partir dos mesmos, mesclando o aprendizado à diversão proporcionada por elementos do jogo. A ferramenta apoia o estudo por cooperação e competição com partidas online em tempo real, trazendo dinamismo com a inclusão de itens ligados à cultura do sumo, além de possibilitar o estudo individualizado por meio do modo treinamento contextualizado ao treino real do sumo. Neste artigo, ainda, apresentamos resultados de um teste realizado com o intuito de avaliar o uso da ferramenta por usuários com diferentes perfis e níveis de proficiência na língua japonesa.

Karuta Kanji: Jogo Educacional para Estudar e Praticar Vocabulário com Kanjis da Língua Japonesa

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Schedule: Tue 20th@15:45, **Room:** C

Atualmente é notório o crescimento do uso de aplicativos em dispositivos móveis para os mais diversos propósitos, incluindo apoio ao estudo dos mais diversos assuntos. Também há um crescente uso de jogos digitais para apoiar o aprendizado de idiomas, incluindo a língua japonesa, ainda que a maioria destes encontre-se no idioma inglês. Este artigo apresenta as decisões e estratégias pedagógicas incorporadas ao design de Karuta Kanji, um jogo educacional desenvolvido para exercitar o maior alfabeto da língua japonesa – o kanji –, tendo como língua nativa base o português, o que visa beneficiar estudantes brasileiros do idioma. O design do jogo foi inspirado no popular jogo japonês de karuta. O ambiente apresenta três modos de jogo que estimulam cooperação, aprendizado individual e competitividade. Karuta Kanji possui diversos elementos de jogos que têm o propósito de fornecer ao estudante um ambiente de estudo dinâmico mesclado ao entretenimento. Ainda, apresentamos um estudo avaliativo do jogo realizado com usuários estudantes de japonês, cujos resultados provêem direções para o aprimoramento da ferramenta, do ponto de vista educacional e de entretenimento.

Katakana Star Samurai: A Mobile Tool to Support Learning of a basic Japanese Alphabet

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Schedule: Tue 20th@16:15, **Room:** C

The growing use of mobile apps in our daily activities is noticed, even for work, leisure or educational purposes, in which the games have conquered considerable space. Also, in the current lifestyle of people in general, time is scarce, and these tools can be very helpful, for they are always available

since the user has a mobile device. In the context of educational purposes, games have the advantages of being fun, and rather possible to play quick matches. This work presents Katakana Star Samurai, a game designed for smartphones and tablets, that supports the learning of Japanese language providing an environment for the student to practice their knowledge, focused on a basic japanese alphabet called katakana. Also, we present a test with users that helped us define the next steps of this research.

Use of a OWL ontology for creating Interactive Learning Object

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Schedule: Tue 20th@16:45, **Room:** C

Interactive Learning objects (ILO) are explored in this paper in order to provide an improvement in teaching learning process, ensuring the monitoring of students by professor through the interaction provided by ILO. The article describes an ontology that defines and structure the classes of the elements of the ILO's metadata standard. This ontology is used as the basis for the development of a Virtual learning environment capable of running these objects and at the same time offer a system of tracking and monitoring the development of the student during the entire process. The ontology is validated through the results of the use of the ILO in the environment with a class of 20 students of the course of computer science.

Simposio Latinoamericano de Sistemas de Información de Gran Escala (SLSIGE)

CARMiCLOC: Context Awareness Middleware in CLOud Computing

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Schedule: Wed 21st@17:15, **Room:** B

Technological advances such as miniaturization of sensors, mobile devices and increased computational capabilities have given way to Context Aware Applications (ACC), which constantly monitor and change depending on the context. These applications require a variety of features and services, particularly on the management of context. When applications/services lack part or some of these services, they must be consumed from other suppliers who can provide them via a middleware. In addition, due to the changes undergone by the context mean that such services consumed by the ACC must be dynamic; and due to the amount of data involved to define the context, it may require more computation capacity than that provided by a mobile device. For these reason it is necessary the use of the Cloud. In this way, to support these requirements is proposed CARMiCLOC (Context Awareness in Reflective Middleware Cloud Computing), a web-service based middleware, which can behave as a SaaS (Software as a Service) or as a PaaS (Platform as a Service).

Comparando ZeroMQ y RabbitMQ como tecnologías orientadas a eventos

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Schedule: Wed 21st@17:45, **Room:** B

Modern web apps handle huge and increasing numbers of users and operations. A rise of event-driven architecture approach and message queue systems provide a new alternative to face this scenario evidencing the lack of quantitative measurements comparing performance and scalability between specific message queue products. This article proposes a prototype architecture applied in ZeroMQ and RabbitMQ, used for measure the impact of (1) the number of messages over performance, and (2) the numbers of consuming nodes over scalability. The results show that for both criteria, the degradation threshold of ZeroMQ is higher tan RabbitMQ, thus more scalable and faster.

Case-based Reasoning for Web Service Discovery and Selection

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Schedule: Wed 21st@18:15, **Room:** B

Web Service discovery and selection deal with the retrieval of the most suitable Web Service, given a required functionality. Addressing an effective solution remains difficult when only functional descriptions of services are available. In this paper, we propose a solution by applying Case-based Reasoning, in which the resemblance between a pair of cases is quantified through a similarity function. We show the feasibility of applying Case-based Reasoning for Web Service discovery and selection, by introducing a novel case representation, learning heuristics and three different similarity functions. We also experimentally validate our proposal with a dataset of 62 real-life Web Services, achieving competitive values in terms of well-known Information Retrieval metrics.

Monitoring and Enforcing Data Protection Laws within an E-government Interoperabilty Platform

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Schedule: Thu 22st@10:15, **Room:** B

Public agencies are increasingly required to collaborate with each other in order to provide high-quality e-government services. This collaboration is usually based on the service-oriented approach and supported by interoperability platforms. Such platforms are specialized middleware-based infrastructures enabling the provision, discovery and invocation of interoperable software services. In turn, given that personal data handled by governments are often very sensitive, most governments have developed some sort of legislation focusing on data protection. This paper proposes solutions for monitoring and enforcing data protection laws within an E-government Interoperability Platform. In particular, the proposal addresses the requirements posed by the Uruguayan Data Protection Law and the Uruguayan E-government Platform, although it can also be applied in similar scenarios. The solutions are based on well-known integration mechanisms (e.g. Enterprise Service Bus) as well as recognized security standards (e.g. eXtensible Access Control Markup Language) and were completely prototyped leveraging the SwitchYard ESB product.

Chilean Virtual Observatory

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Schedule: Thu 22st@10:45, **Room:** B

This paper presents the challenges, architecture and current status of the Chilean Virtual Observatory (ChiVO), which is a software infrastructure for accessing and processing astronomical data generated in Chile. As ChiVO is part of the International Virtual Observatory Alliance (IVOA), we strictly follow the protocols and standards that this organization produce. However, there are always open challenges due to the new observational technologies and local requirements that motivates research on every new virtual observatory, such as the complex data models and Big Data problems that the ALMA Observatory is confronting. The current ChiVO prototype includes IVOA compliant services as well as new solutions designed for ALMA data, all of them using modern software technologies.

Business Intelligence applied to Learning Analytics in student-centered learning processes.

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Schedule: Thu 22st@11:15, **Room:** B

This work aims to evaluate the use of Learning Analytics (LA) in Higher Education; students, and attributes such as: profile, interactions in a virtual learning environment learning - for this use business intelligence paradigm in order to explore and exploit the data from one of the actors in the educational process is analyzed, test scores, among others, which will contribute to their educational success. In particular, this paper tries to answer the following specific objectives: To identify factors that influence the decision of a college student distance learning to abandon their studies and get the profile of potentially susceptible students from their university studies. To meet this purpose we define two analysis tasks learning and use a business intelligence methodology to implement it.

Automating the process of building flexible Web Warehouses with BPM Systems

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The process of building Data Warehouses (DW) is well known with well defined stages but at the same time, mostly carried out manually by IT people in conjunction with business people. Web Warehouses (WW) are DW whose data sources are taken from the web. We define a flexible WW, which can be configured accordingly to different domains, through the selection of the web sources and the definition of data processing characteristics. A Business Process Management (BPM) System allows modeling and executing Business Processes (BPs) providing support for the automation of processes. To support the process of building flexible WW we propose a two BPs level: a configuration process to support the selection

of web sources and the definition of schemas and mappings, and a feeding process which takes the defined configuration and loads the data into the WW. In this paper we present a proof of concept of both processes, with focus on the configuration process and the defined data.

Hacia una ontología de arquitectura de negocio y de procesos basada en un modelo de negocio

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Schedule: Thu 22st@15:45, **Room:** B

BPM como una disciplina integrada postula que la tecnología tiene que seguir a los procesos y los procesos la estrategia organizacional. La literatura de BPM enfatiza la importancia y necesidad de alinear la estrategia con los procesos de negocio, pero uno de los principales problemas de quienes trabajan en una unidad de procesos es plasmar e integrar formalmente una planificación estratégica con los procesos organizacionales. El estudio de la literatura muestra que no existen guías aceptadas o estandarizadas que orienten a los profesionales a lograr este objetivo de integración. En este trabajo se desarrolla una propuesta de una ontología de arquitectura de negocio y de procesos basada en un modelo de negocio como fundamento para la gobernabilidad de BPM. La arquitectura de procesos se extenderá hasta el nivel de los procesos que contienen la lógica de negocio que se emplea en operaciones. La ontología se valida por medio de un caso de estudio integrado.

Simposio Latinoamericano de Ingeniería de Software (SLISW)

Mind Maps in the Requirements Traceability

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Schedule: Mon 19th@10:15, **Room:** B

This work proposes a model of requirements traceability based on mind maps. This model was developed for a Software Company in southern Brazil. In addition to the proposed model, the maps were applied to the process description and software features specification.

Use case technique for requirements modeling in distributed development environments

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Schedule: Mon 19th@10:45, **Room:** B

This paper presents the process and outcomes of a systematic literature mapping about the application of the Use Cases technique for software requirements specification in distributed software development environments. The purpose is to identify which methods, tools and methodologies are reported in literature as more frequently used and how the Use Case technique is applied when the project team is not collocated.

A methodology to guide writing a Software Requirements Specification document

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The Requirements Engineering (RE) is the process of defining, documenting and mantaining requirements and it aims to support the creation and the maintenance of the Software Requirements Specification document (SRS). This document should be produced such way that all the participants can understand it. It is basis for all other activities of development and its quality is fundamental for the project success. This paper presents a methodology for guide writing SRS documents consistent, unambiguous and automated support in its content. The methodology is supported by ERS-EDITOR tool that uses Natural Language Processing techniques to automate the steps of the methodology. A preliminary assessment highlights promising results for the proposed approach.

Collaborative Approach to Security Risk Management Information

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Risk management is one of the main management processes of security information since it aims to identify, analyze, evaluate and control risks that are due to *security information*. To utilize users' experiences in this process, the utilization of collaborative tasks allows one to exploit argumentative interactions between project participants that are involved in the development of risk management debates regarding security information. The goal of this paper is to propose an argumentation-based collaborative approach to deal with such risk management of security information. The approach aims to guarantee that activities defined in a security risk management process are executed accordingly. In it, a set of rules is proposed to ensure that the final security risk management debate is complete and consistent with the arguments presented by participants of a security software project. This communication protocol is tailored to a process of security risk management that was particularly defined from the ISO / IEC 27005. The protocol allows users to structure and control risk discussions developed by debate participants using a web-based tool called RD System.

Through this system, a case study was developed to validate the approach proposed in this work.

Evolution of a Model-driven Process Framework

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Schedule: Mon 19th@15:15, **Room:** B

We discuss the evolution of Praxis, a model-driven process framework, building on feedback from educational and professional applications, along the past fifteen years. We follow the evolution from Praxis first version to the current one, discussing what was introduced in each. For past and current versions, we classify model improvements, discussing their nature and rationale, derived from received feedback.

An MDE-Based Graphical Tool for the Validation of MySQL Replication Models

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Schedule: Mon 19th@15:45, **Room:** B

At modeling level, diagramming tools such as Microsoft Visio are used to design MySQL replication models. However, these type of tools do not allow validating whether the MySQL replication model is free of errors, showing errors if any exist. Thus, we can have erroneous documentation of the MySQL replication models. Due to the lack of this feature, validation is done manually, which becomes a tedious task, time consuming and error prone. This paper proposes a MDE-based graphical modeling tool under the Eclipse platform for the automatic validation of MySQL replication models. In addition, once a model has been validated, the tool is capable of generating the mysqlreplicate commands of configuration. The results of the experiments for the errors correction of MySQL replication models with 25 servers demonstrate that by using the proposed tool the time is reduced in more than 87 % compared with the tool Microsoft Visio 2013.

Dribbling Complexity in Model Driven Development Using Naked Objects, Domain Driven Design, and Software Design Patterns

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Schedule: Mon 19th@16:15, **Room:** B

Systems modeling and transformations that are necessary for code generation in the model driven development approach need to realize user interface aspects and persistence infrastructure to create executable software. The developer does not work just with the domain application and also the modeling is more complex whenever more details are needed in the model. Therefore, we propose a development tool where the developer just models the business objects, the associations between objects, and their behaviors using Domain Patterns and Design Patterns. The code is generated based on these Design Patterns and a framework, that implements the architectural patterns Naked Objects, has the responsibility by the infrastructure.

Comparison of Software Process Models. A Systematic Literature Review

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Schedule: Mon 19th@16:45, **Room:** B

Nowadays, there are several software process models, which fulfill different purposes, approaches and requirements. However, this proliferation causes some confusion in the industry about the benefits or advantages of each proposal. In this context, studies have been conducted to determine the existing equivalence or the extent of coverage between these models having used different approaches to the comparisons. This work aims to present a study of techniques and experiences on comparison of software process models. For this study, a systematic literature review was conducted in relevant databases and available documents finding that there are few works or experiences in this area and it represents an aspect in software engineering that requires a higher level of research and development. Five different methods

to compare process models were found and it was identified that the CCT – Comparison Composition Tree method is the unique method that has a graphic representation.

Using TDD for Developing Object-Oriented Software - A Case Study

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Schedule: Mon 19th@17:45, **Room:** B

Maintenance of software is accomplished to meet the users' needs of this software (evolution/correction). But, it can become hardest if the source code architecture is difficult to understand. Test Driven Development technique can be used to reduce this difficulty, because it leads the developer to build software with simpler source code. In this paper, this technique is employed to develop software whose functionality is the same as legacy software, which was developed in a traditional manner, to obtain more maintainable source code. Software metrics were applied in the source code of legacy and developed software and the results showed improvements in maintainability.

Extracting Static and Dynamic Structural Information from Java Concurrent Programs for Coverage Testing

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Schedule: Mon 19th@18:15, **Room:** B

This paper proposes novel techniques for the extraction of structural information from the source code of Java concurrent programs for their coverage testing. Such techniques differ from others because they consider synchronization flow among processes/threads, distinct paradigms of communication/synchronization, method calls and pointer manipulation. The structural information gathered from the source code is kept in a test model based on a Parallel Control Flow Graph (PCFG) and helps the generation of an instrumented source code, used for a future generation of trace files and to replay the concurrent execution. The results show the techniques can generate both an instrumented code and a PCFG for Java concurrent programs effectively, extracting static and runtime information required for structural testing.

Automated Testing Framework for Mobile Applications based on User-Interaction Features and Historical Bug Information

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Schedule: Mon 19th@18:45, **Room:** B

Mobile applications support a set of user-interaction features that are independent of the application logic. These features include content presentation or navigation features. Rotating the device, gestures such as scroll or zoom into screens are some examples. In this paper an automated testing framework for mobile applications is proposed. Our framework integrates user-interaction features, historical bug information, and an interest point detector and descriptor to identify new bugs. A model of the application is automatically created and explored. While the exploration of the model is performed we introduce user-interaction features and we capture images. These images are passed to a bug analyzer to search for bugs. The bug analyzer uses an interest point detector and descriptor to search for areas prone to bugs in the captured images. The use of historical bug information is proposed to determine sequences of events to better search bugs in applications. Preliminary results show that using the proposed technique is feasible to identify bugs in mobile applications.

An exploratory study about cross-project defect prediction: impact of using different classification algorithms and a measure of performance in building predictive models.

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Schedule: Tue 20th@10:15, **Room:** B

Predicting defects in software projects is a complex task, especially in the initial phases of software development because there are a few available data. The use of cross-project defect prediction is indicated in such situation because it enables reuse of data from similar projects. In order to find and group similar projects, this paper proposes the construction of cross-project prediction models using a measure of performance achieved through the application of classification algorithms. To do so, we studied the combined application of different algorithms of classification, of feature selection, and clustering data, applied to 1270 projects aiming to building different cross-project prediction models. In this study we concluded that Naive Bayes algorithm obtained the best performance, with 31.58 % of satisfactory predictions in 19 models created with its use. This proposal seems to hold promise, once the local predictions considered satisfactory reached 31.58 %, against 26.31 % of global predictions.

Avaliação da Transparência do Sistema de Compras do Governo Brasiliero

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Schedule: Tue 20th@10:45, **Room:** B

The process of change that is happening in the contemporary world reaches inevitably the public sector. The search for more effective management to provide quality and efficient services to citizens has been the target to be reached by moderns governments. Within this perspective the study of information systems on public organizations is strategic. In this sense, this paper aims to investigate transparency in the electronic system of purchases of the Federal Government of Brazil, the ComprasNet, with the perspective of usability. In other words, this study evaluated whether the non-functional requirement of usability has been contemplated in the ComprasNet system interfaces to meet the transparency criteria. This article is designed from a qualitative exploratory approach about the use of ComprasNet. To achieve the goal, semi-structured interviews were conducted and a field study using the observation method with system users. As a result of this research, we found that the deficiency in the ComprasNet use is caused, in most cases, by the lack of usability rules in their interfaces. In addition, the present study suggests changes in interfaces that will improve the usability of the system and in its transparency.

Graphical and Statistical Analysis of Software Evolution Using Coupling and Cohesion Metrics - An Exploratory Study

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Schedule: Tue 20th@11:15, **Room:** B

Developing software is expensive; thus keeping it useful to its users is important. On the other hand, due to constant maintenance performed to meet the changing needs of users, software undergoes degradation of its internal structure, particularly in coupling and cohesion. Monitoring the development of software by using some of its versions can aid a Software Engineer with relevant information to guide your maintenance activities. In this paper, we present a view of the evolution of versions of software. For this, a study was conducted in 10 versions of FindBugs using coupling and cohesion metrics calculated from VizzMaintenance and Metric plug-ins. In this study, we applied the Pearson linear correlation analysis among measurements. The result showed that there is some correlation between these metrics, because coupling metrics directly influenced the cohesion metrics, with undesirable characteristics such as high coupling and low cohesion compromising software quality.

Performance and Accuracy conflict in Monitoring Tools for Web Services: a case study

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Schedule: Tue 20th@11:45, **Room:** B

Web services have become one of the most used technologies in service-oriented systems. Its popularity is due to its property to adapt to any context. As a consequence of the increasing number of Web services on the Internet and its important role in many applications today, Web service quality is a crucial requirement and demanded by service consumers. Terms of quality levels are written between service providers and service consumers to obtain some degree of quality. The use

of monitoring tools to control service quality levels is very important. Quality attributes suffer variations in their values during runtime, this is produced by many factors such as memory leak, deadlock, race data, inconsistent data, etc. However, sometimes monitoring tools can impact negatively affecting the quality of service when they are not properly used and configured. This paper aims to show the impact of monitoring tools over service quality, when they are not used properly. The relationship between performance and accuracy is presented and evaluated on web services. Conflict was found between performance and accuracy, where performance was the most affected, because it presented a degradation in its quality level during monitoring.

How to Automatically Collect Oriented Object Metrics: A Study Based on Systematic Review

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Aim: Getting information to automatically collect object oriented metrics (OO metrics) in order to assist the comprehension and assessment of software products. Method: A study was developed based on a systematic review and 37 primary studies were selected from 577 papers retrieved in 3 databases. Result: 177 metrics that can be automatically collected were catalogued.In addition, 27 of these were the most referenced. The cataloged metrics were classified according to the quality characteristics which were related; 18 collection tools have been identified. In this way, it was concluded that there is a set of common procedures for collecting OO metrics and the Java and C++ are the languages with the largest number of tools on which is possible to extract metrics.

Sistema de Análise de Incidentes para Melhoria Contínua

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Schedule: Tue 20th@15:45, **Room:** B

Software quality is essential for software companies maintain their competitiveness. To achieve continuous improvement in quality, companies can rely on various techniques and tools. The proper use of these tools can provide the company with many benefits such as reduced costs, increased productivity, reduced failures, increased product reliability and customer satisfaction. This paper presents some of these techniques or tools and suggests the use of them together with an application to help a team to reduce the time spent on support and maintenance. The improvement proposal will be elaborated through the PDCA cycle resulting in a system that uses quality tools with manual and automated steps. The use of the system helps the team to identify and prioritize improvement and preventive action opportunities through information taken from the incidents reported by customers, fostering continuous improvement.

Factors driving the adoption of ISO / IEC 29110: a case study of a small software enterprise

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Schedule: Tue 20th@16:15, **Room:** B

Peruvian software industry is mainly composed of micro and small enterprises and presents several problems on quality, schedule and costs. Since 2012 government supports the development of innovative software products using standards in order to improve quality. Quality improvement is affected by several factors, some contributing positively and others, negatively. The objective of this study is to identify which factors have influence on the practices adoption. The research method used is unique case study and a survey to collect complementary data. The studied company presented variations in the assessments results and during interviews, six most influential factors were identified. The company improved their software processes with the use of some practices in a project funded by government and ceased some practices after that project. The factors that positively influenced were: Experience in information technology and Top management support. The negative factors were: Competitive pressure, Perceived usefulness, Perceived ease of use and User training.

Mejora de la monitorización y ejecución de procesos de negocio con integración y socialización

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Schedule: Tue 20th@16:45, **Room:** B

El enfoque orientado a procesos de negocio es un aspecto relevante para las organizaciones y recibe gran atención de la comunidad científica. Los avances tecnológicos para la incorporación de nuevos modelos computacionales distribuidos y de aspectos sociales en la ejecución de los proceso de negocio y de las herramientas que la soportan, no han ido a la par del crecimiento en la provisión de herramientas para automatizar la gestión de procesos de negocios. La revisión de aspectos tecnológicos modernos en BPM – distribución de las actividades de los procesos e inclusión de aspectos sociales relacionados con su ejecución-, contribuye a mejorar los resultados en las etapas de despliegue, ejecución y monitorización de los procesos de negocio. Este trabajo propone una especificación de requisitos para un prototipo de herramienta de gestión de procesos que incorpore aspectos de software distribuido para enriquecer los rastros de ejecución, e incorporar características sociales a su gestión.

Simposio Latinoamericano de Manejo de Datos e Información (SLMDI)

Semantic Recommender System for the Recovery of the Preserved Web Heritage

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Schedule: Wed 21st@10:15, **Room:** B

This paper presents a prototype of a semantic personalized recommender system for a repository of preserved web files. To do this, we design and implement a semantic repository of preserved web files, containing metadata associated with each preserved site. The knowledge stored in the metadata of the semantic repository is used for the recommender system, in order to give prioritized recommendations of the different preserved web files (or web heritage) that meet certain search criteria. The proposed recommender also considers semantic associations, in order to recommend not only the websites matched to the search criteria, but also semantically related.

Distributed Directory System: A Healthcare Use Case for Rural Areas

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Schedule: Wed 21st@10:45, **Room:** B

The digital content of users is commonly organised in local directories representing entities from the real world (e.g., people, locations, organisations, and events). Different representations can show different versions, using different names to refer to the same real world entity (e.g., George Lombardi, Lombardi G., Dr. Lombardi). Although the data in these directories are related and can even complement each other, there are no formal links connecting them and allowing users to share and search across them. In this work we propose a Distributed Directory System, applied to A Healthcare Use Case for Rural Areas that allows peers: (i) to maintain full control over their data; and (ii) to find different versions of an entity based on any name that is used in the network to refer to it. We evaluate the approach in networks of different sizes using PlanetLab and we show promising results in terms of scalability.

MineraSkills: Mineração de Dados Aplicada às Vagas Anunciadas no LinkedIn Visando Definir o Perfil Profissional

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Schedule: Wed 21st@11:15, **Room:** B

The content posted on the online social networks has some interesting features, such as, the wide data availability, the range of subject and constant updates, however its important to know how to use these data to generate knowledge. This paper presents a tool that use data mining technics to explore job posts published on LinkedIn, the goal is to define the professional profile described in these job posts. The keyword extraction and the generation of association rules was employed to do that. The results allows a researcher to identify the most relevant skills and the relations between them.

A Proposal for Customizing Queries on XML documents based on Conditional Preferences

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Schedule: Wed 21st@11:45, **Room:** B

This article presents a proposal to extent the XQuery query language called XQuery-Pref supporting conditional preferences. Aiming to become transparent to the user executing queries written in XQuery-Pref language, we use a system called XQPref, which is responsible for elicitation of dynamic preferences and the processing of these custom queries. We restrict the scope of this paper on Government Open Data that, given the

information overload, has driven the demand for sensitive techniques to solve problems associated with querying XML documents. The government open data consist of the publication and dissemination of data and public information on the Web in an open format to facilitate analysis and reuse. However, information overload has attracted the concern of customizing the query results according to the needs of each user.

Towards Semantic Social Networks

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Computer-enabled social services like tagging or sharing are ubiquitous in current web applications that are aimed to a group of users. These services do not only add value and new functionalities to their applications but also create a network of users and services that interconnect them to a wider on-line ecosystem. Currently these social networks mainly use the vast amount of user-created content, and activity logs to apply to provide recommendations and more complex services. This paper presents the Social Core a social network engine that implements semantic-based functionalities like semantic annotations, semantic search semantic-enhanced access control and user privacy protection. The Social Core was integrated as part of the SmartCampus mobile platform, which was tested by around one hundred students, and it is currently being further developed as part of European FP7 project SmartSociety.

Prediction of Tourist Traffic to Peru by using Sentiment Analysis in Twitter Social Network

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Schedule: Wed 21st@15:45, **Room:** B

—This work involves the use of tweets, from the Twitter social network in which the users manifest the desire to travel to the country of Peru, to build a predictive tool of tourist traffic. To make this task an automated collection of tweets using web crawling has been built and a Naive Bayes algorithm has been used for sorting tweets as part of sentiment analysis. In the final part, we shown the results of the application of the tool for predicting the influx of tourists to Peru.

Speeding up the combination of multiple descriptors for different boundary conditions

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Schedule: Thu 22st@16:15, **Room:** D

Content-based complex data retrieval is becoming increasingly common in many types of applications. The content of these data is represented by intrinsic characteristics, extracted from them which together with a distance function allows similarity queries. Aimed at reducing the "semantic gap", characterized by the disagreement between the computational representation of the extracted low-level features and how these data are interpreted by the human perception, the use of multiple descriptors has been the subject of several studies. This paper proposes a new method to carry out the combination of multiple descriptors for different boundary conditions in which the balancing is carried out in pairs, starting by the best candidate descriptor. In the experiments, the proposed method achieved computational cost up to 3650 times smaller than the exhaustive search for the best linear combination of descriptors, keeping almost the same average precision, with variations lower than 0.9 %.

Simposio Latinoamericano de Teoría Computacional (SLTC)

On discerning strings with finite automata

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Schedule: Tue 20th@15:15, **Room:** D

We study the problem of discerning strings with deterministic finite state automata (DFAs, for short). We begin with a survey on the historical and algorithmic roots of this problem. Then, we focus on the maximum number of states that are necessary to separate two strings of a given length. We survey the most important results concerning this issue and we study the problem from the point of view of some alternative models of automata. The preliminary results concerning the last issue motivate us to formulate a conjecture stating that DFAs can separate any pair of strings by using a logarithmic number of states. We give some evidence supporting our conjecture.

On the real-state processing of regular operations and The Sakoda-Sipser problem

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Schedule: Tue 20th@15:45, **Room:** D

In this work we study some aspects of state complexity related to the very famous Sakoda-Sipser problem. We study the state-complexity of the regular operations, we survey the known facts and, by the way, we find some new and simpler proofs of some well known results. The analysis of the state of art allowed us to find a new and meaningful notion: Real-state processing. We investigate this notion, looking for a model of deterministic finite automata holding such an interesting property. We establish some preliminary results, which seem to indicate that there does not exists a model of deterministic finite automata having real-state processing of regular expressions, but, on the other hand, we are able to exhibit a deterministic model of finite automata having real-state processing of star free regular expressions.

A Model to Guide Dynamic Adaptation Planning in Self-Adaptive Systems

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Schedule: Tue 20th@16:15, **Room:** D

Abstract—Self-adaptive enterprise applications have the ability to continuously reconfigure themselves according to changes in their execution contexts or user requirements. The infrastructure managing such systems is based on IBM's MAPE-K reference model: a Monitor and an Analyzer to sense and interpret context data, a Planner and an Executor to create and apply structural adaptation plans, and a Knowledge manager to share relevant information. In this paper we present a formal model, built on the principles of constraint satisfaction, to address dynamic adaptation planning for self-adaptive enterprise applications. We formalize, modify and extend the approach presented in [1] for working with self-adaptation infrastructures in order to provide automated reasoning on the dynamic creation of structural adaptation plans. We use a running example to demonstrate the applicability of such model, even in situations where complex interactions arise between context elements and the target self-adaptive enterprise application.

Computing Translocation Distance by a Genetic Algorithm

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Schedule: Tue 20th@16:45, **Room:** D

Translocation is a useful operation on strings with challenging questions in combinatorics of permutations and interesting applications in analysis of sequences. A translocation operation essentially is the interchange of prefixes and suffixes among two substrings of a string. For the case of genomes represented as strings, symbols that represent genes and chromosomes are modeled as substrings of the genomes; thus, translocation is an operation that models the interaction between chromosomes inside a genome. The translocation distance between

two genomes is defined as the minimum number of translocations to convert one genome into another and has been proved to be a meaningful manner of modeling the evolutive distance between organisms. The particular case of unsigned genomes, those in which the orientation of the genes are not considered, is particularly difficult, while the signed case, in which the orientation of genes is considered, has been proved to be polynomially decidable. This paper presents an innovative Genetic Algorithm (GA) approach to solve the unsigned translocation distance problem. A distinguishing feature of the proposed GA is that it uses as fitness function the translocation distance for randomly generated signed versions of the input (that is an unsigned genome). Experiments over randomly generated strings (synthetic genomes) showed that the proposed GA approach computes answers that are better than those computed by an $1.5+\varepsilon$-approximation algorithm, the latter also implemented as part of this work.

XXIII Simposio Iberoamericano de Educación Superior en Computación (SIESC)

Philosophy of Computer Science and Its Impact on Education: Towards the construction of an interdisciplinary team

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Schedule: Wed 21st@10:15, **Room:** C

This article presents an interdisciplinary experience that brings together two areas of computer science; didactics and philosophy. As such, the article introduces a relatively unexplored area of research, not only in Uruguay but in the whole Latin American region. The reflection on the ontological status of computing, its epistemic and educational problems, as well as their relationship with technology, allows us to elaborate a critical analysis of the discipline and a social perception of it as a basic science.

Adoption alternatives of academic innovations in computer science schools in Peru

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Schedule: Wed 21st@10:45, **Room:** C

Peru has a variety of names to describe university degrees in computer science or related fields. The adoption of international standards both in the area of knowledge and professional profiles generates all kinds of debates and reactions with few adoption results. The present study introduces the innovation diffusion theory to the analysis of the characteristics of the Peruvian university educational system and proposes the use of these techniques to identify the elements necessary to allow better adoption by institutions. Adoption alternatives that fit the different types of university are presented.

Educational Web Tool for Digital Image Processing

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Schedule: Wed 21st@11:15, **Room:** C

Due to its versatility, the image processing area offers a very wide range of techniques to solve challenges in an effective way linked to fields such as medicine, agriculture, biology, industrial automation and document processing. Therefore a correct and advanced training of professionals in this area is an important task. In this sense, a new educational image processing tool is currently being developed at the Facultad Politécnica of the Universidad Nacional of Asunción. The development focused on improving the interaction between students and teachers and also showing new advances in the digital image processing area. To achieve this goal, a tool is being developed to be expanded in the future to be adapted to new challenges and different audiences. The first stage of development was completed, which allowed developing an extendable basic tool in the near future.

Student Understanding of the C++ Notional Machine Through Traditional Teaching with Conceptual Contraposition and Program Memory Tracing

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Schedule: Wed 21st@15:15, **Room:** C

In order to learn a programming language, a correct understanding of its notional machine is mandatory. Students acquire that comprehension mainly through visual and verbal explanations provided by professors, books, videos, and other instructional materials. This research applied the conceptual contraposition technique and program memory tracing technique to the prevalent teaching method in our country: the lecture. The understanding of the C++ notional machine was

evaluated on students of a Programming II (CS2) course that implemented the mentioned methods. Results revealed that these techniques applied to the lecture are insufficient to help students develop satisfactory mental models of the C++ notional machine.

Academic Performance of University Students and its Relation with Employment

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Schedule: Wed 21st@15:45, **Room:** C

Educational Data Mining collects the various methods that allow extracting novelty and useful information from large data volumes in educational contexts. This paper describes the process used to, through Data Mining techniques, identify the most relevant characteristics in relation to student academic performance at the School of Computer Science of the National University of La Plata. The results obtained using the proposed method to process the information relating to regular and non-regular students at the UNLP allowed establishing interesting relationships in relation to student academic performance. Based on the obtained models it can be said that the fact that the student works does not mean that their academic performance decreases and young students that take several years to join the faculty have better performance if they express interest in getting a job.

University Bonding with Productive Sector Companies: A literature review

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Schedule: Wed 21st@16:15, **Room:** C

The bonding of productive sector companies and universities is a need that has been identified for decades. The interplay between academia and the productive sector, is becoming in an aspect increasingly important in our new demanding and changing society. Knowledge as a strategy to create competitive companies and universities as an agency that generates knowledge and prepares professionals to meet current demands. This document focuses on an extensive literature review of several American authors, Europeans, Asians, Latin Americans and others, in order to identify successful processes and interaction models that can be adopted and adapted to the area of vocational training in Technology information and Communication in the context of Latin America.This study will serve as a starting point for further diagnosis and as an input for generating a linkage program in the area of computer careers.

V Workshop en Nomenclatura y Acreditación en Programas de Computación (WNAPC)

Caso Colombia: La investigación como factor determinante en el Aseguramiento de la Calidad de las Instituciones de Educación Superior

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Schedule: Tue 20th@17:15, **Room:** C

Caso Colombia: La investigación como factor determinante en el Aseguramiento de la Calidad de las Instituciones de Educación Superior

Presentaciones de la problemática de diversos países de la región (parte2)

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Schedule: Tue 20th@17:45, **Room:** C

Presentaciones de la problemática de diversos países de la región (parte2)

Presentaciones de la problemática de diversos países de la región (parte3)

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Schedule: Tue 20th@18:15, **Room:** C

Presentaciones de la problemática de diversos países de la región (parte3)

Presentaciones de la problemática de diversos países de la región (parte4)

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Schedule: Tue 20th@18:45, **Room:** C

Presentaciones de la problemática de diversos países de la región (parte4)

Discusión y resultados

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Schedule: Wed 21st@17:15, **Room:** C

Discusión y resultados de la problemática existente en la región. Propuestas de nuevas estrategias para mejorar y llevar la región a un nivel más competitivo en computación tomando como referencia los últimos avances en el área a nivel mundial.

VII Congreso de la Mujer Latinoamericana en la Computación (LAWCC)

Participação Feminina em Pesquisa na Plataforma Lattes no Brasil

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The Lattes Platform, named after the Brazilian physicist Cesar Lattes, is the major scientific information system to manage information on Science, Technology, and Innovation (ST&I) related to individual researchers and institutions working in Brazil. The Lattes platform allows managing curricular information of researchers and institutions working in Brazil based on the so called Lattes Curriculum. As the registration in the platform is mandatory to require funding from funding agencies, its use is disseminated throughout the National ST&I system.This work addresses the women in science issue in Brazilian institutions, as well as their leadership role in Research Groups.To this end, data related to researchers holding a PhD was collected from the Lattes Platform and was analyzed. It was observed that women participation in science is similar to men participation (47 %). However, there are differences whenever the main research area is taken into account. Nevertheless, women participation in Research Groups, as well as their participation as leaders, has increased over the years.

A Plataforma Lattes, que leva o nome do físico brasileiro Cesar Lattes, é o principal sistema para gerenciar informação sobre Ciência, Tecnologia e Inovação (CTI) no Brasil.As fontes de informação fundamentais são a base de Currículos Lattes (currículos nos padrões da plataforma) e o Diretório de Grupos de Pesquisa. O cadastro de pesquisadores na plataforma é obrigatório para os pedidos de fundos nas agências de fomento e seu uso está disseminado em todo o sistema brasileiro de CTI. Neste trabalho foram analisados alguns aspectos da participação da mulher no contexto da pesquisa realizada no Brasil utilizando dados coletados da Plataforma Lattes. Foi observado que a participação da mulher é quase a mesma que a do homem, embora existam diferenças no que se refere à distribuição nas áreas de pesquisa. Contudo, a participação da mulher tanto em grupos de pesquisa quanto na liderança desses grupos tem-se incrementado ao longo dos últimos anos.

Digital Equity and Gender Issues in Latin America

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Schedule: Tue 20th@17:45, **Room:** B

Latin America and the Caribbean is a middle-income region, with the majority of its 42 countries and territories belonging to that category. However, it is a heterogeneous region, ranging from low income countries, as Haiti, to countries which have higher income and are regarded as more developed, like Chile, Mexico, Argentina and Brazil. According to SEDLAC, 34.3 % of the Latin American population is in the middle class (with incomes between $10 a day and $50 a day), and 25.3 % are still under the moderate poverty line of $ 4 a day.

In the last decades, the region has worked to achieve the Millennium Development Goals (MDGs): poverty has been reduced to lower levels, more girls are in school, child mortality has dropped, and diseases are being fought. However, gender issues remain. Too many women still die in childbirth, and more needs to be done to boost gender parity in employment and decision making, as well as, access to education and reproductive health services. Inequality remains a key problem. Progress in the Region has been weaker amongst women, youth, indigenous peoples, afrodescendants and rural populations.

Digital divide is rooted in the very issues that constrain Latin America's overall economic development - income inequality, lack of infrastructure and a still-nascent technological knowledge base according to UNDP. The region, as a whole, suffers from a poor legal framework for the development of the ICT sector, heavy administrative burdens, almost in-existing government prioritization for ICT development, low Internet penetration rates, and pervasive brain drain which undermines the potential for faster growth of the economies' ICT sectors.

An overview on gender inequality on access to technology tools, computers, Internet and education in the region is presented. Moreover, women's low participation on the ICT sector is depicted. Cultural, professional and technological ba-

rriers imposed on women participation are analyzed, and some possible actions to reduce such gender biases are proposed. Latin American initiatives to try to promote gender digital equity and the presence of women on the ICT sector are also described.

Acciones a futuro en Latinoamérica - discusión general

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De acuerdo al avance de tecnología, diversos profesionales van desarrollando cualidades y talentos que ayuden a contribuir con el crecimiento actual. Hoy en día, es importante discutir las cualidades tanto de hombres como de mujeres de apostar por introducirse en este mundo tecnológico. Este espacio estará dedicado a una discusión abierta entre todas y todos quienes asistan a la sesión, para intercambiar ideas y coordinar iniciativas respecto a acciones que puedan impulsarse a futuro en Latinoamérica para promover una mayor equidad de género y una mayor participación de las mujeres en la informática latinoamericana, tanto en la academia como en la industria.

XXII Concurso Latinoamericano de Tesis de Maestría (CLTM)

Espelho virtual interativo para simulação de maquiagem

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Schedule: Thu 22st@15:15, **Room:** A

Um simulador de maquiagem pode ser utilizado para criar um ambiente virtual interativo capaz de tornar o processo de escolha e experimentação de maquiagens algo rápido, barato e flexível. Para seu sucesso, tal simulador deve respeitar quatro critérios, a flexibilidade na aplicação dos produtos, processamento em tempo real, realismo da simulação e baixo custo. O projeto desenvolvido pode contribuir com uma proposta de um modelo de interação para um simulador de maquiagem e um algoritmo para a simulação de base, batom e sombra, ambos respeitando as quatro características citadas anteriormente.

Image Segmentation by Image Foresting Transform with Non-smooth Connectivity Functions

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Schedule: Thu 22st@15:45, **Room:** A

Image segmentation, such as to extract an object from a background, is very useful for medical and biological image analysis. In this work, we propose new methods for interactive segmentation of multidimensional images, based on the Image Foresting Transform (IFT), by exploiting for the first time non-smooth connectivity functions (NSCF) with a strong theoretical background. The new algorithms provide global optimum solutions according to an energy function of graph cut, subject to high-level boundary constraints (polarity and shape), or consist in a sequence of paths' optimization in residual graphs. Our experimental results indicate substantial improvements in accuracy in relation to other state-of-the-art methods, by allowing the customization of the segmentation to a given target object.

Solving the Art Gallery Problem: A Practical and Robust Method for Optimal Point Guard Positioning

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Schedule: Thu 22st@16:15, **Room:** A

This Master's thesis focused on studying and developing techniques for optimally solving the Art Gallery Problem (AGP), one of the most investigated problems in Computational Geometry. The AGP, which is a known NP-hard problem, consists in finding the minimum number of guards sufficient to ensure the visibility coverage of an art gallery represented as a polygon. We studied how to apply Computational Geometry concepts and algorithms as well as Integer Programming techniques in order to solve the AGP to optimality. This work culminated in the creation of a new algorithm for the AGP, whose idea is to iteratively generate upper and lower bounds for the problem through the resolution of discretized versions of the AGP. The algorithm was implemented and tested on more than 2800 instances of different sizes and classes of polygons. The technique was able to solve in minutes more than 90 % of all instances considered, including polygons with thousands of vertices, greatly increasing the set of instances for which exact solutions are known. To the best of our knowledge, in spite of the extensive study of the AGP in the last four decades, no other algorithm has shown the ability to solve the AGP as effectively as the one described here. For illustration, in a direct comparison with the algorithm by Kröller et al., considered one of the most promising techniques for the AGP, our method solved almost 32 % more instances than its competitor.In addition, we provide a free version of our code and of our benchmark for download, which is unprecedented in the literature.

I Concurso Latinoamericano de Tesis de Doctorado (CLTD)

Multivariate Investigation of NP-Hard Problems: Boundaries Between Parameterized Tractability and Intractability

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Schedule: Thu 22st@10:15, **Room:** A

The main goal when using computing to solve a problem is to develop a mechanism to solve it efficiently. In general, this efficiency is associated with solvability in polynomial time. The theory of NP-completeness was developed to show which problems probably do not have polynomial time algorithms. However, many NP-hard and NP-complete problems must still be solved in practice; therefore it is natural to ask if each of these problems admits an algorithm whose non-polynomial time complexity is purely a function of some subset of its aspects. Questions about the existence of such algorithms are addressed within the theory of parameterized computational complexity developed by Downey and Fellows.

In this thesis we present a multivariate investigation of the complexity of some NP-hard problems, i.e., we first develop a systematic complexity analysis of these problems, defining its subproblems and mapping which one belongs to each side of an "imaginary boundary" between polynomial time solvability and intractability. After that, we analyze which sets of aspects of these problems are sources of their intractability, that is, subsets of aspects for which there exists an algorithm to solve the associated problem, whose non-polynomial time complexity is purely a function of those sets. Thus, we use classical and parameterized computational complexity in an alternate and complementary approach, to show which subproblems of the given problems are NP-hard and latter to diagnose for which sets of parameters the problems are fixed-parameter tractable, or in FPT.

This thesis exhibits a classical and parameterized complexity analysis of different groups of NP-hard problems. The addressed problems are divided into four groups of distinct nature, in the context of data structures, combinatorial games, and graph theory: (I) and/or graph solution and its variants; (II) flooding-filling games; (III) problems on P3-convexity; (IV) problems on induced matchings.

Dynamic Composition of REST services

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Schedule: Thu 22st@10:45, **Room:** A

Service composition is one of the principles of service-oriented architecture; it enables reuse and allows developers to combine existing services to create new services. Dynamic composition requires that service components are chosen from a set of services with equal or similar functionality at runtime. The adoption of the REST services in the industry has led to a growing number of services of this type, many with similar functionality. The existing dynamic composition techniques are method-oriented whereas REST is resource-oriented, and considers only traditional services. The REST architectural style has attracted a lot of interest from the industry due to the non-functional properties it contributes to Web-based solutions. In this thesis, we contribute to the area of web service composition in REST by proposing three techniques oriented to improve static and dynamic composition of this type of service. First we introduce a technique for static composition proposing a set of fundamental control flow patterns in the context of decentralized compositions of REST services. In contrast to current approaches, our proposal is implemented using the HTTP protocol and takes into account REST architectural principles. Afterwards, we present a technique to improve the dynamic composition in security domain extending ReLL to ReLL-S and allowing a machine-client to interact with secured resources, where security conditions may change dynamically. Finally, we propose SAW-Q, an extension of Simple Additive Weighting (SAW), as a novel dynamic composition technique that follows the principles of the REST style. SAW-Q models quality attributes, in terms of response time, availability and throughput, as a function of the actual service demand instead of the traditional constant values. Our results validate our main hypotheses indicating improvements with respect to alternative state-of-the-art methods. This also shows that the ideas presented in this thesis represent a relevant contribution to the state-of-the-art of REST service compositions.

Graph Laplacian for Spectral Clustering and Seeded Image Segmentation

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Schedule: Thu 22st@11:15, **Room:** A

Image segmentation is an indispensable tool to enhance the ability of computer systems to perform elementary cognitive tasks such as detection, recognition and tracking. In particular, interactive algorithms have gained much attention lately, specially due to their good performance in segmenting complex images and easy utilization. However, most interactive segmentation methods rely on sophisticated mathematical tools whose effectiveness strongly depends on the kind of image to be processed. In fact, sharp adherence to the contours of image segments, uniqueness of solution, high computational burden, and extensive user intervention are some of the weaknesses of most existing techniques. In this work we proposed two novel interactive image segmentation techniques that sort out the issues discussed above. The proposed methods rely on Laplace operators, spectral graph theory, and optimization approaches towards enabling highly accurate segmentation tools which demand a reduced amount of user interaction while still being mathematically simple and computationally efficient. The good performance of our segmentation algorithms is attested by a comprehensive set of comparisons against representative stateof-the-art methods. Indeed, qualitative and quantitative results obtained from well-known image benchmarks show that our methodologies outperform others. As additional contribution, we have also proposed two new algorithms for image inpainting and photo colorization, both of which rely on the accuracy of our segmentation apparatus.

Collaboration Networks in Computing (Graduate)

USP Brasil: Redes de Colaboração na Área de Computação: perspectivas e ações

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Schedule: Wed 21st@10:15, **Room:** D

Redes de Colaboração constituem um mecanismo efetivo e essencial para o desenvolvimento de soluções efetivos e de impacto para a sociedade. Nesta palestra promovida pelo ICMC-USP, por meio das Comissões de Relações Internacionais, de Pesquisa e de Pós-graduação, pretende-se motivar redes de colaboração em pesquisa, eventualmente explorando-se também a colaboração academia-indústria, na América Latina. Entende-se que as articulações poderiam ocorrer no âmbito do CLEI - centro e evento, que há décadas desenvolve atividades relevantes para a comunidade latino-americana. Essa colaboração deve ocorrer com o envolvimento de todos os agentes do sistema de ensino e pesquisa dos diversos países. Como ponto central será apresentada uma chamada para realização de pós-doutoramento no ICMC-USP, visando a promover e fortalecer a cooperação sul-sul. Outras iniciativas e propostas serão apresentadas e discutidas: programa de doutorado sanduiche; programa de professor visitante bilateral; dupla titulação entre instituições. Tem-se como objetivo de fundo promover a mobilidade de pesquisadores na América Latina. Um facilitador seria viabilizar um exame para ingresso em pós-graduação na américa latina coordenado pelo centro CLEI, o que facilitaria a mobilidade dos novos talentos para programas de mestrado e de doutorado.

UChile Chile: Programa de Doctorado en Ciencias de la Computación en la Universidad de Chile

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Schedule: Wed 21st@10:45, **Room:** D

Describiré el programa de doctorado que ofrecemos en el Departamento de Ciencias de la Computación de la Universidad de Chile, y los mecanismos de becas que existen para quienes postulan desde el extranjero.

Premios de Investigación de Google para América Latina (Google)

Learning Dynamic Action Units for Three-dimensional Facial Expression Recognition

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Schedule: Thu 22st@10:15, **Room:** C

Automated understanding of facial expressions is a fundamental step towards high-level human-computer interaction. The goal of this proposal is to develop a solution to this problem by taking advantage of the color, depth and temporal information provided by an RGB-D video feed. We plan to model human facial expressions through the analysis of temporal variations in the pattern of activations of their natural constituents, three-dimensional Action Units. As starting point for algorithm development, we propose to build on our prior experience developing convolutional neural network architectures for fine-grained localization, RGB-D scene understanding and video analysis.

Gradual Security Typing for the Web

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Schedule: Thu 22st@10:45, **Room:** C

How to develop secure applications for the Web? Can we help programmers write applications that do not compromise privacy by leaking confidential information on public channels, either accidentally or due to malicious third-party code? Research in programming languages for security has explored two complementary approaches for controlling flow of sensitive data in programs: either statically, with a type system, or dynamically, with a runtime monitor. A static approach is preferable but might impose too much of a burden on programmers. Just like static and dynamic typing can be reconciled with a gradual type system, we propose to develop a gradual security type system, which allows programs to be partially typed, ensuring sound interoperability between the security typed and untyped fragments. Programmers can then start with a standard program, developed without security typing information, and progressively evolve their system towards a program with mixed static and dynamic guarantees. After addressing the language design issues involved in creating a practical secure gradually-typed language, we will extend Dart, a recent programming language for the Web developed by Google. Dart is a great target due to its increasing adoption for Web programming, and for its unique, highly pragmatic approach to type systems. The design and implementation of gradual security typing in Dart will be validated by securing existing Dart applications, and by studying how programmers use such a gradual type system.

Interconnected Dual Biosensor for Type II Diabetes Mellitus

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Schedule: Thu 22st@11:15, **Room:** C

The main objective of the present project is to develop a biosensor for diagnostic and monitoring of type 2 diabetes mellitus. This platform will integrate transducers and electronics to measure glucose and insulin levels in real time, providing data universally accessible and useful for further analysis by physicians and clinicians, as well as for statisticians for a broader screening of this disease in Mexico and in certain local populations.

Urban Coordination of Autonomous Vehicles

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Schedule: Thu 22st@11:45, **Room:** C

The massive deployment of autonomous vehicles in the coming years offers a great potential for improving urban mobility. An open question is how to coordinate selfdriving cars at intersections, which we will address in this project. Since traffic conditions change constantly, a promising alternative to develop adaptive coordination mechanisms is to use self-organization. We have already developed self-organizing algorithms for traffic light coordination with significant performance improvements over traditional coordination methods. We will follow a similar path exploring how autonomous vehicles can self-organize at intersections to maximize efficiency and safety without the need of traffic lights.