Sixth Mexican International Conference on

Computer Science

Puebla, Mexico
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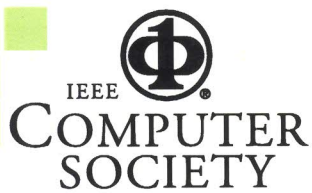
Edited by Vladmir Estivill-Castro and J. Alfredo Sánchez



2005

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Foreword

It is with great pleasure that we welcome you to the Sixth Mexican International Conference on Computer Science ENC 2005. Since 1997, the Mexican Computer Science Society (SMCC, for "Sociedad Mexicana de Ciencia de la Computación") has organized these meetings to bring together scientists, academics and students from major universities and research institutions of Mexico and the world.

Our research communities are experiencing growth and diversification that we hope will continue to feed future editions of ENC and to build new and better research teams for the upcoming generations which are being incorporated into the scientific world every year. Since 2003 we had the vision that ENC could continue to grow and encompass several key events that would catalyze the creation of new interest groups and research communities that could reach critical mass. This year ENC, in addition to the International Conference, is hosting the Reconfig 2005 International Conference on Reconfigurable Computing, as well as several parallel workshops that are showing the diversity and maturity of such new research communities.

Putting together the premier conference on computer science in Mexico is not an easy task, but certainly is a pleasing one thanks to the wonderful team of people collaborating in all aspects of the conference. We want to thank all the chairs involved in the conference, but also all of the chairs responsible for the various logistic aspects. In particular, we want to thank the local committee and all the people from BUAP for their support to all ENC events. Given the size of the conference, it is a significant challenge and an outstanding achievement.

We extend our thanks to the main sponsoring organization of ENC, the SMCC, which has pushed the conference from the beginning seeking to improve its quality. We thank the SMCC executive committee and their staff for their constant support and advice.

Finally, we want to thank all of you, interested in the ENC conference series, hoping you will find new insights in your research by discussing with others about your results that could foster new collaborations. The future is bright, with new things to be discovered, invented and researched, and this conference is only a small taste of that future.

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Tutorials
Manuel Martin, BUAP
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Discussion Panels
Mario Moreno, UTM
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Preface

Research activities in all areas of computer science are showing a positive trend in many institutions throughout Mexico. In an increasingly interconnected world, valuable research takes place through the collaboration with colleagues around the globe. ENC, the Mexican International Conference on Computer Science, aims to gather all computer science researchers working in Mexico, Mexican researchers working abroad, and all academic players who maintain or are interested in establishing collaboration links with the Mexican computer science community. ENC includes a refereed International Conference as well as invited lectures, focused workshops, practical tutorials, poster sessions and discussion panels.

In its sixth edition, our International Conference presents a selection of 41 papers that report research advances in theoretical and applied computer science. The specific areas covered by these papers illustrate the diversity of interests in our community and include fields such as image processing, pervasive computing, software engineering, robotics, human-computer interaction and evolutionary computing, to name a few. The papers were selected from a total of 186 submissions by a truly international Program Committee: In addition to 21 members who are leaders in their areas of expertise in Mexican institutions, the committee was integrated by 35 leading researchers from universities in 13 countries: Argentina, Australia, Brazil, Canada, Chile, Denmark, France, Great Britain, Italy, New Zealand, Spain, United States and Uruguay. Each of the committee members was responsible for reviewing and providing feedback to authors on their work. Selection was based on these reviews and on further discussion of each paper among the involved referees. We are very grateful for the commitment and enthusiastic support displayed by our Program Committee and additional reviewers.

Our impression from the submission and selection processes is that our research community in computer science is growing both quantitatively and qualitatively. We are hopeful that ENC and the worldwide availability of its proceedings will continue to provide opportunities for sharing our progress in computer science research, as well as for establishing collaboration links and strengthening existing ones.

Vladimir Estivill-Castro and J. Alfredo Sánchez
Editors

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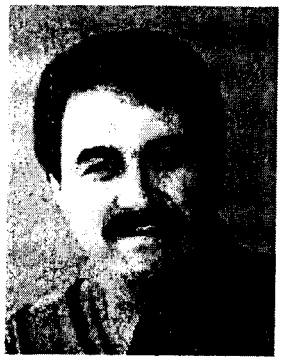

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He is currently Professor in the Department of Computer Science and Engineering and holds a joint appointment in the **Department of Psychology** at the University of South Florida. Professor Goldgof is also a member of **H.Lee Moffitt Cancer Center and Research Institute** at USF and during 2002-2003 he held a position of Professor in Bioinformatics, Cancer Control at **H. Lee Moffitt Cancer Center**. Dr Goldgof is a Founding Member of **Translational Bioinformatics Focused Interaction Group** at H. Lee Moffitt Cancer Center. During 1995-1996, he held a visiting positions at the Department of Computer Science at the **University of California at Santa Barbara** and at the Department of Computer Science at **University of Bern** in Switzerland. Professor Goldgof research interests include motion and deformation analysis, computer vision, image processing and its biomedical applications, bioinformatics and pattern recognition. Dr. Goldgof has published 54 journal and over 100 conference publications, 16 books chapters and edited 4 books.

Model Construction of Nonrigid Biological Objects from Images

Being able to accurately model the deformation of biological objects is vital to the success of many multidisciplinary studies such as computer-aided surgery simulation and planning, image-based medical diagnosis, and motion-based human identification etc. Among various modeling techniques, physical model becomes increasingly popular because the physical and mathematical rigors upon which the model is established can ensure physically sound motion predictions. It has been widely recognized that material properties assigned to the physical model could have a significant impact on its prediction accuracy. In this talk we will explore a number of applications of such modeling for burn scar evaluation and breast cancer detection to facial expression analysis and biometrics.

Robert Kowalski
Imperial College
www-lp.doc.ic.ac.uk/UserPages/staff/rak/rak.html

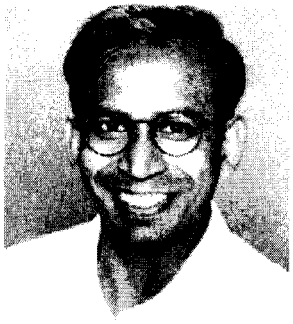
Robert Kowalski is currently Professor Emeritus and Senior Research Fellow at the Imperial College. During the 1980s, he was involved in the British response to the Japanese Fifth Generation Project. At its peak in 1987, the Logic Programming Group, which he headed at the time, numbered approximately 50 researchers and support staff. He also served as an advisor to the UNDP Knowledge Based Systems Project in India and to DFKI, the German Institute for Artificial Intelligence. He coordinated the European Community Basic Research Project, Compulog, and founded the European Compulog Network of Excellence. He served as the Head of the Department of Computing at Imperial College from 1997 to 1999. His current research focuses on the application of Computational Logic to Cognitive Science. A draft of his new book "How to be Artificially Intelligent" can be found at http://www.doc.ic.ac.uk/~rak/.

Reconciling Logic and Objects

Logic and objects can be combined and reconciled in at least three main ways. The simplest and most conservative way is to use logic to describe OO systems. This is useful for specifying and proving properties of OO systems. A more ambitious, but also straight-forward way is to use logic to implement OO methods. Used in this way, logic can implement both condition-action rules and goal-reduction rules. In this combination of logic and objects, objects can be viewed as agents embedded in an object-oriented world, which use logic to represent and reason about the world, as well as to generate actions to change the world. This second way reconciles logic and objects by allocating them separate areas of concern: Objects provide semantic structure, and logic provides their syntactic representation. Unfortunately, this second way leaves a major conflict, concerning their different views of atomic facts, unresolved.

For logic, atomic facts are relationships among possibly several individuals, and they include properties of individuals as a special case. For objects, atomic facts are restricted to properties of individual objects, accessed by sending messages to those objects. From a logical point of view, both the restriction of relationships to properties of individuals and the need to access these properties by sending and receiving messages are artificial. The third way to reconcile logic and objects is to combine them, but without restricting relationships to properties and without accessing information by message passing. Instead of sending and receiving messages, objects/agents can interact by observing atomic relationships and events in their shared environment and by performing actions that change the environment.

The resulting combined system is a semantic structure, consisting of individuals and relationships, in the manner of logical semantics. But some of the individuals in this structure, whether viewed as objects or agents, have the ability to observe changes in the environment and to perform actions of their own. For this purpose, because their methods are encapsulated, they can use any representation for methods they like. In particular, they can use logic both to represent beliefs about the environment and to represent goals that the object/agent desires to achieve. Objects/agents can use their beliefs as goal-reduction rules, to generate actions to achieve their goals. They can also use goals as condition-action rules



Viktor K. Prasanna
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Viktor K. Prasanna is Professor of Electrical Engineering and Professor of Computer Science at the University of Southern California. He is also a member of the NSF supported Integrated Media Systems Center, an associate member of the Center for Applied Mathematical Sciences and a member of USC-ChevronTexaco Center of Excellence for Research and Academic Training on Interactive Smart Oilfield Technologies at USC. His research interests include High Performance Computing, Parallel and Distributed Systems, Network Computing and Embedded Systems. He received his BS in Electronics Engineering from the Bangalore University, MS from the School of Automation, Indian Institute of Science and Ph.D in Computer Science from the Pennsylvania State University.

High Performance Computing using Reconfigurable Hardware

Recently, several state of the art high end platforms have incorporated FPGAs for application acceleration. This talk explores optimizations for accelerating linear algebra computations on such systems. We develop algorithmic optimizations for such systems and demonstrate the suitability of FPGAs for floating point intensive computations. We discuss the design of a BLAS library for such systems and develop a highly optimized reduction circuit for such architectures. Using the reduction circuit, we demonstrate superior performance for sparse matrix computations. The performance of FPGAs is also compared against those of state-of-the-art embedded processors, general purpose processors, and DSPs for floating point intensive applications.