



Editorial

Welcome to the seventh issue of the CoLogNET newsletter, the official newsletter of the Network of Excellence of Computational Logic.

This issue includes a variety of interesting contributions. You will come across reports on summer events, postgraduate student programs, upcoming meetings, and scientific articles.

Of particular interest are the reports on the new Erasmus Mundus program, on the formalization of abstract mathematics, and on the second workshop on principles and practice of semantic web reasoning.

Finally, the newsletter provides calendar information about upcoming events related to the network. ❖

Antonis Kakas and Marinos Georgiades
University of Cyprus

Verifying Agent-Based Systems using Computational Logic

Logic and multi-agent systems

Michael Fisher
University of Liverpool

Introduction

This article provides a report on the second event within the "Logic and Agents" activity in CoLogNET. (Further details can be found at <http://www.csc.liv.ac.uk/~michael/symposium04.CALL/>)

Background

The main aim of this activity, on "Logic and Agents", is to bring together expertise from the Computational Logic and Agent-Based Systems communities, via interaction between the CoLogNET and AgentLink actions, respectively. Formally, this activity is one of the main areas within CoLogNET and was previously a special interest group within AgentLink.

The activity is funded by both actions, showing their commitment to this important area. This formalized activity aims to allow expertise/ideas to flow between the areas, thus providing more chance of productive technology transfer. Thus, in the future, this activity will contribute to the uptake of logic-based agent technology and logical methods for agent-based systems. This, in turn, may impact on forthcoming standards, for example where semantics/ verification/ compliance is an issue.

AgentLink

AgentLink [<http://www.agentlink.org>] is a large, and successful, EU Coordination Action aimed at agent-based computing. AgentLink coordinates research and development activities in agent-based systems and

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Executive Council Report

Heike Scheuerpflug

In 2001 when CoLogNET started its activities, the Executive Council's members were driven by a broad and ambitious spectrum of tasks defined by deliverables and milestones allocated to workpackages. Not only was the description of work ambitious but so was the budget frame of two million Euro EC Community contribution. After almost three years from project start, CoLogNET enters into its final stage now, officially the project will terminate on 31 December 2004, unless the request of extension of the contract will be approved and the amendment will be processed until the end of the project.

Review and EC Meetings

The past three years have seen eight Executive Council meetings, one IND task force kick-off meeting, one task force 3 meeting, one website task force meeting and several website-related meetings, two review meetings and numerous other CoLogNET-related events such as workshops, industrial panels, seminars, symposia, conferences, summer and PhD. schools as well as broadcasted colloquia organized by the specific area chairs or CoLogNET members.

This year the CoLogNET EC met from 25 to 26 January 2004 in Brussels to prepare the cluster review meeting scheduled for 26 January 2004. As a result of the review the majority of activities between January and July were related to fulfill the recommendations set out in the second review report which was released on 5 February 2004. In addition to the website task force meeting held in March in Saarbrücken, the CoLogNET EC met in April and June in London. In the course of the meeting in April, a new chairman for the future network of CoLogNET was elected, some first discussions about future activities of a future project were initiated and major results of the website task force meeting for the re-design of the CoLogNET portal website were discussed. The meeting in June mainly served the purpose to run tests of the two newly-designed portals and area web sites.

The third online review took place on 22 July 2004 and the third review report released in August reflected the overall positive appraisal of the re-design of the website and the implementation of the recommendations stated

in the second review report.

A CoLogNET future meeting was organized at ECAI 2004 in Valencia. A preliminary set of workpackages and related services were defined and the structure of the future consortium was discussed and approved.

Portal of Computational Logic www.cl-portal.org & CoLogNET Portal www.colognet.org

The CoLogNET project aims to create a virtual centre of excellence from the scattered communities in Computational Logic in Europe. The overall objective is to promote the up-take of computational logic technologies in industry and to establish the area as an academic discipline. In a joint effort the consortium synchronized its web presence and displays its information across the nine areas in an integrated and structured manner. This applies for all areas and activities. The response to the corrective actions proposed by the reviewers was reflected by each area in a short report submitted to the coordinator. A summary report which describes the general organizational process of the website's re-design and the actions of the consortium to implement the recommendations of the second review report was submitted to the Commission and the reviewers. In addition, a technical report which describes the information architecture and the technology used for the set up of the two portals was submitted.

The consortium agreed to set up two different portals to satisfy two different needs:

- The Portal of Computational Logic (CL Portal) is oriented towards a broader community and serves as the gateway to all computational logic related information, as a web-based knowledge platform for students, academia and industry.
- The CoLogNET Portal (CoLogNET Portal) serves the network as the project's website and contains all information directly related to the internal needs of the network. It can be regarded as the network's backbone.

However, the inter-relations and the distinction between the two portals are clearly visible, not only from the content point of view but also graphically. The CL Portal's web presence is blue whereas the CoLogNET Portal's information is represented in greenish grey. The two portals fully comply with the W3C guidelines of

the world wide web consortium, <http://www.w3.org/>.

Education

Funded Exchange Scheme

We welcome Martin Balaz and Martin Homolo from the Department of Applied Informatics, Faculty of Mathematics, Physics and Informatics of Comenius University in Bratislava, Slovakia, a member node of CoLogNET, as exchange students of the CoLogNET funded exchange scheme for junior and senior researchers. The two PhD students will spend up to three months with Prof. Luís Moniz Pereira's research group at CENTRIA, Universidade Nova de Lisboa. Their visit to CENTRIA will provide them with the outstanding opportunity to deepen their knowledge and strengthen the cooperation between the two universities. Two reports on the outcome of their stay will be published in the newsletter.

Erasmus Mundus

A new academic year has just started and the Erasmus Mundus
<http://europa.eu.int/comm/education/programmes/mundus/index_en.html> experience with it. This cooperation program was launched by the Commission to encourage exchanges between students and academics from all over the world and the European Union. The Commission has selected the first 19 Erasmus Mundus masters. Of the 19 courses chosen for a period of five years, 14 will come into operation fully this academic year, while the other 5 will have the status of a preparatory year. The CoLogNET consortium is very happy that the European Master's Program in Computational Logic initiated by Prof. Steffen Hölldobler and Prof. Luís Moniz Pereira is among the 14 selected study programs to start this year. "Erasmus Mundus aims to restore Europe to a leading position on the international university scene," said Viviane Reding, European Commissioner for Education and Culture. 82 European universities in 17 countries are participating in the courses selected. The countries most prominently represented are Germany (13 universities), France (12), Italy (10) and the United Kingdom (8).

Summary & Outlook

From an administrative point of view, the third periodic progress report including the set of cost statements will

be due at the end of February, irrespective of approval or non-approval of a request for contract extension. In addition the final report will be due at the end of the project. The final installment which includes the 15 % detention share will be released upon approval of the final report.

When CoLogNET was launched in 2001 the concept of a network of excellence under the regulations of the fifth framework program was the ideal instrument for coordination activities that cross borders and cross-fertilize with other research fields. Today the European R&D landscape is undergoing a process of re-shaping and re-structuring and under the sixth framework program which has been adopted as the financial instrument to enforce the European Research Area. The scientific community of CoLogNET has to re-define and re-focus its area of activities and services and maybe in a sense defend its obtained status and long tradition in linking up the major European players in a specific field of information technology. The future project will respond to this challenge in two ways: First, by continuing and building upon the strengths of the network, namely, networking, international co-operations, cross-fertilization, integration of emerging scientific areas, education and enlargement. The second pillar is a clearly defined-service orientation that is offering a broad set of specific services to European policy makers and stakeholders in academia and industry. ❖

CoLogNet Workshop on Predictable Software Component Assembly

Kung-Kiu Lau
University of Manchester

The CBD workpackage of CoLogNET organized a two-day workshop on Predictable Software Component Assembly at Manchester, on 20-21 May 2004. The workshop was attended by researchers from Australia, China, the Netherlands, Singapore, Sweden, UK and USA.

Aim

Since it focuses on assembly rather than coding, in CBD composition operators and compositional reasoning take centre stage. The need for an engineering approach is paramount, a pre-requisite for which is predictable assembly, whereby the qualities of an assembly can be predicted or calculated from those of its components. Predictable assembly requires component certification, which in turn depends on static analysis of component properties.

The aim of this workshop was to bring together researchers and practitioners interested in predictable software component assembly to exchange and discuss results and ideas, with a view to fostering cross-fertilization as well as collaboration.

Program

The program included 11 talks:

- "Towards a Component Model for Predictable Assembly and Their Composition", Kung-Kiu Lau, University of Manchester, UK
- "Abstract Behavior Types: A Foundation Model for Components and Their Composition", Farhad Arbab, CWI, the Netherlands
- "Software Component Synthesis Theory: A Subdomain-testing Approach", Dick Hamlet, Portland State University, USA
- "Concerning Predictability of Component-based Systems: Classification of Quality Attributes", Ivica Crnkovic, Malardalen University, Sweden
- "Compositional Mechanisms for Performance

Specification", Murali Sitaraman, Clemson University, USA

- "Parameterized Dependent Automata For Modeling Extra-Functional Component Properties", Heinz Schmidt, Monash University, Australia
- "Indirection Components", Bruce Weide, Ohio State University, USA
- "Contract-Oriented Component Software Development", Zhiming Liu, UNU/IIST, Macao, China
- "A Compositional Semantics of UML Components", Marcello Bonsangue, LIACS, the Netherlands
- "Executable Specifications based on Message Sequence Charts", Abhik Roychoudhury, National University of Singapore
- "A Services-based Requirements Model to Drive Component Selection and Constrain Composition", John Hutchinson, Lancaster University

Participants

As well as the 11 speakers, other participants included local researchers and students, who bring the total to about 22.

Outcome

Each talk was accompanied by a long and lively discussion. This resulted in fruitful exchanges, which not only increased mutual understanding but also pointed out future research directions as well as opportunities for future collaboration.

Dissemination

Details of the workshop, in particular, the talks, can be found at the workshop web site:
http://www.cs.man.ac.uk/~wangz0/CologNet_Workshop.html

CoLogNET / FORMAL METHODS EUROPE
SYMPOSIUM ON TEACHING FORMAL METHODS

GHENT UNIVERSITY, "HET PAND"

2004, NOVEMBER 18-19

<http://www.intec.rug.ac.be/groupsites/formal/Sympos2004/Sympos2004.htm>

This symposium will serve as a forum to explore the failures and successes of Formal Methods education, to consider how the failings might be resolved, to learn from the successes, and to promote cooperative projects to further the teaching and learning of Formal Methods (FMs).

The symposium aims to bring together:

- Formal Methods educators, both actual and potential;
- other computer science and software engineering educators;
- industrial practitioners and project managers;
- technical and scientific publishers.

Proceedings

The Proceedings will be published by Springer as a volume in the Lecture Notes in Computer Science series. Each registered participant will receive a copy at the start of the Symposium.

Registration

- Early registration (until October 15): € 225.00
- Late registration: € 300.00. Students: € 150.00

Logic-Based Agent Verification - A special issue of the Journal of Applied Logic

Logic and multi-agent systems

Editors

Michael Fisher [Univ. Liverpool, UK], Munindar Singh [North Carolina State Univ., USA], Diana Spears [Univ. Wyoming, USA], Mike Wooldridge [Univ. Liverpool, UK]

Overview

The view of computational components as 'agents' is widely used in contemporary software applications, such as Internet navigation, information management, autonomous process control, and e-commerce. The popularity of the agent paradigm stems not only from its intuitive and appealing nature, capturing the notions of flexibility and evolving behavior, but also from the range of theories, tools and techniques that have been developed over recent years for agent-based systems.

However, the increasing use of agents in (business, mission, safety) critical applications, together with the development of infrastructures such as the world-wide web and wireless computing is leading to new problems. Central amongst these is that of the "trustworthiness" of agent software. Can agents be trusted to autonomously make decisions in critical areas? In addition, once large numbers of agents are present, can they work together safely?

Thus, it is important to be able to guarantee predictable behavior for agent-based systems if these are to be used in critical applications. Verification of agent-based behavior is a complex problem: the behavior of individual agents must be verified; collections of agents must be shown to be able to work together effectively; and agents that communicate over wider distances and multiple sites must be shown to retain security properties. Tackling these problems often requires a large number of diverse techniques, and many such techniques are based on formal logics, thus providing the clear semantic basis for the verification tasks.

The aim of this special issue is to bring together high-quality papers exhibiting leading edge research where

a "logic-based" approach is taken to the verification of agent-based systems. We here take a broad view of logic, and consider a wide range of logical verification techniques (incorporating theorem-proving, model checking, algebraic, abstract machines, etc.).

THE JOURNAL

The Journal of Applied Logic (Elsevier) publishes papers in areas of logic which can be applied in other disciplines as well as application papers in those disciplines, the unifying theme being logics arising from modeling the human agent.

IMPORTANT DATES

- Submission deadline: 15th October 2004
- Author notification: 15th February 2005
- Revised papers due: 15th April 2005

TOPICS OF INTEREST

The topics of interest of this special issue include (but are not limited to):

- verification, modeling and analysis techniques for agent-based or multi-agent systems based on: theorem-proving (including, classical, modal, temporal, higher-order, etc); constraint-based systems; model-checking; abstract machine modeling; algebraic techniques; multi-paradigm approaches; abstraction techniques; links to testing.

- applications of logic-based agent verification, for example in: robotics; autonomous process control; agent-based knowledge/information management; WWW search/navigation/discovery; e-commerce and B2B applications; critical embedded components; telecommunications; security; cooperation, team work and negotiation; analyzing evolving/adaptive systems.

SUBMISSION OF MANUSCRIPTS

We invite submission of full (typically, 20-40 pages) high-quality research papers for this special issue. These should neither have been previously published in their full form, nor be under review elsewhere. Submissions consisting of the paper (preferably PDF or Postscript via email but, alternatively, five hard-copies) including an abstract in which the role of logic in the particular approach used is clarified, should be sent to Michael Fisher (address given below) to arrive no later

than 15th October 2004. Formatting instructions can be found at the journal's web site.

Queries concerning this special issue should be directed to any of the guest editors. Up-to-date information will also be available from

<http://www.csc.liv.ac.uk/~michael/LBAV04>

Special issue editors

- Michael Fisher, Department of Computer Science, University of Liverpool, Liverpool L69 7ZF, UK, email: M.Fisher@csc.liv.ac.uk url:

<http://www.csc.liv.ac.uk/~michael>

- Munindar Singh, Department of Computer Science, North Carolina State University, Raleigh, USA, email: mpsingh@csc.ncsu.edu

url: <http://www.csc.ncsu.edu/faculty/mpsingh>

- Diana Spears, Department of Computer Science, University of Wyoming, Laramie, USA, email:

dspears@cs.uwyo.edu url:

<http://www.cs.uwyo.edu/~dspears>

- Mike Wooldridge, Department of Computer Science, University of Liverpool, Liverpool L69 7ZF, UK, email: M.J.Wooldridge@csc.liv.ac.uk url:

<http://www.csc.liv.ac.uk/~mjw> ❖

supports a range of activities aimed at raising the profile, quality, and industrial relevance of agent systems research and development in Europe.

Among its many activities, AgentLink supports Special Interest Groups, "focusing on the development of communities around areas of strategic importance". The joint activity on "Logic and Agents" is a Special Interest Group within AgentLink.

Symposium

The work of this "Logic and Agents" activity is centered around two symposia, one on "logic-based agent implementation", the other on "logic-based agent verification", both of which provide very strong links between the actions. The first of these was held on 3rd February 2003 in Barcelona; the second was held on 9th July 2004 in Liverpool.

The aim of this second symposium, on "logic-based agent verification", was to consolidate expertise, stimulate research/collaboration in each area, showcase successful applications and enhance the uptake of logic-based agent technology.

This symposium was co-located with a large event within the agent community, namely the Sixth European Agent Systems Summer School (EASSS; <http://www.agentlink.org/happenings/easss/2004>). The original aim was that each symposium should be co-organized by a leading EU researcher in the topic area. We are pleased that such a researcher agreed to be involved in this way, and thank Mike Wooldridge (Univ. Liverpool, UK) who co-organized this symposium on "logic-based agent verification".



A picture of the keynote speaker Prof. Ron van der Meyde at the symposium

Funding was provided by both CoLogNET and AgentLink. In addition, we would like to acknowledge administrative support from the AgentLink local organizers for this event. Thus, we supported a number of speakers, allowing them to participate in the event. We were also able to attract a high-profile non-EU keynote speaker from Australia.

Program

The symposium was a one day event held on 9th July, 2004 at the University of Liverpool. There was a non-EU keynote speaker: Ron van der Meyden (Univ. New South Wales, Australia) talking about "Knowledge Based Programming: Refinement and Model Checking". In addition, we had nine well-known experts from across the breadth of "logic-based agent verification" (note that the majority of presentations are available on-line at the above URL):

- Clare Dixon (Univ. Liverpool, UK), "Using Temporal Logics of Knowledge in the Formal Verification of Security Protocols"
- Alessandro Cimatti (IRST, IT), "Effective Boolean Methods for Reasoning about Knowledge"
- Alessio Lomuscio (Kings College London, UK), "Model Checking Deontic Interpreted Systems"
- Wojciech Penczek (Polish Academy of Science, PL), "Verifying MAS using the model checker VERICS"
- Dieter Hutter (DFKI, DE), "Information Flow Control to Ensure the Security of Multi-Agent Systems"
- Mike Holcombe (Univ. Sheffield, UK), "Validating Agent Based Models of Biological Systems",
- Rafael Bordini (Univ. Durham, UK), "Model Checking and Abstraction Techniques for Agent Verification"
- Sieuwert van Otterloo (Univ. Liverpool, UK), "Axioms for Preferences"
- Pierre Yves Schobbens (Univ. Namur, BE), "Model-checking and refinement in logics for agents"

Summary

The presentations not only gave a broad view of the

state of the art in logic-based agent verification throughout both communities, but also allowed dissemination of key breakthroughs in this area. We believe that this event will enhance collaboration between groups, projects, academia/industry, etc.

Finally, not only did this symposium allow participants to showcase successful applications concerning the verification of agents using logic-based approaches, it also provided an opportunity to identify important future research issues and key requirements for wider use of these techniques.

Note that a special issue of the Journal of Applied Logic on the topic of Logic-Based Agent Verification is open for submissions until 15th October 2004. See <http://www.csc.liv.ac.uk/~michael/RAV04> for details. ❖

19TH WORKSHOP ON (CONSTRAINT) LOGIC PROGRAMMING
UNIVERSITY ULM, GERMANY
2005, FEBRUARY 21-25
SUBMISSION DATE:: 2004, NOVEMBER 14
http://www.first.fraunhofer.de/en/WLP_2005

The workshop on (constraint) logic programming is the annual meeting of the Society of Logic Programming (GLP e.V.) and brings together researchers interested in logic programming, constraint programming, and related areas like databases and artificial intelligence. Previous workshops have been held in Germany, Austria, and Switzerland. In 2005 the workshop will be organized in order to promote the cross-fertilizing exchange of ideas and experiences among practitioners, researchers, and students from the different communities interested in the foundations, applications, and combinations of high-level declarative programming languages and related areas. The technical program of the workshop will include invited talks, presentations of refereed papers, and demo presentations.

Contributions are welcome on all theoretical, experimental, and application aspects of constraint programming (CP) and logic programming (LP). The primary focus is on new and original research results but submissions describing innovative products, prototypes under development or interesting experiments (e.g., benchmarks) are also encouraged.

PhD and Postgraduate Summer School - Logics of Formal Software Specification Languages

Formal Specification Languages

Dines Bjørner
National University of Singapore

Audience

This Summer School was aimed at PhD Students, young researchers and academics with interests in formal methods, system specification, program development and logical foundations.

Program

The scientific program consisted of lecture courses by renowned experts in the field specification languages and their logical foundation. The school offered nine main courses, each focusing on one major specification language and its logic. Post school materials are available. Two special issues of the Slovak Academy journal Computing and Informatics: <http://www.cai.sk/>, Volume 22, 2003, No.3 and Volume 22, 2003, No.4 featured pre-material:

- http://www.cai.sk/Volumes/Volume_22_2003_No_3.htm
- http://www.cai.sk/Volumes/Volume_22_2003_No_4.htm

Campus

The Congress Centre Academia is situated at the foot of the Lomnický peak in the eastern part of the Vysoké Tatry Mountains in Slovakia, close to the Tatra National Park, and in quiet surroundings.

Slide Shows

The event was an outstanding academic and social success. Many thanks go to the speakers for their superb contributions, as teachers, listeners, advisors and authors. Congratulations to the many participants who traveled from 24 countries: their enthusiasm, energy, intelligence and good humor was an inspiration!

Sponsors

The Event was primarily sponsored by CoLogNET, but with generous financial support of ten participants by Microsoft Research and five participants by UNU-IIST, the UN Univ.'s Intl.Inst.f.Softw.Techn., Macau SAR, China. Generous time was contributed by the following universities: Comenius (SK), Essex (UK), Techn.Univ.of Denmark, as well as those of the speakers. Additional support, in kind, was provided by Slovak Society for Computer Science, and Czech Technical Univ., Prague.

Organizing Committee

- Prof Dines Bjørner - General Chair
- Prof Martin Henson - School Director
- Prof Branislav Rován - School Co-Director
- Dr Dusan Guller - School Logistics
- Mr Martin Penicka - Administration

Program

- School began: Sunday 4pm 6 June 2004
- School ended: Saturday 9am 19 June 2004

Each of the eight lecture series featured five 70 minute lectures. The full program and the tutors were as follows:

"The Expressive Power of Abstract-State Machines",
Wolfgang Reisig, Humboldt-Universität zu Berlin,
Germany;

"Foundations of the B method", Dominique Mery,
Université Henri Poincaré, France;

"CafeOBJ: Logical Foundations and Methodologies",
Razvan Diaconescu, Institute of Mathematics of the
Romanian Academy, Romania;

"CASL - The Common Algebraic Specification
Language: language, semantics, proof calculus, tools",
Till Mossakowski, University of Bremen, Germany;

"Duration Calculus: A formal approach to real-time
systems", Michael R. Hansen, Technical University of
Denmark, Denmark;

"The Logic of the RAISE Specification Language",
Chris George, United Nations University, Macau;

"Specifying Systems in TLA+", Stephan Merz, INRIA

Lorraine, France;

"Z logic: applications and consequences", Steve Reeves,
University of Waikato, New Zealand.

Slide Shows

From Martin Henson, School Director: (probably won't
work under Linux):

- <http://cswww.essex.ac.uk/staff/henson/public/LFSL1/>
- <http://cswww.essex.ac.uk/staff/henson/public/LFSL2/>
- <http://cswww.essex.ac.uk/staff/henson/public/LFSL3/>
- <http://cswww.essex.ac.uk/staff/henson/public/LFSL4/>
- <http://cswww.essex.ac.uk/staff/henson/public/LFSL5/>

From Steve Reeves (quicktime; lovely but 8.5MB):

- <http://cswww.essex.ac.uk/staff/henson/sssl/slovakia.mov>❖

European Masters Program in Computational Logic

Enrico Franconi
Free University of Bozen-Bolzano

The Faculty of Computer Science at the Free University of Bozen-Bolzano, Italy, is offering the European Masters Program in Computational Logic as part of its Master in Computer Science (Laurea Specialistica in Informatica). The European Masters Program in Computational Logic is an international distributed Master of Science course, in cooperation with the computer science departments in the following universities:

- Free University of Bozen-Bolzano, Italy
- Technische Universitaet Dresden, Germany
- Universidade Nova de Lisboa, Portugal
- Technische Universitaet Wien, Austria
- Universidad Politecnica de Madrid, Spain

This program involves studying one year at the Free University of Bozen-Bolzano, and completing the second year with a stay in one of the partner universities. After this, the student will obtain, together with the European degree, two Master of Science degrees: the Laurea Specialistica in Informatica degree from the Free University of Bozen-Bolzano, with legal value in Italy, and the respective Master of Science degree from the visited university, with legal value in its country.

Application deadline was on 27th August 2004.

The study program at the Free University of Bozen-Bolzano

The European Masters Program in Computational Logic is designed to meet the demands of industry and research in this rapidly growing area. Based on a solid foundation in mathematical logic, theoretical computer science, artificial intelligence and declarative programming students will acquire in-depth knowledge necessary to specify, implement and run complex systems as well as to prove properties of these

systems. In particular, the focus of instruction will be in deduction systems, knowledge representation and reasoning, artificial intelligence, formal specification and verification, syntax directed semantics, logic and automata theory, logic and computability. This basic knowledge is then applied to areas like logic and natural language processing, logic and the semantic web, bioinformatics, information systems and database technology, software and hardware verification. Students will acquire practical experience and will become familiar in the use of tools within these applications. In addition, students will be prepared for a future PhD; they will come in contact with the international research community and will be integrated into ongoing research projects. They will develop competence in foreign languages and international relationships, thereby improving their social skills.

The program is part of the Master in Computer Science (Laurea Specialistica in Informatica) and it has various strengths that make it unique amongst Italian and European universities:

- Curriculum taught entirely in English: The program is open to the world and prepares the students to move on the international scene.
- Possibility of a strongly research-oriented curriculum.
- Possibility for project-based routes to obtain the degree and extensive lab facilities.
- Other specializations with streams in the hottest Computer Science areas, such as Web Technologies, Information and Knowledge Management, Databases and Software Engineering.
- International student community.
- Direct interaction with the local and international industry and research centers, with the possibility of practical and research internships that can lead to future employment.
- Excellent scholarship opportunities and student accommodations.
-

Applications at the Free University of Bozen-Bolzano

The European Masters Program in Computational

Logic is part of the Master of Science in Computer Science (Laurea specialistica in Informatica) of the Free University of Bolzano-Bozen. The Master comprises 120 CTS credits and has duration of two years (including the thesis). Each year's course is divided into two semesters. The courses start at the end of September. Students enrolling at the Free University of Bozen-Bolzano for the European Master are required to have a year of stay at one of the partner universities. The continuation of studies toward the PhD doctoral degree is possible. Applicants should have a Bachelor degree (Laurea) in Computer Science, Computer Engineering, or other relevant disciplines; special cases will be considered. Applicants are expected to pre-enroll using the application form available at the course web site. The application form must be given in by the 27th August 2004, at the Student Secretariat of Bozen-Bolzano or it may be sent by surface mail. Please refer to the course web site for detailed instructions. University and province offer grants for supporting the studies, the work on dissertations, post-graduate studies, housing, canteens, and special initiatives for the disabled. Students will be supported by the University Advisory Service. Its staff will give important information, will help with the enrolment procedure, with the application for a residence permit (for foreign students, if necessary) and with accommodation. The office is supported by student helpers who act as tutors for students and show them around the university. Special support is given to foreign students by the International Relations Office. The Language Centre provides language courses for students enrolled at the University and for those on international exchange programs, and it runs an advisory service for autonomous language learning, which takes place in its fully-equipped, flexibly run language laboratory. There are two different student associations: "Kikero" organizes social events, student parties, trips and other activities; S.C.U.B "Sports Club University Bolzano" organizes sports activities, particularly alpine sports like free-climbing, trekking, skiing.

Free University of Bozen-Bolzano

The Free University of Bozen-Bolzano, founded in 1997, boasts modern premises in the centre of Bozen-Bolzano. The environment is multilingual, South Tyrol

being a region where three languages are spoken: German, Italian and Ladin. Studying in a multilingual area has shown that our students acquire the cutting edge needed in the international business world. Many of our teaching staff hails from abroad. Normal lectures are complemented with seminars, work placements and laboratory work, which give our students a vocational as well as theoretical training, preparing them for their subsequent professional careers. Studying at the Free University of Bozen-Bolzano means, first and foremost, being guided all the way through the student's educational career. South Tyrol, due to its enviable geographical position in the centre of the Dolomites, also offers our students a multitude of opportunities for spending their free-time.

For further information please contact:
Enrico Franconi at franconi@inf.unibz.it

European Masters Program in Computational Logic
part of the MSc in Computer Science (Laurea Specialistica).

Faculty of Computer Science
Free University of Bozen-Bolzano
Piazza Domenicani, 3
I-39100 Bozen-Bolzano BZ, Italy

Phone: +39 0471 016 000

Fax: +39 0471 016 009

Email: computer.science@unibz.it

Web site: <http://www.inf.unibz.it/mcs/emcl/> ❖

Formalizing Abstract Mathematics: Issues and Progress

Formal methods specification and verification

Lawrence C. Paulson
University of Cambridge

A huge amount of mathematics has been formalized using automated deduction tools. My (personally biased) selection includes Gödel's incompleteness theorem [9], Quadratic reciprocity [8], probability [3], continuous lattices [2] and my own formalization of the relative consistency of the axiom of choice [6]. Most formalized mathematics is concrete. Only one item in this list, namely continuous lattices, represents abstract mathematics.

Abstract Mathematics concerns classes of objects specified by axioms, not concrete objects like the integers or reals. Examples include groups, rings, lattices and topological spaces. The mathematical objects are typically structures, such as the group $(G, \cdot, 1, \cdot^{-1})$. Concepts are frequently combined and extended: for example, a vector space can be seen as the combination of a field with an Abelian group. Instances of concepts may be concrete (the integers are a ring) or abstract (the product of two groups is a group).

Formalized abstract mathematics places specific demands on tools. Structures must be first-class values rather than the "theories" provided by typical proof tools). The carrier of a structure must be a set, not a type, since most type systems are too inflexible. The notation should support basic conventions. For example, if G is a group, then $x \cdot y \cdot 1 = y \cdot 1 \cdot x \cdot 1$ refers implicitly to G . Inheritance of syntax and theorems should be automatic.

Isabelle [5] is generic proof tool that has powerful reasoning mechanisms. Users can attach infix syntax to the functions they define. The Isabelle developers have been introducing features to support abstract mathematics:

- $\langle \text{index} \rangle$ arguments in syntax declarations. These specify an implicit argument for functions (including infix operators), so that users can write $x \cdot y$ instead of $x \cdot$

$G \cdot y$.

- Extensible records. These represent the structures found in abstract mathematics. Record fields are functions, and can have dedicated syntax possibly with $\langle \text{index} \rangle$ arguments.
- Locales: a lightweight module system providing named contexts and multiple inheritance [1]. Locales can express simple concepts such as "G is a group" or "h is a homomorphism between G and H". A locale can also include pragmatic information such as simplifier hints. Theorems can be proved within the context of a locale. However, each locale has a logical meaning, defined by a predicate, so we can prove theorems about specific locales.
- Isabelle offers the choice between a typed formalism (higher-order logic) and an untyped one (ZF set theory).

A formal development of group theory (distributed with Isabelle) demonstrates these features. A locale for monoids is declared, and then extended to one for groups by adding an axiom stating that all elements have inverses. If we prove a theorem within locale group, we have the implicit assumption that G is a group along with the syntax and other theorems belonging to the locale. In proving that the direct product of two groups is a group, we see the default references to group G can be overridden by explicit references to the other group, H . These features are also visible in a proof that group homomorphisms preserve inverses.

The development goes on to define groups of permutations and automorphisms. It defines cosets and normal subgroups. Formalized results include Lagrange's theorem, the first Sylow theorem [4] and the first isomorphism theorem (for quotient groups).

Mizar provides the best support for abstract mathematics. Mizar structures allow multiple inheritance. Mizar adjectives can express multiple constraints on structures. Structures can be coerced to other structures by widening and by proved closure properties. The Mizar team has built substantial formal developments, such as commutative algebra [7].

The present research attempts to see how support for abstraction can be added to a general-purpose proof tool, in this case Isabelle.

Acknowledgement

This work was partially funded by the Information Society Technologies program of the European Commission, Future and Emerging Technologies under the IST-2001-33123 CoLogNET project.

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ECAI 2004 workshop on Modelling and Solving Problems with Constraints

Brahim Hnich and Toby Walsh

The workshop received support from the Information Society Technologies program of the European Commission, Future and Emerging Technologies under the IST-2001-33123-CoLogNET and was organized with the help of the IND task force of CoLogNET.

The workshop had an invited talk by Hermann Schichl talked on Mathematical Modeling and Modeling Languages. There was also a panel on getting your research taken up by industry. The panelists were Esther Gelle from ABB (Switzerland), Rob Milne from Intelligent Applications (UK), and Marty Plotkin from Oracle Corporation (USA). Among other topics, the panel covered issues such as software patents, starting up your own business, getting the industry interested in your research, etc.

In addition, 14 technical papers were accepted, but only 11 could be scheduled for presentation given the time constraints. There were five sessions: non-binary constraints and propagation algorithms, search, uncertainty, extensions, and applications. There were more than 30 participants.

Two papers were on non-binary constraints and propagation algorithms. The first paper by Javier Larosa and Emma Rollon introduces adaptive consistency with capacity constraints while the second by Christian Bessiere and Romauld Debruyne presents an analysis of singleton arc consistency. The three papers on search covered issues ranging from measuring the search effort by Christian Bessiere, Bruno Zanuttini, and Cesar Fernandez, to studying the effect of value ordering for finding all solutions by Barbara Smith and Paula Sturdy, to techniques that exploit interchangeability during search presented by Steve Prestwich. Two papers on uncertainty were presented. Alan Holland and Barry O'Sullivan presented their work on finding robust solutions for combinatorial auctions, while Robert St-Aubin and Alan K. Mackworth's paper introduced a formal framework based on probabilistic constraint nets to model

Continued on page 20

European Master in Language and Communication Technologies

Logic and Natural Language Processing

Enrico Franconi
Free University of Bozen-Bolzano

The Faculty of Computer Science at the Free University of Bozen-Bolzano, Italy, and the Department of Computational Linguistics and Phonetics (CoLi) of Saarland University, Germany, offer a distributed European Master in Language and Communication Technologies, as part of their individual Master of Science Programs in Computer Science (Laurea Specialistica in Informatica) and Language Science and Technology (M.Sc.), respectively. Students of the European Master enroll in one of the two universities and are required to spend at least one semester at the other university; both universities adopt the ECTS credit system. In the context of the European Master Program the Free University of Bozen-Bolzano cooperates with ITC-irst of Trento, while the Saarland University cooperates with the German Centre for Artificial Intelligence (DFKI); these centers are connected by more than 10 years of close partnership.

Human communication is at the heart of the information society and, in a richly multilingual area such as the European Union, full participation requires multilingual facilities for creating, exchanging and accessing information across language borders, throughout Europe and beyond. During the last few years, Language and communication Technologies have seen a rapid increase in development at both research and industrial levels due to the fast growth of the Internet, of speech-based technologies, and the success of mobile communication. This has caused an acute need for continuous advancements in multilingual human language processing, cross-lingual information access, and multimodal human computer interaction. New expertise, skills and professional profiles are needed which can answer the growing requirements of our societies in the Human Language and Communication Technologies area.

The study program at the Free University of Bozen-Bolzano

The European Master in Language and Communication Technologies is designed to meet the demands of industry and research in this rapidly growing area. It offers advanced courses taught by leading scientists in topical areas such as Computational Linguistics, Speech Processing, Information Retrieval, and Intelligent Interfaces. The program is part of the Master in Computer Science (Laurea Specialistica in Informatica) and it has various strengths that make it unique amongst Italian universities:

- Curriculum taught entirely in English: The program is open to the world and prepares the students to move on the international scene.
- Possibility of a strongly research-oriented curriculum.
- Possibility for project-based routes to obtain the degree and extensive lab facilities.
- Other specializations with streams in the hottest Computer Science areas, such as Web Technologies, Information and Knowledge Management, Databases and Software Engineering.
- International student community.
- Direct interaction with the local and international industry and research centers, with the possibility of practical and research internships that can lead to future employment.
- Excellent scholarship opportunities and student accommodations.

The application deadline at the Free University of Bozen-Bolzano to the European Master in Language and Communication Technologies was the 27 August 2004. Details can be found at <http://www.inf.unibz.it/msc/>

The study program at the Saarland University

Beginning in October 2004, CoLi at the Saarland University offers a new international Masters program in Language Science and Technology, completely taught in English, leading to the degree Master of

Science (M.Sc.) in 18 months. Saarbruecken is one of the world's leading centers for language science and technology with faculty and students coming from many countries. An active program of basic, applied and cognitive research combines with state-of-the-art facilities to provide students with a rich and stimulating environment for their research. The program cooperates closely with various departments and facilities of related disciplines, where lectures and classes are open to our graduate students. The course of studies can be personalized by setting an individual research focus. In addition to the general degree Master of Science in Language Science and Technology, students have the option of specializing in the following areas: Computational Linguistics, Computational Psycholinguistics, Language Technology, and Phonetics and Speech Technology. Technical support facilities available to students in the program include:

- State of the art computing infrastructure
- Computer lab with facilities for the visually impaired
- Eye-tracking lab
- Speech labs
- Dialogue and usability lab
- Video conferencing lab
- In-house Institute library

Applications at the Saarland University to the European Master in Language and Communication Technologies will be accepted starting from the academic year 2005-2006. Details can be found at <http://www.coli.uni-sb.de/msc/>

Free University of Bozen-Bolzano

The Free University of Bozen-Bolzano, founded in 1997, boasts modern premises in the centre of Bozen-Bolzano. The environment is multilingual, South Tyrol being a region where three languages are spoken: German, Italian and Ladin. Studying in a multilingual area has shown that our students acquire the cutting edge needed in the international business world. Many of our teaching staff hails from abroad. Normal lectures are complemented with seminars, work placements and laboratory work, which give our students a vocational

as well as theoretical training, preparing them for their subsequent professional careers. Studying at the Free University of Bozen-Bolzano means, first and foremost, being guided all the way through the student's educational career. South Tyrol, due to its enviable geographical position in the centre of the Dolomites, also offers our students a multitude of opportunities for spending their free-time.

ITC-irst

The Centre for Scientific and Technological Research (ITC-irst, <http://www.itc.it/irst/>) is a public research centre of the Autonomous Province of Trento, Italy. Founded in 1976, it conducts research in the areas of Information Technologies, Microsystems, and Material Sciences. ITC-irst is one of most active and internationally renowned research centers for Human Language and Communication Technologies, with more than 80 people working in this area. The extensive lab facilities and a strong commitment to higher education render ITC-irst a dynamic research institute with all the relevant resources to foster creativity and innovation. ❖

SAINT 2005 Workshop – Context-aware adaptation and Personalisation for the Mobile Internet, Trento, Italy, January 31 - February 4, 2005

Claudio Bettini
University of Milan, Italy

The heterogeneity of device capabilities, network conditions, user location and environment that is associated with mobile computing has emphasized the need for more advanced forms of adaptation of Internet services. The workshop seeks to present and discuss innovative, significant research in the area of context-aware Internet services for mobile computing. The workshop values contributions both on advanced architectures or techniques enabling context awareness and experiences with designing and implementing innovative adaptive Internet services for the mobile Internet. Areas of interest include, but are not limited to:

- Middleware architectures supporting context-aware adaptation
- Context representation
- Reasoning with context data
- User profiling
- Application adaptation based on context
- Service personalization
- Designing and evaluating context-aware services for mobile devices
- Privacy and security issues in the context-aware mobile Internet

Important Dates

- Paper Submission: Oct 7, 2004
- Notification: Oct 20, 2004
- Final Manuscript: Nov 1, 2004

Papers and Author's Kit

Workshop papers should be within 4 pages, no extra page is allowed. The Proceedings of the Symposium and the Workshops will be published, in separated volumes, by the IEEE Computer Society Press. Please follow the

instruction on the web (<http://www.saint2005.org/>) when preparing your Workshop papers.

Author's Kit

Paper Submission

Papers should be sent to [bettini@dico.unimi.it](mailto:bettini@ dico.unimi.it) no later than Oct 7. After a review process by Organizers and Program Committee of the Workshop, authors of accepted papers will be requested to send its final manuscript to IEEE-CS press no later than November 1st. Authors are kindly requested to submit their papers as early as possible to facilitate our review process.

Registration

The IEEE policy states that accepted papers can be published only if at least one author has registered for presentation. Therefore, authors of accepted paper must register along with the submission of their final manuscript. SAINT Conference Registration fees include a copy of the Conference proceedings, a copy of the Workshop proceedings and admission to the Conference/Workshop sessions (Note: The workshop will be a half day event).

The date of the Workshop will be decided by SAINT2005 Organizing Committee and be notified on the SAINT2005 web. Please also note that, according to the SAINT2005 Organizing Committee, the workshop is subject to cancellation in case of an insufficient number of submitted of papers.

Organizers:

- Christian Becker, University of Stuttgart, Germany
- Claudio Bettini, University of Milan, Italy

Program Committee

- Alessandra Agostini, U. Milano, Italy
- Michele Colajanni, U. Modena, Italy
- Antonio Corradi, U. Bologna, Italy
- Giulio Iannello, U. Campus Bio-Medico, Roma, Italy
- Jadwiga Indulska, U. Queensland, Australia
- Hui Lei, IBM Watson, USA
- Paddy Nixon, U. Strathclyde, UK
- Thomas Strang, German Aerospace Center (DLR), Germany. ❖

IFIP World Computer Congress 2004 - TRain: The Railway Domain, Toulouse, France

Formal Methods Specification and Verification

Dines Bjørner
National University of Singapore

Overview

Software is being developed for the partial or full automation of many forms of railway planning and operation. Increasingly these software packages could benefit significantly from being interoperable – and also more properly reflecting other railway supporting technologies.

TRain stands for a worldwide consortium of computing science groups and railway engineering centers. The aim of TRain is to establish a shared, formal theory of the railway domain; a theory, which can be the basis for co-design of railway solutions involving software, IT, electro-mechanics, people, etc.

The railway domain theory is to be seen as a set of coordinated, mathematical models of eventually all aspects of railway systems. As physics is to mechanical, electrical, construction and chemical engineering, TRain could be to the engineering of railway systems. We need to establish computing science (&c.) laws of railways akin to Kepler's, Newton's, and others' laws.

Publication

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Kluwer Academic Press

ifip imprint: WCC Toulouse 2004

18th IFIP World Computer Congress

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Program

10h30 - 12h: Rationale, Practice and Theory Chair:
Wolfgang Reif (Augsburg U., Germany)

– 'TRain: The Railway Domain - A Grand Challenge',
Dines Bjørner (National U., Singapore) pp 607-611

– 'Reusing Formal Models - Domain capitalization via formalization', Denis Sabatier (Clearsy, France) pp 613-619

– 'A Refinement Based Approach to Calculating a Fault Tolerant Railway Signal Device', Alastair A. McEwan and Jim Woodcock (U. Kent, UK) 621-627

13h30 - 15h: Railway Application, Present and Future
Chair: Alastair A. McEwan (U. Kent, UK)

– 'Management and Operation of Railways', Martin Penicka (Czech Technical U., Czech Republic) pp 629-636

– 'Integrated Formal Methods for Safety Analysis of Train Systems', Wolfgang Reif (Augsburg U., Germany) pp 627-642

– 'CyberRail - Information Infrastructure for New Intermodal Transport Business Model', Takahiko Ogino (RTRI, Japan) pp651-655

15h30 - 17h: TRain and Transportation Engineering
Chair: Dines Bjørner (National U. Singapore, Singapore)

– 'A Stochastic Framework for TRain Domain Theories', Ted C. Giras (U. Virginia, USA) pp 643-649

– 'TRain: Transportation Engineering meets Computing Science', Eckehard Schnieder (Brunswick Technical U., Germany)

Panel: The TRain Grand Challenge ? Presentation of Consortium,

Discussion and Questions - All Speakers. ❖

Advances in Modal Logic (AiML-2004)

Ian Pratt-Hartmann
Department of Computer Science, University of Manchester

The conference Advances in Modal Logic (AiML-2004) took place at the University of Manchester from September 9th to September 11th, 2004. The conference was organized by Renate Schmidt (with the help of Ian Pratt-Hartmann); the program co-chairs were Mark Reynolds and Heinrich Wansing.

The conference was attended by a total of sixty delegates, who between them presented twenty-eight contributed papers. (There were approximately sixty responses to the call for papers.) As in previous years, AiML-2004 could boast a glittering array of invited speakers: Philippe Balbiani (Toulouse), Keith Devlin (Stanford), Valentin Goranko (Rand Afrikaans University), Wiebe van der Hoek (Liverpool), Maarten Marx (Amsterdam) and Robert Stalnaker (MIT).

It is well-known that the impetus for the study of modal logic has shifted in recent years. While the origins of the subject lie in the philosophical analysis of specific modalities - alethic, epistemic, deontic, or temporal - many of its more recent developments stem from the realization that systems of modal logic can often be alternatively viewed as decidable fragments of first-order (or occasionally higher-order) logic enjoying interesting computation-theoretic properties. On this view, the most salient issues include, for example, expressive power, decidability, computational complexity and practicable implementation. Unsurprisingly, many of the talks at AiML this year reflected this computational bent. Nevertheless, the more traditional concerns of modal logic were still very much in evidence, with papers on logics of knowledge, agency, time and, an intriguing recent development, space. Last but not least, the conference included a small number of talks which were primarily philosophical in character or motivation.

The preliminary proceedings are published as a University of Manchester Department of Computer Science Technical Report (UMCS-04-09-01), available online under <http://www.cs.man.ac.uk/cstechrep>.

Finally, the organizers and program co-chairs wish to acknowledge the generous support of the following

organizations:

- TARSKI EU COST Action 274
- CoLogNET (Areas 'Logic and Multi-Agent Systems' and 'Automated reasoning, deduction, theorem proving')
- Advances in Modal Logic Initiative British Logic Colloquium
- School of Information Technology, Murdoch University
- Language and Inference Technology Group, University of Amsterdam
- Department of Computer Science, University of Manchester. ❖

PPSWR 2004 - 2nd Workshop on Principles and Practice of Semantic Web Reasoning

Uta Schwertel

Institute for Informatics, University of Munich

The Workshop on "Principles and Practice of Semantic Web Reasoning" (PPSWR 2004) took place from September 8-9 2004 as a satellite event of The 20th International Conference on Logic Programming (ICLP) in St. Malo, France. The workshop was organized by Hans J?rgen Ohlbach (program chair) and Sebastian Schaffert (proceedings chair).

PPSWR addresses issues of representing information on the Web in a way so that inference rules can derive implicit information from explicitly stated information. In particular, the workshop is a forum for discussing various forms of reasoning that are or can be used on the Semantic Web. The workshop focuses on both, reasoning methods for the Semantic Web and Semantic Web applications relying upon various forms of reasoning. After PPSWR 2003 in Mumbai, India, PPSWR 2004 was the second workshop in this series.

The 11 selected papers and the two invited talks attracted many participants to the one and a half-day Workshop. The lively and fruitful discussions inspired by the talks clearly demonstrated that the issues addressed by PPSWR are perfectly targeted at current research needs, and constitute a relevant, successful and promising line of research.

The following main topics were discussed during the workshop:

Structures in XML documents

Wlodzimierz Drabent reported on subtyping of tree-structured data encountered on the Web. The long range objective of this research is to define a type system for Web and/or Semantic Web query languages amenable to static type checking.

Querying and updating XML documents

Wolfgang May outlined aspects of querying and updating resources on the Web and on the Semantic Web, including the development of query and update

languages within the REVERSE project. *Paula-Lavinia Patr?bnjan* introduced two of these languages, viz. the Web query language "Xcerpt" and the event and update language "XChange" stressing the suitability of these languages for querying, changing and reasoning with data on the conventional and the Semantic Web.

Invoking ontologies into the querying process

Enrico Franconi showed the necessity of combining ontology and rule languages in the Semantic Web, and presented a common framework for this combination. Liviu Badea demonstrated an approach to integrate heterogeneous resources found on the Web using rules and ontologies with a particular focus on query planning. Jakob Henriksson gave a talk about the principles and the implementation of a system that checks correctness of a given set of Datalog rules encoded in XML wrt to a type specification taking recourse to an OWL ontology.

Manipulating and invoking temporal notions

Hongwei Zhu presented an extension of the COIN (Context Interchange) format suitable for reasoning on the Semantic Web that detects and reconciles semantic differences of Web data at different times. Stephanie Spranger showed an innovative type system for temporal and calendric data facilitating the development of Web services for temporal operations. Hans J?rgen Ohlbach gave an overview of the formalism and implementation developed within WebCal, a system which provides a very detailed modeling of the temporal notions which can occur in semi-structured data.

Non-monotonic reasoning

There was one paper by N. Bassiliades et al. that could not be presented at the workshop. The paper describes DR-DEVICE, a system for defeasible reasoning on the Web with applications like ontology integration and modeling of business rules and policies.

Web services

Joachim Peer presented a tool called PDDL that transforms web service composition problems into AI planning problems and delegates them to different planners most suitable for the respective planning task.

Furthermore, two invited talks given by the renowned researchers Benjamin Grosz, MIT Sloan School of Management, and Michael Kifer, University at Stony

Brook, complemented the interesting program.

Benjamin Grosz's invited talk "Combining Semantic Web Rules with Ontologies: New KR Theory and Tools" outlined new techniques for knowledge representation (KR) and inference that can in particular be used to combine Semantic Web rules with ontologies. In a first part the talk introduced the vision, design and status of the "SweetRules" Toolset for RuleML. In a second part B. Grosz focused on the motivation, challenge and possible solutions to have a single KR language that unifies all or most of first-order logic and non-monotonic Logic Programming thus taking benefit of the advantages of both languages.

In the second invited talk "Rules on Steroids" Michael Kifer surveyed FLORA-2, an object-oriented rule-based system, which seamlessly integrates Frame Logic, HiLog and Transaction Logic making it to a powerful knowledge programming environment. Many elements of FLORA-2 are being incorporated in the design of the rules languages underlying SWSI and WSMO -- two important projects in the area of Semantic Web Services.

The proceedings of PPSWR 2004 have been published by Springer in the highly prestigious series "Lecture Notes in Computer Science" (LNCS), no. 3208. More information -- including a link to the proceedings, titles and abstracts of all PPSWR 2004 papers -- can be found at <http://www.pms.ifi.lmu.de/PPSWR04/>.

The Workshop PPSWR 2004 was supported by the EU Network of Excellence CoLogNET (<http://www.colognet.net>) and the EU Network of Excellence REVERSE (<http://reverse.net>). REVERSE (REasoning on the WEb with Rules and Semantics) includes 27 European research and development organizations, and its objective is to bundle Europe's expertise in Web reasoning systems and applications thus establishing Europe as a leader in these research fields.

The PPSWR workshop will be continued in the next years. PPSWR 2005 is scheduled for September 12-16, 2005 in Dagstuhl (<http://www.dagstuhl.de/05371>). PPSWR 2006 is planned to take place in Lisbon, Portugal. Submissions from a broad research community working in the area of reasoning on the Web will be highly appreciated.

We would like to thank the organizers, the program committee, the speakers and all participants of the workshop for this inspiring event. ❖

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uncertain dynamical systems.

Three extensions to the classical framework were presented. Handling preferences was the concern of the paper by Steve Prestwich, Francesca Rossi, Kristen Brent Venable, and Toby Walsh on Constrained CP-nets. Solving over-constrained problems with MAX-SAT algorithms was presented by Josep Argelich and Filip Manyà, while T. K. Satish Kumar work focused on geometric CSPs with (near)-linear domains and max distance constraints. In addition, a number of interesting applications were covered by a number of papers. Michael Marte's paper presents a constraint-based approach to school timetabling. Peter Gregory, Alice Miller, and Patrick Prosser compare solving a rehearsal problem using constraint programming, planning and model checking. Alan Holland and Barry O'Sullivan propose a constraint-based approach to flexible generalized Vickrey auctions. Finally, Roman Bartak describes generators of random quasigroup problems.

The workshop proceedings are available online at the workshop web page. ❖

Erasmus Mundus is born

European Commission

researchers. The budget for the launch year is €8 million. ❖

Image composition Erasmus diploma - globe A new academic year has just started and the Erasmus Mundus

http://europa.eu.int/comm/education/programmes/mundus/index_en.html experience with it. This cooperation program was launched by the Commission to encourage exchanges between students and academics from all over the world and the European Union.

The Commission has selected the first 19 Erasmus Mundus masters

http://europa.eu.int/comm/education/programmes/mundus/projects_en.html courses. Of the 19 courses chosen for a period of five years, 14 will come into operation fully this academic year, while the other 5 will have the status of a preparatory year.

"Erasmus Mundus aims to restore Europe to a leading position on the international university scene," said Viviane Reding, European Commissioner for Education and Culture.

82 European universities in 17 countries are participating in the courses selected. The countries most prominently represented are Germany (13 universities), France (12), Italy (10) and the United Kingdom (8).

From this autumn, these universities will welcome the first recipients of Erasmus Mundus scholarships (Action 2): 140 students and 42 academics, all with excellent academic records and chosen by their universities, from about 80 countries all over the world, will come to study in Europe for up to two years.

The master program courses cover a very wide variety of disciplines: law, economics, social sciences, politics, environmental sciences, management, sociology, education, industrial relations, mathematics, health, new technologies, etc.

Another part of the Erasmus Mundus program, which will enable European students and researchers to go to non-EU countries to enrich their studies, will be launched in 2005. A total of €230 million will be spent on the Erasmus Mundus program in the period 2004-2008, 90 percent of it on the mobility of students and

CICLOPS 2004 CoLogNET Workshop

Implementation Technology for Computational Logic Systems

Manuel Carro, José F. Morales
Technical University of Madrid

CICLOPS 2004 and ICLP 2004

As part of the activities of the Area 3 (*Implementation Technology for Computational Logic Systems*) of CoLogNET, the CICLOPS 2004 workshop was held in St.-Malo, France, as a workshop associated to the International Conference on Logic Programming, ICLP 2004. ICLP 2004 is the twentieth conference in a classical series largely sponsored by the Association for Logic Programming, an independent association whose purpose is “to contribute to the development of Logic Programming, relate it to other formal and also to humanistic sciences, and to promote its uses in academia and industry all over the world”. ICLP was chosen this year due to its very convenient European placement, and also in order to somehow fill in a trip which lead the CoLogNET-sponsored implementation workshop through SAS and LOPSTR (Madrid, 2002) and Formal Methods (Pisa, 2003). ICLP it is a forum which attracts contributions from researchers devising (and using) systems with a strong logic and constraint basis. The ICLP 2004 organizers included CoLogNET as one of the official conference sponsors.

The scientific program of ICLP 2004 made the conference an exciting one, full of interesting events: tutorials about *Defeasible Logic Programming and Belief Revision* and *The Implementation of Answer Set Solvers* were given, and workshops such as the *Workshop on Multiparadigm Constraint Programming Languages*, the *14th Workshop on Logic Programming Environments*, the *First International Workshop on Teaching Logic Programming - TeachLP 2004*, and the *Workshop on Principles and Practice of Semantic Web Reasoning* were also held as part of the event.

Outline of the Workshop

Researchers and practitioners interested in the implementation of constraint and logic systems were invited to submit papers to CICLOPS and to get

together in a friendly ambient. The program committee decided to discard some of the submitted papers, despite their quality, and to squeeze the rest in the time allotted for the workshop (one full day). Seven regular talks and an invited speaker filled interesting sessions which were attended by a reputedly very knowledgeable and relevant audience, which made opinions to spark. A final discussion session was held, in which, besides retaking some of the topics presented during the talk, the discussion drifted towards more general issues in Logic Programming. The discussion session can perhaps be summarized as “What should the next step in logic programming language design and implementation be?”

We will give a short account of the talks delivered, starting by the invited one:

- K. Shen (IC-Park, London), gave the invited talk, entitled *On Benchmarking Constraint Logic Programming Platforms*. He made a *tour de force* through several flaws and incoherence to be avoided when benchmarking complex programming systems such as constraint logic platforms, in a broad sense. It was full of enlightening examples taken from real-life experience which vividly show how careful should one be when trying to measure the effectiveness of such involved systems. The talk was in fact very much enjoyed by all of the audience.
- E. Pontelli, gave the talk entitled *Towards a CLP System for Reasoning about Answer Sets*, coauthored by himself, O. Elkhatib, and T. Cao Son. The aim of this work is to devise a framework to allow Prolog and Answer Set systems to interact (*à la* foreign language interface, but trying to respect the declarative semantics as much as possible), so that every language is enriched with the capabilities of the other.
- N. Angelopoulos (*On the implementation of MCMC proposals over Stochastic Logic Programs*, coauthored with J. Cussens), presented a design proposal for the implementation of logic programs where predicate clauses have a probability distribution.
- P. Tarau, described in the paper *Orthogonal Language Constructs for Agent Oriented Logic Programming* the set of tools available within the Jinni logic programming system to write agents able to react to the environment and to easily communicate with the final user. This trip leads from object-oriented LP,

featuring inheritance, to the creation of independent computations as first-order citizens, and to a set of facilities to connect and exchange data with external entities.

- F. Drexhammar, presented the work *Implementation Strategies for Single Assignment Variables*, written jointly with C. Schulte. He introduced the *Flow Java* language, which features constrained, single-assignment variables in a concurrent setting, and the paper examines different implementation strategies to efficiently support aliasing, mono-tonicity, and synchronization.

- J. J. Cook, presented the paper *Optimizing P#: Translating Prolog to More Idiomatic C#*, in which he introduced a new version of his Prolog to C# compiler. The innovation introduced is trying to generate a C# code which would be compiled more efficiently by (current) C# compilers, trying to perform a smarter variable liveness analysis and also trying to generate code which performs last call optimization in more cases than it was possible before.

- M. Ferreira, gave the talk *Comparing Alternative Approaches for Coupling Logic Programming with Relational Databases*, a joint work with R. Rocha and S. Silva. He described and evaluated different interfaces, at several levels, to make the communication between a relational database and a Prolog system possible. These approaches have been tested using the YAP Prolog system.

- P. Tarau, presented *A Logic Programming Framework for Semantic Interpretation with WordNet and PageRank*, coauthored with R. Mihalcea and E. Figa. The paper examined the application of the PageRank ranking algorithm, of Google's fame, to the disambiguation of natural language sentences. The prototype is mainly written in Jinni (a Prolog's variant), with some parts developed in Java.

Registration for and attendance to the workshop was in the line of other workshops simultaneously held at ICLP 2004 (and notably higher than some of them). The relaxed ambient fostered the formulation of relevant questions which eventually derived into interesting discussions, especially in the last session.

Further Information

Information about the CICLOPS 2004 workshop, along

with the accepted papers, can be found at the workshop web site, and information about the series of workshops can be found at CoLogNET ITCLS Workshop homepage. ITCLS 2003 was organized by Manuel Carro (UPM) and José F. Morales (UPM). The program committee included, additionally:

Ricardo Lopes	Universidade do Porto (Portugal)
Enrico Pontelli	New Mexico State University (USA)
Vitor Santos	Universidade Federal do Rio de Janeiro (Bra)
Tom Schrijvers	Katholieke Universiteit Leuven (Belgium)
Christian Schulte	Royal Institute of Technology (Sweden)
Paul Tarau	University of North Texas (USA)
Neng-Fa Zhou	The City University of New York (USA)

Besides the WWW-based repository, all the papers accepted at the workshop are collected in a 96-page volume which was handed to the people who registered for the workshop. The proceedings were published by the Computer Science School of the Technical University of Madrid (UPM) as a Technical Report.

The workshop organizers want to thank the organization of ICLP 2004 for the facilities given for the celebration of the workshop, and also the following institutions for their support:

- Computational Logic Network (CoLogNET) (<http://www.colognet.org>)
- Association for Logic Programming (ALP) (<http://www.cwi.nl/projects/alp/>)
- Computer Science School of the T. U. Madrid (FI-UPM) (<http://www.fi.upm.es/>)
- Technical University of Madrid (UPM) (<http://www.upm.es/>)
- Institut National de Recherche en Informatique et en Automatique (<http://www.inria.fr/>)
- The homepage of the workshop can be found at the address:
<http://clip.dia.fi.upm.es/Conferences/CICLOPS-2004>

CALENDAR OF EVENTS

ACM SIGSOFT 2004/FSE - 12

NEWPORT BEACH, CA, USA

2004, OCTOBER 31 - NOVEMBER 5

<http://www.isr.uci.edu/FSE-12/>

SIGSOFT 2004 brings together researchers and practitioners from academia and industry to exchange new results related to both traditional and emerging fields of software engineering.

SIXTH INTERNATIONAL CONFERENCE ON FORMAL ENGINEERING METHODS (ICFEM)

SEATTLE, USA

2004, NOVEMBER 8-12

<http://research.microsoft.com/conferences/icfem2004/>

ICFEM 2004 aims to bring together researchers and practitioners from industry, academia, and government to advance the state of the art in formal engineering methods and to encourage wider uptake of formal methods in industry.

6TH AUGUSTUS DE MORGAN WORKSHOP ON LOGIC AND LAW

KING'S COLLEGE, LONDON

2004, NOVEMBER 15-18

This conference intends to bring together researchers from Logic (as applied to Law) and from Legal Reasoning (as studied in law schools) in order to exchange ideas and demonstrate the intimate close connections between logic, artificial intelligence, and law.

INTERNATIONAL WORKSHOP ON CONSTRAINT AND LOGIC PROGRAMMING IN SECURITY

SAINT MALO, FRANCE

2004, DECEMBER 5-11

THE 17TH ANNUAL CONFERENCE ON LEGAL KNOWLEDGE AND INFORMATION SYSTEMS

BERLIN, GERMANY

2004, DECEMBER 8-10

PAPER SUBMISSION CLOSED

<http://gi-fg612.fokus.fraunhofer.de/Jurix2004>

Jurix is the leading European conference on legal knowledge

and information systems. The JURIX conferences are held under the auspices of the [Dutch Foundation for Legal Knowledge Systems](#). Papers were invited on the foundations, methods, tools, systems and applications of legal knowledge and information systems.

MODEL-BASED REASONING IN SCIENCE AND ENGINEERING ABDUCTION, VISUALISATION, AND SIMULATION

PAVIA, ITALY

2004, DECEMBER 16-18

COLOGNET / FORMAL METHODS EUROPE SYMPOSIUM ON TEACHING FORMAL METHODS

GHENT UNIVERSITY, "HET PAND"

2004, NOVEMBER 18-19

<http://www.intec.rug.ac.be/groupsites/formal/Sympos2004/Sympos2004.htm>

This symposium will serve as a forum to explore the failures and successes of Formal Methods education, to consider how the failings might be resolved, to learn from the successes, and to promote cooperative projects to further the teaching and learning of Formal Methods (FMs).

SAINT 2005 - THE 2005 INTERNATIONAL SYMPOSIUM ON APPLICATIONS AND THE INTERNET

TRENDO, ITALY

2005, JANUARY 31 - FEBRUARY 4

<http://www.saint2005.org/>

Paper Submission closed.

The heterogeneity of device capabilities, network conditions, user location and environment that is associated with mobile computing has emphasized the need for more advanced forms of adaptation of Internet services. The workshop seeks to present and discuss innovative, significant research in the area of context-aware Internet services for mobile computing. The workshop values contributions both on advanced architectures or techniques enabling context awareness and experiences with designing and implementing innovative adaptive Internet services for the mobile Internet.