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Web Version Web

Please **don't throw away** the **envelope** in which CAI/IAC arrived. It contains information about your userID and password, which are needed to access the members-only area of the CSCSI/SCEIO website:

http://cscsi.sfu.ca/cai.html

Sample issues and articles are accessible to non-members. The members-only area contains this issue and some past issues of *CAI/IAC*. To access the area, type your userID and password at the login window.

Your **userID** is the first letter of your first name plus up to seven letters of your last name. For example, the userID for Anne Murray is amurray.

Your **password** is based on your CSCSI/SCEIO membership number which is **printed on the envelope** in which this issue arrived. Take that number and prepend to it the first letter of your first and last name. (e.g. if Anne Murray's membership number was 876543, then her password would be am876543.)
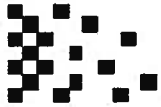
Annual General Meeting

Robert Mercer

Annual General Meeting 2001 (Unofficial Minutes)

Bob Mercer called the meeting to order.

1. Approval of Agenda

Moved: Howard Hamilton Seconded: Stan Matwin Passed.

2. Approval of Last Meeting's Minutes

Moved: Eleni Stroulia Seconded: Jim Greer Passed.

3. Get Web Site with .org www.cscsi.org

The society has obtained the rights to use the www.cscsi.org domain name. This web site will contain information about the history of the society, the society's constitution, minutes of the society's meetings, upcoming conference announcements, etc. This web site is currently empty and the original web site has been experiencing some accessibility problems. Aliases need to be defined for the executive to be able to login to both these sites. The newsletter editor to maintain the web site.

4. Bob Thanks Program Co-chairs.

Steve Beauchemin (VI) put together local arrangement. Thanks to him. Repeat this at banquet.

5. Treasurer's Report (Howard Hamilton)

Lost a lot of money last year. Spent money on newsletter, $833/month Received very little from last year's conference, less than $1000. Previous conferences used to bring $7000. A quick survey showed that about 1/3 people in the room read the magazine (newsletter).

The society is losing members steadily. The details regarding membership are in the report. Howard Hamilton moved that the report be approved, with a correction of a date. Seconded: Ali Ghorbani. Passed.

Relationships with CIPS. Possible regional editor, easier to collect information

6. Other Reports

Gord McCalla: the possibility of enlarging the AI/GI/VI meeting to include other areas of CS, e.g., CASCON. November is not good for AI/GI/VI and neither is Toronto where CASCON is always held. There was not a lot of interest of attending the AI/GI/VI meeting at chairs' meeting. This concept is now on back-burner.

HPCS happens in June. To talk to Jonathan Schaeffer at HPCS conference in UWO.

Gord: Saving may come from sharing more common organization, such as registration.

Yang Xiang and Ali Ghorbani: assembled information on university's ability to hold AI/GI/VI Yang: surveyed 26 universities: dorm, conf room, banquet, theatre, etc. 13 replied: Victoria, Calgary, Guelph, McMaster, Alberta, ... Memorial

A. replies are enthusiastic.
B. all of these universities satisfy our minimum requirements for facilities for AI/GI/VI

Steering committee meeting:

A. hold next conf in Cal May 27-29 (M-W). site:
   1. Banff Center
   2. UofC Sally is affiliated with Banff Center and will get more info. Banff Center: dorm under $100 for two

   B.GI/VI asked us to select a chair. Agreed in the meeting to have more joint activities: registration, ... produce joint web site. GI has an old website Single registration fee. VI produced CD, asked whether two conferences would like to have CD.

Sites discussed for future years: 2003 Halifax, 2004: UWO, 2005: Vancouver

Discussion ensued: issues dealt with collocating with AAAI'2002 in Edmonton, (decision was not to collocate); commitment to annual meetings; steering committee for future conferences

7. Relationship with CIPS

Asked by CIPS to have a new relationship. To model after CIPPRS.

Maintain own memberships. Pay $4 tax for each membership signed by CIPS. CIPPRS paid $4000 for web site collecting membership fee. AI can buy the right to use it for $1500.

Bob Woodham moved that the executive be empowered to settle the relationship with CIPS. Seconded: Gord McCalla Passed. Discussion after the motion: Magazine cost is $200/year/person. Do we need the magazine?

8. Meeting at IJCAI of Local AI Societies.

Information from Alan Mackworth: Two models:

1. society of societies
2. society of individuals: all join the international society, agreement to have money flow back to national society.

Bob Mercer will attend the meeting at IJCAI, which is not going to make a decision, but will simply discuss the issues. He invites interested people to joint him at a pre-meeting discussion with Alan Mackworth on the IJCAI Sunday (evening).

With the possible changes to CSCSI, discussion ensued regarding the CAI magazine. There were strong voices that it should be discontinued in its present paper form and that the executive should look into an enhanced website.

Howard Hamilton: Moved to discontinue the newsletter ASAP within the constraints imposed by the current newsletter status and Ann Grbavec's employment agreement, and discontinue the membership fee. Seconded: Nick Cercone.

Amendment (Bob Woodham) the executive should check the status of the society: was it incorporated as a society under the "Ontario Letters Patent" or under the "Societies' Act"?

Exec has to check whether the society act has to require some kind of financial statement. Passed.

9. Travel scholarship

Bob M: Proposed that the society not provide travel scholarships in the forseeable future. We have some financial difficulties. The executive is always put in a difficult situation especially when the request comes from a student whose supervisor does not actively support the society.

10. Other Business

Stan Matwin: also register sceio.org. Seconded: Jim Greer. Passed. ⚓

Treasurer's Report

Howard J. Hamilton

Canadian Society for Computational Studies of Intelligence

Treasurer's Reports for Fiscal Years 1999 and 2000

CSCSI had three major financial activities in fiscal years 1999 and 2000 — holding our biennial conference (AI'2000), member servicing and the production of the Canadian AI magazine. As planned, in 1999, our expenses for the website and the Canadian AI magazine exceeded our membership income. In 2000, unlike other conference years, expenses again exceeded income. We had only a small income from AI'2000 and our expenses for the Canadian AI magazine were far greater than our membership income.

After increasing to 146 members in 1998, the number of members in CSCSI decreased in 1999 and again in 2000. In 1998, membership income was $3824.31 including $672.84 paid in advance for 1999 memberships under our two-year renewal plan, in 1999, membership income was $1990.67, and in 2000, it was $2174.49. At the 1998 annual meeting, the society agreed to spend more than it earned in the two year period starting July 1, 1998 to further increase the number of members and the services they receive. Funds were earmarked for updating the website as well as providing more frequent magazine issues. These plans were carried through, and extended to June 30, 2001, but membership did not increase.

On the following pages are financial reports for both fiscal years 1999 and 2000.

Howard J. Hamilton, Treasurer, CSCSI ⚓

Treasurer's Report for Calendar Year 1999
Canadian Society for the Computational Studies of Intelligence (CSCSI)
June 6, 2001

Opening Balance Sheet, January 1, 1999
Assets

Bank balance	$	21,299.30
GIC		30,000.00
Dec. membership cheque		202.37
Amount owed by CIPS		22.95
Total assets	$	51,524.62

Liabilities

Unpaid expenses: GST, website, printing issue #42	$	3,812.68
Uncashed cheque		35.00
Total liabilities	$	3,847.68

Capital (assets - liabilities)	$	47,676.94

Income

Memberships, including some multiyear		1,990.67
Interest income		1,755.14
Cancel uncashed cheque		35.00
GST received		163.24
Other income		
Total	$	3,944.05

Expenses

Website		416.67
GST paid		49.50
Shipping cost of move of CAI to SFU		366.96
CAI magazine, Issue #43		3,143.30
CAI magazine, Issue #44		2,791.76
CAI magazine, Issue #45		1,666.66
Other		
Total	$	8,434.85

Income - Expenses	-$	4,490.80

Closing Balance Sheet, Dec. 31, 1999
Assets

Bank balance		44,665.01
Uncollected GST refund		62.40
Dec. membership cheque		157.42
Amount owed by CIPS		176.80
Total assets	$	45,061.63

Liabilities

Unpaid GST		41.77
Unpaid Shipping cost of move of CAI to SFU		366.96
Unpaid expenses: CAI#44		1,050.09
Uncashed cheque		416.67
Total liabilities	$	1,875.49

Capital (assets - liabilities)	$	43,186.14

Change in capital = New capital - old capital	-$	4,490.80

Treasurer's Report for Calendar Year 2000
Canadian Society for the Computational Studies of Intelligence (CSCSI)
June 6, 2001

Opening Balance Sheet, January 1, 2000
Assets

Bank balance	$	44,665.01
Uncollected GST refund		62.400
Dec. membership cheque		157.420
Amount owed by CIPS		176.800
Total assets	$	45,061.63

Liabilities

Unpaid moving expense to SFU for CAI	$	366.96
Unpaid expenses: Printing of CAI #44		1,050.09
Unpaid GST		41.77
Uncashed cheque		416.67
Total Liabilities	$	1,875.49

Capital (assets - liabilities)	$	43,186.14

Income

Memberships, including a few multiyear	$	2,174.49
Interest income		614.24
AI2000 conference income		1,873.81
GST received		45.54
Total	$	4,708.08

Expenses

GST paid	$	179.35
AI2000 Expenses		546.82
CAI magazine, Issue #45		943.76
CanadaPost repayment of overpayment	-	38.20
CAI magazine, Issue #46		5,432.69
CAI magazine, Issue #47		4,987.59
CAI magazine, Issue #48		1,666.66
Other		
Total	$	13,718.67

Income - Expenses	-$	9,010.59

Closing Balance Sheet, Dec. 31, 2000
Assets

Bank balance	$	34,549.46
Uncollected GST refund		107.94
Nov. membership fees owed by CIPS		68.71
Dec. membership fees owed by CIPS		285.32
Amount owed by CIPS		176.80
Total assets	$	35,188.23

Liabilities

Unpaid expenses: unpaid GST	$	179.35
Uncashed cheque		833.33
Total liabilities	$	1,012.68

Capital (assets - liabilities)	$	34,175.55

Change in capital = New capital - old capital	-$	9,010.59

Report on AI 2001

Saeed Hashemi

Résumé

La 14ème conférence canadienne bisannuelle sur l'IA (AI 2001) a été tenue dans la belle ville d'Ottawa, du 7 au 9 juin, 2001. Ce qui en suit sont les impressions d'un étudiant gradué participant à la conférence. Dans ce raport, de diverses sessions de conférence, les sujets de discussion, et le changement du format de la conférence sont discutés. À la fin, la nouvelle idée d'augmenter les présentations d'affiche est brièvement discutée comme une façon de rendre les conférences comme celles-ci plus interactives et utile.

Abstract

The 14th biennial Canadian conference on AI (AI 2001) was held in the beautiful city of Ottawa from June 7 to June 9, 2001. The following are the impressions of a graduate student participating in the conference. In this report, various conference sessions, the topics of discussion, and the change in the format of the conference are discussed. At the end, the new idea of expanding poster presentations is briefly discussed as a way to make the conferences like this more interactive and useful.

1 Introduction

AI 2001 was the 14th biennial Canadian conference on Artificial Intelligence, sponsored by the Canadian Society for Computational Studies of Intelligence. The first Canadian conference was held in 1976 at UBC. This year, AI 2001, held June 7th to 9th, was the "silver anniversary" of the conference. The conference was co-located with the annual conferences of two other Canadian societies, Graphics Interface (GI 2001) and Vision Interface (VI 2001) in the beautiful city of Ottawa.

Almost one third of the submitted papers were accepted to be presented at the conference. Decisions were made by at least three independent reviews and a total of 24 papers were selected.

AI 2001 offered an innovative format, which was different from the previous years. This year, the conference had a session for accepted posters with a short presentation and also a graduate symposium session to discuss the main issues in participating graduate students' theses. The new format made the conference environment not only more interactive but also friendly enough to allow participants, specifically graduate students, to feel comfortable to talk about the issues they had in mind. Nine posters and four graduate symposium papers were presented.

The conference also had a workshop on "Novel E-commerce Applications of Agent" which was held in a parallel session with posters and graduate symposium. The three invited talks, given in separate days, were among the most interesting and informative parts of the conference.

Although AI 2001 was a Canadian conference, the diversity of participants was surprising. Researchers had come form different parts of the world, including but not limited to Australia, Iran, Germany, Kuwait, Switzerland, UK, and USA. The subjects of the conference were also very diverse. Since AI is a broad field, papers were classified into sessions were devoted to theses subjects: learning, theory, search, applications, constraints, and natural language.

2 Conference Sessions

2.1 Machine Learning

As one of the areas that has attracted most researchers in the mainstream AI, Machine Learning was dedicated two sessions. Two of the three papers in the first session were related to learning in Bayesian belief network. The third was about reinforcement learning in agents with heterogeneous actions. On the second day's session, the idea of studying imbalanced data and its impact on learning was one of the ideas discussed. An, et al. (University of Waterloo), presented a case study for learning from imbalanced sets.

One of the interesting papers in the learning session was the work of Cameron-Jones and Charman-Williams (University of Tasmania, Australia). They presented

their experimental work, "Stacking for mis-classification cost performance." The idea of stacked generalization was reflected in a few other papers too, which indicates that it is receiving more attention in machine learning.

2.2 Theory

Theory was the second session on the first day. Among the ideas presented in the theory session was working with imbalanced data. While some researchers do not take the idea of imbalanced data seriously, some have worked intensively in this area. Nathalie Japkowics (University of Ottawa) has focused on this subject and discussed her experiments on neural network and imbalanced data. She presented the idea of considering between-class and within-class imbalances in concept learning.

2.3 Search

In the search session, three papers were presented. Menzies (UBC) and Singh (West Virginia University) had used randomized search with some AI flavor as help for software engineering. Hernadvolgyi (University of Ottawa) had used automatically generated heuristics to search for macro operators. Holte (University of Ottawa) presented the idea of using hill-climbing search in combinatorial auctions and knapsack problems.

2.4 Applications

Applications was another session with three papers. The main ideas were about multi-agent infrastructure for electronic procurement, GUI aspects of a translation typing system, and personalized contexts in help systems.

2.5 Constraint Programming

Another session, constraints, was dedicated to constraint programming. Four papers were presented in this session. The first was the award winning paper by Beacham, et al (University of Alberta) with the title of "Constraint Programming Lessons Learned from Crossword Puzzles." They used crossword puzzle generation as a case study to show that three design issues in any constraint programming problem — model, algorithm, and heuristic — are indeed mutually dependent. As a result, any decision assuming some form of independence in theses three design issues can lead to sub-optimal results by the order of magnitude. This work has been invited to appear in Computational Intelligence.

2.6 Natural Language

Natural Language was the last sessions in the conference. Three papers were presented. Among them was the idea of capturing human body motions for body-based reasoning, presented by Berkowitz (Roosevelt University) and Greene (Illinois Inst. of Tech.). Motions can be associated with feelings and imagery with object-oriented presentation.

2.7 Invited Speakers

Invited talks are always one of the most informative parts in conferences and AI 2001 was no exception. Three invited speakers and their talks were Yang (SFU), "Making a Case for Case-Based Reasoning"; Provost, "Machine Learning for Information Monitoring and Triage"; and Laplante, "Humility Must be Earned". The last talk was a nice review of the last few decades work and the lessons to learn for AI community.

Two other sessions, posters and graduate symposium, along with invited talks are worth a bit more explanation.

3 Productive Poster Sessions

Nine posters were presented in the conference in a two-hour session. Each had a brief 10-minute introductory presentation. The subjects were as diverse as the whole area of AI itself. Considering the main purpose of a scientific conference like AI 2001 as well as participants' interactions and exchange of knowledge, the idea of posters deserve closer attention. It has some advantages over the plenary presentations:

1. In regular presentations, the main ideas and details of a paper can be easily mixed up specially when the author is not experienced. Often, only the first five minutes or so is understandable. If the conference subject is as broad as AI, there is almost no way to avoid this pitfall. Distribution of the proceedings, in advance can help — as it was done in AI 2001 — yet it is not enough. In presenting posters, authors have a very limited time, like 10 minutes, for their introductory presentation which prevents them not to confuse main ideas with details.

2. One of the major achievements in a conference is the personal interactions among participants that happen in the halls, during recess times, at banquets, and so on. I noticed that, most often, it is not easy to talk in such gatherings where almost everybody is talking. You must yell in order to make yourself heard.

Besides, the time is so limited that you can barely finish a talk. Moreover, if English is your second language, differences in accents may make it difficult to understand what your partner says. The good thing about poster presentations is that there is enough space to make a conversation feasible.

However, not all papers have posters and the time to present posters is rather limited (two hours in AI 2001). The other important point is that most participants, specifically graduate students, may have questions in mind and like to present their questions to gather all possible answers from the research community.

One innovative idea that addresses all the above-mentioned drawbacks can be the use of posters with some modifications.

1. Any participating paper should be allowed to have a place for its poster.

2. The time for posters could be expanded to be as long as the duration of the conference.

3. Receptions and recesses could be held at the same place as posters, in order to make more interaction possible.

4. Posters could also present specific questions as a way for authors to seek the views of other researchers on their problem.

5. Presentation booths could include notebooks so that, in the absence of the poster's author, visitors could write their ideas, name, free time for discussion, and the location.

4 Graduate Symposium

To me, as a graduate student, the Graduate Symposium was the most interesting part of the conference. In a friendly environment, a few experts in the field evaluated the work of participating graduate students. Topics ranging from the way to present ideas to methodology and verification methods were discussed in this session, as these related to each paper. I found this session very useful because it gave researchers feedback needed both in areas where one is on a right track and the ones which may need some revisions. Yet the time was not enough to discuss the issues seriously. The results were like some major hints and but often these have already been obtained them from your advisory committee. To go any further in details where the required expertise in the conference are available needs more time and interaction. This opportunity can and should be taken more seriously by letting *questions* be presented. Some of the suggestions outlined involving posters sessions might also be used to enrich future Graduate Symposia.

About the author

Saeed Hashemi M. (saeed@cs.dal.ca) is currently a PhD candidate in the Faculty of Computer Science, Dalhousie University, Halifax, Canada. His research interests include machine learning, classification and diagnostic tasks, case-based reasoning, and dynamic learning. ⩗

CSCSI
SCEIO
AI 2001

The Fourteenth Canadian Conference on Artificial Intelligence
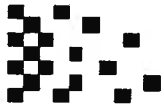
Biomedical Computing at Queen's University

Janice Glasgow and Randy Ellis

Résumé

La recherche en intelligence artificielle à l'université de Queen's fut une entreprise impétueuse dans la création d'un programme étudiant, au niveau du premier cycle Science en computation biomédicale. Elle a également facilité la création de deux compagnies secondaires de pointe pour l'exploitation moléculaire de données et la chirurgie assistée par ordinateur. Dans cet, article nous fournissons une brève vue d'ensemble de la recherche interdisciplinaire en computation biomédicale et décrivons le nouveaux programme et compagnies associées.

Abstract

Research in artificial intelligence at Queen's University has been an impetus for a novel undergraduate program in biomedical computing. It has also facilitated two high-technology spin-off companies for molecular data mining and computer aided surgery. In this article we provide a brief overview of the ongoing inter-disciplinary research in biomedical computing and describe the new program and companies.

RESEARCH PROJECTS:

Computer Aided Surgery:

Led by Randy Ellis in the Department of Computing and Information Science, researchers at Queen's University have developed and implemented methods for improving surgery by the use of computers. The essence of this work is that computers can be used to process medical images, to allow a surgeon to simulate the procedure beforehand, which are then used in the operating room to guide the surgeon in performing the procedure more accurately than was possible using traditional manual techniques.

To understand the research better, consider how a surgeon ordinarily performs an orthopedic procedure such as repairing a broken hip or wrist, aligning an arthritic joint, or totally replacing a joint. The process is usually to examine one or more plain X-ray films, plan the procedure by drawing on them with ink or pencil, and then using mechanical or fluoroscopic alignment methods to try and assure accuracy. The images are taken from unknown viewpoints, and the X-rays produce pictures in which many anatomical structures overlap~--- the three-dimensional knowledge is lost. In the operating room, accuracy is also lost by using mechanical devices that inherently have looseness and backlash, and by using fluoroscopic images (which are 2D, significantly distorted real-time X-ray images).

The research being carried out at Queen's recognizes that using 3D medical images could eliminate many sources of inaccuracy. Computed tomography (CT, or more popularly CAT scans) and magnetic resonance imaging can produce three-dimensional views of the human body. Radiologists normally use these images for diagnosis, and only rarely use them for planning or performing procedures. CT in particular produces geometrically accurate images that can provide a "blueprint" of the bones and joints of the patient.

Researchers at Queen's have developed methods for simulating the outcomes of orthopedic surgical procedures and for integrating the planned procedures with guidance systems. These computer systems have been tested in a wide variety of surgical procedures, including knee realignment, reconstruction of poorly healed wrist fractures, realignment of congenitally deformed hips, and removal of painful noncancerous bone tumors from teenagers.

Molecular Scene Analysis:

A fundamental goal of research in molecular biology is to understand protein structure. Protein crystallography is currently the most successful method for determining the three-dimensional (3D) conformation of a protein, yet it remains labor intensive and relies on an expert's ability to derive and evaluate a protein scene model. Researchers at Queen's University (Janice Glasgow in Computing and Information Science and Suzanne Fortier in Chemistry) have formulated the problem of protein structure determination as an exercise in scene analysis. A computational methodology has been developed in which a 3D electron density map for a protein is segmented into a graph of critical points, and an intelli-

gent system is used to analyze critical point graphs and identify meaningful substructures, such as alpha-helices and beta-sheets. Experiments that successfully apply the methodology to protein images at low and medium resolution have been carried out.

Recently, Janice Glasgow and Suzanne Fortier have been working with Igor Jurisica, of the Ontario Cancer Institute (OCI), in developing an intelligent decision support system for crystal growth. The crystallization of macromolecules is currently primarily empirical. Because of its unpredictability and high irreproducibility, crystal growth has been considered by some to be an art rather than a science. Thus, there is a need for principled and systematic studies to improve our deep understanding of the crystallization process and to provide a basis for the planning of successful new experiments. The Queen's/OCI approach to crystallization involves combining a high-throughput crystallization setup and evaluation in the wet lab with a sophisticated algorithmic analysis of the outcomes in the computer lab.

NEW UNDERGRADUATE PROGRAM:

Biomedical Computing

Queen's University is offering a new undergraduate program in Biomedical Computing beginning in the fall of 2001. This program is unique to Canada and addresses the problem of a shortage of trained professionals in this rapidly emerging and growing field. This program builds on the university's existing strengths in areas such as computing, biochemistry and medicine and complements the interdisciplinary research collaborations described above.

Biomedical computing involves the application of computational methods for the advancement of biological and medical science. Activities in this area range from data acquisition, robotics and laboratory analysis to the dissemination, storage and retrieval of knowledge. Modern biomedical computing is rooted in a broad range of application areas. Imaging needs from microscopy to mammography have motivated and relied on advances in imaging science. Medical data storage and access systems benefit from the study of information retrieval. Algorithms and software development are of key importance in areas such as genome sequence analysis and acquisition, which also depend on techniques from statistics and artificial intelligence. Medicine and the biological sciences already have seen an accumulation of extraordinarily large and complex data sets that are uninterpretable without the benefit of computational methods.

Details of the new program can be found on the Queen's web site http://www.cs.queensu.ca/biomed/

SPIN-OFF COMPANIES

Research in biomedical computing at Queen's has resulted in two recent high technology companies in Kingston: Molecular Mining and iGO.

Founded by Janice Glasgow, Suzanne Fortier, Evan Steeg, Don Weaver and Larry Hunter, Molecular Mining specializes in the exploration of molecular data for such purposes as identifying drug targets and predictive toxicology. The company, which recently received approximately $13 million in second round financing, is currently launching a line of data mining software products for the genomics and bioinformatics market. It also has ongoing collaborations with pharmaceutical, genomics and biotechnology partners to analyze large heterogeneous datasets. (See http://www.molecularmining.com/ for more information).

Founded by Randy Ellis, David Pichora, Doug Ross, John Rudan, and Cam Thompson, iGO Technologies provides a suite of computer-assisted surgical and diagnostic products for detecting and treating conditions such as arthritis and osteoporosis. The companys has two principal products. The Virtual Surgery System is an imaging and guidance system that allows surgeons to work with computerized 3D models of a patient's anatomy to plan, carry out, and assess surgical procedures. The MIDScan System is a diagnostic screening device for osteoporosis - a bone-loss disease that often goes undiagnosed until a bone is fractured. (See http://www.igotechnologies.com/ for more information).

About the Authors

Janice Glasgow (http://www.qucis.queensu.ca/home/janice) is Professor and Head in the Department of Computing and Information Science, Queen's University, Canada. Her research interests include the design and development of knowledge representation techniques for computational imagery, and the application of these techniques to the determination of molecular structure from crystallographic data. She received her PhD in Computer Science from the University of Waterloo. Dr. Glasgow is a Principal Investigator in three Federal (Protein Engineering Network; Institute for Robotics and Intelligent Systems; GEOID) and one provincial (Communications and Information Technology Ontario) Centers of Excellence. She is a Past-President of the Canadian Society for Computational Intelligence;

Vice-Chair of the IFIP Technical Committee on Artificial Intelligence; past NSERC Group Chair for Computing and Engineering and past Chair of the NSERC Grant Selection Committee. She sits on the Advisory Board for IBM Canada, the Management Committee for PRECARN and the Editorial Boards for Bioinformatics Journal, AI Magazine, Journal of Spatial Cognition and Computing and Trends in Software. She is also co-founder of Molecular Mining Corporation.

Randy Ellis is a Full Professor at Queen's University in the Departments of Computing Science, Mechanical Engineering, and Surgery. His early research included work in robot dynamics, human and robotic perception of touch, and biomechanics. While he was a Visiting Research Professor at the University of Bologna, he began working on new methods for computer-enhanced surgery. His recent work includes the development of methods for modeling knee and wrist motion of arthritic patients, improvements in the use of CT and X-ray images, and new ways of using CT scans and computer graphics to improve the outcomes of orthopedic surgeries. ◢◣

Eighth International Conference on Principles of Knowledge Representation and Reasoning (KR2002)

April 22-25, 2002
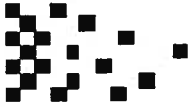## Toulouse, France

held in conjunction with

AIPS 2002

The Sixth International Conference on Artificial Intelligence Planning and Scheduling Systems

NMR 2002

The International Workshops on Nonmonotoic Reasoning

http://www.kr.org/kr/kr02/

Artificial Intelligence and the Game of "Goal and Null"

Saeed Hashemi

I am playing Goal & Null[1] with my daughter when Saleh, my 4½-year-old son, interrupts us. He wants to play too. "OK, but first, you gotta learn how to play, my son.", I tell him. After a long *training session,* he is ready to play. He takes the goal behind his back and returns his two small hands right away. They are both open and the goal is obviously seen in one of them. *What honesty!* "No Saleh, this is not the way you play; you have to hide the goal from us.", his sister tells him. We start another training session and make some adjustments to his learning algorithm.

Knowing the value of keeping the goal hidden, he takes the goal behind his back, keeps one of his hands back there and returns the other one to us. Of course, it is the empty one. He now waits for us to choose! We all laugh and ask him to bring up his other hand too, but he insists in keeping it behind his back. OK, another training session and some more modifications to his learning algorithm.

Now, he knows the rules and is so excited that he does not let anyone else have a turn. He brings up his two hands but before we make a choice, he starts scratching his head. Everyone sees that the scratching hand is empty, except Saleh. He does it a few times and, as a result, some new adjustments are made. Now, not only does he know the rules, but also his *cache memory* has enough *facts* to direct him to the right path.

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1. In this game, the goal (a small object like a button) is taken by a player in a way that no other player knows which hand has the goal. Other players, in turn, each should choose one hand and if his/her guess is correct it will become his/her turn to take the goal. The longer you have the goal the better.

We experience many *cases* like when the goal is seen from between his small fingers, when he makes one hand too firm and the other (the null one) pretty loose, and so on. Soon, his *case-base* has enough cases to enable him to play in a professional league as a *normal player.*

The following night, we play the game again. When it is his turn; he takes the goal behind his back and after a few seconds returns his hands. His sister chooses a hand. "Wrong!", Saleh says while opening the hand to show that it is empty. He takes his hands behind his back, brings them in front of me, I choose one and he says again "Wrong...!" Unlike the other times, he looks very confident. Everything looks perfect until he repeatedly wins against all of us and starts suspiciously laughing. "Why can't we catch the goal at all?" I think. Suddenly, it occurs to me. "Saaaleh...?", I say and try to open his other hand. As I guessed, they are both null! He has hidden the goal from us *almost* as he was taught to. We all laugh and some new *rules* are added.

A few days later, he surprised me by secretly using two similar goals one in each hand. When we chose a hand, he opened the other one also containing a goal leading us to believe the hand we chose was null. I had never thought of that. I could not even guess the secret until he revealed it himself. It sounds very funny and we have a good time. Yet again, there is another thing to fix in the algorithm: the very first thing we'd made him confused about: *honesty.*

I wonder: someday, when the kids we are raising -*AI applications*- hide the goal from us or make pseudo goals, can we still laugh and have a good time? Is that going to be funny? ◢◤

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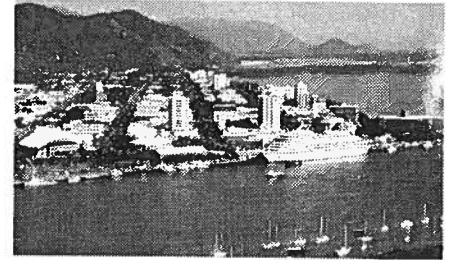
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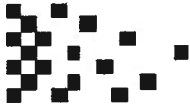
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11th Annual Canadian Conference On Intelligent Systems

Canadian Research Excellence

At the 11th Annual Canadian Conference on Intelligent Systems hosted by Precarn and the Institute for Robotics and Intelligent Systems (IRIS), 350 delegates representing a wide range of universities, industries, government, and research organizations, gathered at the Ottawa Congress Centre on June 4-5. As Canada's leading forum for the exchange of ideas and information in intelligent systems technologies, the much-anticipated event allowed attendees to demonstrate and learn about innovative technologies, meet various robotics and intelligent systems professionals, talk with experts, and learn from several keynote speakers about the impact of intelligent systems today.

"This is an industry that just a decade ago was probably no more than a couple of dozen companies. Today there are more than 300, and recent projections suggest this total could double in the next five years," said Anthony Eyton, President of Precarn and Director of IRIS. The phenomenon of the intelligent systems sector resides in the fact that it is growing at an extraordinary rate as over 25,000 people are currently employed in R&D firms. The Precarn network itself is comprised of 31 companies and is continuously growing, while IRIS links 22 universities across Canada.

Over the two days, delegates had the opportunity to meet researchers and graduate students working in different fields of intelligent systems, view demonstrations of leading-edge technologies and their applications, attend sessions in which leading projects were discussed, and see the latest innovations from Canada's IT companies. "Take a look around the exhibits. Some of the projects will blow you away," said Jim Roche, chair of the Precarn Board and President of Tundra Semiconductor Corporation. "This is a showcase of Canadian research excellence."

An evening reception provided a relaxed venue conducive to the meeting of industry and student minds. "My favourite part of the conference was being able to network with industry representatives, allowing me to discuss future opportunities for employment and research," said Joseph Amati, a Masters student at York University in Toronto.

Jochen Lang, University of British Columbia, demonstrates his project "Acquisition and Real-Time Simulation of Elastic Objects"

The support of Precarn has led to innovations in various sectors of industry such as natural resources, health care, manufacturing, information technology, modeling and virtual reality, intelligent decision support, control and reasoning systems, human machine vision, robotics, and sensing. This breadth was realized at the conference as many projects demonstrated a strong backing for positive economic results as well as direct social benefits.
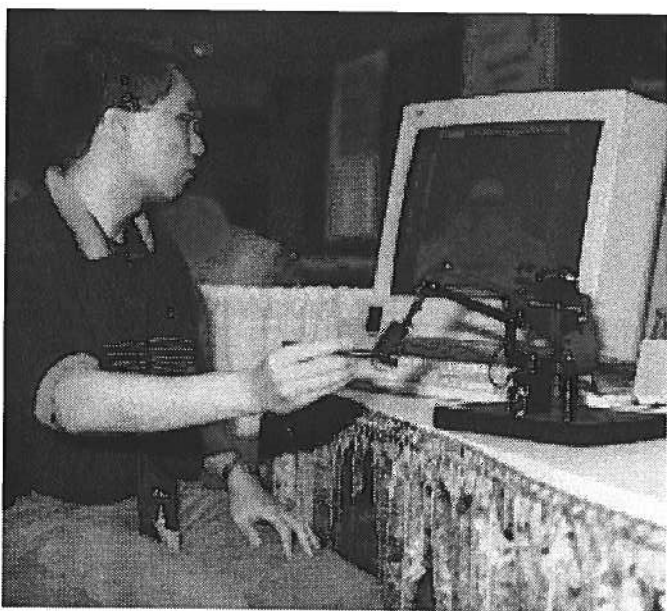
Project demonstrations on the show floor displayed a variety of technologies such as intelligent tools that better facilitate computer-assisted health operations. Not only do these applications reduce costs, they provide more accuracy and precision in health care. Researchers demonstrated intelligent tools for automating mining or manufacturing tasks, which can alleviate safety concerns for workers. Also showcased were Web-based applications that turn qualitative data into quantifiable results, making activities such as purchasing airline tickets over the telephone an easy task. The entertainment industry was also represented through projects

such as lightweight robots, computer simulated events, and intelligent cameras used in video games, toys or entertainment.
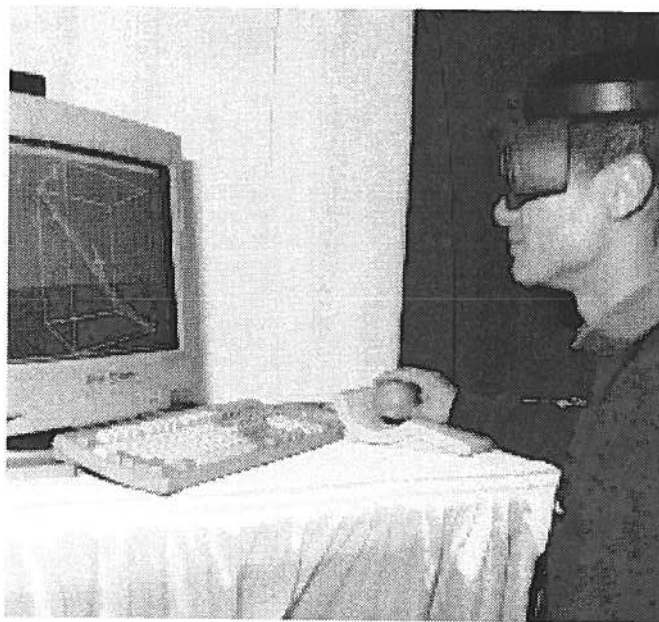
Elsewhere at the conference, a theatre was set up where news of current research of Precarn and IRIS was presented and discussed. Spanning different fields, 14 Precarn projects and 19 IRIS projects were described, covering aspects such as objectives, deliverables, applications and benefits. Presenters outlined the current results of the research and projections for completion.

Keynote Speakers

Keynote speakers captivated the crowd as they entertained, enlightened and gave insight about the face of today's industry. Renowned storyteller David Snowden, European Director from the Institute of Knowledge Management talked about the prospect of "complex" systems today. He said complex machines are intelligent; parts are constantly interacting and changing according to the environment; and they can decipher various metaphorical data or scenarios, bring them together and make a more personal archive. In other words, industry today leans towards tools that do not simply analyze, but rather, tools that can look back and understand information once the task has occurred.

Wenbi Wang, University of Toronto, demonstrates his project "Viewpoint Optimisation in a Virtual Roller Coaster Simulation"

Snowden sees this synergy, found in intelligent machines, being applied to the realm of management as well. His parting message was that although people are valued for their expertise, it is the final outcome of their work, after collaborating, that really counts.

On a "smaller" scale, Aristides A. G. Requicha, Professor of Computer Science and Electrical Engineering and Director, Laboratory for Molecular Robotics at the University of Southern California spoke of Nanorobotics—the development of robotics with overall dimensions on the order of the tens to the hundreds of nanometers, and with the manipulation of nanoscale objects. Outlining the results of research conducted at USC, Dr. Requicha talked about some of the issues that arise in nanorobotic construction, as well as nanomanipulation.

Awards

Finally, at the Awards luncheon, attendees were entertained by journalist and host of CBC Radio's "*Quirks and Quarks,*" Bob McDonald. His presentation included a retrospective look at what has happened in space technology over the past several decades. Ponderous thoughts concerning alien life forms or the possibility of living on another planet were presented as well. McDonald talked about the history of science and soci-

Som Yau, École Polytechnique de Montréal, demonstrates his project "Scanning Physical Interaction Behavior of 3D Objects Using ACME"

ety with a look ahead at the challenges facing a new generation of technically sophisticated young people.

The Future

The future of robotics and intelligent systems was epitomized in two other groups that were present at the conference: The Marianopolis College Robotics Team, and Kars Public School. The former was a group of students from Quebec aged 17-19. They have gained much praise for their two robots, which they showcased at the conference; "Lord Stanley" plays hockey, and the other is a biathlete. Kars Public School, where a robotics program is part of the optional curriculum, also shared their ideas as students from Grades 1-6 demonstrated their keen sense of technology and knowledge of robotics.

As an extremely fluid industry, intelligent systems are constantly changing and expanding. Precam itself is changing to match the broadening scope of things. "We plan to grow – by reaching out more effectively into new application areas, and by involving more companies of all sizes in our research programs. We are taking various steps to make that happen, including a new membership fee structure, expanded partnerships, and a new look and feel," Eyton said. Through these efforts, Precam will respond to change, and will shape it, too – not only to keep pace, but also to lead the way! ∦
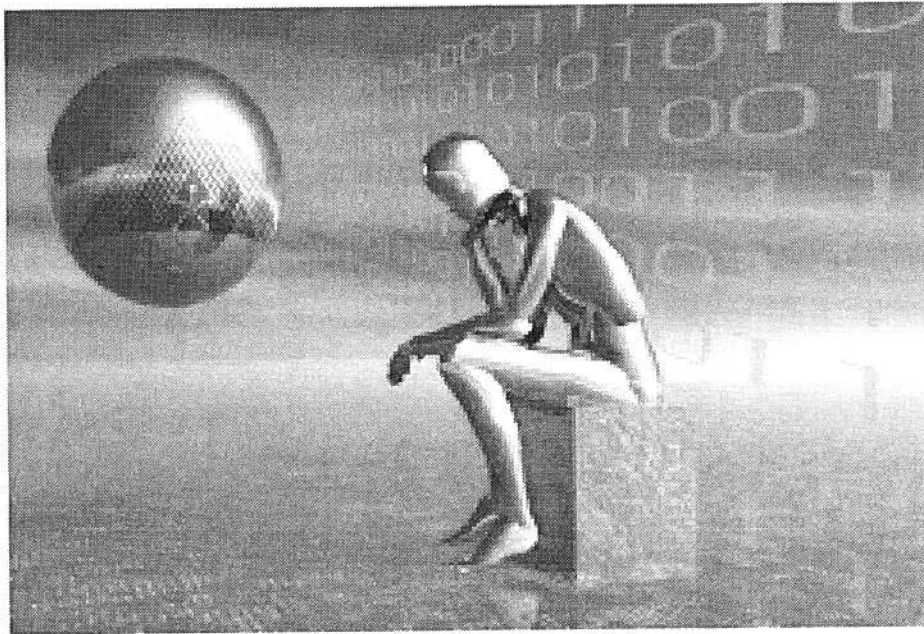
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