

IPSI-2005 HAWAII

Hawaii, USA, January 6 - 8, 2005

General Chairman:

Veljko Milutinovic, Fellow of the IEEE, University of Belgrade, Serbia, SCG

Opening Keynote Speaker:

Erich Neuhold, General Director of Fraunhofer IPSI, Darmstadt, Germany

Welcome Addresses:

Prof. Dr. Veljko Milutinovic, Fellow of the IEEE, University of Belgrade, Serbia, SCG

Organizer:

IPSI Belgrade, Serbia, SCG (www.ipsi.co.yu)

ISBN: 86-7466-117-3

© 2004
IPSI Belgrade
Academic Mind
January 2005

<http://www.ipsi.co.yu>
email: office@ipsi.co.yu

IPSI-2005 HAWAII
Hawaii, January 6 - 8, 2005

Message from the Chairman

The field of e-business, e-education, and e-science in general is fast growing, and up to now it has been noticed that there is a large body of unpublished knowledge that needs an appropriate forum for its presentation. This was the main rationale behind the idea to organize the IPSI-2005 international conference series. All IPSI conferences are organized in an accordance with the latest recommendations of the world's major research sponsoring agencies related to Multidisciplinary, Interdisciplinary, and Transdisciplinary research. A sign of appreciation goes also to all the people who worked hard for making this conference a success.

Management staff:

Aleksandra Jankovic, Jelena Kronic

Technical support:

Aleksandra Kovacevic, Sanida Omerovic, Nenad Korolija, Miroslav Radakovic, Aleksandar Stanic, Darko Jovic, and Zoran Babovic

Design support:

Aleksandra Jankovic

Review support:

Aleksandra Jankovic, Senad Omerovic, Siv Hilde Houmb, Daphnen Manoussaki, Christopher Stokes, Greg Attwood, Peter Smith, Pierluigi Crescenzi, Sofija Micic, Xueshu Song, Lori Foster Thompson, Ausif Mahmood, John L. Gordon, Jill Owen, Kaye H. Kilburn, Dag von Lubitz, Ted D. Wade, Eve Maler, Luis Olsina, Gustavo H. Rossi, Steven Weisler, Liliana Ardissono, Henry Lieberman, Glenn Jayaputera, Mark Turner, U. Ferreira, Dianne Wright, Susumu Yamasaki, Wolfgang Teubert, Sylviane Cardey-Greenfield, Susan Hunston, María José Luzón, Claudio Bettini, Munehiro Fukuda, Michael Dillencourt, Stathis Tompaidis, Paul Wilmott, Matt Thurber, W.M. Zuberek

Welcome to the IPSI-2005 USA conference. We hope you will all enjoy the event as much as we have enjoyed in contributing to its preparation.

Veljko Milutinovic, Program Chairman

IPSI-2005 HAWAII
Hawaii, January 6 - 8, 2005



IPSI-2005 HAWAII
Hawaii, January 6 - 8, 2005



IPSI-2005 HAWAII

VIP Forum Abstracts
Talented Students Forum
Abstracts
IPSI Award Abstracts
Authors
Schedule



IPSI-2005 HAWAII
Hawaii, January 6 - 8, 2005



VIP Forum Abstracts

*IPSI-2005 HAWAII
Hawaii, January 6 - 8, 2005*

User Profiles with Common Modules for Multiple Domains

Oshadi Alahakoon, Seng Loke, Arkady Zaslavsky, School of Computer Science and Software Engineering, Monash University, Australia

Personalization using profiles of the users has become an important feature in the fast growing number of e-commerce applications. In current applications, these profiles are usually tailored to the application domains. Therefore separate profiles have to be generated and maintained for each different application domain. Each time a new need arises, users have to reveal their personal details or/and needs to new applications. To overcome this limitation we propose a novel modular user profile, which has layers of information enabling these to be used across multiple application domains. The proposed model consists of three layers where information related to a particular user is separated according to "domain dependence".

The role of the internet in developing business strategies of knowledge- intensive enterprises in south-east Europe (SEE): the case of Croatia

Nikša Alfirević, Faculty of Economics Split, Domagoj Hruška, Mislav Ante Omazić, Graduate School of Economics and Business, Zagreb, Croatia

The information system has been crucial part of business more than half a century but not a prime determinant of enterprise strategy, until early- or mid- 1990s. Then the emergence of the Internet changed everything, virtually overnight. In this paper, the authors discuss the role of the Internet in formulating, implementing and controlling the strategic management process of business organizations in Republic of Croatia, as well as its influence to the development of the "knowledge sector" in the national economy. First, the theoretical findings regarding the influence of the Internet into the formulation and implementation of the strategy are presented, while the issue of the existence of the "e-Business strategy" / e-Strategy as a separate theoretical construct is discussed.

Special attention is given to the specific features of the knowledge-intensive companies in the South-East European (SEE) context, with the knowledge as a strategic resource being analyzed as a (potential) source of competitive advantage for the large enterprises in the region. Subsequently, on the basis of experience from the successful and globally recognized dot.com enterprises, based in the Republic of Croatia, we assess and make specific recommendations for developing feasible knowledge-based business strategies, which should assist the enterprises from the other countries in the region to successfully integrate into the global knowledge economy.

On the basis of qualitative research, a theoretical framework for strengthening the "knowledge sector" of the economy (in the specific regional context) is being developed, paying special attention to the opportunities brought by the "maturing" of the e-Business concept in the US and EU. It is demonstrated that the knowledge-based business strategies, assisted by the development of the Internet and strengthening of the information society, may represent a significant strategic milestone for the development of the whole region.

The Non-specific Intelligent Guided-View System Based On RFID Technology

HungPin Chao, Graduate Institute of Information Management, Chinese Culture University, China

The purposes of this research are to design a "Non-specific Purpose Intelligent system with context-aware capability" as a kernel system and then to design an "Intelligent Wireless Guided-View System" evolved from it. That kernel System includes the Radio Frequency Identification (RFID) technique and take advantage of the Artificial Intelligent technique, for instance "Expert System", "Intelligent Agent" and "Neuro Network", etc., to reach the expected functions of automatic getting information from environment and respond an Adaptive-Feedback to its user. This "Intelligent Wireless Guided-View System" will use an RFID System as a fundamental environment and the Expert System (ES) and the Intelligent Agent (IA) of Artificial Intelligent (AI) as added-value application functions. Additionally, the Finite State Machine (FSM) will be used to express the input-output, components and functions of this system.

Toward Next Generation Business Information Systems: Four Inherent Capabilities of Service Oriented Computing

*Sam Chung, Lai Hong Tang, Sergio Davalos, Institute of Technology, Univ. of WA, Tacoma, USA
Saechul Park, Dongeui Institute of Technology, Korea*

The research conducted examines how the emerging Service Oriented Computing (SOC) paradigm will influence the development of the distributed Business Information Systems (BIS). For this purpose, a Service Oriented Architecture (SOA) that can be implemented by currently available SOC technologies, which we call a basic SOA, is described. The basic SOA is applied to the development of distributed BISs for retail Supply Chain Management (SCM). To analyze the effects of the SOC paradigm on the development of distributed BISs, the following four inherent capabilities of SOC are proposed: interoperability, reusability, adaptability, and interdependability. Then, we investigate how the proposed capabilities are naturally provided by the SOC paradigm through the development of the BISs for retail SCM. Based upon the inherent capabilities of the SOC paradigm, the SOC paradigm is very effective for not only Enterprise Application Integration within an organization, but also for B2B Application Integration between organizations. The capabilities cannot be easily obtained through other distributed object computing paradigms.

Building Lightweight Ontologies for E-Learning Environment

F.Colace, M. De Santo, C. Liguori, A. Pietrosanto, M. Vento, University of Salerno, Italy

In the last decade the term "Ontology" has become a fashionable word inside the Knowledge Engineering Community. Although there are several methodologies and methods for building ontologies they are not fully mature if we compare them with software and knowledge engineering techniques. In literature the main approaches to solve this problem aim to facilitate manual ontology engineering by providing natural language processing tools or skeleton methods. Other approaches rely on machine learning and automated language processing techniques in order to extract concepts and relations from structured or unstructured data such as databases and text. This second approach is more interesting and fashionable but shows very poor results. On the other hand the concept of ontology is not unique. In this paper we propose a novel approach for building university curricula ontology through analysis of real data: answers of students to final course tests. In this paper the term ontology means Lightweight Ontology: a taxonomy with more semantic value. In fact teachers design these tests keeping in mind the main topics of course knowledge domain and their semantic relation. The ontology building is accomplished by means of Bayesian Networks. The proposed method is composed by two steps: the first one uses a structural learning multi-expert system in order to build a Bayesian Network from data analysis. In the second step the obtained Bayesian Network is translated in the course ontology. This approach can be useful for performing subsequent inference and knowledge extraction tasks as for example the updating of lesson's sequencing in e-learning environment or for improving intelligent tutoring systems performance.

Chemical Sensitivity in the Workplace

James T. Decker, Bridgewater State College, Charles Lowe, Peggy Peck and Associates, Fort Thomas, Peggy Peck, Peck and Associates, Fort Thomas, Sabrina Gentlewarrior, Bridgewater State College, USA

The debate continues to rage in the medical community and amongst policy makers. The debate centers on a new disease mechanism commonly known as Multiple Chemical Sensitivity (MCS). Magill & Suruda (1998) grouped the theories of etiology of MCS into four broad categories: physical, stress, misdiagnosis, and illness belief. A new name for this illness has recently been advanced as well, toxin-induced loss of tolerance (TILT). Problems with chemical sensitivity are especially troubling for workers and their employers. Employees seeking relief under the Americans with Disability Act of 1990 (AD) are requesting accommodations in the workplace, disability claims, and worker's compensation claims. Courts are trying to make sense of chemical sensitivity with respect to accommodations in the workplace. Court decisions regarding MCS issues are varied and oftentimes highly controversial. Primary social problems and mental

.....

health issues associated with chemical sensitivities are economic costs and loss of enjoyment of life by MCS sufferers. Economic costs are spread throughout the system; however, their major manifestations are lost worker production, increased demands on services, and the long-term costs associated with supporting a growing disabled subset of the population comprised of chemically injured workers. Social and mental health costs are seen in escalating cases of depression, divorces, behavioral acting out, isolation, anxiety attacks, and chronic medical problems.

Social workers are particularly well suited to advocate for accommodations in the workplace and for social policy change on behalf of those suffering from chemical sensitivity. Their training in systems and ecosystems theory makes them well aware of the importance of the environment on the individuals. That training includes knowledge of utilizing strengths based approach to problem solving, and clinical training in mental health, which leads to empowerment for the client.

The Effects of Dolphin Interactions with children diagnosed with Posttraumatic stress disorder

Elissa Faye, Dolphin therapy innovations (NFP), USA

The Effects of Dolphin Interactions with children diagnosed with Posttraumatic stress disorder, evaluates the positive effects on children diagnosed with PTSD from the ages of 7 to eleven, suffered one or more of the following: Chernobyl, Armenian Earthquake, Hurricane Mitch, abuse, abandonment or neglect and suffer from PTSD as a result of Nuclear toxicity, civilian and military forms of trauma. Also included is an understanding of the damage of a misdiagnosis, the utilization of trauma and drugs and their related companies as a source of warfare as well preventative and curative means which include: light, sound and color therapies, art therapy, swimming with dolphins, interacting with dogs, etc. The cross of high (and subsequent neurochemical processing as seen in various forms) and low technology for healing is explored on a national and international level, as well the documentation in unconscious expressions of the artwork - different from propaganda.

Mobility and Computation

U. Ferreira, Escola Politecnica, Salvador, Brazil

Mobile agents and the Internet have brought new ideas to theoretical foundations of computer science in the last few years. As an example, in 1999, I had an interesting conceptual insight over computation: "...at the moment that I conceive the idea of moving computation from one place to another, I also observe that a general notion of computation transcends pure mathematics and meets the physical world". This itself requires new, informal and philosophical discussions in the foundations of computer science. Later, in 2001, "and because the universe is on the move, computation is essentially mobile." The present paper discusses some meaning of computation, provides a different semantics and present a formalized, physical and abstract model after my simplification. The present model makes use of four forms of mobility, namely strong mobility, intentional unity mobility, non-intentional unity mobility, and broadcast mobility. In this paper, I present other arguments for the most general and unified notion of computation, although it is only one among other good proposals. Mobility and global computing form two different classes of argument.

Modeling System Integrity of a Security Critical System using Coloured Petri Nets

Siv Hilde Houmb, Dep. of Computer and Information Science, NTNU, Karin Sallhamma, Q2S Centre of Excellence, NTNU, Norway

There exist several standards targeting assessment and certification of security. However, these standards focus on qualitative evaluation according to predefined security levels, rather than providing quantitative assessment of operational security. Quantitative evaluation, such as probabilistic analysis, is frequently used within the dependability domain. Recently, the need for techniques for quantification of security attributes has been raised. This relates both to security requirements in Quality of Service architectures and input

.....

requirements to trade-off decisions regarding the design and choice of security mechanisms to comply with an established security policy. A security critical system is a system that contains data or information that should be protected against unauthorized reading, change or deletion in accordance to a security policy. In this paper, we present an approach for quantitative evaluation of security critical systems using a higher level formalism for stochastic modeling, analysis, and simulation. We present a generic hierarchic Coloured Petri Nets (CPN) model to quantify operational system integrity of a security critical system. In our modeling framework, we consider security breaches along with hardware, operating system, and application/services failures, regardless of cause. To demonstrate the use of the hierarchical and generic CPN model, operational security aspects of a real-world web service is modeled and analyzed.

Transferring Critical Path Technology to Financial Planning

Stephen J. Huxley , University of San Francisco, USA

To scientists and other young professionals under the age of 50, especially those who specialize in technical research, retirement probably seems like a distant, barely visible event, remote on the planning horizon. Even those over the age of 50, when the passing of time can no longer be denied, may pay little attention to their financial futures. Nevertheless, both types of workers are likely to be saving money for that far off day retirement. A question that probably haunts many, at least at the subconscious level, is whether they saving enough (or too much).

While they may be well versed in the analytical and engineering methodologies within their own fields, they often have only a hazy idea of how to apply similar quantitative tools to personal financial matters. If they seek help from a financial professional, they may get lucky and find someone who can perform the simple mathematics of projecting the path their retirement account should follow to meet their goals. But many financial planners, especially stockbrokers, are trained more to sell financial products than to perform analysis. Furthermore, even if the planner helps them to correctly determine their ultimate financial goal correctly, the information is seldom presented in an easily understood format.

This paper transfers the technology of the critical path concept used in project management theory to personal financial planning theory. The critical path separates the planning horizon over time into a "safety zone" and a "danger zone." If a retirement portfolio drops below the critical path, the probability it will hit its target drops below an acceptable level of chance. This level of chance can be set at any value between 0 and 1. If the median growth rate for an index fund were used, for example, dropping below the critical path would imply a less than 50 probability of reaching the goal.

This idea seems so simple that one would think that all financial advisors use the critical path routinely. Unfortunately, such is not the case. Most financial advisors are sufficiently well trained to calculate required growth rates to meet a goal at the end of some span of time. But they generally focus on how well the portfolio did in the prior period without the proper perspective of what it means with regard to meeting the goal at the end of the planning horizon. Their or their clients may then make poor decisions regarding their investments, and permanently damage their chances of meeting their ultimate goal.

The critical path provides the proper perspective as to the correct investment actions to take over time. As an example, it will be shown later how investors saving for retirement could have used the critical path concept to avoid the major stock market decline that began in March 2000.

Physicians, Public Health Practitioners, Educators and Linguists: A League of Extraordinary Bedfellows

Daniel S. Janik, Margaret Bills, Hisako Saito, Intercultural Communications College, Honolulu, USA

Physicians since Hippocrates have been trying to assist individuals healing from disease. Public health professionals have long been striving to understanding and control the causes of morbidity and mortality factors that affect human populations. Together their intense, unremitting focus within public health has contained "classical" epidemics, such as puerperal fever and milk-related diseases of childhood, to more contemporary ones such as peptic ulcer disease, smoking, alcohol consumption, gun control, and even longevity. Yet, interestingly, one of the oldest and perhaps the furthest-reaching human nemeses, violence,

.....

continues to elude us, even though all measures of outcome rank it far beyond other causes of mortality and morbidity. Of the infamous Four Horsemen of the Apocalypse: Conquest, War, Famine, Death, the original 'Axis of Evil,' is based on a single common factor: violence, the result of which, in medical terms, is trauma. Much of the world's focus has been on controlling weapons of trauma (consider the contemporary importance placed on finding Iraq's 'weapons of mass destruction'); the immediate, visible results of trauma; retribution; justice; and the rehabilitation of convicted criminals. But what has impressed me, as a physician and public health practitioner assisting adults with psychological recovery from trauma, is what is learned by trauma survivors - victim-learners and perpetrator-teachers alike - as a result of the trauma - 'effective learning' if you will - and its amazing attributes. Consider, for example, that what is learned traumatically is resistance to change and incredibly persistent, as well as having the inherent ability to self-replicate, quickly adapt and expand in terms of impact far beyond the original learning event and perpetrator-victim/teacher-learner pair. One of the classical signs of trauma is "erasure" of the original event -repression - of both a coherent understanding of the event and its attendant psychic pain. Perhaps nowhere is this more demonstrable than around the birth event. As a pediatric physician, I repeatedly observed that birth trauma effected not only the newborn (who retains little conscious memory of the birth event), but also the adult mother (who also retains little memory of the actual agony of childbirth). Odd. And I should like to point out that mothers are and always have been the primary source of behavioral imprinting, early learning and even language acquisition for almost all humans - the penultimate teacher. When viewed in this manner, it is amazing that, given its ubiquitousness, we humans can access any non-biased place from which to "see" traumatic learning *in situ* as it is occurs moment-to-moment throughout our lives. When I retired from full-time clinical practice and began academic studies in linguistics and language acquisition, I was surprised to see this familiar specter, traumatic learning, reappearing over and over in the guise of something constantly sought by educators: "effective" teaching. The more I studied the myriad theories and methods of effective teaching, the more I was impressed by trauma's 'educational' form: institutionalized impression of the ideas of one person - the teacher - onto another - the learner - as effectively and efficiently as possible. I observed in the classroom, that many of the 'best' teachers, in the name of teaching, employed many of the variations of trauma without realizing that they were, in fact, teaching traumatically. To make the business of education more profitable (efficient, effective), teaching, as practiced professionally throughout most of the world, inevitably invokes and reinforces, throughout our lives, the traumatic model we have assimilated from birth! Is it any wonder that we are blind-sided? I am convinced that ever since Plato broke from the Socratic tradition and formed his famed Academy, institutionalized traumatic teaching has co-evolved with and within us, and is now a full-blown public health epidemic of such penetrance and proportion that it is difficult to find and perhaps even conceive of a non-affected control. If in fact traumatic learning is so effective, and underscores virtually all teaching activities today, then it could provide insight into a fundamental, unified, physicallybased learning theory underlying all current 'fashion' educational theories and methods. My linguistics practice these last 10 years has been focused on identifying the physical processes underlying effective, traumatic learning - what I call neurobiological learning (NL) - in the hope that knowledge of these processes could possibly lead to a non-traumatic form of effective learning. During my doctoral dissertation work, I researched and applied contemporary clinical and experimental information in the tradition of the German School of neurobiological linguistics and produced what I believe to be the first cohesive theory of NL, including tenets and a basic methodology. This theory and method was since published as *A Neurobiological Theory and Method of Language Acquisition* (Munich, Lincom GmbH, 2004).

In 1996, I had the opportunity of applying NL theory, tenets and methodology in the classroom at Intercultural Communications College in Honolulu, Hawaii, USA. The results were astounding from almost every perspective. But most interesting was the evolution of a non-traumatic form of NL: a curiosity-based, discovery-driven, mentor-assisted transformational learning (TL). Preliminary work led me to believe TL to be applicable to classroom, tutoring and even distance learning situations. NL and its derivation, TL, may actually prove to be the long sought after unified educational theory underlying the 'next generation' of education - that of education over extended distance - educational insitutions without walls - the next logical step in mankind's reach beyond the geopolitical boundaries of our planet. It is our hope that this collection of three related papers will stimulate interest in other cross-specialty-trained researchers, educators and 'teachers.' It is our hope to create a new focus upon the most important 'disease' of humankind, violence - violational learning - teaching - and open the door to a much needed evolution from traumatic to non-traumatic, transformational learning.

Valuation and Hedging of Power-Sensitive Contingent Claims for Power with Spikes: a Non-Markovian Approach

Valery A. Kholodnyi, Department of Mathematical Sciences, Middle Tennessee State University, USA

We present and further develop a new approach to modeling spikes in power prices proposed earlier by the author. In contrast to the standard approaches, we model power prices with spikes as a non-Markovian stochastic process that allows for modeling spikes directly as self-reversing jumps. We also show how this approach can be used to value and hedge European contingent claims on power with spikes.

Service Quality Improvement Using Quality Function Deployment in the Application Service Provider Industry

Dohoon Kim, College of Business Administration, Kyung Hee University, Korea

The ASP (Application Service Provider) industry provides essential infrastructure for the Internet-based ebusiness transactions, thereby accelerating corporate transformation. First introduced is the QFD (Quality Function Development) framework which provides a great tool not only to arrange and evaluate VoC (Voice of Customers) and VoE (Voice of Engineers), but also to link and combine VoC and VoE, thereby presenting explicit directions for service quality improvement. There have been, however, few researches on QFD for the telecommunication service industries. The case study discussed here serves an illustration of the applicability and usefulness of the QFD approach to the ASP industry. The proposed QFD framework shows great potentials since customers' needs are explicitly considered in the framework, and it helps service operators develop better IT outsourcing by providing guidelines for redesigning or reengineering the service delivery process.

An Ethical Perspective on Internet Commerce

Ann Lind, University College of Borås, Sweden

Electronic commerce on the Internet has increased rapidly during the last few years. As well as in Europe as for example in the USA there are an increasing number of companies that use Internet as a channel for commerce. Electronic commerce stands for all paperless exchange of business information. There are generally two different types of electronic commerce: business-to-consumer (B2C) and business-to business (B2B). This paper has a focus on B2C with Internet as media. The purpose of the paper is to illuminate some ethical aspects that are important to consider during such electronic commerce. Electronic commerce can be regarded from different perspectives: a communicative perspective, a business process perspective, a service perspective and an online perspective. The analysis presented in this paper considers all these perspectives. Companies use different techniques to come into contact with prospective customers, such as storefront, auctions, dynamic price, portals, financial services and casinos. This kind of commerce has had a great impact on individuals, companies and the society. There are many advantages such as reduced costs and shorter lead times that give the customer lower prices for products bought on the Internet. For the customer Internet commerce also gives increased choice and the possibility to shop 24 hours per day 7 days a week. The customer may also interact with other customers to discuss product quality and the service level of a specific company. Internet commerce will also bring benefits for the society as a whole. But there are also disadvantages. When people do not have to go to a shop the traffic on the roads will decrease as well as pollution. Cheaper products will also give poorer people the possibility to increase their standard of living. But electronic commerce will also bring some disadvantages. Rationalisations may cause unemployment and less profitable branches may be closed. The people in the affected society were earlier used to a service that they no longer have access to if they cannot use the new information technology. Electronic commerce also means a more complicated environment with can have a negative impact on individuals as well as for companies. People who cannot adapt to the new technique will become unemployed and the company who cannot or will not be part of it may suffer from competition. Companies

.....

that have been in the business for a long time may have old business systems that it is necessary to integrate with an electronic commerce system. That can be complicated as well as costly. Electronic commerce also has less flexibility compared with traditional commerce and has an impact on the social environment. Many customers may prefer the personal contact. In the paper some ethical theories are also presented. They are used for evaluating ethical implications of electronic commerce. The teleological (for example the utilitarian perspective) and deontological (for example Kantianism) theories are the main basis for this evaluation. If our basis is a utilitarian perspective there may be problems since it is difficult to grasp the consequences a specific action may cause. There are definitely positive as well as negative consequences to consider. It is very hard to estimate how many people who will suffer from negative consequences and how many who will benefit from positive consequences and it is also difficult to estimate what the emerging of electronic commerce will mean for the society as a whole. From a deontological point of view we may conclude that it is not acceptable that a certain group of people is not given the same advantages as others and that their social environment suffers. Ethical relativism will probably accept electronic commerce since it is normal in our culture. Electronic commerce also gives great advantages for consumers and companies as well as for the society as a whole. A greater ethical awareness from all parties should make it possible to lessen the negative effects that may be caused by electronic commerce.

Multi-Population Genetic Algorithm for Protein Folding

Ausif Mahmood, University of Bridgeport, USA

Predicting the three-dimensional or tertiary structure of a protein through computational means is commonly referred to as the *protein folding* problem. This problem has been shown to be NP-complete even with many approximations to simplify the underlying model. We develop a multi-population genetic algorithm with small population exchanges after certain generations as a solution to this problem. This guarantees enough diversity to prevent premature convergence thus yielding better (lower energy) conformations at the expense of a (possibly) slower rate of convergence. The new algorithm formulated is particularly suitable for distributed computing and does not lead to premature convergence. A distributed implementation of the protein folding problem using web services is also carried out. When we compare our scheme on the sequences published in [UM – Unger and Moul], which (by design) have known optimal solutions, our algorithm was found to have achieved the optimal result in all the cases, which were sometimes 3 to 4 units lower energy than the best reported solution with other methods [UM, PPG, KLM].

Creating bilingual medical electronic dictionary

Sofija Micic, Associate Professor of English, School of Medicine, University of Belgrade, Serbia

The present study introduces the use of a lexical analysis software WordSmith tool for developing specialized corpora. They are possible in specialized fields because of the restricted subject domains. Corpus analysis techniques have provided evidence about recurring language patterns valuable for constructing specialized dictionaries which reflect the language used in the workplace. Statistically significant co-occurrences of words in a corpus are collocations. The computer is a very useful tool in collecting, organizing and verifying the use of multi-word expressions. It will be shown how an approach based on collocation software yields results applicable in creation of an English-Serbian medical electronic dictionary. The study will provide new insights in numerous disciplines: linguistics, lexicography, translation, computer science, psychology and cognitive science.

Protocols for Enhancing Gateway Dependability in Hybrid Mobile Ad Hoc Networks

Mohiuddin Ahmed , HRL Laboratories, LLC, Malibu, USA

One standard method to enable connectivity amongst groups of isolated mobile nodes is to use *gateways* that can communicate across platforms, and thus form a hybrid “network of ad hoc networks.” However, such a hierarchical network is particularly vulnerable to single points of failure (at the gateways). This article describes techniques that enable such gateways to incorporate a measure of security and distributed fault tolerance. Algorithms are designed to employ redundant gateways in each ad hoc domain that, along with node signaling schemes, ensure continued operation and graceful degradation of the network performance in the face of node/gateway failures. Preliminary simulation study shows that the proposed algorithms are tractable, implementable, and have relatively modest computational and network overhead.

Semantic Web Application Models

Erich Neuhold, Fraunhofer IPSI, Germany

The Semantic Web and the Web service paradigm are currently the most important trends on the way to the next generation of the Web. They promise new opportunities for content and service provision, enabling manifold and flexible new applications and improved support for individual and cooperative tasks. The use of the Web service paradigm in the development of Web applications, that typically couple application databases with user dialogs, is quite obvious. The development of Web applications that can be operated effectively in the Semantic Web context (*Semantic Web Applications*), however, imposes some challenges. Two main challenges towards extended (conceptual) modeling support are addressed in this talk:

1) In the Semantic Web, Web applications move from a purely human user community towards a mixed user community consisting of humans as well as of software agents; This results into new requirements towards models for Web applications’ *user* interfaces;

2) Automatic interpretation of content, one of the main building blocks of the Semantic Web, is based on interlinking local models with globally defined interpretation schemes like vocabularies and ontologies; This has to be reflected by the conceptual application domain models of Semantic Web Applications;

Conceptual Modeling for Web applications, thus, has to be revisited in the context of the new Web trends looking for adequate *Semantic Web Application Models*.

Managing Project Knowledge: The Contribution of Lessons Learned

Jill Owen, Frada Burstein, Henry Linger, School of Information Management and Systems (SIMS), Monash University , Steven Mitchell, Primavera Australia, Australia

Project-based organizations need to retain their knowledge base as an accumulation of their core intellectual property reserve for use in future projects. This paper analyses the application of knowledge management to project management to facilitate learning. It explores how learning and knowledge can improve project capabilities leading to enhanced project maturity and organizational development. We propose a model that shows how knowledge is embedded within the project management methodology of an organization. The paper presents the model and a case study. Findings from the case study indicate that informal lessons learned play a crucial role in knowledge re-use and transfer in projects.

.....

Internet as a marketing communication media of nonprofit organizations: the case of Croatia

Jurica Pavicic, Goran Vlastic, Najla Podrug, Graduate School of Economics and Business Zagreb, Croatia

The modern nonprofit organizations in Croatia have been developing only since the early 1990's – after significant changes caused by the radical social/economic/political transition. At first they were mostly humanitarian (mostly due to a fact that, in ex-Yugoslavia, the war and post-war problems caused many sufferings for thousands of refugees and displaced persons). Since 1995 - after the war, many other NGOs were started. Due to the Government budget problems and relatively low interest of companies in community issues, large number of NGOs cannot find sufficient funds to develop their programs adequately and communicate to their target audience through traditional media (TV, radio, newspapers, ...). That is why, besides some PR activity, Internet has become the main communication media for NGOs with their donors, general publics, and target users. Computer science NGO Sabirnica is one of the few modern NGOs in Croatia founded before 1990's (it was founded in 1984) which is still active.

By using the case of Sabirnica and the practical evidence of using the modern marketing communication the authors will emphasize the importance of Internet as an inexpensive way of communication with the target audience, but also making it easier to get new people interested as volunteers or donators. The importance is even greater when the possibility of finding international donators as well as cooperation with other NGOs throughout the world is analyzed.

Developing Mathematical Models in Chemistry

Agnes M. Rash, Saint Joseph's University, Philadelphia, USA

The process of developing a mathematical model and applying it immediately to a concrete situation enhances student learning. There are many bright students in non-science majors are capable of understanding the interconnection between mathematics and science and benefiting from an interdisciplinary approach to topics This presentation discusses two units (group theory and drug concentration) in detail from a course in mathematical modeling in chemistry.

These units are part of a year-long, team-taught Honors course designed to fulfill the core requirements in mathematics and science for non-mathematics and non-science majors. The course, Mathematical Models in Chemistry, involves selected topics in mathematics from discrete mathematics and calculus that have applications in chemistry. The complete list of topics will be given with a detailed explanation of two of the units and the associated laboratory experiments. Prerequisites for the course include high school chemistry and precalculus mathematics.

The MOMENTS Integrated Metamodel — Future Multidisciplinary Teaching–Studying–Learning (TSL) Processes and Knowledge Construction in Network-Based Mobile Education (NBME)

Heli Ruokamo, University of Lapland, Faculty of Education, Seppo Tella, University of Helsinki, Faculty of Behavioral Sciences, Finland

One of the principal pedagogical insights of recent years has been the recognition of the teaching–studying–learning process, whose three components are equally pivotal and essential to understanding the entirety (e.g., Uljens 1997; Tella 2001; Ruokamo et al. 2002). A second innovation, which has developed with advances in information and communication technologies (ICT), is network-based education (NBE). In this paper we argue that (1) it is essential to examine teaching, studying and learning as multidisciplinary and cross-disciplinary processes and to adopt a future orientation in doing so; (2) the concept of network-based education should be extended to include the added value brought by network-based mobile education

.....

(NBME); and (3) taking these first two orientations into account allows us to create the theoretical prerequisites for better understanding the mechanisms and regularities underpinning knowledge construction in novel operating environments that make use of technology.

These arguments constitute the foundation of the metamodel developed in the MOMENTS project, which is part of the Academy of Finland's *Life as Learning* research program. The MOMENTS integrated metamodel is a multidisciplinary framework that describes and structures the teaching, studying and learning of the future, knowledge construction, and network-based mobile education. The article presents the integrated metamodel augmented by findings from over ten of the case studies conducted as part of the MOMENTS project.

The MOMENTS metamodel is based on four conceptual levels of observation: (1) cultural discourses and practices; (2) pedagogical models and principles; (3) action; and (4) individual acts. Intersecting these four levels are the three main components of the model: culture, interaction and adaptability. Where the levels and the main components intersect lie the model's dimensions. It is where the conceptual levels, components and dimensions meet that new knowledge is created.

The central question informing the metamodel is what kinds of interventions different techniques and technologies create, enable and bring about when they are used in connection with teaching, studying or learning, and how teachability, studiability and learnability are then defined.

The discussion to follow draws on the concept of *affordance* (Gibson 1979), which has its basis in ecological theories. Central to the concept is the significance of the relationships which an organism has to the various resources in its environment, an individual using network-based mobile education being an example of such an organism. Affordances can thus be seen as including all of the ICT tools, mobile technologies and mobile and network applications that together form the "jungle" in which an individual lives and works. According to ecological theories, learning is the discovery of increasingly effective means to negotiate the world and life as a human being by taking advantage of affordances.

The development among the main components of the model we term the information work value chain. Its impacts are reflected on the concrete level as the increased meaningfulness of using tools, exploring studying materials and, in turn, as improved efficiency. Value chains are procedural mechanisms that are needed if new knowledge or skills are to be constructed.

The MOMENTS metamodel contributes to the creation of a common terminology and conceptual core among different academic disciplines. The model was originally formulated as a collaborative effort of the Universities of Helsinki and Lapland in Finland and extended to focus-group work. It is an important tool for the knowledge management of the entire MOMENTS consortium, and in our view is one of the tools that will enable work on the consortium level to meet the objectives and expectations set for it in the sphere of research.

Aviation Maintenance Online - Multimedia and Multidimensional Approaches to Engineering Technology

Xueshu Song, Charles Billman, Phil Pilcher, Kristin Wilson, Northern Illinois University, USA

Three aviation training modules included aircraft systems simulations under normal and faulty conditions, animated cartoon movies of scientific concepts; measurements of aircraft systems in simulated team-based, trouble shooting exercises, and time and labor costs for component replacement. Significant differences between test and control groups were found for students' attitude, knowledge, learning time, and instructional resources. The authors are currently creating a network of practitioners to assess, implement, demonstrate the transportability of the modules, and assess student learning. Live demonstrations will be at IPSI-2005 HAWAII.

LYEE Agent System Development Method

Yozo Takeda, Hamido Fujita, Iwate Prefectural University, Japan

The system, which does not ask a place and time, grows greatly with the development and the spread of Web system in recent years, and the growth has also accomplished various evolutions. However, no big differences and changes are found in the technique of development for such software in the Web system. For example, when reconstructing the complicated workflow system, an upper design process defines strictly subjects, such as the functional contents and a scope of workgroup, and a user, and afterward, very complicated and fixed logic is created as a program by downstream development according to this definition. The more workflow logic becomes complicated, the more term of system development extends and delays away from the original schedule. An organization and business schema changes, which sometimes happens, force to update various system specifications in a short term. It is not so strange that on the complete day workflow system becomes useless with old specification in actual business. Thus, as for the system with complicated specifications, which change to progress of time and conditions, it is becoming general recognition gradually that the conventional or the non-flexible method of software development is not suitable to the actual business fields. Although many researches are made in order to cope with such a problem, the software development methodology of LYEE gives some hints as one of them. In this paper, using a way of thinking LYEE methodology, new type of structure's agent is introduced as a useful device in the workflow agent system. This device is named **LYEE Agent**. Proposal and consideration are performed using LYEE Agent on the systems development in which it can respond flexibly and promptly to the users' requirements of various types of workflow systems.

Use of knowledge mapping to elicit knowledge flows and gaps in insurance organization

Mandar Thosar, Frada Burstein, School of Information Management and Systems, Monash University, Australia

Many Knowledge Management professionals advocate the use of knowledge maps as one of the tools to elicit the knowledge flows and gaps within organization. This paper analyses advantages, disadvantages and limitations of using knowledge mapping technique for making knowledge artefacts and flows explicit and visible. The authors share the lessons learnt, while implementing a knowledge mapping project at one of the leading insurance companies in Australia.

Modelling Software Metric Data with XML

Ng Keng Yap, Abdul Azim Abdul Ghani, Ali Mamat, Hazura Zuzalil, Malasia

Software measurement is the dimension and/or decision criteria as to what a piece of software can provide. The output of software measurement is in the form of metric data. Metric data are important because it can be used as the input for software analysis in software engineering. Software engineering relies on these data to investigate many factors in software development such as cost, scheduling, affordability, quality etc., in order to gain better control of the engineering processes. These days, people store data in different data formats, media and database technologies. These heterogeneous formats have posed many problems in data analysis, especially in terms of the integration and reusability of historical data. These problems have prompted efforts to find a data format that is compliant with the concepts of software measurement and which is applicable to any metric data.

Size and Effects in the Use of Best Financial and Cost Accounting Practices (BFCAP)

Monir Zaman, School of Commerce Faculty of Business and Law Central Queensland University, Australia

The aim of the study was to investigate the size and effects associated with the size measure of employees in small business in Central Queensland region in the context of a "best financial and cost accounting practice". This investigation surveyed a sample of 100 small businesses in Central Queensland region in order to test the interrelationships between strategic planning and budgetary control, use of internal and external accounting staff, manual versus computerised accounting, costing, recording systems and the composition of debt equity ratio and the effect of size on these variables. We found that until the largest size is reached, there is a distinct trend in the increased use of strategic plans and budgetary control. Clear size effects were also found in the number of internal staff used for finance and accounting functions but size had little effects on the use of external advisors for tax consulting and business advisory services. The paper concluded with some implications for the small businesses wishing to increase growth and employment in the Central Queensland region.

Design of Advanced Guidance Law against Hypersonic Attacking Targets: Robust Adaptive Neural Network Approach

Yung-Yue Chen, Industrial Technology Research Institute, Pai-Chuan Liu, Chinese Military Academy, Taiwan

An advanced guidance law for three-dimensional engagement is developed against very high-speed and maneuverable targets. In practical situation, three-dimensional missile-target dynamics are not always exactly known. Therefore, one method that can approach the unknown missile-target system needed to be used. It is famous that unknown systems can be approximated by the neural network systems to any desired accuracy; hence the unknown three-dimensional (3-D) pursuit dynamics of missile and target is able to be approximated by neural network systems with adjustable parameters.

Furthermore, by the combination of feedback linearization, neural network approximation, and H_∞ control, an robust adaptive neural network guidance law can be successfully develop to treat the robust tracking of uncertain missile-target systems. By this arrangement, the effects of approximation errors between the true models of missile-target systems and neural network approach model and exogenous disturbance (targets' accelerations) on tracking errors are attenuated below a prescribed level via a robust H_∞ tracking technique.

*Talented
Students
Forum
Abstracts*

*IPSI-2005 HAWAII
Hawaii, January 6 - 8, 2005*



IPSI-2005 HAWAII
Hawaii, January 6 - 8, 2005



Acceleration of Watermarking

Ivana Vujovic, Darko Jovic, and Veljko Milutinovic, IPSI Belgrade, Serbia and Montenegro

Watermarking is a process of embedding information into digital data in a secret and inconspicuous way. Today watermarking is widely used in applications of copyright protection, fingerprinting, copy protection, content authentication, data hiding, etc. We can classify watermarking in two general categories: spatial domain and frequency domain watermarking. In frequency domain watermarking, media is transformed from spatial to frequency domain, then some watermarking algorithm is applied, and finally watermarked data is transformed back to spatial domain. Additionally, for some media types, certain decoding and encoding operations can take place before and after watermarking algorithm is applied. In this paper, methods for acceleration of watermarking process will be presented. These methods are not referring to watermarking algorithm itself, but rather to optimizations of spatial/frequency domain transformations, as well as optimizations of encoding/decoding operations.

Multi-Domain Metadata Agents

Darko Jovic, Jovan Popovic and Veljko Milutinovic, IPSI Belgrade, Serbia and Montenegro

This research is based on the assumption that more important and useful data (or metadata) about stored information can be gleaned and collected from the storage systems and the servers that use them. The proposition is that this additional metadata can then be used to allow improved, more automated, information lifecycle management (ILM) solutions. The current methods of implementing ILM are slow and human labor intensive. In order to make ILM more efficacious and cost effective in the future, more of the storage, data, and information management needs to be automated. This paper focuses on metadata agents which collect metadata from multiple domains like infrastructure data, file activity data, content data, etc. This multi-domain metadata can then be used to more efficacious manage data in the storage system.

SwanLink Network Application

Fred B. Holt, Virgil Boussa, Andrija Bosnjakovic, Nenad Korolija, Predrag Minic, Jovan Popovic, IPSI Belgrade, Serbia and Montenegro

This paper presents a new intensity-based technique for interactive teaching over the network. The goal of this project is to develop a network layer for P2P communication between network nodes. Application provides environment in which potential users are informed about what other users are working on their workstations. Each user can draw, input text and images, and post that to other users on the network. The paper discusses several practical aspects of problems that affect the accuracy of the method and proposes some solutions.

MPEG1/2 Multiplexer

Zoran Babovic, Jelena Kronic, Nenad Korolija, IPSI Belgrade, Serbia and Montenegro

MPEG Multiplexer is software tool for multiplexing MPEG video and MPEG Audio Streams into an MPEGSystem Stream. It is full implementation of ISO/IEC 13818-1 (MPEG2 System) and ISO/IEC 11172-1 (MPEG1 performance. An easy interface is provided to the programmer which wants to exploit this software in own Project. Both version, for Windows and Linux, are available.



Virtualization Layer for Automated Storage Management

Zoran Babovic, IPSI Belgrade, Serbia and Montenegro

The task of the virtualization layer is to provide global name space feature to the consumer of the storage with ability to move, relocate, and replicate the files, without affecting client's view of the files. Such virtualization layer provides strong base for efficient information lifecycle management that means automatically managing data from its creation to deletion. The environment is a typical enterprise storage system that evolves pool network attached storage devices, including NAS appliances, SAN, servers and clients with shared storage. The main issue is choice of the efficient way to track the class of the storage where files reside and in the same time to provide transparent view of the file names to the client. We consider both block oriented and object based file systems, in order to solve the problem. Some topics about independency of the virtualization layer to the remaining part of system are also mentioned.

Media-Retrieval from Partial Downloads

Jelena Krunić, Zoran Babovic, IPSI Belgrade

Only a very small part of a media file is required is required for watermark detection (for example: a few seconds from 90 minutes of playing time of a typical movie are sufficient). This may decrease the processing and verification time while tracing illegal copies on the internet. Downloading content from peer-to-peer networks often produces partial downloads, which are not viewable on media players. Our software tool identifies type of the partially downloaded file first, and thereby decides if parsing is possible. If parsing is possible, media file is parsed in the second phase, thus identifying successive blocks and extracting correct sequences, either audio and video joined, or separated, that are playable on the media player. We support parsing of MPEG1, MPEG2, DIVX, and XVID media files.

Data Assurance in a Conventional File System

*Sasa Rudan, Aleksandra Kovacevic, and Charles Milligan
IPSI Belgrade, Serbia and Montenegro
StorageTek, USA*

The goal of this research is to find a mechanism to guarantee that a file stored in a conventional file system, on disk, has not been modified. Our proposal for achieving that goal is a smart card based DSFS (Digital Sealed File System). The main idea is to send only the hash value of a document to the SmartCard together with the unique document identification. After creation of public/private key pair and hash value encryption, SmartCard destroys private key. This yields a final signature and public key as output. Therefore, sending confidential key material from SmartCard to a system is completely avoided. Since hash value is small data, limited bandwidth to the card for transferring large documents for encryption is not a problem. However, there are some possible drawbacks of the proposed idea. An attacker is able to circumvent the signing process in SmartCard and to act as SigningTool. Moreover, publishing of public key is the issue of the DSFS architecture and public key distribution is too complex and unreliable solution. Here we describe a possibility of overcoming these problems.

The Solution for Distributed Management of Digital Signatures in Highly-loaded SAN Systems

Sasa Rudan, Aleksandra Kovacevic, Zoran Babovic, Darko Jovic, IPSI Belgrade, Serbia and Montenegro

New SAN (Storage Area Network) systems deal with billion of files. These files are usually stored on classical hard-disk based storages. This environment very soon pointed out inefficiency of hierarchical file systems. New concepts of raw file systems use digital signatures as URIs (Uniform Resource Identifier) for stored files. This implies need for extremely fast digital signature management, i.e. searching, storage, and deletion of digital signatures in domain of $2^{20 \cdot 8} = 2^{160} \approx 10^{48}$ values. This paper presents solution for distributed digital signature management in the highly-loaded SAN environment with one frontal (gateway) server and eight background (parallel) storage nodes.

Experimenting on Selection as a Part of Genetic Algorithm

Marija Radovic, Serbia and Motenegro

Genetic algorithm as part of evolutionary computing is very important and has shown to be very efficient in solving many complex problems, like some NP-complete problems (traveling salesman problem, knapsack problem, etc.). Selection is a very important component of Genetic Algorithms. And in this paper, some of the methods for selection have been described (Roulette Wheel Selection, Rank Selection, Steady-State Selection, Tournament Selection, etc.), and also some of the results of experiments that have been acted upon them.

Technology Roadmapping - The Right Way for Developing a Project

Aleksandar Kovacevic, IPSI Belgrade, Serbia and Montenegro

Technology roadmapping is a form of technology planning and it can help companies dealing with their competitive environment. Roadmapping is widely adopted in industry. In collaboration with computer science, technology roadmapping makes a powerful way of communication between product teams with purpose to link business strategy, product plans, and technology development. It is the process of creating time-based representations of information designed to support a specific aim or decision process. When used as part of a strategic planning operation, roadmapping promotes innovation by forecasting the elements needed to focus on future technological needs or market demands.

Problem solving with Interpretive Structural Modeling

Aleksandar Kovacevic, IPSI Belgrade, Serbia and Montenegro

When a company or project team introduce themselves with complex problem, they use a way of collective thinking such as brainstorming, or some similar method. Interpretive Structural Modeling (ISM) makes a pictorial representation of all connections between ideas generated by the team members. It helps team to get the clear picture of a problem and to get a key idea for solving the problem more likely. With a computer support and some mathematical logical analysis, ISM is the method that demands every possible linkage between ideas and generates priority levels, categorizes ideas or shows the connection between ideas.

.....

Recommended mutation in GA TSP with weather-forecast and tanker history

Ognjen Sobajic, The Faculty of Mathematics, Serbia and Montenegro

In order to improve fitness function value of the solution we've found, our team recommends several heuristics. Bad fitness factor could be caused by a storm or some not so good weather condition in a region. The first approach is simply to avoid it by changing the path between two nodes in the graph into a curve. This solution might be unstable because shifting all the incoming-time can increase costs. The second one is simply to change orientation of the path in a given solution so that high percentage to storm can be avoided. Other approaches are based on local path mutation.

IPSI Award Abstracts

*IPSI-2005 HAWAII
Hawaii, January 6 - 8, 2005*

TV is Dead – Long Live the WEB (SSGRR-2000)

Harold Kroto, Nobel Laureate, University of Sussex, UK

Science, Engineering and Technology are as vital to our intellectual and cultural development (particularly our children's) as they are to our training to get along in the Modern World. Some efforts to redress the problems involved in the general Public awareness and understanding of science and engineering (PAUSE) issues are being initiated via the Vega Science Trust (www.vega.org.uk), which aims to take advantage of the revolution in TV and Internet communications technology to improve matters. The best scientists and science communicators are being recorded and the programmes are being broadcast on BBC-TV and the Internet. Furthermore School/University outreach programmes are being developed and Vega is piloting ways in which members of the Science, Engineering and Technology (SET) community can, as individuals and groups, make important contributions. Excerpts from SET programmes will be presented. These efforts present a perspective on SET which places the cultural factors in the foreground and focuses on the intrinsic charisma of science which is hidden from many. It is now crucial that the society in general and the scientific community in particular accept that serious problems are involved in communicating science and the Internet is set to play a major role. Before the invention of the printing press there was only one book in the west – the bible – and it was hand-written by monks. After the invention the printing press book – writing and reading was democratized and this was truly the beginning of general education. In a similar way the birth of the Internet has democratized broadcasting – the broadcasting channels no longer control the dissemination of recorded material – individuals and groups of individuals can now do it themselves and so the Internet has enabled broadcasting to fulfill the promise it has always had – to be a superb educational medium.

Electronic Business and Education (SSGRR-2001)

Bob Richardson, Nobel Laureate, Cornell University, USA

There is no longer any question that the Internet and electronic communication are the major new tools for collaborative advances in the creation of new knowledge and in future learning. There are countless examples of highly successful professional courses taught on the Internet. Similarly, international and multidisciplinary collaborations in scientific research based upon little contact other than through electronic communication dominate the scientific literature. Perhaps the most profound examples of distance collaboration in science are found in astronomy. The Hubble telescope has permitted astronomers to gather breathtaking images from the most remote observatory imaginable – one in orbit around the earth. A significant challenge remains. The challenge is to devise a remote mode for nonverbal communication about difficult concepts. In the shared creation of new ideas and knowledge, facial expressions and body gestures frequently play an important role in peer interactions. As the speed and bandwidth of electronic communication increase, we have the prospect that the important elements of human contact can be imitated. Without the development of sympathetic peer or mentor relationships, distance learning will remain quite sterile.

E-Business and E-Challenges (SSGRR-2002)

Jerome Friedman, Nobel Laureate, MIT, USA

The development of Homo sapiens has been a history of innovations, from the earliest crude tools to the modern technological society of today. The growth of science and technology has been exponential during the last century; and under the right circumstances, this rapid growth can be expected to continue. The major innovations of the future - those that will shape the society of the future - will require a strong foundation of both basic and applied research. It is ironic that quantum mechanics, one of most abstruse conceptual frameworks in physics - one that was developed to explain atomic spectra and the structure of the atom, lies at the foundation of some of our most important technological developments, because it provided the understanding of semiconductors that was essential for the invention of the transistor. Quantum mechanics thus contributed directly to the development of technologies that gave us world wide communication, computers with their applications to all phases of modern life, lasers with many diverse uses, consumer electronics, atomic clocks, and superconductors - just to mention a few. The internet and the World Wide Web, which are profoundly reshaping the way that we communicate, learn, and engage in commerce, owe their origins in a deep sense to the physicists of the past who worked to understand the atom. In modern industrial nations, quantum mechanics probably lies at the basis of a sizable fraction of the gross national product. This is but one example, and there are many others in all areas of science that demonstrate this point. It is clear that innovation is the key to the future and the human drive to understand nature is the key to future innovation. Society must do all that it can to preserve, nurture and encourage curiosity and the drive to understand.

The Next Generation of IP – Flow Routing (SSGRR-2003)

Lawrence G. Roberts, Father of the Internet, USA

For the last 33 years IP routers have not changed, they still support only "best effort" traffic. However, the bandwidth available to people has been increasing rapidly with the advent of broadband access. The result is that many new services are now desired that require far better QoS than "best effort" IP can support. Also, with broadband, the problem of controlling the total usage and carrier expense has become important. Thus, it has become critical to improve both the delay performance and the control of bandwidth for IP service, much as was accomplished in ATM. Also, call rejection for high bandwidth streaming services like video is required instead of random discards if quality is to be maintained. All these problems can be solved with no change to TCP/IP by routing flows rather than packets. This requires keeping some state information for the duration of the flow, but this information can be captured on the fly as the first packet goes by. This permits an IP flow router to achieve all the capabilities of an ATM switch, but without the call setup delay and at a lower cost than a conventional IP router.

Number and Organization of Primary Memory Objects in the Brain (IPSI-2004 Montenegro)

P.G. de Gennes, Nobel Laureate, College de France

A memory area contains a large number ($N \sim 10^4$) of neurons, each of which is connected with many neighbors (number of efferents: $Z \sim 10^4$). But the connections are poor: the probability for one connection to be efficient is $p \sim 10^{-2}$. This is important: different memory objects must be independent. We discuss how a definite memory object can be stored on a cluster of well connected neurons, and what is the statistics of these clusters. The average number M of neurons per cluster is contained within two limits: if M is too small, the memory is not faithful. If M is too large, the storage capacity is too small. Various consequences of this picture will be presented.

.....

IPSI-2005 HAWAII
Hawaii, January 6 - 8, 2005

Mastering the e-Science

Herbert Simon, Nobel Laureate, USA

Our generation like all its predecessors leaves many tasks – hopefully no more than it inherited – for the next generation to take up; but even knowing that it must be so does not remove one's sense of loss in the parting.

Computer Architecture: Concepts and Systems

Kenneth Wilson, Nobel Laureate, USA

The coming of the computer has created a revolution as profound as the change from the Middle Age to the Renaissance. Many of the changes that took place around the time of the Renaissance – the invention of printing the development of systematic experimental science, the invention of oil painting – have analogs today, made possible by the computer.

Neural Networks: Concepts, Applications, and Implementations

Leon Cooper, Nobel Laureate, USA

When interest in neural networks revived some fifteen years ago, few people believed that such systems would ever be of any use. Computers worked too well; it was felt that they could be programmed to perform any desired task.

New Space Technology: 1km Tether to 100,000km Space Elevator

Hironori A. Fujii, The Father of Space Elevator, Japan

Tether technology is a very old technology used for human activity in fabric works for clothes, fishing and hunting, building, and tethering horses and dogs. The tether technology is now becoming one of new and promising technologies for human space activities as spacecraft thrusters, power generators, and important elements of space infrastructures. The present paper addresses some recent works of the author on the space tether technology applied to an aurora experiment using a sounding rocket, a space solar power satellite and a space elevator for lifting us from the Earth to space.

Design is an Art Form

Michael Flynn, Father of Computer Architecture Revolution, USA

Design is an art form in which the designer selects from a myriad of alternatives to bring the "optimum" choice to a user. In many complex systems the notion of "optimum" is difficult to define. Indeed, the users themselves will not agree, so the "best" system is simply the one in which the designer evaluates the options and takes the responsibilities.

.....

Are We Going Towards Artificial Man? Humanoid Robots: Past, Present State and the Future

Miomir Vukobratović, The Father of Zero Point Moment in Robotics, Serbia and Montenegro

Rapid development of humanoid robots brings about new shifts of the boundaries of Robotics as a scientific and technological discipline. New technologies of components, sensors, microcomputers, as well as new materials, have recently put up the barriers to real-time integrated control of some very complex dynamic systems such as humanoid robots are, which already today possess about fifty degrees of freedom and are updated in microseconds of controller signals. In view of the above statements, the work for the first time raises the essential question on the justifiability of increasing the number of degrees of freedom of humanoid robots, having in mind that for the overall skeletal activity man has at its disposal roughly about 650 muscles of human body which could be approximately expressed by more than three hundreds equivalent degrees of freedom, i.e. the same number of biological actuators.

Authors



A

A. Pietrosanto · 10
Abdul Azim Abdul Ghani · 19
Agnes M. Rash · 17
Aleksandar Kovacevic · 25
Aleksandra Kovacevic · 24, 25
Ali Mamat · 19
Andrija Bosnjakovic · 23
Ann Lind · 14
Arkady Zaslavsky · 9
Ausif Mahmood · 15

B

Bob Richardson · 29

C

C. Liguori · 10
Charles Billman · 18
Charles Lowe · 10
Charles Milligan · 24

D

Daniel S. Janik · 12
Darko Jovic · 23, 25
Dohoon Kim · 14
Domagoj Hruška · 9

E

Elissa Faye · 11
Erich Neuhold · 16

F

F. Colace · 10
Fort Thomas · 10
Frada Burstein · 16, 19
Fred B. Holt · 23

G

Goran Vlastic · 17

H

Hamido Fujita · 19
Harold Kroto · 29
Hazura Zuzalil · 19
Heli Ruokamo · 17
Henry Linger · 16
Hironori A. Fujii · 31
Hisako Saito · 12
HungPin Chao · 9

I

Ivana Vujovic · 23

J

James T. Decker · 10
Jelena Kronic · 23, 24
Jerome Friedman · 30
Jill Owen · 16
Jovan Popovic · 23
Jurica Pavicic · 17

K

Karin Sallhamma · 11
Kristin Wilson · 18

L

Lai Hong Tang · 10
Lawrence G. Roberts · 30
Leon Cooper · 31

M

M. De Santo · 10
M. Vento · 10
Mandar Thosar · 19
Margaret Bills · 12
Marija Radovic · 25
Michael Flynn · 31
Miomir Vukobratović · 32
Mislav Ante Omazić · 9
Mohiuddin Ahmed · 16
Monir Zaman · 20

N

Najla Podrug · 17
Nenad Korolija · 23
Ng Keng Yap · 19
Nikša Alfirević · 9

O

Ognjen Sobajic · 26
Oshadi Alahakoon · 9

P

P.G. de Gennes · 30, 31
Pai-Chuan Liu · 20
Peggy Peck · 10
Phil Pilcher · 18
Predrag Minic · 23

S

Sabrina Gentlewarrior · 10
Saechul Park · 10
Sam Chung · 10
Sasa Rudan · 24, 25
Seng Loke · 9
Seppo Tella · 17
Sergio Davalos · 10
Siv Hilde Houmb · 11
Sofija Micic · 15
Stephen J. Huxley · 12
Steven Mitchell · 16

U

U. Ferreira · 11

V

Valery A. Kholodnyi · 14
Veljko Milutinovic · 23
Virgil Boussa · 23

X

Xueshu Song · 18

Y

Yozo Takeda · 19
Yung-Yue Chen · 20

Z

Zoran Babovic · 23, 24, 25

Schedule

January 7, 2005

12:00 - 12:20 Welcome address

Dr Veljko Milutinovic,
General Chairman, Fellow of the IEEE
IPSI BgD

12:20 - 12:40 The Mision of IPSI BgD

Dr Veljko Milutinovic
IPSI BgD

12:40 – 13:00 Opening Keynote Speech

Erich Neuhold, General Director of Fraunhofer IPSI, Darmstadt, Germany
"Semantic Web"

13:00 – 13:20

Aviation Maintenance Online - Multimedia and Multidimensional Approaches to Engineering Technology

Xueshu Song, Charles Billman, Phil Pilcher, Kristin Wilson
Northern Illinois University,
USA

13:20 – 13:40

The Non-specific Intelligent Guided-View System Based On RFID Technology

HungPin Chao
Graduate Institute of Information Management, Chinece Culture University
China

13:40 – 14:00

Transferring Critical Path Technology to Financial Planning

Stephen J. Huxley
University of San Francisco, USA

14:00 – 14:15 Pause

14:15 – 14:35

Building Lightweight Ontologies for E-Learning Environment

F.Colace, M. De Santo, C. Liguori, A. Pietrosanto, M. Vento
University of Salerno, Italy



IPSI-2005 HAWAII
Hawaii, January 6 - 8, 2005

14:35 – 14:55

The MOMENTS Integrated Metamodel — Future Multidisciplinary Teaching–Studying–Learning (TSL) Processes and Knowledge Construction in Network-Based Mobile Education (NBME)

Heli Ruokamo, University of Lapland, Faculty of Education

Seppo Tella, University of Helsinki, Faculty of Behavioral Sciences

Finland

14:55 – 15:15

Creating bilingual medical electronic dictionary

Sofija Micic, Associate Professor of English, School of Medicine,

University of Belgrade

Serbia

15:15 - 15:35

Managing Project Knowledge: The Contribution of Lessons Learned

Jill Owen, Frada Burstein, Henry Linger, School of Information Management and Systems (SIMS), Monash University

Steven Mitchell, Primavera Australia

Australia

15:35 – 15:55

Valuation and Hedging of Power-Sensitive Contingent Claims for Power with Spikes: a Non-Markovian Approach

Valery A. Kholodnyi, Department of Mathematical Sciences, Middle Tennessee State University

USA

15:55 – 16:15

LYEE Agent System Development Method

Yozo TAKEDA, Hamido FUJITA, Iwate Prefectural University

Japan

16:15 – 16:30 Pause

16:30 – 16:50

Service Quality Improvement Using Quality Function Deployment in the Application Service Provider Industry

Dohoon Kim, College of Business Administration, Kyung Hee University

Korea



16:50 – 17:10

Internet as a marketing communication media of nonprofit organizations: the case of Croatia

Jurica Pavicic, Goran Vlastic, Najla Podrug, Graduate School of Economics and Business Zagreb

Croatia

17:10 – 17:30

The role of the internet in developing business strategies of knowledge-intensive enterprises in south-east Europe(SEE): the case of Croatia

Nikša Alfirević, Faculty of Economics Split,

Domagoj Hruška, Mislav Ante Omazić, Graduate School of Economics and Business, Zagreb

Croatia

17:30 – 17:50

Use of knowledge mapping to elicit knowledge flows and gaps in insurance organization

Mandar Thosar and Frada Burstein, School of Information Management and Systems, Monash University

Australia

17:50 – 18:10

User Profiles with Common Modules for Multiple Domains

Oshadi Alahakoon, Seng Loke, Arkady Zaslavsky, School of Computer Science and Software Engineering, Monash University

Australia

18:10 – 18:30

Mobility and Computation

U. Ferreira, Escola Politecnica, Salvador,

Brazil

.....

January 8, 2005

8:00 – 8:20

Protocols for Enhancing Gateway Dependability in Hybrid Mobile Ad Hoc Networks

Mohiuddin Ahmed , HRL Laboratories, LLC, Malibu
USA

8:20 – 8:40

Chemical Sensitivity in the Workplace

James T. Decker, Bridgewater State College
Charles Lowe, Peggy Pack and Associates, Fort Thomas,
Peggy Peck, Peck and Associates, Fort Thomas
Sabrina Gentlewarrior, Bridgewater State College
USA

8:40 – 9:00

Developing Mathematical Models in Chemistry

Agnes M. Rash, Saint Joseph's University, Philadelphia
USA

9:00 – 9:20

Physicians, Public Health Practitioners, Educators and Linguists: A League of Extraordinary Bedfellows

Daniel S. Janik, Margaret Bills, Hisako Saito, Intercultural Communications
College, Honolulu
USA

9:20 – 9:40

The Effects of Dolphin Interactions with children diagnosed with Posttraumatic stress disorder

Elissa Faye, Dolphin therapy innovations (NFP)
USA

9:40 – 10:00

Toward Next Generation Business Information Systems: Four Inherent Capabilities of Service Oriented Computing

Sam Chung, Lai Hong Tang , Sergio Davalos, Institute of Technology, Univ. of
WA, Tacoma, USA
Saechul Park, Dongeui Institute of Technology, Korea



10:00 - 10:15 Pause

10:15 – 10:35

Modeling System Integrity of a Security Critical System using Coloured Petri Nets

Siv Hilde Houmb, Dep. of Computer and Information Science, NTNU
Karin Sallhamma, Q2S Centre of Excellence, NTNU
Norway

10:35 – 10:55

An Ethical Perspective on Internet Commerce

Ann Lind, University College of Boras,
Sweden

10:55 – 11:15

Size and Effects in the Use of Best Financial and Cost Accounting Practices (BFCAP)

Monir Zaman, School of Commerce Faculty of Business and Law Central
Queensland University
Australia

11:15 – 11:35

Modelling Software Metric Data with XML

Ng Keng Yap, Abdul Azim Abdul Ghani, Ali Mamat, Hazura Zuzalil
Malasia

11:35 – 11:55

Design of Advanced Guidance Law against Hypersonic Attacking Targets: Robust Adaptive Neural Network Approach

Yung-Yue Chen, Industrial Technology Research Institute, Pai-Chuan Liu,
Chinese Military Academy, Taiwan

SCHEDULED AT SPECIAL SLOT:

Multi-Population Genetic Algorithm for Protein Folding

Ausif Mahmood, University of Bridgeport
USA