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Invited Speaker Talk

The Computerization of Information: The challenges and the Pitfalls.

Prof. Fairouz Kamareddine (Heriot-Watt University, Scotland)

Abstract

The twentieth century saw the invention of computation machines and languages. Then, information engines, the world wide web and electronic search tools have changed the way we store, use and manipulate all aspects of knowledge. The 21st century will continue the search for the best computerisation tools and methods. However, we need to pose first and look at the challenges and pitfalls of the 20th century. In this talk, as a working example throughout, I concentrate on the computerisation of mathematical texts in the MathLang project. However, one can follow the same techniques to computer any other aspect of knowledge. The MathLang project aims at computerizing mathematical texts according to various degrees of formalisations, and without any prior commitment to a particular logical framework (e.g., having to choose either set theory or category theory or type theory, etc.) or to a particular proof checker (e.g., having to choose Mizar or Isabelle or Coq, etc.). Instead, MathLang keeps the choices of the logical framework and proof checker open depending on the taste and expertise of the user. Furthermore, MathLang allows useful computerizations of mathematical texts at much lower levels where the emphasis is not on full formalization as is done in the foundations of mathematics (e.g., as initiated by Frege and Russell) or on proof checking (e.g., as initiated by de Bruijn's Automath). During computerization, first, the mathematical text is input into the computer exactly as it was written and then one or more MathLang aspects are applied to the text to provide extended versions of the text that can be checked for different levels of correctness. One basic aspect is to extend the text with categorical information (term, noun, adjective, statement, etc) and to automatically check the correctness of the text at this categorical level. This guarantees coherence of the text (e.g., variables are declared before being used and the text constitutes a well structured book). Another aspect is to divide the text into parts annotated with relations (e.g., Corollary A uses Theorem B) and to automatically derive from these relations a number of structures that represent some dependencies in the text which help explain the logical structure of the text. These dependencies are used in a further aspect where a version of the text is transformed into another which shows the holes in the proofs. Other aspects will transform this version into a fully formalized version (say in Mizar or Isabelle). MathLang was created in 2000 by Fairouz Kamareddine and J.B. Wells as an experience driven project where the computerisation of different texts taken from various branches of mathematics, is the basis for the design and implementation of the MathLang aspects. So far, a number of

athematical texts have been computerised, some of which have been gradually transformed through MathLang aspects into full Mizar. Other proof checkers (e.g., Isabelle and Coq) are envisioned for the near future. In this talk, the MathLang framework, its developments and its current and future aspects, as well as examples of computerization from original mathematical texts to the fully formalised Mizar versions are given. For each aspect, emphasis will be on its design, formalisation, implementation, the automation available for this aspect and the correctness or trustworthiness of these processes. Then, we discuss how the computerisation path from the original mathematical text to full Mizar will look if Isabelle was the checker chosen instead of Mizar and show that a number of aspects and computerised versions of the original text are common between both path. We also discuss at which stage a commitment to a certain logical framework and a certain proof checker can be made on the path from the original mathematical text to the version fully formalised in that proof checker. The MathLang project started in 2000 by Fairouz Kamareddine and Joe Wells and has had since 2002 four PhD students (Manuel Maarek, Krzysztof Retel, Robert Lamar and Christoph Zengler) and a number of MSc and BSc students all collaborating and contributing to the design and implementation of the various aspects and to the computerization of mathematical texts.

Survey on Ontology learning from Web and open issues

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Abstract

With the continual increase of the volume of available information on the Web, information access and knowledge management become challenging. Thus, adding a semantic dimension to the Web, by the deployment of ontologies, contributes to solve many problems. In the context of the semantic Web, ontologies improve the exploitation of Web resources by adding a consensual field of knowledge. The need for using domain ontology for information retrieval (IR) has been explored by some approaches to better answer users' queries. However, ontology in IR system requires a regular updating, especially the addition of new concepts and relationships. In fact, IR systems are generally based on few number of domain ontology that cannot be extended. This paper proposes a survey of main several approaches of ontology learning from Web. In a previous work, we have proposed an incremental approach for ontology learning using an ontological representation called "Metaontology". In this paper, we describe a how the processes of semantic search and ontology learning from texts can collaborate for learning of multilayer ontology warehouse.

Keywords: Semantic Web, Ontology, Ontology learning, semantic search.

Combining Evidence with Logic and Preferences to Learn Relations from Structured Few Sparse Textual Data

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Abstract

In the literature, it is commonly believed that learning from few data problem can be resolved by using classifiers that consider interclass relationships. In this work, we will adopt this point of view in learning from few sparse textual data, essentially, by considering the sparseness of the latter as a good support for inducing theories about generalization. Therefore, we opt for an inductive approach based on combining: evidence-based analysis of patterns, logic and preferences. More precisely, we are

interested in supervised learning of biomedical articles by exploiting a multi-scale hybrid description and constrained pattern-based data mining techniques. Unlike existing works, we will highlight the relevance of the absence/weakness of patterns and we will associate to their absence a semantic value compared to their presence. The main characteristic of our approach is that of considering local and global contexts, which connect textual data by introducing regret ratio measures and generalized exclusive patterns in order to avoid a crisp effect between the absence and presence of patterns. Experimental results show the effectiveness of our approach. Structural Constraints, Analysis of Textual Patterns, Learning from Few Examples, Interclass Relationships, Sparse Textual Data.

Applying Packets Meta data for Web Usage Mining

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Abstract

With data mining the techniques of the search engines and visitor tracking called web mining. The important task for web mining is web usage mining, which mines Web log records to discover user access patterns of Web pages. Analyzing and exploring regularities in Web log records identify potential customers for electronic commerce, enhance the quality and delivery of Internet information services to the end user, and improve Web server system performance. This research introduces a new approach for Mining Web Usage which aims to improve the mining results. For web usage mining we aim to mine the proposed added metadata of the packets in addition to the values of the header's fields of the packets which are used in web usage. This is done by adding metadata as a new factor in web logging process. These data about data (metadata) will be added as a new attributes in web databases. Even so that will increase the number of attributes; we will treat this problem by using a suitable method for finding frequent item sets with limited time.

Keywords: Data mining, Web usage, Sensitive data mining, Meta data, and Internet packet.

Design improvement through dynamic and Structural pattern identification

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Abstract

Despite the high design quality they can produce, design patterns remain difficult to reuse directly within a development process. To overcome this problem, several works proposed approaches and/or tools to identify design patterns for code improvement and/or re-engineering purposes. Overall, theses propositions either rely mainly on the static aspect of the pattern, or require an exact match between the design pattern and its instantiation in the design/code. In this paper, we propose to improve designs through recognizing occurrences of patterns using both static and dynamic information. To propose improvements in a design, we adapt an XML document retrieval technique and, thus, tolerate design variability with respect to non essential parts of the pattern.

Keywords: design pattern identification; design pattern instantiation; XML document retrieval

Modeling and Verification of Real-Time Embedded Systems

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Abstract

In this paper, we present an approach for the analysis of real-time embedded systems. The analysis is based on the verification of the schedulability of tasks in addition to the verification of requirements on the overall system. The real-time embedded system is interacting with an environment composed essentially from a plant and other computerized software. In our approach we identify the behaviour of the plant using observed output from a simulation or from a real system. This measured/observed output will be used to model the behaviour of the plant. The specification of tasks controlling the plant will be integrated to this model. At the end, a model representing the scheduler will be composed with the plant models to get an overall system model which will be used for analysis. We have used the formalism of timed automata extended to specify tasks and scheduling which are implemented within a tool called "TIMES" for real-time model checking. Real-Time Embedded Systems, Modeling and Verification, Timed Automata, Scheduling.

WS-UML: A UML PROFILE FOR WEB SERVICE APPLICATIONS

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Abstract

Web service technologies have specificities that must be accounted for at the design level. The first part of this paper presents a web service design language WS-UML that is a UML profile. WS-UML extends UML with graphical annotations to express the specific concepts of web services, e.g., composition, security, location, trace of execution. The second part of this paper presents a meta-model describing the essential elements of web services. Finally, the paper illustrates the usefulness of the WS-UML notation using a Tourist information service example.

Keywords:Web service, Profile UML, security, composition.

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Derivation of an Analytical Model for Evaluating the Performance of a Multi-Queue Nodes Network Router

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Abstract

This paper presents a derivation of an analytical model to evaluate the performance of a multi-queue nodes network router, which is referred to as the mQN model. In this model, expressions were derived to calculate two performance metrics, namely, the queue node and system utilization factors. In order to demonstrate the flexibility and effectiveness of the mQN model in analyzing the performance of a

multi-queue nodes network router, two scenarios were performed. These scenarios investigated the variation of queue node and system utilization factors against queue node dropping probability for various numbers of queue nodes, and packets arrival routing probabilities. The performed scenarios demonstrated the flexibility and effectiveness of the mQN model to evaluate the performance of a multi-queue nodes router prior to the design and implementation stage as compared to experimental tests and computer simulations.

KEYWORDS: Congested networks; network routers; active queue management; multi-queue system; analytical modeling; utilization factor.

Performance evaluation of generic deployment platform for component based applications using graph theory

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Abstract

In this study, we present a generic deployment platform for distributed component based applications. The proposed platform is based on deployment and configuration specification and model driven architecture that is becoming a key approach for model transformation. Even though, our approach is experimented for enterprise Java beans model, it can be obviously extended to other specific model. Moreover, we develop a novel method for computing distances between hosts in a network. The intended method is based on graph theory and allows to represent the coast to any deployment transactions of component based applications. We illustrate the benefit of this approach in terms of accuracy, using k-median algorithm. We explain some implementation issues and discuss how the proposed method can be useful to any deployment transactions. Deployment, component based applications, deployment and configuration specification, model driven architecture, computer network graph, clustering, k-median algorithm.

Invited Speaker Talk

Resource Management and Trust in On-Demand Computing.

Prof. Odej Kao (Technical University Berlin, Germany)

Abstract

On-Demand-Computing technologies have reached a high level of development, but adopters underline core shortcomings related to QoS-guarantees, trustiness, and dependability for commercial applications and services. This is a significant problem for outsourcing mission critical applications in cloud infrastructures despite negotiation and availability of service level agreements (SLA). In this talk we will discuss methods for SLA-aware resource management in order to provide QoS guarantees for high-performance applications. Resource outages threaten the guaranteed resource reservations, therefore methods for application transparent fault tolerance are developed. These methods are based on checkpointing and migration, if necessary over multiple administrative domains. Alternative compute resources are discovered using a peer-to-peer based search engine. Finally, methods for risk assessment and management help to reduce the risk of SLA violation by providing indicators for self-organising fault tolerance. Applications such as information management on cloud infrastructures benefit from the developed methods. The presented results are achieved in a number of national and international projects such as HPC4U, AssessGrid and BisGrid.

EVALUATION TECHNIQUE IN THE SPICALCULUS FOR CRYPTOGRAPHIC PROTOCOLS

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Abstract

Bisimulation as a technique could be well invested for proving authenticity and secrecy properties of ryptographic protocols to gain the legality of protocol optimization. In this paper, we will do some changes in the spi-calculus after the original work of M.Abadi and A.Gordan. Then we will introduce evade bisimulation following Abadi and Gordan's framed bisimulation proposal, in which a convenient proof technique is presented. It will impose minimality requirements on the environment and detect the limit beyond which the bisimilarity is kept valid and furthermore it will avoid quantification over contexts. Also, it will give a solution for input transitions for the case of finite processes. Based on the revised spi-calculus would be used to prove that evade bisimilarity, an equivalence relation, is decidable for main security properties: Authenticity and Secrecy.

Keywords: Cryptographic protocols, testing equivalence, Bisimulation , authenticity and secrecy

Security Measures in Wired and Wireless Networks

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Abstract

The purpose of this study is to review contemporary wireless network protocols and areas that affect the ability of wireless fidelity (Wi-Fi) technology to secure data transmitted over wireless networks. The research approach takes the form of a case study, in collating the methods used by existing protocols in the implementation of wireless Security Trust Models within their networks. So the paper follows a case study methodology on all the wireless protocols provided by the Institute of Electrical and Electronic Engineers Wireless protected access Wi-Fi protected access; version 2 (WPA2) protocol has provided a more secure means for securing wireless networks but has only provided stronger encryption as it has a longer key which takes longer to decipher. So far, researchers have acknowledged that location privacy is critical to the security of data transmitted by wireless technology. The security reality though, is that even with the implementation of the purportedly secure standards for wireless systems e.g. the 802.1x suite; there are insecure gaps where the information in transit remains in its plain unprotected form for some seconds before it is re-encrypted into another format for transmission. It is at such security holes that the information criminals tend to attack. In this paper, we identify the various security related challenges faced by wireless protocols. This study is useful as it provides lessons for ICT managers, directors, academia and organizations, who wish to develop install or are already using wireless networks within their offices Keywords: Wi-Fi, WPA2, Wireless, Wired, Networks, WEP, Privacy, Security, Protocol, Models

Validating The IS-Impact Model At Queensland University Of Technology (QUT): Part A

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Abstract

The overall research aims to develop a standardised instrument to measure the impacts resulting from contemporary Information Systems (IS). The research adopts the IS-Impact measurement model, introduced by Gable et al, (2008), as its theoretical foundation, and applies the extension strategy described by Berthon et al. (2002); extending both theory and the context, where the new context is the

Human Resource (HR) system. The research will be conducted in two phases, the exploratory phase and the specification phase. The purpose of this paper is to present the findings of the exploratory phase. 134 respondents from a major Australian University were involved in this phase. The findings have supported most of the existing IS-Impact model's credibility. However, some textual data may suggest new measures for the IS-Impact model, while the low response rate or the averting of some may suggest the elimination of some measures from the model.
Keywords: Enterprise Systems, Information Systems Success, Information Systems Evaluation, IS Success, IS Impact.

Identifying Critical Success Factors of ERP Systems at the Higher Education Sector

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Abstract

In response to a range of contextual drivers, the worldwide adoption of ERP Systems in Higher Education Institutions (HEIs) has increased substantially over the past decade. Though the difficulties and high failure rate in implementing ERP systems at university environments have been cited in the literature, research on critical success factors (CSFs) for ERP implementations in this context is rare and fragmented. This paper is part of a larger research effort that aims to contribute to understanding the phenomenon of ERP implementations and evaluations in HEIs in the Australasian region; it identifies, previously reported, critical success factors (CSFs) in relation to ERP system implementations and discusses the importance of these factors.
Keywords: Critical success factors, CSFs, ERP implementation success, ERP systems, Higher Education.

An Exploratory Study of the Drivers of E-Business Value Creation in the Jordanian Banking Sector

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Abstract

Based on the Amit and Zott e-Value framework, we have developed an extended conceptual research model for assessing the value of e-business at the bank level. For the purposes of our research some parameters were added to or excluded from e-Value framework since our research is at the national level in Jordanian banking sector. Based on the extended framework, we have formulated four hypotheses and identify four factors (efficiency, complementarities, lock-in, and novelty) that may affect value creation of carrying out e-business in Jordanian banking sector. Survey data from 140 employees in seven pioneered banks in the Jordanian banking sector were collected and used to test the theoretical model. Based on simple and multiple linear regressions, our empirical analysis demonstrates several key findings: (1) Together, the efficiency, complementarities, lock-in and novelty factors strengthen e-business value as the hypotheses are supported. (2) the novelty is the strongest driver for e-business value creation than the other drivers efficiency, lock-in and complementarities (3) all of the drivers efficiency, complementarities, lock-in and novelty explain to the high degree the variance of sales-services-marketing as a dimension of e-business value, then to the middle degree the variance of internal operations as a dimension of e-business value, and to the low degree the variance of coordination and communication as a dimension of e-business value. These findings indicate the usefulness of the proposed research model for studying e-business value in banks. They also provide insights for both business managers and policy-makers to betterment the bank performance in terms of salesservices-marketing; internal operations and coordination & communication.
Keywords: e-business, e-business value, drivers of value creation, e-Value framework, bank performance,e-banking, Jordanian banking sector.

G2C Acceptance in Malaysia: Trust, Perceived Risk and Political Efficacy

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Abstract

Electronic government or e-government has long been known as a breakthrough of a new form of communication and transaction between the government and citizens, the government and industries, and among the government agencies. Simply, e-government is meant not only to help the government to accomplish its daily administrative activities but also to provide an easier way to communicate with external entities such as citizens and businesses throughout the utilization of information and communication technology (ICT). With the implementation of e-government in Malaysia, study about Government to Citizens (G2C) adoption could be significantly important in reflecting its progress. Against this backdrop, this research intends to study G2C adoption in Malaysia by adopting Technology Acceptance Model (TAM) theory as a framework. We investigated factors that are believed to influence citizens' intention to use G2C system. The factors were trust, perceived risk and political efficacy. Keywords: TAM, Intention to use, Perceived Risk, Trust, Political Efficacy

Applying E-marketing Methodologies In The Mobile Industry: The Case of Orange - Jordan

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Abstract

This paper explores the concepts of e-marketing and utilizes a case study focusing on Orange mobile firm. The study utilized some reports, data and the company website to identify the e-marketing strategy used by Orange and to recommend some remedies to improve their e-marketing strategy. The study uses an online tool to conduct some test on Orange's website and explore the firm's website using qualitative some tools and aspects of e-marketing concept. The output of this paper is aimed at aiding Orange to gain experience from what is working in other countries or organizations in relation to e-marketing and to know how it can benefit from using e-marketing as an effective tool to gain competitive advantage.

Key words: E-marketing, Orange, Mobile companies, case study

Exploiting P-invariant analysis for distributed systems diagnosis based on interacting behavioral Petri nets

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Abstract

This paper deals with the problem of distributed causal model-based diagnosis on interacting Behavioral Petri Nets (BPNs). The system to be diagnosed comprises different interacting subsystems (each modeled as a BPN) and the diagnostic system is defined as a multi-agent system where each agent is designed to diagnose a particular subsystem on the basis of its local model, the local received observation and the information exchanged with the neighboring agents. The interactions between subsystems are captured by tokens that may pass from one net model to another via bordered places. The diagnostic reasoning scheme is accomplished locally within each agent by analyzing the P-

invariants of the corresponding BPN model. Once local diagnoses are obtained, agents begin to communicate to ensure that such diagnoses are consistent and recover completely the results obtained by a centralized agent having a global knowledge about the whole system.
Keywords: Model-based diagnosis, causal models, Petri nets, reachability analysis, P-invariants.

DATA BASED ONTOLOGY CONSTRUCTION COUPLED TO EXPERT SYSTEM FOR STEAM TURBINE AIDED DIAGNOSTIC

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Abstract

This paper describes an approach for ontology construction using heterogeneous databases. We propose a mono-ontology of multiple CCOs (Canonical Conceptual Ontology) approach coupled to an expert system. Each database is described by its own CCO. The NCCO (Non Canonical Conceptual Ontology) are defined and used for realising inter-CCO mapping and to express the relationships between the COO. An expert system JESS (Java Expert System Shell) is integrated into ontology to generate automatically the NCCO starting from the logical rules. The proposed approach is applied for designing a fault diagnostic maintenance system for steam turbine. The main data and information constituting the system come from disparate data bases with different usage. In this case a database for equipment characteristics and another containing maintenance acts defining symptoms, defects and remedies for maintenance cases. The second aspect of the paper focuses on the possible enhancement and evolution of the developed ontology in order to take into account new maintenance cases. Ontology Construction and Evolution, Expert System (JESS), DataMaster

A Multi-Agent System for Image Segmentation A Bio-Inspired Approach

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Abstract

We explore the artificial life domain which opens new horizons to find bio-inspired solutions to image processing problems. Besides the ants which were successfully used, we investigate a new approach based on the interaction of social spiders, where we adapt the collective web weaving to an image segmentation on regions. Spiders were successfully used to extract regions on grey level images. We resume this method and try to adapt it for an image segmentation. The spiders which are considered as simple, autonomous agents, in limited perception, communicate by stigmergy of the silk that they weave, and so build several webs comparable to regions on an image.
Keywords: multi-agent systems, image segmentation, artificial life, emergence, stigmergy