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Recent Advances in Information Science

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Proceedings of the 3rd European Conference of Computer Science (ECCS '12)

Paris, France, December 2-4, 2012

Recent Advances in Computer Engineering Series | 8

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Plenary Lecture 1

Dimension-Oriented Software Engineering (DOSE): Rule-Based Software Development through Traceability Patterns

Professor Arbi Ghazarian
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Abstract: Information systems (IS) development, due to its opportunistic nature, is often characterized as a lengthy, unrepeatable, and unpredictable process, leading to high costs. Repeatability and predictability are key characteristics of any efficient engineering production process. Both of these factors are a function of the degree of opportunism present in the various phases constituting the production process. It follows that the quest for an economically-viable approach to quality software development should necessarily move in the direction of substituting more of the opportunism inherent in conventional plan-driven or agile development approaches with prescriptivism (i.e., substituting subjective heuristics with a set of system and domain-wide universally-observed objective rules). In line with this philosophy, in this plenary speech, I will introduce a framework for IS development, called Dimension-Driven Software Engineering (DOSE), which is capable of systematically bridging the gap between software requirement and source code components through a set of prescriptive rules, called Traceability Patterns, which govern the structure of a software system.

Brief Biography of the Speaker:
Dr. Ghazarian is an Asst. Professor of Computing Studies at Arizona State University. He received his Ph.D. degree in Computer Science from the University of Toronto in Canada. His research interests lie in Software Engineering, in particular, requirements engineering, software traceability, software maintenance and evolution, software comprehension, software reliability, software design and architecture. In addition to his academic background, Dr. Ghazarian has over 15 years of professional experience in the software industry and has been involved in several large-scale industrial software projects. He is the author of numerous papers published in international conferences and journals. He has been on the international technical program committee for the IASTED International Conference on Software Engineering and Applications (SEA). Dr. Ghazarian is the inventor of several novel approaches and concepts in software engineering, including the Traceability Patterns, Dimension-Oriented Software Engineering (DOSE), and the measurement of software regularities. Dr. Ghazarian's theoretical software engineering research program aims at establishing a solid formal foundation for the field of software engineering.

Plenary Lecture 2

Prediction and Knowledge Engineering through Semantic Tagging in Natural Language Processing

Professor Ahsan Nabi Khan
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University of Engineering and Technology
Lahore, Pakistan
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Abstract: There have been numerous attempts made to classify datasets into predictable structures and formats in order to test, train and organize knowledge. However, unstructured text in English, Urdu and other complex natural languages chiefly remains undiscovered, unaltered and unprocessed. Various computational linguistics tools and techniques including stemmers, parts-of-speech taggers, tag clouds, parsers and machine translators have been recently developed by online communities to model and use natural language dataset. Combinations of such linguistics and data mining techniques can produce XML and Ontology Standards to organize knowledge over the world wide web, cloud platforms and physical world in the ultimate. Working on these lines, we initiated our work by organizing personality features of human writing into psyche mapping. Now we are able to predict, assimilate, learn, classify and test any kind of feature set out of raw text into an ontology of semantic mapping. Various human understandable presentations of knowledge surveys are prepared through text-crawlers over the world wide web regenerating the view of knowledge we see around us.

Brief Biography of the Speaker:
Ahsan Nabi Khan is a Magna Cum Laude graduate from National University of Computer and Emerging Sciences, where he worked as a Research Assistant to Associate Professor, Liaquat Majeed Sheikh during 2008 through 2011, finally producing several internationally acclaimed publications in the field of Natural Language Processing and Text Data Mining. The best among those publications during the Assistantship was accepted in WSEAS Conference in Cambridge on Artificial Intelliegence, Knowledge Engineering and Databases in 2012, (AIKED'12). Recently Ahsan Nabi Khan has joined Masters of Science Program in University of Engineering and Technology, Lahore and subsequently continued research in NLP as a Research Officer in Center of Language Engineering, University of Engineering and Technology, Lahore. Ahsan Nabi has also been involved in teaching and software development in some pioneer software houses in cloud computing and academic solutions in Pakistan and currently also holds Director Education position in an NGO in Pakistan, Jesus of World Mission. His aim is to grow and help growth in academic excellence.

Plenary Lecture 3

Changing E-Business Philosophy in Web 2.0 Environment

Professor Zeljko Panian
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Abstract: In the early days of e-commerce, somewhere between 1994 and 2000, the driving force of doing business over and in the Internet was individual, personal initiative. Entrepreneurs with ideas – sometimes good and sometimes not successful in their implementation – tried their luck in this new kind of business. From today's point of view, it was rather straightforward and even naive approach to E-Business and there is no wander many of the pioneers did not survive for a longer time.
After the famous dot-com crash at the very beginning of the 21st century companies started rethinking their E-Business strategies and tried to create sustainable business models based upon the value added by companies themselves, the new era in E-Business development. Many excellent models like brokerage, affiliate, co-operative and many more other worthy models were set up and many of them still dominate the contemporary E-Business arena. The main characteristic of all E-Business models developed in this stage is a kind of "lead-to-cash" approach. But the emergence of Web 2.0 and particularly social networking technologies, supported by computing cloud technologies, revealed an undiscovered gold mine of business potentials – the power of masses and the worth of user-generated content. A growth of social media and networks as well as a huge number of connected customers may be and actually are an important source of virtually endless quantity of innovations and business opportunities. So, the E-Business philosophy is changing towards consumers becoming agents of adding value to products and services offered by businesses while companies position themselves as mediators in collecting, selecting, shaping and implementing people's contributions through sophisticated new E-Business models. Therefore, monetization of user-driven content forms a basis of the new generation off E-Business models.

Brief Biography of the Speaker:
Zeljko Panian is full professor of business informatics at The Faculty of Economics and Business, University of Zagreb, Croatia. He received his master degree in 1978 and Ph. D. in 1981 at the University of Zagreb. His scientific interests are primarily focused on Enterprise Information Systems, e-Business and Business Intelligence.
He wrote 33 books and more than 180 scientific and professional papers, and lectured as a visiting professor at the People's University of China at Beijing, Florida State University in Tellahassee (USA), University of Maribor (Slovenia) and University of Sarajevo and Mostar (Bosnia and Herzegovina), as well as nearly all universities in Croatia.
For several times, he delivered invited, keynote and plenary speeches at WSEAS and other international conferences and symposiums.

Plenary Lecture 4

Artificial Immune Systems and Swarm Intelligence for Pattern Recognition with Applications to Knowledge Discovery from Earth Observation Satellite Imagery

Professor Victor-Emil Neagoe
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Abstract: Man has learned much from studies of natural systems, to develop new algorithmic models able to solve increasingly complex problems. Enormous successes have been achieved through modeling of biological and natural intelligence, resulting so-called „intelligent systems". These nature-inspired intelligent technological paradigms are grouped under the umbrella called computational intelligence (CI). This lecture explores the nature and role of two bio-inspired paradigms, (chapters of CI), namely Artificial Immune Systems (AIS) and Swarm Intelligence (SI). Artificial Immune Systems (AIS) can be defined as adaptive systems, inspired by theoretical immunology and observed immune functions, principles and models, which are applied to problem solving. Swarm Intelligence (SI) is an innovative intelligent paradigm for solving optimization problems that originally took its inspiration from the biological examples of insects or animals that collectively exhibit complex behaviors, for example, bees, ants or birds. On the other side, modern environmental remote sensing satellite imagery, owing to their large volume of high-resolution data, offer greater challenges for automated image analysis. This lecture is an approach dedicated to the improvement and experimentation of Artificial Immune Systems (AIS) and Swarm Intelligence (SI) models for pattern recognition with applications in Earth Observation (EO) imagery. For the SI paradigm, one considers the model of Ant Colony Optimization (ACO). First model is an Unsupervised Artificial Immune System (UAIS), inspired from the vertebrate immune system, having strong capabilities of pattern recognition. We have implemented this model for a LANDSAT 7ETM+ multispectral image from the region of Bucharest (Romania) with four pixel categories (agricultural fields, artificial surfaces, forest, and water) ; using UAIS, one leads to the correct clustering multispectral pixel score better than performances obtained by applying K-Means and Fuzzy K-Means algorithms. Second model uses pixel classification by Ant Colony Optimization (ACO) algorithm which takes inspiration from the coordinated behavior of ant swarms. Using the ACO algorithm for pattern recognition in remote sensing imagery does not assume an underlying statistical distribution for the pixel data, the contextual information can be taken into account, and it has strong robustness. The experiments of ACO classification for a Landsat 7ETM+ image dataset (the same as that used in the first model) lead to promising results.

Brief Biography of the Speaker:
Victor-Emil Neagoe was born in Pitesti (Arges county, Romania) on May 31, 1947. From 1965 till 1970 he attended the courses of the Faculty of Electronics and Telecommunications, Polytechnic Institute of Bucharest, Romania. In 1970 he received the M.S. degree of diplomat engineer in electronics and telecommunications as a head of his series with Honor Diploma. He also obtained the Ph.D. degree in the same field from the same institution in 1976 as well as the Postgraduate Master degree in applied mathematics and informatics from the Faculty of Mathematics, University of Bucharest in 1981 . From 1970 till 1976 he has been an Assistant Professor at the Faculty of Electronics and Telecommunications, Polytechnic Institute of Bucharest, while from 1978 till 1991 he has been a Lecturer at the same Institute and Faculty, courses: information transmission theory and applied electronics. Since 1991 he has been a Professor of the Polytechnic University of Bucharest, Romania, where he teaches the following courses: pattern recognition and artificial intelligence; digital signal processing; computational intelligence; data mining. He has been a Ph.D. supervisor since 1990. He has published more than 120 papers; his research interest includes pattern recognition, nature inspired intelligent techniques (computational intelligence), multispectral and hyperspectral satellite/aerial image analysis, image compression and recognition, biometrics, sampling theory. He has been a Member of IEEE since 1978 and a Senior Member IEEE since 1984. Prof. Neagoe has been included in Europe 500 . He has been also included in Who's Who in the World 2011 and 2012 (28th and 29th Editions) as well as in Who's Who in Science and Engineering 2011-2012 (11th Edition).

Plenary Lecture 5

Application of Self Organizing Maps to Multi-Modal Adaptive Authentication System

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Abstract: Recently, biometric authentication attracts more attention as the security system. Biometric authentication is classified to two types. The first type is biometric authentication using biological biometrics such as fingerprint, iris, and vein pattern. The authentication system using biological biometrics generally shows high accuracy. However, it needs special hardware for implementation. Furthermore, biological biometrics can be copied because they are static information. The other type is biometric authentication using behavior biometrics such as keystroke timings, pen patterns, and pressures writing signs or handwritten patterns and walking patterns. For implementing to a computer system or mobile system, the device that is equipped with the system can be used to obtain the behavior biometrics. For example, many recent mobile devices are equipped with touch panels, which can be used to obtain sign or handwritten patterns. And it is difficult to imitate behavior biometrics because it is dynamic information. However, the accuracy of the authentication system using behavior biometrics is less than that of using biological biometrics because of the fluctuation of the behaviors. For solving this problem, integration of several biometrics is accepted to be effective. We proposed the authentication method using integrated information of multi-modal behavior biometrics. For example, the integration of the pen speed and pen pressures of handwritten patterns, integration of the features of handwritten patterns and keystroke timing for Tablet PC, and integration of keystroke timings and key typing sounds obtained from keyboard and microphone equipped to the notebooks were proposed.
For the authentication system, we proposed Supervised Pareto learning Self Organizing Map(SP-SOM) which can integrate the multi modal biometrics naively based on the concept of Pareto optimality. SP-SOM registers the input data of several users and can identify the user from the test input for authentication. For this problem we proposed Concurrent SP-SOM and Concurnt P-SOM which uses small map for each user.

Brief Biography of the Speaker:
Hiroshi Dozono graduated from Kyoto University, Japan in 1984, and graduated Doctor cource of Kyoto Univeristy in 1989. He worked in Tokushima University for two years, and in Kumamoto University for three years and currently works in Saga University as Associate Professor. His research area is Object Oriented System, Knowledge Engineering, Control Theory, Artificial Intelligence, Evolutional Algotithm Neural Networks. Recently, he specialized in application of Self Organizing Maps to Bioinformatics, Security Systems, and Control systems. He is author of about 50 papers published in international journals and conference proceedings.