Guest Editorial Preface

Special Issue on New Frontier on Information Systems and Technologies

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The special issue brings together a few selected papers from the proceedings of the 5th International Conference on Information Systems and Technologies (ICIST 2015), held in Istanbul, Turkey during March 21 - 23, 2015. The International Conference on Information Systems and Technologies (ICIST) is a forum for researchers, developers, and practitioners in the information systems and computer science fields. The ICIST conferences have been held annually since ICIST'11 (Tebessa, Algeria) in 2011, followed by ICIST'12 (Sousse, Tunisia), ICIST'13 (Tangier, Morocco), ICIST'14 (Valencia, Spain), and), and ICIST'15 (Istanbul, Turkey).

The aim of the ICIST is to report on the progress and development of methodologies, technologies, planning and implementation, tools, and standards in information systems and computer science. The conference also examines socio-economic aspects, impacts and success factors of information systems. ICIST brings together leading academics and professionals in information systems from around the world. It aims at providing a platform for discussions on issues that take into consideration the social and technological aspects of information systems. We would like to express our appreciation to all of those who have contributed to this special issue as author and reviewers.

The following eight articles address a wide range of issues related to the design, development and use of information systems in organizations from a multidisciplinary perspective.

The first paper, "Decision Support Systems Application Development Trends (2002 – 2012)" (Eyong Kim and Sean Eom) present a new survey which provides new approaches to the design and development of DSSs published in peer reviewed journals. DSS applications were searched using the online database ABI/INFORM complete, which is available on the web through ProQuest. The collected 80 specific DSS applications, which were published in 41 journals, were analyzed to examine the development pattern of DSS in the time period of 2002-2012. This paper summarizes the survey results according to the area of application, the year of publication in each area of application, the distribution of underlying decision support tools in DSSs, a classification based on Alter's taxonomy, and the management level (operational, tactical, or strategic) for which the DSS was designed.

The second paper, "Incorporating the Negotiation Process in Urban Planning DSS" (Benatia, et al.), proposes a new cooperation and negotiation protocol based on the principals of the Contact Net Protocol (CNP). The suggested negotiation protocol is used to solve one of the problems in the context of the city planning which is the problem of election of urban projects. Our proposed protocol is intended for the decision makers in order to help them resolve the problem of the evaluation and the selection of the best urban project without the need to be together in a decision urban room. Cooperation in multi-agent systems (MAS) is necessary in order to perform complex tasks and lead MASs towards

its objective. Contract-Net Protocol (CNP) is one of the communication and coordination mechanisms used by multi-agent systems which prefer cooperation through interaction protocols.

The third paper, 'Associating Searching on Search Engines to Subsequent Searching on Sites" (Adan Ortiz-Cordova and Bernard J. Jansen) investigates the association between external searching, which is searching on a web search engine, and internal searching, which is searching on a website. We classified 295,571 external – internal searches where each search was composed of a search engine query that was submitted to a web search engine. Then one or more subsequent queries were submitted to a commercial website by the same user. We examined 891,453 queries from all searches, of which 295,571 were external search queries and 595,882 were internal search queries. We algorithmically classified all queries into states, and we then clustered the searching episodes into major search configurations and identified the most commonly occurring search patterns for both external, internal, and external-to-internal searching episodes. The research implications of this study are that external sessions and internal sessions must be considered as part of a continuous search episode and that online businesses can leverage external search information to more effectively target potential consumers

The fourth paper, "Web Application for User Profiling" (Iggui, et al.), presents a novel approach to build user profiles. It is based on information extraction techniques and proceeds by iterative steps. The use of different statistic metrics, Natural Language Processing (NLP) techniques and semantic descriptions (ontologies) in our approach, has provided it with a good precision degree when extracting information from texts. This has been demonstrated by an application prototype which is an automatic user profile constructor, using the texts of emails job applications (E recruitment field).

The fifth paper, "Towards a Faster Image Segmentation Using the K-means Algorithm on Grayscale Histogram, "(Benrais and Nadia Baha) use the K-means algorithm to segment grayscale images. The aim is to reduce the computation time elapsed in the K-means algorithm by using a grayscale histogram without the loss of accuracy in calculating the clusters centers. The main idea consists of calculating the histogram of the original image, applying the K-means on the histogram until the equilibrium state is reached, and computing the cluster centers. The cluster centers are then used to run the K-means for a single iteration. Tests of accuracy and computational time are presented to show the advantages and inconveniences of the proposed method.

The sixth paper, "Software Implementation of Real-time Discrete Wavelet Transform Algorithm with Filter Banks" (Bogdanovs, et al.), describes the real-time discrete wavelet transform algorithm implementation for high-level programming language. The article describes multiscale transform algorithms both for direct discrete wavelet transform and inverse discrete wavelet transform. This algorithm has been implemented in C++ programming language and tested with the Raspberry Pi microprocessor system. This article proposes the improved delay line algorithm without the full shifting of the register. The new algorithm requires a single reading operation, single writing operation, and one division calculation for any length of delay line. The article includes experimental measurements of processing times on a Raspberry Pi for various scale numbers. The algorithm described in this article can be used with any software tool capable of using high level programming language, for example Matlab, Octave, Opnet, etc. The main purpose is to create an algorithm which is not tied strictly to hardware implementation, but can also, nonetheless, provide real-time discrete wavelet analysis capability.

The seventh paper, "Formal Verification of UML2 Timing Diagrams Based on Time Petri Nets" (Louati and Barkaoui), extends the Unified Modeling Language (UML) diagrams by adding a formal verification stage. We presented the UML2 timing diagram (TD) as an interaction diagram in order to describe the system's behavior in a temporal way. To do this, we gave a formal description for TD using Time Petri Nets (TPN). Then, we proposed a formal verification by means of Romeo Model Checker. In particular, we showed how to formulate quantitative properties using TCTL (timed computation tree logic). In addition, we demonstrated how to derive the TCTL formulae from Object Constraint Language-Real Time (OCL^{RT}) constraints. Finally, we illustrated the proposed approach through a real case study.

The eighth and last paper, "ADM-Based Migration from JAVA Swing to RIA Applications" (MBARKI, et al.), applies an ADM approach in order to develop a tool named FlexMigration which allows the automatic reverse engineering of Swing GUI to obtain a RIA GUI. The usefulness of this tool is the automation of the migration process with the extraction of the actions encapsulated in possible anonymous classes. As an illustration, we presented a reengineering of a small legacy chat application and explained its migration process to generate a similar Flex Graphical User Interface.

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