Foreword and Editorial

International Journal of Software Engineering and Its Applications

We are very happy to publish this issue of an International Journal of Software Engineering and Its Applications by Science & Engineering Research SoCIety.

This issue contains 17 articles. Achieving such a high quality of papers would have been impossible without the huge work that was undertaken by the Editorial Board members and External Reviewers. We take this opportunity to thank them for their great support and cooperation.

Authors of the paper “Hashed Page Table Support for the Virtualization” are re-evaluating the existing techniques and architectural support made for virtualization environment. They propose hashed page table to reduce the memory accesses from 24 to 2. Proposed methodology is divided into three modules. First one is to give the computational time of hash. Hash function must provide unique values for two different virtual addresses which is included in second module. Third module is to calculate benchmark results on the proposed system.

The paper “A Clustering Approach Based on Charged Particles” applied a new method called magnetic charged system search (MCSS) to determine the optimal cluster centers. This method based on the behavior of charged particles. The proposed method employs the electric force and magnetic force to initiate the local search while Newton second law of motion is employed for global search. The performance of the proposed algorithm is tested on several datasets which are taken from UCI repository and compared with the other existing methods like K-Means, GA, PSO, ACO and CSS.

In the paper “Design of a Work Process and Implementation of a Prototype for the Development of an Automation Tool for Android Application Vulnerability Inspection”, as a variety of services are provided through mobile devices, there have been increasing security threats to mobile platforms and applications. Many mobile application security check methodologies are proposed to deal with such threats, but it is not clear exactly how the security vulnerabilities are inspected, and there is no correct methodology for such. One way to increase the execution rate of vulnerability check is to develop an automation tool that simplifies the process. Therefore, in this study, a work process of Android application vulnerability inspection was designed and a prototype of the automation tool for vulnerability inspection was implemented. Furthermore, the effectiveness of the implemented prototype was assessed through an actual application using the prototype.

The thesis “Integrating the Computer Systems and Applied Music Education - Focus on Sequencing Program” researches about the most popular MIDI used in popular music majors; Cubase and Logic Pro. Among several functions, this thesis would compare the strength and weakness of sequencing, and special features in an educational perspective.

Proponents of the study “Clauser: Clause Slicing Tool for C Programs” introduce the “Clauser,” which is a new clause slicing tool for C programs. The Clauser is a slicing tool that divides the program code lines into clauses, depending on certain rules, and then it slices the clauses by applying the rules of clause slicing and returns the slices of the slice criterion. Compared to other static slicing techniques, clause slicing is more accurate.
because it considers all code phrases that may affect the program flow. Implementation results showed that the Clauser succeeded in automating a part of clause slicing.

In the paper “Integration of Korean Feature Information for SRL System”, automatic semantic role labeling using 10,000 sentences in a semantic role tagged corpus constructed from a Korean syntax tagged corpus was conducted. In Korean, affix, such as josa and eomi, is a very important role in syntactic parsing and semantic role labeling. Semantic role labeling was achieved in this study by improving particle and word ending information, which were insufficiently addressed in previous studies on semantic role labeling, and creating new features. When features based on the affix information created in this study were added to the basic features used in previous studies on semantic role labeling of languages, an F1 score of approximately 80.83% was obtained.

Authors of the paper “A Stochastic Approach for Valuing Customers: A Case Study” propose a new method to calculate individual customer’s lifetime value dynamically. The feasibility of the suggested model is illustrated through a case study of the wireless telecommunication industry in Korea. Data mining techniques are used to predict lifetime value of a customer. Marketing implications will be discussed based on the result of individual CLV.

Paper “Modeling and Code Generation of Android Applications Using Acceleo” presents a methodology based on the Model Driven Architecture (MDA) to develop mobile applications according to the principle “develops once, use everywhere”. Their approach exploits UML modeling and Acceleo to generate specific code in order to accelerate and facilitate the development of mobile applications.

The study “Case Study on Message Races in Data Distribution Service Programs” empirically presents fault cases how it lead to message races on the different order of events. In order to prove it, they show four cases of message races considering the order of two write events and the quality of service (QoS), which lead to nondeterministic results.

The paper “An Empirical Study of MCL-based Spreadsheet Visualization” discusses the results of a controlled experiment conducted to investigate the effectiveness and efficiency of the prototype tool. They used cognitive fit theory as the basis for the evaluation of the tool. Among the features of the tool, highlighting of clusters was found to be useful for spreadsheet debugging while data dependency graph based visualization did not improve effectiveness and efficiency of debugging a spreadsheet.

The paper “A Classification Method of Commonality and Variability for Mobile Services” proposes a classification method of commonality and variability for identified services from feature models, since features can express the properties of services. The service is identified by feature organizing, considering the selective and relational attributes of features. Identified services are classified the commonality and variability of services; this involves analyzing the service properties and reuse levels. The service types in a service level are as follows: mandatory, optional, alternative, and or. The suggested method can facilitate service reusability in the product lines of mobile phones.

The paper “Visualizing Communications between Software Developers during Development” presents an approach to visualize communication among developers during development. The proposed approach analyzes and visualizes various types of communication flows between developers. The main focus of this approach is on emails, chat archives, bugs and common files extracted from version histories and public
communication archives. A tool is developed to realize the approach, VCSD, (Visualizing Communication between Software Developers). The tool provides three views that present the overall different and useful aspects for collaborations. Project managers can get a comprehensive understanding about collaborations between developers as well as contributions of each developer and how they are involved in the development process. The main components are menu bar, three graphical views and the timeline. First view presents the communication evolution. Second view presents system’s evolution and third view presents the modification history.

In the paper “Case Study: Interrupt-less Servo Motor Controls for Pneumatic Pump in Safety Critical Devices”, interrupt-less servo motor controls for pneumatic pump system in medical devices are evaluated and analyzed in terms of behavior correctness as well as the predictability of the system. Experimental results show negligible differences on the main control variable of servo motor compared to the interrupt-driven controls while it provides better predictability by getting rid of interrupts except an internal timer for periodic handling of time stamps by sensor events including motor, pump pusher plate, and buttons in the user interface.

Authors of “NoSQL based Web Service System for Sharing of Emotion Information in Cloud Computing” present the No-SQL based Web service system for sharing of emotion information regarding the individual emotional states and location information of users using by a MongoDB in cloud computing environments. Pre-processed emotion information represents the individual emotional states categorized as a nine domain based on physiological signals recognition within the database system. However, in order to present individual emotional states regarding to pre-processed user’s emotional states and locations on a Web-based map, the computational overload with large amount of data for a location-query process is to be solved for support sharing Web services. Meanwhile, previous RDBMS-based systems are inadequate due to insufficient scalability and processing time of data processing nodes. Therefore, in this paper, they have designed and implemented an emotion sharing web service by reducing the load on the system using NoSQL database. In addition, it was confirmed that it is possible to effectively utilize resources and visualized by using Google’s FusionTable and it is possible to share on a Web map.

The work presented on the paper “A Formal Model of Robustness Testing for an Object-Oriented Specification” proposes a formal model of constraints for testing the conformity of an implementation from its specification. The principal idea of their approach is based on an equivalence partitioning of input domains for each method type in an object oriented (OO) paradigm for detecting the different classes of errors. The main contribution of their approach is the use of invalid data which do not satisfy the precondition constraints for testing the robustness of entities in an OO model. Indeed, the first objective of the proposed work is to develop a theoretical model of constraint in order to test the conformity of classes. The second objective of their approach is to detect anomalies in invalid input data which induce valid output constraints. The implementation of this approach is based on a random generation of test data and analysis by formal proof.

The research “A Classification of Software Modules into Library and Application Components in the Open-Source Field” aims to validate Chidamber and Kemerer (CK) metrics as predictors of software reusability. In order to achieve this goal, an empirical study is conducted to validate metrics in classifying two groups of components: library (reuse-prone) and non-library (less reuse-prone). A nearest neighbor’s technique is used to classify library and application components using object-oriented software metrics. The
approach is applied to a number of library and application systems available online. The conducted nearest neighbors models have produced acceptable classification. The results provide evidence of using metrics as surrogates of software reusability when models are evaluated using F-measure. CK metrics can be used to measure component reuse-proneness and can be used to differentiate between library and application components. A nearest neighbor’s technique can be used to identify the reuse-prone components in open-source application.

The paper “Embedding Algorithm among Half Pancake, Pancake, and Star Graphs” suggest embedding algorithm among these networks. The half pancake $HP_n$ was embedded on pancake $P_n$ with dilation 1 and congestion 1. The half pancake $P_n$ was embedded on star graph $S_n$ with dilation $1.5n-2$, average dilation about $0.25n+4$, and congestion 6. The pancake $P_n$ was embedded on star graph $S_n$ with dilation $1.5n$. All the three of embedding were one-to-one embedding with expansion 1.

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