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EDITORIAL

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Novel Solutions and Approaches to Effective Data Processing

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Executive Editor and Editor-in-Chief, *JIPS*

1. Introduction

The *Journal of Information Processing Systems* (*JIPS*) is a journal published by the Korean Information Processing Society (KIPS), which publishes papers related to a wide variety of advanced research fields including systems, applications, networks, architecture, algorithms, security, and so forth and has indices such as ESCI, SCOPUS, EI COMPENDEX, DOI, DBLP, EBSCO, Google Scholar, and CrossRef. There are four divisions: Computer system and theory, Multimedia systems and graphics, Communication systems and Security, and Information systems and application.

The published theoretical and practical articles contribute to the relevant research area by presenting cutting-edge techniques related to information processing including new theories, approaches, concepts, analysis, functional experience reports, implementations, and applications. Topics covered in this journal include, but are not limited to, computer systems and theory, multimedia systems and graphics, communication systems and security, software systems, and applications.

2. Related Works

Fahim et al. [1] propose a novel load balancing model for cloud computing. The proposed model is based on Bat-algorithm, which allocates tasks to the most efficient number of virtual machines (VMs) by ensuring equal load balancing and increasing the total number of allocations possible in serial or parallel mode. This paper compares various meta-heuristic algorithms to select the most appropriate classification model for pre-classifying the entry instructions in VMs.

Zhang et al. [2] present a new proposal based on operator extracting image patches for performing image denoising via the Expected Patch Log Likelihood (EPLL) method. They propose a new operator that can retain more information when extracting image patches to solve the poor anti-noise and the loss of structure information. In the experiment, this proposal shows better results in both the value of PSNR and visual effect.

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Wang et al. [3] Wang propose a low-cost method that can identify legacy devices, especially code wheel instruments. This method can effectively identify the digital numbers from the numeric image acquired from the code wheel instrument. This method needs a small amount of memory for calculation; it can be deployed on a cheap microcontroller unit (MCU) with low read-only memory (ROM). While maintaining the existing instruments, the proposed method will be helpful for building a smart city, because the automatic management of the measurement can be performed using this method.

Jang [4] describes an automobile control software program. TMMi is a representative examination-driven test process model widely used in the test process maturity evaluations of test execution organizations and its usability has been proven in many ways. This paper contributes to a software testing organization that has a plan to improve the software test process.

Crowdsourcing software development (CSD) is a new type of emerging software engineering that is performed by open participation in any task of software development. It usually utilizes an open call online format to allow a large number of CSD developers to participate together in different types of software project tasks.

Tunio et al. [5] propose a conceptual framework for task assignment modeling on the basis of personality, which provides a fundamental platform for CSD developers to find proper tasks and assign their tasks directly.

Kim [6] presents a novel technique for flash memory page management to solve the problem of conventional buffer replacement algorithms. The proposal is based on the idea of dividing pages into groups and considering the reference frequency and time when the target page replacement occurs. According to performance evaluation, it shows the highest buffer hit rate and the lowest number of write operations, compared with existing algorithms.

Hua et al. [7] investigate the reason for balance shifting from Europe to Asia in Information Communication Technology (ICT) industry. This paper examines the reasons for the loss of ICT momentum led by European countries in the past and explores why Asian countries have taken the lead in the field of digital power nowadays. According to this study, Asia is a densely populated region over 2.8 billion people with a cheap workforce and ample capital, and great absorption capacity for new R&D technology with ICT industry. All of these factors seem to position Asian countries as emerging economies and shift the regional balance of ICT power to Asia.

Pardamean et al. [8] present a design for information technology infrastructure for Indonesian agriculture genotyping. This target infrastructure needs big data management because it demands the management of a large quantity of genome data typing. This study shows a secure, reliable, and scalable IT infrastructure for agriculture genotyping.

Wang et al. [9] propose a new fragile watermarking method based on the discrete wavelet transform and the local binary pattern (LBP). The proposed scheme is defined as follows. The LBP pattern of the low-frequency wavelet coefficients is used for a feature watermark, which is inserted into the least significant bit (LSB) of the maximum pixel value in each block of the host image. This watermark scheme is encrypted by applying a logistic map to ensure the safety of the proposed algorithm. The experimental results show that the proposed algorithm has lower watermark payloads and good performance in tamper identification and localization for various malicious attacks, compared with existing methods.

Ryu et al. [10] present a novel scenario-based forensic analysis technique for specific third-party social networking service application in the mobile device. This paper analyzes what kinds of valuable forensic artifacts remain when a user performs social activities, which are stored in the internal memory of the mobile device. This proposal will be helpful for a forensic investigator to locate artifacts and valuable meaning of data left according to the specific third-party social application.

Zhao et al. [11] propose a new approach for hierarchical partitioning of passenger nodes based on a self-organizing map (SOM) and k-means algorithms. It removes individual impacts and local optimizations compared with existing hierarchical partitioning process models. This study will help the railway authorities to understand the importance of passenger nodes, plan train operations and carry out transportation assignments.

Miloudi et al. [12] propose an improved database classification algorithm for multi-database mining. It suggests an efficient approach to the problem of classifying multiple databases as a matter of identifying the connected components based on the non-directional weighted graph. Compared with existing works, the suggested algorithm shows searches for the best classification.

Dong et al. [13] present a novel sentiment analysis (SA) model on the Chinese microblog. This proposal is based on spectral clustering in semi-supervised machine learning to improve the accuracy of sentiment classification and solve the problem of SA. The experimental results show that the proposed algorithm can improve identification accuracy without increasing the network complexity of SA.

To analyze more than 100,000 security vulnerabilities, it needs to automate the process of identifying a large number of Internet-connected devices. Na et al. [14] propose a practical method and system for automatically generating internet-connected device information in Common Platform Enumeration (CPE) format from banner text to detect potentially vulnerable devices with Common Vulnerabilities Exposure (CVE) vulnerabilities.

Malhotra and Sharma [15] present an experiment in which seven web applications analyze the fault prediction using fourteen machine learning techniques, which are conducted on various releases of Apache Click and Apache Rave datasets. This experiment conducted on the input basis set for each release is first optimized using the filter-based correlation feature selection (CFS) method for predictive analysis. It shows that the LCOM3 (lack of cohesion amongst methods), WMC (weighted methods per class), NPM (number of public methods), and DAM (data access metrics) metrics are the most significant predictors.

In heterogeneous wireless networks supporting multi-access services, selecting the best network from among the possible heterogeneous connections and providing seamless service during handover for a higher Quality of Services (QoS) is a big challenge. Pandey et al. [16] present an intelligent vertical handover (VHO) to maximize network utilization as more than one target network exists during VHO. This proposal focuses on how to associate a standard VHO framework, such as IEEE 802.21, with network metrics selected for a VHO decision. Based on the simulations in this paper, it was discovered that the proposed IEEE 802.21 schemes using the SINR aware handover decision (SAHD) and the traffic aware handover decision (TAHD) provide high throughput, unwanted handover reduction, and low handover latency as compared with other handover methods.

A simplified neutron set (SNS) is a generalization of a fuzzy set where each element is designed for some real-life situations with truth member functions, indefinite member functions, and falsity member functions. Liu [17] presents a novel method to construct similarity measures of single-valued neutrosophic sets (SVNSs) and interval-valued neutrosophic sets (IVNSs) for generalizing the fuzzy set,

respectively. Those proposed formulas prove that it can be more effective and reasonable than other methods for satisfying the axiomatic definition of the similarity measure in pattern recognition.

3. Conclusion

This issue featured 17 novel and original papers from around the world. We introduce novel or practical approaches to studies from diverse research areas. This issue includes novel solutions and approaches to load balancing in cloud computing, extracting image patches, improvements for software engineering and testing, big data management for practical area, practical cases for machine learning, automation for security management, real-world ICT issues, and so forth. We would like to thank all authors who submitted their papers for this issue and all reviewers who accepted our review invitations.

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