EDITORIAL

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Practical Approaches Based on
Deep Learning and Social Computing

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1. Introduction

The *Journal of Information Processing Systems* (JIPS) publishes a wide range of topics related to a wide variety of advanced information and communication technologies, including systems, networks, architectures, algorithms, applications, and security. As the official international journal published by the Korea Information Processing Society, JIPS is the world's leading academic journal indexed by ESCI, SCOPUS, EI COMPENDEX, DOI, DBLP, EBSCO, Google Scholar, and CrossRef. The purpose of JIPS is to provide an outstanding, influential forum where researchers and experts gather to promote, share, and discuss crucial research issues and developments. 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

Zhang et al. [1] review two classical models of copy-move forgery and two frameworks of copy-move forgery detection (CMFD) methods. The authors explain that the massive CMFD methods are separated into two types to recollect the process of CMFD technologies, including block-based and keypoint-based. The performance evaluation criteria and the datasets created for evaluating the performance of CMFD methods are also presented in this paper.

Gurjar and Moon [2] deal with the area of music similarity analysis in the music information retrieval (MIR) system. This paper addresses two sectors of MIR: general description of MIR and investigation of methods for music similarity measurement. The authors analyze the efficiency and accuracy through comparative analysis among MIR systems.

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Tseng et al. [3] describe the black hole attack and security concerns in MANETs including current issues and future trends. The authors summarize attack detection schemes with systematic comparison tables, such as collaborative black hole, non-cooperative black hole, and other attacks.

Rudrapal et al. [4] provide an overview of the summarization approaches on Twitter. This paper presents them by Tweet summarization approaches including extractive, abstractive, and summaries. It also presents summary evaluation methodologies: human, recall-oriented, information-theoretic, and model-free evaluations.

Nguyen and Kim [5] survey Blockchain-based consensus algorithms, i.e., proof-based consensus and vote-based algorithm. Recently, Blockchain has been popularized as a key technology to solve the problem of low-trust centralization. This paper categorizes algorithms into two kinds: proof-based algorithm and vote-based consensus algorithm. Comparison analysis is also performed between these two types focusing on the highlighted characteristics.

Tunio et al. [6] present AI automated planning by Planning Domain Definition Language (PDDL) to solve the Crowdsourcing Software Development (CSD) task assignment problem. The goal of this study supports the CSD developer in evaluating PDDL planning. The experiment shows that it has many challenging issues in undefined conditions when the developer assigns the tasks. Thus, the authors suggest that AI-based automated planning can provide a reliable solution to the CSD developer.

Park and Peng [7] deal with a Spark-Hadoop-based LDA association system to process user features at high speed from a huge amount of social data. The extraction of meaningful user comments from social data are constrained by various limitations such as unstructured dataset, huge storage space, and long processing time. In order to overcome those obstacles, the authors propose a Spark framework on top of the Hadoop cluster. The experiment in this paper shows that it can reduce the requirement of disk access time and improve the processing speed.

Song and Kim [8] propose a novel approach to the deep neural network model for untrimmed video analysis, especially human activity detection. The suggested model features two steps: feature extraction and human activity detection. The first step of this study extracts the rich features for recognizing human activities in a long untrimmed video. For the next step, the authors use a bi-directional recurrent neural network model (BLSTM) for detecting human activities from the sequence of extracted feature vectors, which is based on convolutional neural networks (CNNs) including C3D and I-ResNet.

Song et al. [9] present a smart meter based on the IoT platform, which provides air conditioning control automatically. The proposed IoT platform with a Deep Belief Network (DBN) algorithm enables remote and automatic air control with low power consumption features based on environmental information such as temperature and humidity.

Zeng et al. [10] present a novel approach to non-rigid 3D model retrieval, which is based on the multi-feature fusion learning model. The suggested model is used for multi-scale shape distributions by heat kernel signature (HKS) and wave kernel signature (WKS) descriptor for the input features of CNNs. This paper proposes the cross-connected layer to unify the low-level features and high-level features. Not only is the fusion layer able to learn the discriminative characteristics of the two kinds of descriptors; correlation analysis between them is also enabled.

Li et al. [11] present an approach to DBN for face recognition under complex illumination conditions. The proposed method is divided into two steps: enhanced local extraction feature and DBN for face recognition. The wavelet decomposition-based image fusion provides the illuminations variation on the feature extraction. Those local texture features are unified with DBN to obtain robust face recognition under severe illumination conditions.

Lee et al. [12] describe the performance analysis between AlexNet and GoogLeNet for Korean character recognition. Comparing their performances will yield data that will serve as a valuable reference in the deep learning area, especially CNNs. The result shows that KCR-AlexNet is faster than KCR-GoogLeNet; otherwise, KCR-GoogLeNet shows faster classification speed. This research used the PHD08 training dataset, a large-scale Korean character database.

Chao et al. [13] propose a new approach to the vocal effort detection method to enhance the performance of the speech recognition system. In this area, detecting the level of vocal effort is one of the crucial issues. Feature extraction is carried out in spectral information entropy, with the proposed fusion method applied to the recognition system based on those extracted features.

Ha and Kim [14] propose a new flow management scheme in the SDN-based network on cloud computing. The proposed scheme enables efficiency management that can speed up the flow entry search speed and maximize the number of flow entries simultaneously.

Zhang and Xiao [15] present a novel approach to the immune intrusion detection model in virtual machines (VMs) in cloud computing, called I-VMIDS (Immune-inspired Intrusion Detection System). The goal of this study is to ensure the security of user-level applications in virtual machine clients. The suggested model extracts the system call of running programs, abstracts them into antigens, unifies related environment information from virtual machine clients to produce suspicious signals, and develops an intrusion detection method based on these results.

Salam et al. [16] describe the future direction for public education with ICT infrastructure. This study found out that new ICT-based education can lead to well-trained teaching staff and upgrading of the curriculum and policy.

Finally, Koo et al. [17] propose multi-purpose PCI Express adapter cards by applying an onboard optical module with the latest optical communications. According to their experiment result, the proposed card can improve transfer distance and utilization on the same bandwidth compared with the existing adapter cards.
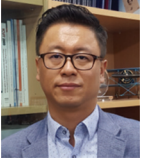
3. Conclusion

This issue featured 17 novel and original papers from around the world including 5 survey papers. We introduce novel approaches to studies from diverse research areas. Especially, this issue tackles deep learning and social computing, which are hot topics and key technologies in ICT nowadays, such as DBN-based smart home application and face recognition, 3D modeling using CNN, automation system application using DL, LDA-based topic analysis, speech recognition and so forth. In addition, this issue features 5 outstanding papers awarded in the 2017 JIPS Survey Paper Awards, including forgery detections for image copy & move, analysis for music retrieval systems, text summarizations for Twitter, blockchain-based consensus algorithms, and security countermeasures for MANETs. 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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