Hindawi Publishing Corporation
Journal of Electrical and Computer Engineering
Volume 2016, Article ID 2901835, 2 pages
http://dx.doi.org/10.1155/2016/2901835

Editorial

Advanced Information Technology Convergence

Jucheng Yang,[1] Hui Cheng,[2] Sook Yoon,[3] Anthony T. S. Ho,[4] and Weiming Zeng[5]

[1]*College of Computer Science and Information Engineering, Tianjin University of Science and Technology, Tianjin, China*
[2]*School of Computing and Mathematical Sciences, Liverpool John Moores University, Liverpool, UK*
[3]*Department of Multimedia Engineering, Mokpo National University, Jeollanam-do, Republic of Korea*
[4]*Department of Computing, School of Electronics and Physical Sciences, University of Surrey, Guildford, UK*
[5]*College of Information Engineering, Shanghai Maritime University, Shanghai, China*

Correspondence should be addressed to Jucheng Yang; jcyang@tust.edu.cn

Received 6 June 2016; Accepted 6 June 2016

The tremendous growth and usage of information technologies led to rapid development on the various aspects of advances in convergence and hybrid information technology. The spread of current technologies is more emanative at all stages of research, development, diffusion, and use. Moreover, different regions of research and applications are often integrated together to achieve better performance, solve problems and restructure systems, and improve the computational intelligence both theoretically and practically. Hence, the convergence of information technologies could lead to the new stage of innovation with significant increasing speed.

This special issue is aimed at providing state-of-the-art publication of refereed, high quality original research papers in all branches of the convergence technologies and its applications, such as signal and image processing for IT convergence, web and database technology for IT convergence, IT convergence in health care, robotics, transportation system, and big data technology.

The special issue consists of 13 papers whose brief summaries are listed below.

"Disordered and Multiple Destinations Path Planning Methods for Mobile Robot in Dynamic Environment" by Y. Dong et al. presents a sinusoidal adaptive genetic algorithm for mobile robot in dynamic environment which can calculate the crossover probability and mutation probability adaptively changing with environment at any time.

"Heuristic Data Placement for Data-Intensive Applications in Heterogeneous Cloud" by Q. Zhao et al. proposes an improved data placement algorithm for heterogeneous cloud environments. In the initialization phase, a data clustering algorithm based on data dependency clustering and recursive partitioning has been presented, and both the factor of data size and fixed position are incorporated. And then a heuristic tree-to-tree data placement strategy is advanced in order to make frequent data movements occur on high-bandwidth channels.

"A Fusion Face Recognition Approach Based on 7-Layer Deep Learning Neural Network" by J. Liu et al. presents a method for recognizing human faces with facial expression. In the proposed approach, a motion history image (MHI) is employed to get the features in an expressive face. It fused the 2D images of a face and MHIs which were generated from the same face's image sequences with expression. Then the fusion features were used to feed a 7-layer deep learning neural network. The previous 6 layers of the whole network can be seen as an autoencoder network which can reduce the dimension of the fusion features. The last layer of the network can be seen as Softmax regression.

"Spatial Circular Granulation Method Based on Multimodal Finger Feature" by J. Yang et al. focuses on a new multimodal finger feature recognition scheme based on granular computing. First, the ridge texture features of FP, FV, and FKP are extracted using Gabor Ordinal Measures (GOM). Second, combining the three-model GOM feature maps in a color-based manner, it then constitutes the original feature object set of a finger. To represent finger features effectively, they are granulated at three levels of feature granules (FGs) in

a bottom-up manner based on spatial circular granulation. In order to test the performance of the multilevel FGs, a top-down matching method is proposed.

"Cloud Multidomain Access Control Model Based on Role and Trust-Degree" by L. Xie et al. presents an access control model based on role and trust-degree. The model combines role-based access control and trust-based access control. The role assessment weights are defined based on the user's role classes, and the trust-degree is calculated according to the role assessment weights and the role's behavior.

"Power Consumption Based Android Malware Detection" by H. Yang et al. proposes a malicious software detection method based on power consumption. Firstly, the mobile battery consumption status information was obtained, and the Gaussian mixture model (GMM) was built by using Mel frequency cepstral coefficients (MFCC). Then, the GMM was used to analyze power consumption; malicious software can be classified and detected through classification processing.

"Finger Vein Recognition Using Optimal Partitioning Uniform Rotation Invariant LBP Descriptor" by B. C. Liu et al. proposes two block selection methods which are based on the estimate of the amount of information in each block and the contribution of block location by looking at recognition rate of each block position to reduce feature extraction time and matching time. The specific approach is to find out some local finger vein areas with low-quality and noise, which will be useless for feature description. Local binary pattern (LBP) descriptors are proposed to extract the finger vein pattern feature.

"Subsurface Geobody Imaging Using CMY Color Blending with Seismic Attributes" by J. Cao et al. focuses on the approach of CMY color blending and its application in subsurface geobody characterization by using seismic attributes data. The first step is to calculate three types of seismic attributes based on the Hilbert transform algorithm, including envelop, instantaneous phase, and instantaneous frequency. Then, the three attributes are scaled and combined together using CMY color model in three-dimensional environment, and each attribute is corresponding to one primary color channel.

"Plant Leaf Recognition through Local Discriminative Tangent Space Alignment" by C. Zhang et al. introduces a dimensionality reduction method based on local discriminative tangent space alignment (LDTSA) for plant leaf recognition based on leaf images. The proposed method can embrace part optimization and whole alignment and encapsulate the geometric and discriminative information into a local patch.

"HS-RAID2: Optimizing Small Write Performance in HS-RAID" by Y. Dong et al. proposes a redundancy algorithm, data incremental parity algorithm (DIP), which employs HS-RAID to minimize the write penalty and improves the performance and reliability of the storage systems.

"Research on the Rough Extension of Ontology Description Language of SWRL" by X. Zhang et al. extends the Semantic Web Rule Language (SWRL) and gives the extension of reasoning rules. Firstly, the concept of rough ontology and the extension of rough relationship of ontology are put forward; secondly, they give the extension method for concepts, relationships, axioms, examples, and rules of SWRL. Finally, a psychological counseling case shows that the method can well express the uncertainty of knowledge, and it is able to well express the reasoning rules.

"Research on the Influence of Sensor Network Communication in the Electromagnetic Environment of Smart Grid" by Y. Zhang et al. analyzes the application of wireless sensor network in smart grid and proposes the test method of the interaction between wireless sensor networks and smart grid.

"Multiresolution Rotational Symmetry Detection via Radius-Based Frieze-Expansion" by G. Pan et al. presents a rotational symmetry detection algorithm, which is easy to use and can determine both the center and the radius of the rotational symmetry supporting region without human interaction. The algorithm is derived from frieze-expansions approach and improved through a radius-based expansion idea. Multiresolution pyramid is used to accelerate this detection process.

Jucheng Yang
Hui Cheng
Sook Yoon
Anthony T. S. Ho
Weiming Zeng