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## Editorial

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**Biographical notes:** KeeHong Park received his BE and ME in Computer Science from the University of Soongsil, Seoul, Korea, in 1982 and 1985, respectively; and his DrEng in System Engineering from the University of Tokushima, Japan, in 1995. He is currently a Professor at the Department of Computer Information Engineering, Kunsan, Korea. His research interests include software engineering and sensor networks.

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## 1 Introduction

The special issue promotes exchange of opinions between experts working in different areas of the growing field of multi-data processing technologies and its applications to ubiquitous environments.

The main purpose of the special issue on sensor networks, ubiquitous, and trustworthy computing is to bring together the above communities to exchange latest results, to join efforts in solving the common challenges, but also to contrast the developments in the different communities.

The research and development of these systems, that exploit knowledge in the target domain, is at the forefront of modern researches.

This special issue is intended to present applications to ubiquitous environments. Submitted papers are expected to postulate diverse problems, models and solutions for these applications.

## 2 Papers in this issue

The first paper in this issue, 'Personal classification space-based collaborative filtering algorithms' by Takahisa Shirakawa and Setsuya Kurahashi, proposes a new similar information recommendation system focusing on social bookmarking, which organises bookmarks by using tags. The paper improves the collaborative filtering algorithm for users of social bookmark services. A user's bookmarks are placed on his/her own classifying space made of tags. These bookmarks are transformed into a degree of similarity for recommendations. The degree is used to compare the personal classifying space with another's space.

The second paper, 'Document summarisation on mobile devices using non-negative matrix factorisation' by Hiroya Kitagawa, El-Sayed Atlam, Masao Fuketa, Kazuhiro Morita and Jun-ichi Aoe, presents compact and fast approaches that can summarise documents on mobile devices efficiently. The proposed method improves unsupervised schemes using the original non-negative matrix factorisation (NMF) that can determine the

paragraph precedence without morphological and syntax analyses. In order to speed up the summarisation, the proposed technique is applied to the NMF method. From simulation results for test data of DUC2006, it turns out that the matrix size could be reduced by about 95% and the precision of summarisation speeding becomes 8.5 times faster than the original method without degrading the precision of extracted paragraphs.

The third paper, 'Content management in a ubiquitous learning environment' by Débora Nice Ferrari Barbosa, Jorge Luis Victória Barbosa, Patrícia Brandalise Scherer Bassani, João Rosa, Marcus Martins and Cássia Nino, proposes a new model of education called ubiquitous learning. GlobalEdu is a computing environment that aims to support ubiquitous learning, being aware of the context and mobility of the learners. The paper presents the GlobalEdu content management model, as well as its model of interoperability among repositories of learning objects that are used throughout the educational processes carried in the system.

The fourth one, 'An ellipsoidal model for generating realistic 3D facial textures' by YoungJae Park, SeokWoo Jang, JoongJae Lee, YangWeon Lee and GyeYoung Kim, suggests an image registration algorithm based on an ellipsoidal model with size-variable blocks that similar in shape to a human face. The proposed algorithm exploits a block matching algorithm that uses size-variable blocks. The experimental results show that the proposed algorithm can realistically generate 3D facial textures compared to other conventional methods.

The fifth paper, 'A mapping method for 3D satellite and sensor images using a road extraction algorithm for occlusion processing of virtual targets' by SunHee Weon, GyeYoung Kim, JeongHee Cha, KeeHong Park and HyungIl Choi, proposes a realistic 3D model with a high resolution geographic tag image file format (GeoTIFF) satellite image and digital terrain elevation data (DTED), and extracts the road area from a given sensor image with an existing and enhanced snake algorithm for the occlusion processing. The paper also proposes a moving synchronisation technique that projects the target onto the

sensor image according to the marked moving path on a 3D satellite image by applying a thin-plate-spline (TPS) interpolation function, which is an image warping function, on the two given sets of the corresponding control point pair.

The sixth paper, 'An efficient software testing method by decision table verification' by Keiji Uetsuki, Tohru Matsuodani and Kazuhiko Tsuda, proposes a knowledge creation method of software logic extracted automatically from programme source code. In this method all possible programme paths are extracted from source code, and then converted into a Decision Table, which is easy-readable table format for software testing engineer. The logic verification can be performed exhaustively in a short time by comparing the decision table with a specification of software. The method would contribute to improve both efficiency and quality of software testing.

The last paper, 'Performance comparison of data compression algorithms for environmental monitoring wireless sensor networks' by Jonathan Gana Kolo, Li-Minn Ang, Kah Phooi Seng and S.R.S. Prabaharan, proposes a simple lossless data compression algorithm designed specifically to be used by environmental monitoring sensor nodes for the compression of environmental data which are characterised by significant fluctuations in entropy. The proposed Huffman style compression algorithm makes use of temporal locality and delta compression to provide better bandwidth utilisation. The paper shows that the algorithm outperforms the other two algorithms when the entropy of the dataset is large.