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Series editor

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About this Series

The series “Advances in Intelligent Systems and Computing” contains publications on theory, applications, and design methods of Intelligent Systems and Intelligent Computing. Virtually all disciplines such as engineering, natural sciences, computer and information science, ICT, economics, business, e-commerce, environment, healthcare, life science are covered. The list of topics spans all the areas of modern intelligent systems and computing.

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Advanced Intelligent Systems
Intelligent systems have been initiated with the attempt to imitate the human brain. People wish to let machines perform intelligent works. Many techniques of intelligent systems are based on artificial intelligence. According to changing and novel requirements, the advanced intelligent systems cover a wide spectrum: big data processing, intelligent control, advanced robotics, artificial intelligence and machine learning. This book focuses on coordinating intelligent systems with highly integrated and foundationally functional components. This book consists of 19 contributions that feature social network-based recommender systems, application of fuzzy enforcement, energy visualization, ultrasonic muscular thickness measurement, regional analysis and predictive modeling, analysis of 3D polygon data, blood pressure estimation system, fuzzy human model, fuzzy ultrasonic imaging method, ultrasonic mobile smart technology, pseudo-normal image synthesis, subspace classifier, mobile object tracking, standing-up motion guidance system, recognition structure, multi-CAM and multi-viewer, robust Gaussian Kernel, multi human movement trajectory extraction, and fashion coordination. This edition is published in original, peer reviewed contributions covering from initial design to final prototypes and authorization.

To help readers understand articles, we describe the short introduction of each article as follows;
1. “Qualitative Assessment of Social Network-Based Recommender Systems based on Essential Properties”: This paper evaluates and assesses several social network-based recommender systems in terms of robustness, trust, serendipity, diversity, privacy preservation and scalability. It proposes that the observation and analysis can improve the performance of various recommender systems respectively.
2. “Application of Fuzzy Enforcement to Complementarity Constraints in Nonlinear Optimization”: This paper presents the application of fuzzy enforcement to complementarity constraints in nonlinear interior point method (NIPM) based optimization. The fuzzy enforcement can provide enough room for the optimality, adequately satisfying complementarity constraints.
3. “iPhone as multi-CAM and multi-viewer”: This paper describes catching and watching the real-time images on iPhones or iPads using the WiFi networks. The
resolution of images and frame per second depends on the traffics of WiFi. These systems are widely applicable to home monitoring and baby caring.

4. “Robust Gaussian Kernel Based Approach for Feature Selection”: This article incorporates similarity margin concept and Gaussian kernel fuzzy rough sets. It optimizes the Symbolic Data Selection problem. The advantage of this approach features robust function.

5. “Multi Human Movement Trajectory Extraction by Thermal Sensor”: This paper proposes a multi human movement trajectories (HMTs) extraction system with room layout estimation by a thermal sensor. The sensor is attached to the ceiling and it acquires $16 \times 16$ elements spatial temperatures – thermal distribution. The distributions are analyzed to extract HMTs.

6. “An Energy Visualization by Camera Monitoring”: This paper proposes an energy visualization system by a camera. The system applies edge detection and the connected-component labeling to extract numeral regions in counters of a gas meter. Gas consumption is estimated based on shape characteristics of numerals.

7. “Ultrasonic Muscular Thickness Measurement in Temperature Variation”: This paper proposes a muscular thickness measurement method using acoustic velocity dependency according to temperature. The authors employ a 1.0 MHz ultrasonic probe, and acquire two kind ultrasonic echoes from same position of body with temperature variation.

8. “Regional Analysis and Predictive Modeling for Asthmatic Attacks in Himeji City”: This article predicts the number of asthmatic attacks by a time series data analysis occurred in the areas divided into the coastal place and the inland place in Himeji city.

9. “Analysis of 3D Polygon Data for Comfortable Grip Form Design”: This paper describes the method using 3D image processing techniques to extract some features, i.e. positions/directions of fingers and relationships among them, from the 3D polygon data. The research results show that gripping trends can be categorized into 5 classes and the obtained features will be one effective for the mathematical models.

10. “Blood Pressure Estimation System by Wearable Electrocardiograph”: This paper proposes a blood pressure estimation system based on electrocardiogram (ECG). The ECG is unconstraintly measured by wearable sensor that provides acquired data to personal computer by wireless communication.

11. “A Fuzzy Human Model for Blood Pressure Estimation”: The paper describes a blood pressure prediction model. The model predicts blood pressure of the subject based on trend of the blood pressure, body weight and number of steps.

12. “A Fuzzy Ultrasonic Imaging Method for Healthy Seminiferous Tubules”: The authors make cross-section images that consist of multiplying fuzzy degrees depending on amplitude and frequency of line echoes. The images are healthy or unhealthy seminiferous tubules images (HSI or USI) that indicate distribution of healthy or unhealthy seminiferous tubules.

13. “Ultrasonic Mobile Smart Technology for Healthcare”: This study designs the mobile medical system to review data prior to patient access. Improved communication can also make the process easy for patients, clinicians, and care-givers.

14. “Pseudo-normal Image Synthesis from Chest Radiograph Database for Lung Nodule Detection”: The pseudo-normal image is synthesized from a database containing
other patient’s chest radiographs that have already been diagnosed as normal by medical specialists. And then, the lung nodules are emphasized by subtracting the synthesized normal image from the target image.

15. “Low-pass Filter’s Effects on Image Analysis using Subspace Classifier”: This paper shows an effect for applying a low-pass filter on the performance of image analysis using the subspace classifier. Analysis accuracies depend on if images are filtered or not.

16. “A New Mobile Object Tracking Approach in Video Surveillance: Indoor Environment”: This paper deals with mobile tracking object indoors. A new mobile tracking object approaches to the simple operation of extension and contraction on the object window.

17. “Development of a Standing-up Motion Guidance System using an Inertial Sensor”: This article presents a standing-up motion guide system for elderly and disabled people. The system consists of a flexion phase, in which the center of gravity (COG) moves forward, and an extension phase, in which COG raises upward. The proposed system is evaluated highly as efficacy in supporting forward COG movement.

18. “A Structure of Recognition for Natural and Artificial Scenes; Effect of Horticultural Therapy Focusing on Figure-Ground Organization”: This paper presents a solution of horticultural therapy for the elderly with depression symptom. The therapy in perception-action cycle can enhance motivation, when subjects interact with natural objects. Their experimental results demonstrated a significant difference of eye movements in natural and artificial object cases.

19. “A Study on Fashion Coordinates Based on Clothes Impressions”: This paper proposes the fashion coordinates generation system reflecting impressions expressed by an image word. In order to construct the coordinates systems, there are three steps to go through; the analysis of impressions of clothes, the analysis of impressions of the combinations of outerwear and a shirt, and the generation method of initial coordinates candidates.

We would appreciate it if readers could get useful information from the articles and contribute to creating innovative and novel concept or theory. Thank you.

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Young-Chul Bae
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