



Special issue on extracting crowd intelligence from pervasive and social big data

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With the prevalence of ubiquitous computing devices (smartphones, wearable devices, etc.) and social network services (Facebook, Twitter, etc.), humans are generating massive digital traces continuously in their daily life. Considering the invaluable crowd intelligence residing in these pervasive and social big data, a spectrum of opportunities is emerging to enable promising smart applications for easing individual life, increasing company profit, as well as facilitating city development. However, the nature of big data also poses fundamental challenges on the techniques and applications relying on the pervasive and social big data from multiple perspectives such as algorithm effectiveness, computation speed, energy efficiency, user privacy, server security, data heterogeneity and system scalability. This special issue presents the state-of-the-art research achievements in addressing these challenges. After the rigorous review process of reviewers and guest editors, eight papers were accepted as follows.

The first paper “Automated recognition of hypertension through overnight continuous HRV monitoring” by Ni et al. proposes a non-invasive way to differentiate hypertension patients from healthy people with the pervasive sensors such as a waist belt. To this end, the authors train a machine

learning model based on the heart rate data sensed from waists worn by a crowd of people, and the experiments show that the detection accuracy is around 93%.

The second paper “The workforce analyzer: group discovery among LinkedIn public profiles” by Dai et al. describes two users’ group discovery methods among LinkedIn public profiles. One is based on K-means and another is based on SVM. The authors contrast results of both methods and provide insights about the trending professional orientations of the workforce from an online perspective.

The third paper “Tweet and followee personalized recommendations based on knowledge graphs” by Pla Karidi et al. present an efficient semantic recommendation method that helps users filter the Twitter stream for interesting content. The foundation of this method is a knowledge graph that can represent all user topics of interest as a variety of concepts, objects, events, persons, entities, locations and the relations between them. An important advantage of the authors’ method is that it reduces the effects of problems such as over-recommendation and over-specialization.

The fourth paper “CrowdTravel: scenic spot profiling by using heterogeneous crowdsourced data” by Guo et al. proposes CrowdTravel, a multi-source social media data fusion approach for multi-aspect tourism information perception, which can provide travelling assistance for tourists by crowd intelligence mining. Experiments over a dataset of several popular scenic spots in Beijing and Xi’an, China, indicate that the authors’ approach attains fine-grained characterization for the scenic spots and delivers excellent performance.

The fifth paper “Internet of Things based activity surveillance of defence personnel” by Bhatia et al. presents a comprehensive IoT-based framework for analyzing national integrity of defence personnel with consideration to his/her daily activities. Specifically, Integrity Index Value is defined for every defence personnel based on different social engagements, and activities for detecting the vulnerability to national security. In addition to this, a probabilistic decision tree based automated decision making is presented to aid

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defence officials in analyzing various activities of a defence personnel for his/her integrity assessment.

The sixth paper “Recommending property with short days-on-market for estate agency” by Mou et al. proposes an estate with short days-on-market appraisal framework to automatically recommend those estates using transaction data and profile information crawled from websites. Both the spatial and temporal characteristics of an estate are integrated into the framework. The results show that the proposed framework can estimate accurately about 78% estates.

The seventh paper “An anonymous data reporting strategy with ensuring incentives for mobile crowd-sensing” by Li et al. proposes a system and a strategy to ensure anonymous data reporting while ensuring incentives simultaneously. The proposed protocol is arranged in five stages that mainly leverage three concepts: (1) slot reservation based on shuffle, (2) data submission based on bulk transfer and multi-player dc-nets, and (3) incentive mechanism based on blind signature.

The last paper “Semantic place prediction from crowd-sensed mobile phone data” by Celik et al. semantically classifies places visited by smart phone users utilizing the data collected from sensors and wireless interfaces available on the phones as well as phone usage patterns, such as battery level, and time-related information, with machine learning algorithms. For this study, the authors collect data from 15 participants at Galatasaray University for 1 month, and try different classification algorithms such as decision tree, random forest, k-nearest neighbour, naive Bayes, and multi-layer perceptron.

As guest editors of this special issue, we really appreciate all the authors and the reviewers for their valuable contributions. We would also like to express our thanks to Editor-In-Chief Professor Vincenzo Loia for providing us the opportunity to organize this special issue.