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EDITORIAL

Data fusion in the internet of data

This special issue collates a selection of representative research articles that were primarily presented at the 2nd International Workshop on Data Mining on Internet of Things (IoT) Systems. This annual workshop brings together researchers and practitioners from both academia and industry who are working on data mining approaches on the IoT with applications in the Smart City framework and in the Cultural Heritage research domain in order to promote an exchange of ideas, discuss future collaborations, and develop new research directions.

The Internet of Things envisages a plethora of heterogeneous objects interacting with the physical environments. It can be foreseen that IoT applications will raise the scale of data to an unprecedented level. Collecting, analyzing, and correlating data from different resources is a key role to drive smart interactions between actors of IoT environments.

In this scenario, the Internet of Data (IoD) represents a concept of network composed by data entities coming from the Interne of Things (IoT). The IoD can be considered an extension of the IoT into the digital world, since the amount of data being collected is staggering. The opportunities created by IoD have the potential to be infinite. The IoD presents an ambitious purpose, ie, organizing the data to be interconnected as a network in order to infer useful information for data analysis and creates useful, customized, and location-based services.

The scope of this special issue is broad and is representative of the multidisciplinary nature of the Internet of Data research field.

Zheng et al[1] propose a term representation framework for four different features, ie, temporal feature, geographical feature, term co-occurrence, and hashtag. The framework deals with a series of attribution definition to detect topics on a Twitter dataset and confirm the effectiveness of LTDMF. The authors have also deeply analyze the importance of different features in topic detection.

Kumar et al[2] present an efficient and secure time-limited hierarchical key assignment scheme key management suitable for data outsourcing scenario. They compare the proposed scheme with other recent similar schemes with respect to the cost of static and dynamic operations.

The obtained results show that with similar unit private storage cost; the proposed scheme manages to reduce the key generation cost at the data owner and key derivation cost by each user.

Wi and Tsai[3] propose a system to analyze at-home behavior and physiological indices of the elderly people. The design concepts for software and hardware equipment emphasize the following features: (1) low-cost sensor devices, (2) user-friendly interface for the wearable device, (3) easy installation for the equipment, and (4) low-power consumption for the wearable device.

Experiment results show that the system simulation proves the algorithm to be feasible.

Malik et al[4] discuss a data transformation methodology for geo-related semantic annotation and the importance of reducing the response time of investigation and offer compatibility between the web and semantically enriched spatial data. Research on currently available tools and methodologies along with their frameworks can help for bringing state-of-the-art mechanisms for data fusion and transformation.

Xue et al[5] present a new type of application based on the structure of the social network graph, ie, top-k followee recommendation, called FRFB. FRFB gives the ranking score by exploring the topological-effect of the users' following behaviors. Specifically, we recognize the inherent characteristics and the dynamic propagation of the following behaviors from a topological perspective. The effectiveness of the proposed algorithm is verified by extensive experiments, which show that FRFB has remarkable advantage compared with some well-known state-of-the-art work w.r.t. the topology-based followee recommendation methods.

Park et al[6] propose a method for query expansion with contextual information called "Query Contextualization." This method can remove the ambiguity of the queries by sensing and rebuilding the users' contextual information. As a result of experiments with actual SNS data, the authors confirmed that the concept changes based on spatio-temporal information.

Giannino et al[7] present and discuss an IoT system based on a DSS integrating a predictive mathematical model, specifically designed to infer information from data collected directly from biotechnological cultivations. The modular IoT-based system could be efficiently used to support the manager in his everyday decisions regarding the optimal balance of light and temperature needed to maintain algae production at the highest possible level.

Emami et al[8] propose an interesting soft cooperative spectrum sensing by means of an energy detector. The core of the proposed approach include the produced data and the data communication through connectivity technologies. The experimental tests, in terms of error probability, have shown promising results in comparison to hard combination schemes and soft combination schemes.

Cuomo et al[9] discuss models and approaches used to analyze the social network realm. In particular the authors focus on data preparation and privacy concerns. The main objective is to find a set of individual to be targeted with the aim to drive social contagion and generate a diffusion cascade. The proposed analysis aims at modeling the diffusion processes governing social interactions within the networks.

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REFERENCES

1. Zheng H-T, Wang Z, Wang W, Sanhaiah AK, Xi X, Zhao C. Learning-based topic detection using multiple features. *Concurrency Computat Pract Exper*. 2018;30:e4444. https://doi.org/10.1002/cpe.4444
2. Kumar N, Tiwari S, Zheng Z, Mishra KK, Sangaiah AK. An efficient and provably secure time-limited key management scheme for outsourced data. *Concurrency Computat Pract Exper*. 2018;30:e4498. https://doi.org/10.1002/cpe.4498
3. Wu H-T, Tsai C-W. A home security system for seniors based on the beacon technology. *Concurrency Computat Pract Exper*. 2018;30:e4496. https://doi.org/10.1002/cpe.4496
4. Malik KR, Habib MA, Khalid S, et al. A generic methodology for geo-related data semantic annotation. *Concurrency Computat Pract Exper*. 2018;30:e4495. https://doi.org/10.1002/cpe.4495
5. Xue Z, Li R, Li Y, Gu X, Xiao W. FRFB: top-k followee recommendation by exploring the following behaviors in social networks. *Concurrency Computat Pract Exper*. 2018;30:e4514. https://doi.org/10.1002/cpe.4514
6. Park J-H, Lee O-J, Jung JE. Spatio-temporal query contextualization for microtext retrieval in social media. *Concurrency Computat Pract Exper*. 2018;30:e4458. https://doi.org/10.1002/cpe.4458
7. Giannino F, Esposito S, Diano M, Cuomo S, Toraldo G. A predictive decision support system (DSS) for a microalgae production plant based on internet of things paradigm. *Concurrency Computat Pract Exper*. 2018;30:e4476. https://doi.org/10.1002/cpe.4476
8. Emami M, Zarrabi H, Jabbarpour MR, Sadat Taheri M, Jung JJ. A soft cooperative spectrum sensing in the presence of most destructive smart PUEA using energy detector. *Concurrency Computat Pract Exper*. 2018;30:e4524. https://doi.org/10.1002/cpe.4524
9. Cuomo S, Maiorano F. Social network data analysis and mining applications for the Internet of Data. *Concurrency Computat Pract Exper*. 2018;30:e4527. https://doi.org/10.1002/cpe.4527