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Intelligent Services for Smart Cities

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The Smart City concept has flourished in the last decade since its first appearance in late 1990s. The dramatic increase in the importance of this topic has been possible thanks to the rapid development of the technology, especially due to the emergence of a myriad of sensors aimed to gather different urban data (e.g., weather, traffic, use of energy, flows of people, etc.) [Anthopoulos 2017]. While technological progress seems to be reaching an acceptable maturity level, the focus has now shifted to the development of intelligent applications to processing such urban data. These new challenges range from low-level services such as dealing with the size and variety of urban data or handling the complexity of the underlying physical models [Hashem et al. 2016, Nam and Pardo 2011], to high-level applications such as platforms for cultural heritage management or intelligent parking applications [Koukopoulos et al. 2017, Muñoz and Botía 2010], without forgetting the concerns on protecting individuals' privacy in all these applications [Martinez-Balleste et al. 2013].

The first paper in this issue, entitled "A Study on Context-Relationship with Context-Attributes for a Smart Service Generation in Smart City" and authored by Hoon Ko, Seogchan Hwang, Libor Mesicek, Jongsun Choi, Junho Choi and Pankoo Kim, focuses on developing more efficient services in smart buildings through the analysis of the relationships among context-attributes such as user's location, movements and service history. Authors design a smart service model to track user's contexts and offer only the most accurate services in each different context by different strategies such as service sustainability or service merging. A case of study is presented to illustrate the functionality of the proposed service model.

In the second paper, entitled "Air-Pollution Prediction in Smart Cities through Machine Learning Methods: A Case of Study in Murcia, Spain" and authored by Raquel Martínez-España, Andrés Bueno-Crespo, Isabel Timón, Jesús Soto, Andrés Muñoz, and José M. Cecilia, different machine learning techniques have been evaluated for a selection of the most influence climatic variables to predict ozone level in smart cities. Moreover, by using hierarchical clustering techniques based on air quality data collected as time series, it is shown that, as a case of study, the Region of Murcia (Spain) can be divided into two zones to study the ozone level. Among the machine learning models analyzed, Random Forest has been proved as the best technique for predicting pollution according to ozone levels. Thus, this paper provides some compelling solutions to efficiently deal with air pollution problems in smart cities.

The third paper, entitled "Linking User Online Behavior across Domains with Internet Traffic" and authored by Yuanyuan Qiao, Yan Wu, Yaobin He, Libo Hao, Wenhui Lin and Jie Yang, introduces the idea of the Online With Offline (OWO) era in smart cities, where the majority of the population is using various online services to connect friends, watch videos, listen to music, download resources and so on. Citizens' online behaviors are separated by different domains, which may cause serious problem in the area of cross-domain recommendation, advertising, and criminal tracking in both the online and offline worlds, since it is a very challenging task to link user online behaviors belonging to the same physical person. As an alternative, authors propose a novel hybrid model called *Online Behavior Linkage across Domains* (OBLD) to link user's online behavior across domains with Internet traffic.

The fourth paper, entitled "Crowd Sensing for Urban Security in Smart Cities" and authored by Bruno Fernandes, Fábio Silva, Cesar Analide, and José Neves, aims to provide a proof of concept for crowd sensing and smart clothing, evaluating its feasibility and practical potential for any city that wants to cross borders and become a smart one. The achieved results exceeded expectations with a Smart Scanner being able to sense 98% of the crowd, thus providing relevant insights on important points of interest for vulnerable road users. In turn, a Smart Clothing study has been performed to strengthen the citizen sensor, allowing pedestrians, runners and cyclists to be equipped with a sweater holding BLE (Bluetooth Low Energy) transmitters, making these vulnerable users visible on the road. Advocating for transparency and reliability, all produced software has been released as open source in GitHub.

In the fifth paper, entitled "Multi-scaled Spatial Analytics on Discovering Latent Social Events for Smart Urban Services" and authored by O-Joun Lee, Yunhu Kim, Hoang Long Nguyen, and Jai E. Jung, a novel smart city application has been presented by developing an adaptive method to discover latent social events by using social data. Three steps are proposed to achieve this goal: discovering areas of interest (AOIs), allocating texts from social media to the AOIs and detecting social events in each AOI according to the texts. These steps rely on the use of keywords and temporal distribution of the social texts.

This special issue has been achieved by a number of fruitful collaborations. We would like to thank the editor in chief of Journal of Universal Computer Science (JUCS), Christian Gütl, for his kind support and help during the entire process of publication. This was possible thanks to the work of the renowned researchers that provided their anonymous reviews.

Finally, we are most grateful to the authors for their valuable contributions and for their willingness and efforts to improve their papers in accordance with the suggestions and comments from reviewers.

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References

[Anthopoulos 2017] Anthopoulos, L. G.: The Rise of the Smart City. In *Understanding Smart Cities: A Tool for Smart Government or an Industrial Trick?*, 5-45, 2017. Springer, Cham

[Hashem et al. 2016] Hashem, I.A.T., Chang, V., Anuar, N.B., Adewole, K., Yaqoob, I., Gani, A., Ahmed, E., Chiroma, H.: The role of big data in smart city. *International Journal of Information Management*, 36(5):748-758, 2016.

[Koukopoulos et al. 2017] Koukopoulos, Z., Koukopoulos, D. and Jung, J.J.: A trustworthy multimedia participatory platform for cultural heritage management in smart city environments. *Multimedia Tools and Applications*, 76(24):25943-25981, 2017.

[Muñoz and Botía 2010] Muñoz, A., Botía,J.A.: Developing an intelligent parking management application based on multi-agent systems and semantic web technologies. In *International Conference on Hybrid Artificial Intelligence Systems* , 64-72, 2010. Springer.

[Martinez-Balleste et al. 2013] Martinez-Balleste, A., Pérez-Martínez, P.A., Solanas, A.: The pursuit of citizens' privacy: a privacy-aware smart city is possible. *IEEE Communications Magazine*, 51(6):136-141, 2013.

[Nam and Pardo 2011] Nam, T., Pardo, T.A.: Conceptualizing smart city with dimensions of technology, people, and institutions. In *Proceedings of the 12th annual international digital government research conference: digital government innovation in challenging times*, 282-291, 2011.