Guest editorial: Technological advancement and pioneering methods for smart cities – recent advances and future trends

Introduction

Smart cities of the future must aim to accommodate increasing urban populations and their prospects of contemporary living, integrated societies, knowledge-based workforce, factory automation, gig economies, virtual-real social behaviors, etc. This complex concoction of challenges requires technological advancement and methods including artificial intelligence (AI), big data (BD) and blockchain (BC) techniques for more efficiency and sustainability of smart cities. AI, BD and BC are gaining significant attention in solving many real-life problems. They have been applied in clustering, control, design, image processing, information processing and retrieval, knowledge representation and reasoning, marketing, medical diagnosis, optimization, pattern classification, production planning and scheduling, quality control, etc.

This special section focuses on the role of technological advancement in smart cities and provides a unique opportunity for disseminating to the research community recent relevant and impactful research on applications, practice and methodologies of AI, BD and BC techniques for smart sensing and data mining, big data analytics, cloud computing and high-performance computing. We have invited scholars worldwide to submit original and high-quality papers.

This special section provides an excellent opportunity for contributors to share research results and experiences to enhance the understanding of effective AI, BD, BC and soft computing techniques to strengthen scientific cooperation in this important area. We are particularly interested in new methods for technological advancement and pioneering methods and recommendations in the context of government, information organizations, educational institutes and society. We welcome any unpublished and high-quality papers with real-world examples, solutions, recommendations and case studies.

In this special section, we followed a double-blind peered review process. After fulfilling vigorous review processes and requirements, only five papers have been selected. Each paper has justified its research contributions thoroughly. The summary of each paper is as follows.

Summary of each selected paper

The authors led by de Araujo *et al.* (2021) studied the effects of social robots on depressive symptoms in older adults based on two major databases they could extract. A total of 28 relevant studies were included, in which PARO was the most used robot. Most studies included very older adults with neurocognitive disorders living in long-term care facilities. The intervention protocols were heterogeneous regarding the duration, session duration and frequency. Only 35.6% of the studies had a control group. Finally, only 32.1% of the studies showed a significant improvement in depression symptoms. Their review showed that their usefulness and effects in improving depressive symptoms in older adults have low internal and external validity.

Using the Scrum method described in this paper, Chang *et al.* (2021) developed a fundamental smart retail ordering application that can be used on an iOS device, such as an

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iPhone, for smart cities. The authors achieve this through an integrated development environment (IDE) and back-end services for smart cities. For customers, the mobile-based ordering system makes their shopping experience more convenient and easier to place orders without the limitations on time and location. For the business, the staff's work can be more efficient and companies are able to reduce their cost. For the new software developers, this work demonstrated the process of creating a retail ordering application from scratch. In the case of the COVID-19 outbreak, people do not recommend going out to crowded places. Ordering via mobile phones helps reduce contact with others hence the risk of infection.

Zhuang *et al.* (2021) explored the influence mechanism of corporate social responsibility (CSR) for smart cities on consumers' purchase intention. The authors exploit data collected by questionnaire surveys to estimate the effects of CSR for smart cities on consumers' purchase intentions and investigate the statistical causality between them. The results illustrate that CSR for smart cities and its three dimensions all have significant positive impacts on consumers' purchase intentions. Besides, consumer–corporate identity (CCI) exerts a partial mediation effect on this influence mechanism. The authors conclude that corporates should actively fulfill CSR in the field of consumer responsibility to boost consumers' purchase intention.

Early prediction, prevention and control of any epidemic is the need of the hour and artificial intelligence plays a great role in it. In this paper by Gill *et al.* (2021), a deep neural network-based framework is proposed, which helps smart surveillance of the spread of an epidemic in any region. The proposed framework is generic for any kind of infectious spread like pandemic, epidemic, or outbreak. It uses multiple neural networks of different kinds to predict the level of disease, the direction of spread and the mode of transmission. By using the input data collected from various sources, the proposed framework helps to spot the region of interest and alert government agencies to take appropriate actions. The proposed framework is tested on the Zika virus outbreak in Brazil in 2016 and achieved an accuracy of 87% to spot the major regions to mark as containment zones.

Fakhfakh *et al.* (2021) reviewed security for smart cities and they adopted the systematic literature review (SLR) methodology to summarize existing research papers that focus on the potential attacks on CAN bus networks. They compared the selected papers by classifying them according to the adopted validation strategies. They also identify gaps in the existing literature and provide a set of open challenges that can significantly improve the current works. The study showed that most of the examined papers adopted simulation as a validation strategy to imitate the system behavior and evaluate a set of performance criteria.

Conclusion

All the selected papers have ensured a high quality of academic rigor and justifiable contributions satisfying the requirements of the journal and the vigorous peer-review process. We are committed to serving scholarly activities in a quality and timely manner. We are grateful for the opportunities to serve the *Library Hi Tech* community and will be delighted to serve the community again in the near future. We particularly thank two editors-in-chief, the journal manager, reviewers and contributors to make our special section happen.

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Prof. Victor Chang is Professor of Business Analytics at Operations and Information Management, Aston Business School, Aston University, UK, since mid-May 2022. He was previously Professor of Data Science and Information Systems at the School of Computing, Engineering and Digital Technologies, Teesside University, UK, between September 2019 and mid-May 2022. He has deep knowledge and extensive experience in AI-oriented data science and has significant contributions in multiple disciplines. Within 4 years, Prof Chang completed Ph.D. (CS, Southampton) and PGCert (Higher Education, Fellow, Greenwich) while working for several projects simultaneously. Before becoming an academic, he has achieved 97% on average in 27 IT certifications. He won 2001 full Scholarship; a European Award on Cloud Migration in 2011; IEEE Outstanding Service Award in 2015; best papers in 2012, 2015 and 2018; the 2016 European award: Best Project in Research; 2016-2018 SEID Excellent Scholar, Suzhou, China; Outstanding Young Scientist award in 2017; 2017 special award on Data Science; 2017–2022 INSTICC Service Awards; Talent Award Suzhou 2019; Top 2% Scientist 2017/2018, 2019/2020, 2020/2021 & 2021/2022; the most productive AI-based Data Analytics Scientist between 2010 and 2019 and Highly Cited Researcher 2021 and numerous awards mainly since 2011. Prof Chang was involved in different projects worth more than £14 million in Europe and Asia. He has published three books as sole authors and the editor of two books on cloud computing and related technologies. He published one book on web development, one book on mobile app and one book on Neo4j. He gave 31 keynotes at international conferences. He is widely regarded as one of the most active and influential young scientists and experts in IoT/data science/cloud/security/AI/IS as he has the experience to develop 10 different services for multiple disciplines. He is the founding conference chair for IoTBDS, COMPLEXIS, FEMIB and IIoTBDSC to build up and foster active research communities globally with positive impacts.

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