Editorial

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Biographical notes: Zhejing Cao is the PhD candidate in School of Architecture at Tsinghua University, and currently a visiting PhD student in Massachusetts Institute of Technology. Her current research interest is how urban configuration can be optimised with better integration of public transit network and performance. Her prior research includes various topics, such as data driven urban design and planning, walkability index and built environment, land supply and urban planning system, etc. She has the overseas visiting and exchange experience to Tokyo Institute of Technology, the University of Hong Kong, Kanazawa University, and National University of Singapore. She used to be trained as a researcher, planner, and architect at the China Sustainable Transportation Center (Beijing), Tsinghua University Planning and Design Institute (Beijing), and Pencil Office Architect (Singapore).

Zhenjiang Shen is a member of The Engineering Academy of Japan, Prof. Colleague of Science and Technology, Kanazawa University, Japan. His research interest includes policy-making support system for planning and design using GIS and VR. He served as a commissioner of the Chugoku Branch of Architectural Institute of Japan, and Planning Advisor in local cities such as Nanao city, Kanazawa city in Japan and has developed online design tools for enhancing public participation. He is a commission member of Commission on Geospatial Analysis and Modeling of International Cartographic Association (ICA), City Planning Institute of Japan (CPIJ) and also works as a joint member of Fudan University and PhD Instructor at the Tsinghua University, China. He is the Editor-in-Chief of *IRSPSD International* (indexed in Scopus, ESCI), and organising an international community on spatial planning and sustainable development.

This special issue focuses on smart house and smart community, as well as the smart city in a broad term. The objective is to provide an insight on the co-benefit framework of smart house prototype, architectural design standards, new technology, urban modelling, and relevant policies and practice from multidisciplinary viewpoints. Smart house involves the control and automation of lighting, heating, ventilation, security and home appliances. The systematic integration of switches and sensors of smart house has facilitated more artificially intelligent life style, further requiring the spatial reconfiguration of residential community. The connection between smart house, information communication technology (ICT) control centre and community on-demand service would impact all aspects of daily life, including disaster prevention, business and shopping, transportation, energy, and healthcare. The smart house revolution not only influences family needs and human behaviours, but also promotes the improvement of architectural layout, community design, and city planning. We include four papers addressing the topic on 'Smart house oriented community' from different perspectives of strategic planning and practice, new sensor technology for space interventions, engineering realisation of home automation, and design tool and modelling for smart regulation.

Zhejing Cao, in her paper, starts from the smart city planning policies and practice in Japan and discusses its recent development. She differentiates Japan's smart city from global context through literature reviews and comparative analysis, formulating a comprehensive scope to examine Japan's smart city policy, standards, projects based on evidences from governmental propagandas and enterprise initiatives, which leads to discussion on future Japan smart city development within global context. It presents critical finding that although energy efficiency is underlined for smart city globally, smart city in Japan is deployed on community and household level for life quality and user respect, and converted as a prototype for overseas export. The national government is the leading agent for strategic development and subsidy management, while the local government usually organises the consortium for stakeholders. More specifically, this paper illustrates the three goals and five approaches for Japan smart city strategies with ICT as the hard core. Two waves of projects have been initiated by national government, while the private sectors and local government have started many other projects as supplement. For the first-wave of smart city projects either launched for economic sectors or deployed in different geographically-determined districts, it is typically focused on smart infrastructure, energy saving and management, smart transportation, and ICT application. This paper stresses that stakeholder engagement, alignment of smart city projects to strategic urban agendas, social value more than just technology orientation, and data security should also be considered, when smart city in Japan is in a future of evolving towards disaster resilience and tourism activation, seeking global expansion, and establishing the international standards.

Yuming Lin and Weixin Huang address the new sensor technology for space intervention. In their paper, they focus on the environmental behaviour study from a new perspective of Wi-Fi indoor positioning system. Their paper proposes the methodology of detecting the human interaction pattern with the tool of social network analysis, based on a case study of an innovation incubator. It establishes the loop of Wi-Fi positioning system, environmental behaviour study, and architectural design. Compared to traditional methods of collecting human behaviour data through on-site observations, questionnaires, interviews, cognitive maps and few other standard methods which would lead to subjective bias and information omission with lower quantitative accuracy, the newly

developed Wi-Fi indoor positioning technology based on smart sensor can provide a bunch of informative data and help to interpret human activities more objectively. Their paper introduces the application of Wi-Fi positioning system workflow, embed technologies, and the abundant information contained in spatial, temporal, object, and other dimensions. It clearly presents the possibility of understanding human social interactions through social network analysis based on indoor Wi-Fi positioning data. And an application prospect is proposed to adapt spatial environment to human needs as indicated by the feature of social interactions. Although it is idealistic at current stage to realise a perfect smart home highly responsive to human interactions, it makes a step forward to utilise the indoor Wi-Fi positioning sensors to understand human behaviour and accommodate different activities and human needs with changing space and facilities.

The paper by Rajarajeswari Subbaraj and Neelanarayanan Venkatraman introduces an engineering realisation of home automation, which is a technical core for smart home and community. Home automation controls the electronic devices remotely and automatically with the help of context awareness which requires the seamless integration among humans, physical objects, and user interactions. This paper proposes that context aware automation is supported by the adaptive rules defined for the smart home automation and require consistent behaviour of the smart home devices. Their work describes the process of how to check the consistent behaviour of the context aware system in a smart home environment using formal modelling and verification method. Then they continue their work to identify the undefined environmental factor values and generate rules for this situation.

Hangyu Chen and Zhenjiang Shen's paper introduces a design tool and modelling for smart city and community regulation. How to evaluate the legality of building form according to zoning restrictions and design guidelines smartly? Their paper innovatively proposes a 3D building form regulation visualisation tool which allows for efficient legality verification of building permission in Japan. They utilise CityEngine in 3DGIS software, to translate Japan's building form regulation into a 3D shape parameter including building coverage limit, floor area ratio limit, height limit, road oblique line limit, adjacent lot oblique line limit, north oblique line limit. And they use 3D shape parameter to check the building volume legality automatically in Python Script. The setup workflow for automatic and generic building form legality verification may allow easier access to building form regulation information, facilitate building permission efficiency, and connotate richer information combined with other data sources as a function of city information modelling.

In this special issue, the value of smart house-oriented community may extend to the scale of smart city, with special focus on user respects, sustainability, human interactions, technology innovation for spatial adaption, and smart management. We hope this special issue presents a fine reference for researchers and practitioners.