

Editorial introduction

Special Issue on “Urban Simulation and Modeling”

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Since the turn of this century, cities are homes to more than half of the world's population even though they cover only three per cent of the Earth's land surface. Cities are often the fast-growing innovation and socio-economic hub of a region; however, they also face the challenge of finding new space to accommodate the increasing number of urban habitants. While there has been a long tradition of urban modelling in geography and transportation research to understand urban growth dynamics and identify new growth directions, with its roots in both social physics and urban and regional economics, considerable globally efforts are being expended in developing models to understand how cities grow and evolve. However, urban modelling is still challenged by a diversity of methods, metrics, indicators and data ([OECD 2011](#)). After all, cities are places where people come together to interact with one another and therefore our understanding on the evolution of cities must be enriched by studies of networks, interactions, connections and transactions ([Batty 2013](#)). Thus, this special issue focuses on modelling the various aspects of urban dynamics ranging from urban evacuation modelling, agent-based simulation for on-line meetings to the modelling of truck driving and residents' outdoor recreation behaviours, all of which contributes to enhance our understanding on the interaction of urban individuals which shape the form and outcome of our cities.

The first paper by Li and Deng *et al.* ([2015](#)) presents a traffic model to simulate evacuation scenarios under various environment configurations. Developed and implemented using NetLogo on high performance computing platform, their model was used to evaluate drivers' evacuation performance and identify the best evacuation strategy in an emergency situation. By analysing a number of metrics including the evacuation time and average car speed for each strategy under different population distribution patterns, their results show that the model could reveal an effective evacuation strategy for realistic scenarios.

The second paper by Ma *et al.* ([2015](#)) introduces a conceptual design of an integrated agent based model (ABM) with an online decision making meetings (ODMM) model for sustainable management of water resources. This integrated modelling platform consists of a remote server, a number of clients representing several agents related to water resource management who will communicate with each other through online meetings, as well as

an agent based simulation model for processing of data collected from the clients. On the one hand, the clients can set up global parameters based on their roles and policies for the simulation model to generate output scenarios. On the other hand, the ABM also supplies the clients with simulated policy outcomes in visual form which can facilitate online discussion, communication and decision-making. It is expected that this online simulation and decision making tool can help government department to share their views and visualise the policy outcomes, thereby making informed decisions and policy implementation.

Ando and Mimura's (2015) work tries to understand the driving behaviors of garbage truck drivers in Japan. Using survey data collected in Toyota City in Japan, their analyses show significant correlation between the drivers' personalities and consciousness, and the traffic accidents they experienced. In particular, truck drivers have a lower probability of looking aside and becoming irritated when driving the garbage trucks than private car drivers and drivers feel more difficult to drive on community roads in residential areas than on trunk roads. While further study is needed to confirm their findings in other city context, the results from this study alert important traffic safety measures on community roads.

Jiao *et al.* (2015) presents an integrated model to explore the spatial distribution of outdoor recreation trips of urban residents based on their case study in Salford, UK. Using annual household travel survey data collected between 2009 and 2013, their work modelled two types of recreation trips using logit discrete choice modelling approach; a) predominantly local trips; and b) predominantly non-local trips. Their results show that the choice of destinations for local trips is strongly influenced by travel time and socio-economic profiles of households, and relatively weakly influenced by the size of the greenspace. In contrast, the destination choice of non-local trips is strongly affected by greenspace size. While other factors such as the type and other attributes of the greenspaces need to be further investigated in to model, their work can be extended to offer policy intervention regarding the allocation and design of urban greenspaces.

The last paper by Li and Shen *et al.* (2015) presents a practical project which attempts to offer a solution to address the indoor space insufficiency of low-rent housing development based on China's Green Construction Standard for residential environments, using Tianjin city as a case study. Following interviews with the local residents and analyses of the characteristics of the residences towards housing space usages, their work shows that the low-rent housing space can be reorganised by shifting insufficient indoor functions to the outdoor space, a more cost-effective approach than rebuilding an area for residential improvement.

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