CIHT Dubai Online Seminar – Bulletin

James Nicoll – Associate Director, Jacobs
Brett Little – People Movement Leader, Arup
Tan-Na Cheng – Technical Expert, SWECO
Samya Ghosh – Director of Transport Planning, AECOM

About the Event

This comprehensive seminar delved into the multifaceted aspects of pedestrian modelling, including the intricate dynamics of pedestrian behaviour within urban environments, extending beyond transport planning to encompass broader considerations of urban design, human behaviour, and public space management.

Through presentations by four esteemed experts, attendees gained valuable insights into the diverse applications and inherent challenges in creating pedestrian-friendly environments across various contexts, from large-scale events to public transport interchanges.

Discussions revolved around innovative modelling techniques and how the rise of big data and AI could impact the future trajectory field, exploring their potential impacts on the modelling process and how they could work to optimize pedestrian flow and enrich our understanding of human interaction with the built environment.

About the Panel Speakers

James Nicoll is an Associate Director in Jacobs' Transport Planning unit with 18 years of experience including extensive work as a pedestrian modeling Subject Matter Expert (SME), covering questions of pedestrian-related design, capacity, and assessment for transport and sporting infrastructure for a range of UK and International clients.

Tan-Na Cheng is a Technical Expert at Sweco Sweden, specializing in micro-simulation modeling (VISSIM and VISWALK) for 20 years. She has been leading pedestrian modeling for all three planned new extensions of the Stockholm underground lines, and multiple train stations, public transport interchanges, and arenas in Sweden.

Brett Little is the People Movement Lead at Arup UK. With over 25 years of experience, he has been pivotal in various high-profile projects, such as pedestrian modeling efforts for London Olympic Venues and Central London Zone Modeling. He currently heads a team of consultants, analysts, and modelers, where he works across various sectors, including rail stations, stadiums, venues, streets, buildings, airports, and events.

Samya Ghosh is the Director of Transportation Planning at AECOM UAE, with over 28 years of experience in micro-simulation modeling, pedestrian modeling/planning, and crowd management. He has contributed to several publications in this field, including "Modelling Pedestrian Movement" – an indispensable guide to the principles and practices of pedestrian and crowd flow simulation.

Panel Discussion

In his welcoming remarks, **Martin Tillman**, Chair of CIHT Dubai, welcomed attendees and the speakers of the event.

James Nicoll began his presentation by delving into the intricate dynamics of pedestrian modeling, emphasizing its pivotal role in transportation planning and management. He underscored the importance of recognizing individual agency, goals, and energy levels, stressing

that, unlike other forms of modeling, pedestrian modeling requires a nuanced understanding of human behavior. By incorporating these individual dynamics into simulation and technical applications, James highlighted how pedestrian modeling serves as a vital tool in bridging the gap between conceptualization and implementation.

James also addressed the evolving landscape of pedestrian modeling, particularly considering recent advancements in sensing technology and image processing. He pointed out how the increasing availability and affordability of high-quality data, including big data sources such as mobile phone data, offer unprecedented insights into pedestrian behavior. This wealth of information not only enables the optimization of pedestrian infrastructure but also allows for a reevaluation of urban design paradigms.

Brett Little continued the presentation by sharing insights from his background in human geography and journey into the field, emphasizing his transition from data collection work to shaping human-centric design. Through experiences with Transport for London (TfL), he highlighted the shift towards sophisticated software for modeling pedestrian networks, especially in complex urban environments like London's interchanges. He also emphasized the necessity for pedestrian modeling approaches to be tailored to diverse cultural contexts and regional challenges.

Brett also discussed the challenges of designing pedestrian infrastructure for diverse user needs, such as for hospitals and universities. Hospitals require constant flow management for patients, staff, and visitors, including those with mobility aids. Conversely, universities experience high-density influxes during certain periods, needing efficient vertical transportation and access to transport networks. Case studies, such as two concerts by artists with different audience groups, emphasized tailored infrastructure and consideration of operational factors for different events. By understanding user demands enables effective circulation systems, pedestrian modeling can ensure smooth mobility experiences.

Tan-Na Cheng continued the presentations by challenging the traditional focus of transportation planning, which prioritizes optimizing traffic flows and increasing road capacity. Instead, she advocated for a paradigm shift towards a people-centric approach, recognizing pedestrians and cyclists as integral components of urban mobility. Tan-Na emphasized the importance of considering the needs and behaviors of all road users, highlighting tools that analyse pedestrian networks to prioritize infrastructure improvements.

Pedestrian modeling, as highlighted by Tan-Na, aims to maximize infrastructure capacity while minimizing costs and environmental impacts. With advancements in data collection and modeling techniques, pedestrian modeling can address complex urban challenges, such as optimizing infrastructure design for public transport interchanges and stations. Unconventional applications include assessing crowd dynamics in sports arenas, and optimizing arena design to meet fan needs efficiently. Looking ahead, advancements in technology offer new possibilities for combining pedestrian modeling with interactive simulations, enhancing user experience in urban environments.

Samya Ghosh provided insights into the impact of innovative modeling techniques on future urban planning, particularly focusing on pedestrian modeling. He highlighted advancements such as AI, big data, and machine learning, emphasizing their role in revolutionizing pedestrian modeling by enabling the analysis of vast amounts of data to predict pedestrian behavior. Additionally, he discussed the significance of virtual reality technology in offering immersive experiences for understanding pedestrian behavior and optimizing spatial layouts. Samya presented a case study about VR at a public transport station that was used to help clients visualize pedestrian modelling results.

He also highlighted the evolving intersection of planning and pedestrian modeling, stressing collaboration opportunities and emerging regulations for multimodal planning. He emphasized

the critical role of collaboration between transport planning and policy in developing regulations for pedestrian-friendly environments. Adapting pedestrian modeling approaches to different regions involves addressing unique challenges while adhering to universal principles, such as considering visual variations, contextual differences, behavioural preferences, and climate/environmental factors.

In conclusion, the seminar stressed the importance of a holistic approach, merging transport planning with pedestrian modelling, while also addressing the human and social dimensions of this field. Beyond urban environments, discussions explored potential applications in various contexts. In the future, technological advancements promise to elevate pedestrian modelling through interactive simulations, enriching user experiences in diverse settings. By embracing this multidimensional perspective, the seminar highlighted the transformative potential of integrating these disciplines, shaping the future landscape of urban design and transportation planning.

Questions

Can crowd modelling predict human behaviour when natural disasters occur for example earthquakes, rain flooding, fires etc. and identify optimum evacuation routes?

Crowd modelling predicts human behaviour during man-made disasters, aiding in evacuation planning and route optimization, but its applicability to unpredictable natural events like earthquakes remains limited.

Has Covid changed the people density algorithm in any of the pedestrian modelling software?

In the Far East, there was a higher density adopted for crowd modelling in public transport as compared to similar situations elsewhere. COVID-19 has not significantly altered people density algorithms used previously. While the pandemic may have prompted short-term adjustments to accommodate social distancing measures and changing travel patterns, the core principles and methodologies of crowd modelling remain largely unchanged,

Are there examples of using mobile data in studying at walking or cycling around smaller attractions like schools?
The utilization of mobile data for studying walking or cycling patterns around smaller attractions like schools is limited due to the granularity of available data. While mobile data can provide insights into broader mobility trends, it may lack the necessary resolution to accurately capture movement at a fine-grained level, especially in areas with lower population density or fewer mobile users. Additionally, privacy concerns and data aggregation practices may further constrain the applicability of mobile data for studying localized activities such as walking or cycling around specific attractions like schools.

What can we do to improve accuracy in crowd modelling - particularly in environments which require movement both horizontally and vertically (i.e. interaction between walkways, lifts, escalators, moving walkways) as a single movement?

Firstly, incorporating high-resolution data sources such as real-time surveillance footage or sensors can provide more precise information on pedestrian flow dynamics. Additionally, refining simulation algorithms to account for interactions between different modes of vertical transportation, such as lifts, escalators, and moving walkways, as well as their integration with horizontal pathways, is essential. Furthermore, integrating behavioural models that consider individual characteristics and decision-making processes can enhance the realism of crowd simulation