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Spatio-temporal Behavior in Complex Urban Systems

Panel chairs : Suhong Zhou (Sun Yat-Sen University), C. Rozenblat (University of Lausanne)

Speakers :

- Pr. D. Pumain (University Paris 1, France). *The SimpopLocal Model*
- Dr. Xinyue Ye (Kent State University,USA). *Visual analytics platform of urban trajectory data*
- Dr. M. Bida, Dr. E. Swerts, Pr. C. Rozenblat (University of Lausanne, Switzerland). *Modeling hierarchy of a system of cities as a result of the dynamics of firms' interactions*
- Pr. Pengjun Zhao (Beijing University, China). *China's small townships: the challenges and development strategies*
- Dr. F. Pfaender (UTC – Complex City, France – China). *Modelling with new urban micro data*
- Pr. Yang Yue (Shenzhen University, China). *Two Societies in One City: A Spatio-temporal Mobility Approach*
- Dipl. Ing. J. Raimbault (University Paris 7, France). *A macro-scale model of co-evolution for cities and transportation networks*

Abstract

Space, time, and human activities are the eternal topics of human geography. The spatio-temporal behavior research provides an important theoretical tool and perspective to reveal the patterns and dynamic system of space and place. Two complementary ways to enter the domain are data analytics and modeling. This panel gathers diverse approaches from both, having in common the study of spatio-temporal dynamics.

Today a wide range of ubiquitous data can be harvested using carefully designed methodologies, and corresponding data mining and machine learning techniques unveil underlying structure of the complex system, implying a statistical and structural approach. To explore the spatio-temporal behavior of individual, group and the whole society, and to analyze the demand of individuation and socialization, the research on spatial-temporal behavior and its application is ushering in a new opportunity. The emergence of new paradigms such as "big data" and "Internet +", or "Crowdsourcing", imply the rise of new ideas and research questions. The rapid development of new technology and production methods of massive spatial-temporal data also brings new methods and means. Comply with the interdisciplinary development, to further expand the application field of spatial-temporal behavior research, has important practical significance on the aspects of planning, public security, health, quality of life and intelligent decision-making applications.

On the other hand, new methodologies and techniques in modeling bring also useful insights on spatio-temporal dynamics. Complex networks analysis acts in the same way as an efficient dimensionality reduction and dynamical structure reconstruction tool, and aims at providing information on intrinsic components of the dynamics. Complex models of simulation, for example of Urban Systems, allow to reconstruct the emergence of complex macroscopic patterns from the interaction of lower scale agents. They can for example be applied to the study of particular trajectories of cities, and evaluate corresponding potential policies.

Building on the confrontation of these different visions, a round table shall take a step back and attempt an overview of the study of sptio-temporal behavior, and how different approaches can be complementary. Some conclusions on the processus of knowledge production are also expected, by extracting for each particular process the relation between knowledge domains (empirical, theoretical, modeling, data, methodology, tools) in a comparable way since each one is framed in the same context of complex urban systems.