EPB Special Issue: Advances in Spatial and Transport Network Analysis

Transportation networks have for long attracted a vast interest from the scientific community, as the ability to move across space and reach activities and opportunities is a cornerstone of the functioning of cities, regions and markets. In the era of Big Data and increased modelling capabilities, the study of spatial and transport networks has expanded rapidly across disciplinary boundaries. Geographers, engineers, physicists, planners, social scientists, data scientists and others are increasingly interested in investigating the characteristics and dynamics of transport systems; how they are used; and what kind of implications using a given transport mode has on individuals, societies and the environment. A common denominator between these disciplinary fields is the joined interest in graphs, complex networks and spatial network analysis.

Societies are facing many complex challenges such as climate change and growing urban and social inequalities in which transportation plays a key role. Tackling these grand challenges requires crossing disciplinary boundaries and developing novel measures and methods that bring new insights into the structure and dynamics of transportation networks on multiple levels (from individual to system level). For long, time and distance have been the most common metrics used for assessing connectivity and performance of transport networks. Much less work, however, has been made to assess other dimensions of travel cost and performance of transport systems from the perspectives of i) the environment; ii) what individuals are exposed to; or iii) what they experience during the travel.

This special issue is dedicated to papers focusing on recent advances in the development of new measures and methodologies to evaluate and analyze the performance of transportation networks. These measures might include, but are not limited to, environmental costs or exposures (e.g., CO₂, noise, pollution); monetary costs (the price of access), complexity; and resilience of multimodal transportation networks or focus on qualitative aspects of travel, where travel might be seen as a “gain” instead of cost (such as exposure to aesthetic or green environments). Methodologically, we welcome papers using novel ways to measure transport network connectivity, performance and accessibility, including recent advances in machine learning and artificial intelligence. Special attention will be given to papers studying transport related questions with interdisciplinary approaches, bridging fields such as network science, transport geography, urban and regional planning, economics, history and environmental studies.

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