A Framework for Big Data in studies of Urban Mobility and Movement

Eusebio Odiari[1], Mark Birkin[3], Susan Grant-Muller[2], Nick Malleson[1]

Corresponding author: Eusebio Odiari (gyeao@leeds.ac.uk)

[1]School of Geography, University of Leeds, Leeds LS2 9JT, UK
[2]Institute for Transport studies, University of Leeds, Leeds LS2 9JT, UK
[3]Consumer Data Research Centre, Leeds Institute for Data Analytics, LS2 9JT, UK

Summary

Various papers and strategies studying urban mobility and movement patterns are reviewed and, categorised according to the mathematical discipline of the models employed. This has enabled the development of a structured framework for studying urban mobility and movement patterns, while taking advantage of the opportunities that big data presents.

The choice of strategy for investigating urban mobility and movement is dependent on the type of data and, the particular problem, questions or situation that needs answers. The various types of Big Data come with volume, velocity, variety and veracity, and corresponding ever widening range of solution strategies, calling for a systematic approach based on an objective framework.

The particular opportunity that today's data analyst has is the freedom to introduce a new strategy better describing the situation being modelled, and then exploiting the flexibility in today's simulation tools, not limited or constrained as in the past, by purely mathematical concerns. That ability or skill to revise simulation code to suite a particular modelling scenario is a main strength.

For illustration purposes, an Agent Based Model (ABM) is used to simulate a railway infrastructure and its populated environs, and data is measured at various points to simulate types of consumer Big Data typically available within economic sector operators. This data is used to review solution techniques adopted in urban mobility papers, while developing solution concepts for illustration to sector operators, with a view to garnering support for the release of real-life data for future research.