Imputation of Urban Movement Patterns Using Big Data

Authors : Eusebio Odiari, Mark Birkin, Susan Grant-Muller, Nicolas Malleson

Abstract : Big data typically refers to consumer datasets revealing some detailed heterogeneity in human behavior, which if harnessed appropriately, could potentially revolutionize our understanding of the collective phenomena of the physical world. Inadvertent missing values skew these datasets and compromise the validity of the thesis. Here we discuss a conceptually consistent strategy for identifying other relevant datasets to combine with available big data, to plug the gaps and to create a rich requisite comprehensive dataset for subsequent analysis. Specifically, emphasis is on how these methodologies can for the first time enable the construction of more detailed pictures of passenger demand and drivers of mobility on the railways. These methodologies can predict the influence of changes within the network (like a change in time-table or impact of a new station), explain local phenomena outside the network (like rail-heading) and the other impacts of urban morphology. Our analysis also reveals that our new imputation data model provides for more equitable revenue sharing amongst network operators who manage different parts of the integrated UK railways.

Keywords : big-data, micro-simulation, mobility, ticketing-data, commuters, transport, synthetic, population

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