Smart Mobility Based on Big Data Analytics and Artificial Intelligent Applications

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Abstract

Recently, we can obtain big amounts of smart card data, which most of travelers using public transport have used for their daily travel activities. These data could be viewed in microscopic as well as macroscopic levels in order to investigate their shapes and characteristics. We have analyzed how smart card based big data analytics can be used to diagnose and retrofit metro networks in Seoul Metropolitan Area. Unweight metro networks are transformed to demand based and travel time based weighted networks in current and planned expansion lines of metro networks in order to identify weak points in terms of efficiency and equity. These networks have been analyzed using some centrality indices such as degree, betweenness and closeness in order to measure an effectiveness of retrofits. In particular, long tailed asymmetry phenomena in daily travel activity movements have been analyzed to identify hub stations and corridor lines for faster movements. On the other hand, metro catchment areas are analyzed as a symmetry phenomenon. We have also analyzed big amounts of taxis movements in order to estimate arrival times and locations based on 10 second cumulative 75,000 GPS taxis tracking data. Deep learning predictions of these arrival times would lead to support metro trips as first and last mile services so called Mobility as a Service (MaaS). In this context, we attempt to find the implications of the degree of asymmetry of transport weighted networks in transport induced social well beings. The higher the degree of asymmetry in movements is the more concentrated and congested in travel conditions, which could be interpreted and connected as a transport induced social deprival index.

Keywords: *Retrofits, Future Forms of Metro Networks, Centrality Indices, Asymmetry, Smart Card Data Analytics, Efficiency, Equity, Transport Induced Social Deprival Index. Mobility as a Service (MaaS).*

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