Calibration of MATSim in the District of Liège (Belgium) using Mobile Phone-based OD-matrices: Preliminary Results

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Abstract

Mobile phone data have shown the potential to contribute to the reliability of travel demand models. However, due to privacy issues, mobile phone data are generally only available as aggregate information in terms of OD-matrices, which lack disaggregate information like household travel survey data, which is indispensable for travel demand modelling. Therefore, the main objective of this paper is to present the construction of MATSim activity plans by combing the activity patterns imputed from 2010 Belgian HTS (Household Travel Survey), that is, BELDAM, and mobile-phone-based OD-matrices for the District of Liège in Belgium. The mobile phone data are provided as two weeks' hourly mean OD-matrices at the commune level. One week is for regular days and the other for holidays. First, a synthetic population augmented with home-based activity chains has been prepared from the MCMC-based travel simulation Framework using BELDAM. The synthetic population keeps the sociodemographic attributes such as age, gender, social status and the home location at the municipal level. Then, to ensure a direct linkage at the same spatial level, the mobile-phone-based OD-matrices are further aggregated to the municipality level. Meanwhile, we have derived the start-time distribution of the first leave home activity and the average duration of activities from BELDAM. After that, the algorithm matches the population origin by origin of the OD-trip and selects the departure time based on the start-time distribution. In addition, the approach sequentially goes through each hour of the OD-matrices to complete the simulated activity chains, emphasizing the location choice based on a distance-decay function. As the shape of the distance-decay curve is influenced by the travel mode and the travel purpose, we estimated distance-decay functions for all combinations of activities and modes registered in BELDAM, indicating the simultaneous choices of the activity's mode and location. The resulting plans fulfil the information required by MATSim. As a result, the generation of MATSim activity plans from mobile-phone-based OD-matrices is described and evaluated.

Keywords: Mobile phone data, OD-matrices, MATSim activity plans, location choice, distance-decay function