

Modeling and Factor Analysis of Human Mobility between Cities in Japan Using Spatio-temporal Data from Twitter

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This research investigates a method to show factors determining mobility between cities using fine-grained spatio-temporal data from Twitter. This is important because until now the targets of mobility analyses have been taken over relatively long intervals (3 years) and have been spatially approximate. This research can analyze real-time mobility and is not limited by administrative districts. The research makes it possible to show latent and potential mobility. It makes it possible to carry out effective transportation planning and advertisement strategies.

We used the whole year spatio-temporal data in Japan extracted from Twitter (2014). These data are generated by the users who activated their location data, and these data are open access. We applied 3 existing methods to our research: First, to formulate the model of human mobility, we applied the formulation of geography called “Gravity Model”. Second, to identify each person’s important places (home, workplace), we applied DBSCAN (Density Based Spatial Clustering Algorithm with Noise). Third, to calculate unknown valuables of the formula, we used multiple regression analysis.

This research discovered that differences in distance from an origin point between two destination points sharply affects the amount of mobility if the two destination points are very near from the origin point. However, if the two destination points are far from the origin point, the difference of distance does not affect the amount of the mobility. This research also discovered that mobility in areas where many middle-size cities are located is great throughout the whole year.

Further research will be needed to classify and analyze mobility tendency according to the purposes of trips.