Demonstration of Mobile Auto-GPS for Large Scale Human Mobility Analysis

Teerayut Horanont (1), Apichon Witayangkurn (2), and Ryosuke Shibasaki (3)

(1) Institute of Industrial Science, The University of Tokyo, Japan (teerayut@iis.u-tokyo.ac.jp), (2) Institute of Industrial Science, The University of Tokyo, Japan (apichon@iis.u-tokyo.ac.jp), (3) Center for Spatial Information Science, The University of Tokyo, Japan (shiba@csis.u-tokyo.ac.jp)

The greater affordability of digital devices and advancement of positioning and tracking capabilities have presided over today's age of geospatial Big Data. Besides, the emergences of massive mobile location data and rapidly increase in computational capabilities open up new opportunities for modeling of large-scale urban dynamics. In this research, we demonstrate the new type of mobile location data called "Auto-GPS" and its potential use cases for urban applications. More than one million Auto-GPS mobile phone users in Japan have been observed nationwide in a completely anonymous form for over an entire year from August 2010 to July 2011 for this analysis.

A spate of natural disasters and other emergencies during the past few years has prompted new interest in how mobile location data can help enhance our security, especially in urban areas which are highly vulnerable to these impacts. New insights gleaned from mining the Auto-GPS data suggest a number of promising directions of modeling human movement during a large-scale crisis. We question how people react under critical situation and how their movement changes during severe disasters. Our results demonstrate a case of major earthquake and explain how people who live in Tokyo Metropolitan and vicinity area behave and return home after the Great East Japan Earthquake on March 11, 2011.