

Method to estimate means of transportation using the operation data of mobile phone base stations

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1. Introduction

The demographic statistics of mobile spatial statistics generated from the operation data of mobile phone base stations are the origin-to-destination (OD) data in which the 24-hour, 365-day location information of 75 million mobile phones (except for the data of corporate accounts) is expanded by adding information, such as the Docomo mobile phone penetration ratio and areas covered by base stations. Unlike a conventional urban traffic survey, however, the demographic statistics cannot directly identify the means of transportation. If the means of transportation can be identified, it would complement and reinforce person-trip surveys, complement other statistical surveys, and be used for measuring the effect of new developments in areas with new services. In this research, the authors came up with methods to estimate whether a certain long-distance trip in the demographic statistics of mobile spatial statistics was a trip by an airplane or Shinkansen and analyzed the precision of the estimates.

2. Proposal of estimation method

The authors proposed a method to estimate whether a trip is an airplane trip or not by combining three ways to judge it, including judgment based on power off status, judgment based on travel speed, and judgment based on base stations around airports. The authors also proposed a method of estimating whether a trip is a Shinkansen trip by combining two judgments, including judgment based on the highest speed and judgment based on whether the trip passes near Shinkansen routes.

3. Comparison of the outcomes of estimation

The authors compared the O-D quantity data of airplanes and the Shinkansen prepared by setting departure and arrival areas in five prefectures (Tokyo, Osaka, Fukuoka, Kumamoto, and Kagoshima), spatial resolution in prefectures, and chronological resolution in one day and the traffic facility data obtained from the 2010 national arterial passenger flow survey as the O-D pair of individual departure and arrival areas. The authors then analyzed the characteristics of individual cases in the airplane and Shinkansen estimation method for individual departure and arrival areas. These comparisons and analyses indicated that the method exhibited a high correlation with the national arterial passenger flow

survey and that the number of trips erroneously judged between airplanes and the Shinkansen could be reduced

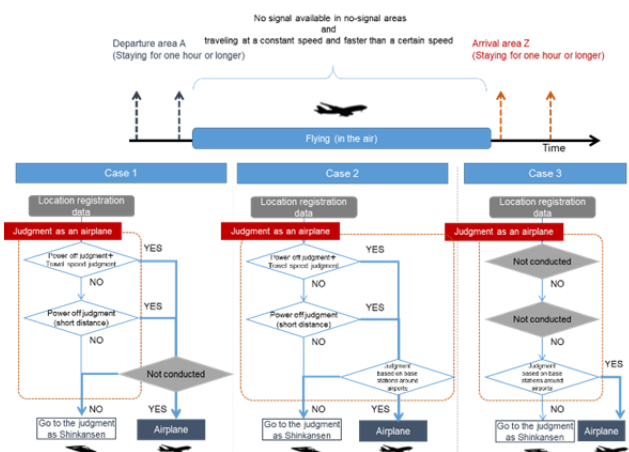


Figure. Image of judging power off status and the judgment chart of the method to estimate airplane trips

when judgments were combined.

4. Future outlook

A report session will be held to spread the outcomes of research on the operational data of mobile phone base stations, including this research. In addition, challenges and problems in using the operational data will be clarified by letting actual operators use the operational data of mobile phone base stations.

☞ For more detail

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