Analysis Of People'S Route And Destination Choice In Evacuation Using GPS Log Data

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Abstract: Tohoku Earthquake, occurred on March 11th 2011, resulted in the failure of public transportation affecting approximately 5,150,000 commuters, hence they were forced to choose their destinations and routes abnormally. The situation where roads and other public transportations are a flood of people not only puts people in danger of secondary disaster but also becomes an obstacle to relief activities, rescue operations, and emergency transportation. Therefore, clarification of properties of evacuation behaviors of people following the disaster by analyzing it is important for natural disaster prevention, mitigation, and response. Previous researches related to evacuation behaviors in disaster mainly used the data of behavior patterns acquired by conducting various questionnaire surveys regarding disaster experience or an attitude against disaster, while the data from questionnaire tend to be subjective and the amount of available data is small. However, with development of sensor and information technology such as positioning systems and mobile devices, now large human population movements become easily monitored and enormous and objective data about people's evacuation behaviors become automatically acquired. Therefore, in this research, GPS records from mobile devices of a huge number of people around a year which includes the day of Tohoku Earthquake are used as the data for the analysis of evacuation behaviors, such as route and destination choice in the situation of disaster. We extracted stay points of each person and trips between them from whole year GPS log data based on the method which the previous research applied to the same data. Then comparing extracted trip data in normal condition and those in disaster, we clarify the property of people's determination of route and destination on the day of Tohoku Earthquake.

Keywords: disaster management, human behavior, GPS log data