

A classification of transport mode on a smartphone based on a neural network

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Abstract

In this study, we discuss the possibility of conducting a trip survey using a smartphone. The Person Trip Survey obtains the most basic transportation data between an origin and destination in an urban area. In particular, the survey is conducted once every five years in Japan. Many countries spend a large amount of money to conduct such a survey because it is a questionnaire survey. It is used for area marketing, in addition to transportation planning.

At the present time, various types of sensor are available in daily life with the spread of smartphones and wearable devices. In particular, smartphones have the Global Positioning System, in addition to an acceleration sensor and camera. Many people move somewhere carrying their smartphones. If we use smartphones as a survey device, then we can collect trip data inexpensively and accurately using the aforementioned functions.

In this paper, we develop a classification system for a transport mode on a smartphone. The function is based on deep machine learning in a neural network. We measure the traffic mode and three-axis acceleration using a smartphone and make our neural network learn them. Based on the performance, we discuss the possibility of classifying the trip mode.

Keywords

Smartphone, neural network, machine learning, acceleration.

Biographies

Taku Tanichi is currently a student on the advanced course in Production Systems Engineering, Salesian Polytechnic, Japan. His research interests include machine learning, human behavior recognition, and human computing interaction.

Yoichi Shimakawa is a Professor and the Director of the Department of Computer Science and Technology, Salesian Polytechnic Japan. He received his B.S. and M.Sc. degrees from Chuo University in 1990 and 1996, respectively. In 1998, he joined Chuo University as a research assistant on the research project “Integrated Geographic Information Systems.” He received his D.E. degree from Chuo University. He received paper awards from the Operations Research Society of Japan (ORSJ) in 2002. He is a member of ORSJ and the Geographic Information Systems Association of Japan.