Journal of Telecommunications System & Management

Abstract

Mobile Computing Application In Advanced Urban Public Transportation System

Manish Chaturvedi

Institute of Infrastructure Technology Research And Management (IITRAM), Ahmedabad, India

Abstract:

The ICT based advanced urban public transportation systems (APTS) are used to improve the commuters' experience during their trips using public transportation buses. Generally, the deployment of APTS solutions requires the manual route feedings which is a tedious task specifically when the route changes are frequent. We design an automatic bus-stop detector using the GPS traces of buses and the crowd sourced accelerometer data of the commuters. We leverage the stop-and-go pattern of buses observed during their trips. The historical trajectory data of buses are processed using the DBSCAN algorithm to find all the locations where a bus stops recurrently during its trip (including the non-bus-stop locations). To discard the non-bus-stop locations, we utilize the fact that the bus-stops are the locations where commuters board or alight the bus. When a commuter is near the location detected as a stoppage by the DBSCAN algorithm, the accelerometer data of the commuter are processed in her smart phones to detect the bus-boarding event. The process involves the stepping event detection and the transport mode classification. The locations of bus-boarding events are used to extract all the bus-stops on the route accurately.

For detecting crowdedness in a bus, we leverage the fact that in a crowded trip, the commuters do not get seat and they are required to travel standing during the crowded stretch of the journey. The route stretch of the trip is declared crowded if this event occurs recurrently. We propose a novel solution that uses the crowd sourced accelerometer data of commuters. The accelerometer data of commuters are processed in their own smart phone to classify them as standing or sitting during the course of their journey. The classification is accurate and enables the cost-effective crowdedness detection of trips.

Biography:

Dr. Manish Chaturvedi is an Assistant Professor of Computer Science & Engineering (CSE) at IITRAM since January 2020. Before joining IITRAM, he worked at the CSE Department of Pandit Deendayal Petroleum University and Nirma University for more than 16 Years. He did M.Tech. (ICT) and Ph.D. (ICT) from Dhirubhai Ambani Institute of ICT (DA-IICT) in year 2009 and 2016, respectively. His Research Interests include the design of Intelligent Transportation Systems, Embedded Systems and IoT, Scalable protocol design for large distributed systems, and the application of ICT for solving problems of societal importance.

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Citation: Manish Chaturvedi, Mobile Computing Application In Advanced Urban Public Transportation System; Mobile Computing 2020; October 18, 2020; London, UK