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An Intelligent Traffic Management System Based on the WiFi and Bluetooth Sensing

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Abstract : This paper introduces an automated clustering solution that applies to WiFi/Bluetooth sensing data and is later used for traffic management applications. The paper initially summarizes a number of clustering approaches and thereafter shows their performance for noise removal. In this context, clustering is used to recognize WiFi and Bluetooth MAC addresses that belong to passengers traveling by a public urban transit bus. The main objective is to build an intelligent system that automatically filters out MAC addresses that belong to persons located outside the bus for different routes in the city of Ottawa. The proposed intelligent system alleviates the need for defining restrictive thresholds that however reduces the accuracy as well as the range of applicability of the solution for different routes. This paper moreover discusses the performance benefits of the presented clustering approaches in terms of the accuracy, time and space complexity, and the ease of use. Note that results of clustering can further be used for the purpose of the origin-destination estimation of individual passengers, predicting the traffic load, and intelligent management of urban bus schedules.

Keywords : WiFi-Bluetooth sensing, cluster analysis, artificial intelligence, traffic management
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