

Prize:

**Best Paper in the 22nd International Multi-Conference Reliability  
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**Title:**

**SMARTPHONE-BASED RECOGNITION OF ACCESS TRIP PHASE TO PUBLIC  
TRANSPORT STOPS VIA MACHINE LEARNING MODELS**

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Abstract:

The usage of mobile phones is nowadays reaching full penetration rate in most countries. Smartphones are a valuable source for urban planners to understand and investigate passengers' behaviour and recognize travel patterns more precisely. Different investigations tried to automatically extract transit mode from sensors embedded in the phones such as GPS, accelerometer, and gyroscope. This allows to reduce the resources used in travel diary surveys, which are time-consuming and costly. However, figuring out which mode of transportation individuals use is still challenging. The main limitations include GPS, and mobile sensor data collection, and data labelling errors. First, this paper aims at solving a transport mode classification problem including (still, walking, car, bus, and metro) and then as a first investigation, presents a new algorithm to compute waiting time and access time to public transport stops based on a random forest model. Several public transport trips with different users were saved in Rome to test our access trip phase recognition algorithm. We also used Convolutional Neural Network as a deep learning algorithm to automatically extract features from one sensor (linear accelerometer), obtaining a model that performs well in predicting five modes of transport with the highest accuracy of 0.81%.