Estimating Arrival and Departure Times of Public Transportation in Istanbul using Deep Learning

Muhammad Zharif Bin Msduki

Yüksek Lisans Öğrencisi, İstanbul Üniversitesi

muhammadzharifbin.msduki@ogr.iu.edu.tr

Muhammet Gül

Doç. Dr., İstanbul Üniversitesi

muhammetgul@istanbul.edu.tr

Abstract

Istanbul, a bustling metropolis with a population of over 15 million people, faces significant challenges in managing its complex public transportation system. Efficient and reliable public transportation is vital to the daily lives of its residents and the sustainability of the city. In the study conducted with the data provided by the French government in 2015, it was determined that 27% of the total greenhouse gas production was caused by the transportation field in general. A total of 94.8% of 27% of this is by road. Thus, people are directed to public transportation to reduce the burden on transportation. Being informed correctly about the arrival time at the stops attracts passengers. In this study, deep learning methods with big data analytics concept were used to predict bus arrival time. Five different performance measurements are considered to assess the accuracy of the prediction models. mean absolute error (MAE) , mean absolute percentage error (MAPE), mean squared error (MSE), root mean squared error (RMSE) and residual sum of squares (RSS) were taken into consideration. The case study was carried out on the data obtained from Istanbul public transportation (Istanbul Metropolitan Municipality Open Data Portal) and deep learning methods were applied to the data using the traditional and Big Data Architecture. We will collect the data such as Real-time GPS and sensor data from public transportation vehicles, including buses. Other than that we will also collected the data of historical public transportation schedules and actual arrival/departure times. The model with the best accuracy result among the prediction models can support service operators and the authorities in obtaining better passenger satisfaction.

Keywords: *Deep Learning, Arrival Time, Public Transportation*