

ABSTRACT

VEHICLE COUNT PREDICTION IN MOHAMMED BIN ZAYED ELEVATED ROAD WITH LONG-SHORT TERM MEMORY (LSTM)

By

Hardian Alkori

Student ID 20102153

PT. Jasamarga Jalanlayang Cikampek and the Indonesian government constructed the Mohammed Bin Zayed (MBZ) Elevated Road from 2017 to 2019. This elevated road stretches 37 kilometers above the Trans-Java toll road, connecting Cikunir to West Karawang. After the Covid-19 pandemic, the number of vehicles increased, reaching 39 million from the beginning of 2022 to July 2023. However, PT. Jasamarga Jalanlayang Cikampek does not yet have an accurate predictive model to estimate the number of vehicles per hour. They only rely on subjective assumptions and Microsoft Excel Forecasting, which often results in predictions with high errors, such as on July 31, 2023, with an average error of 29% in lane A and 60% in lane B (the lane leaving Jakarta). A more accurate predictive model is needed to forecast the number of vehicles, and these predictions are used for traffic, infrastructure, and travel planning. High prediction errors lead to poor infrastructure and traffic planning, which may affect the experience of drivers and consequently impact the revenue of PT. Jasamarga Jalanlayang Cikampek. This study aims to implement Long-Short Term Memory to predict the number of vehicles on the Mohammed Bin Zayed Elevated Road. The objective of this study is to implement the LSTM method and find the best architectural scenario to predict the number of vehicles on the Mohammed Bin Zayed Elevated Road. The development process of this model requires historical data on dates, hours, and vehicle numbers from January 2022 to July 2023, totaling 13,848 rows for both lanes. This study considers four scenarios: one proposed and three taken from previous research with the same task, namely time series forecasting. The best LSTM architecture scenario with three LSTM layers, each with 128, 256, and 512 units, and three Dense layers with 100, 100, and 2 units respectively, resulted in a MAPE of 1.57% and MSE of 0.00067648 when predicting lane A (lane towards Jakarta), and a MAPE of 2.14% and a low MSE of 0.00107 when predicting lane B (lane leaving Jakarta). The best scenario for predicting validation data achieved a MAPE of 2.1% and MSE of 0.0006338 for lane A, and a MAPE of 7.4% and MSE of 0.007074 for lane B.

Keywords: *LSTM, Predictive, MAPE, MSE.*