This study aims to explore and simulate the traffic flow model on Buah Batu Road using the velocity-density function generated by the Decision Tree Regression method. The model utilizes a macroscopic approach, specifically the Lightill, Whitham, and Richards (LWR) model, which considers vehicle interactions. Observational data were collected directly from Buah Batu Road and processed to produce a velocity-density function, which shows that vehicle speed decreases as density increases, following a non-linear but step-like pattern. The velocity function generated by the Decision Tree Regression indicates that for low density ($\rho > 0.102$), the average speed is predicted to be around 3.681 to 4.551, while at high density ($\rho > 0.273$), the speed drops to around 1.411 or lower. The simulation was conducted on a 40-meter road segment with a total simulation time of 5 minutes and a grid resolution of 300 points. At the beginning of the simulation, a peak density of 0.70 was recorded in the 15-25 meter segment, which then shifted and decreased to 0.50 in the 30-50 meter segment by the end. The results indicate that vehicle movement reduces density and improves traffic flow. Thus, the Decision Tree Regression method has proven effective in modelling and simulating the velocity-density relationship to understand traffic dynamics on Buah Batu Road.

Keywords: Simulation, Decision Tree Regression, Velocity-Density