

## **Dynamic Speed Advisory Systems for Signalized Intersections: Enhancing Fuel Efficiency**

*ADKH Aluthge<sup>1</sup> and Pradeep Kalansooriya<sup>2</sup>*

### **Abstract**

Signalized intersections serve as the most crucial nodes in the urban transportation system. Major issues associated with these intersections include unnecessary fuel consumption due to sudden accelerations or decelerations, high idling time at the intersections, and accidents that may occur with the sudden decision-making. As a solution to these problems, this research proposes a dynamic speed advisory system. This study presents a comparative analysis of existing systems and explores an adaptive speed management system designed to reduce fuel consumption through real-time speed recommendations. By integrating kinematic modeling into the SUMO simulation platform, the proposed system dynamically adjusts vehicle speeds based on real-time traffic conditions. The key outcomes of this research include the selection of the most suitable simulation platform and methods for speed calculation, as well as identifying the factors that influence speed adjustments and incorporating equations for estimating fuel efficiency. Simulation results indicate that the proposed system can achieve between 9% and 10% fuel savings. Future work will focus on refining the system for real-world

implementation, ensuring it can effectively reduce fuel consumption at signalized intersections.

**Keywords:** *Signalized junctions, Simulation environment, Speed guidance*

1. Faculty of Computing, General Sir John Kotelawala Defense University, Sri Lanka. [38-bcs-0013@kdu.ac.lk](mailto:38-bcs-0013@kdu.ac.lk)
2. Faculty of Computing, General Sir John Kotelawala Defense University, Sri Lanka. [pradeepkalansooriya@kdu.ac.lk](mailto:pradeepkalansooriya@kdu.ac.lk)