

Advanced Real Time Traffic Controller System Based on Fuzzy Logic and Motion Detection Sensors

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Abstract

Traffic congestion in intersections are becoming a major concern in metropolitan cities. The customary traffic light signals (TLS) are being operated in predetermined traffic light patterns based on the traffic weights calculated through previous statistics on particular junctions. This method becomes inefficient for day to day growing automobile usage in a country like Sri Lanka. Another reason for inefficiency is determining a pattern of traffic flow through statistical analysis is less reliable. A sophisticated solution for this issue is recommended in this paper by controlling the TLS respect to real time traffic flows using motion detection sensors and fuzzy logic technology. The objective is to maximize the traffic flow rate and reduce waiting on junctions. The motion detection sensors are to count the flow rate on the path toward the junction from reasonable distance. Fuzzy logic is the intelligence in the system which acts like a human traffic operator. The Matlab fuzzy logic toolbox is used to design the fuzzy logic. A model of road junction installed with the advanced real time traffic controller system is animated to display the results. The traffic light will act on the decisions made by fuzzy logic system according to the instantaneous traffic load in the roads approaching the junction. The sensors are installed twenty five meters before the intersection in all the paths approaching the junction and this helps the fuzzy logic system to efficiently decide the next signal change time and foresee incoming vehicles to make decision in advance and reduce the vehicle waiting latency. The sample traffic flows applied in a simulation and the response of traffic light signals are observed and these scenarios are compared with a customary traffic light controller system. This model is more efficient than the current traffic light controller system available in Sri Lanka.

Keywords: *fuzzy logic, motion detection sensors, traffic flow, simulation*