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Traffic through - An effective right-turn-bay of signalized intersections for busy hours

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Abstract

Sri Lanka, as a developing country, the traffic congestions are becoming severe day by day because of the population and the economic background. To overcome the congested areas, the traffic controlling light systems were introduced and used in most of the junctions. Existing traffic light system is based on the fixed cycle times for each phase, depending on the environmental conditions, geometry design of the junction and traffic movements of the particular junction. Among the most of the features at the road intersections, the feature called "Right-Turn-Bay" is an extra segment of lane which was introduced to the vehicles which are supposed to proceed right turning movement at the intersection. Because of the limited area of that lane segment, it can be filled easily. The proposed solution is to overcome the overflowing problem in the right-turn-bay by giving an extra cycle time period for the right turnings in busy time. For this real-time process, the image processing techniques were used for a video sequences, captured by a video camera to detect the arrival of vehicles at the bay and its count was gathered using the pixel-wise detection and blob tacking of the vehicle. The traffic light was controlled as usual and the additional functionality was to control the junction considering the maximum count and the current count at the bay. The controller is to decide whether the traffic should leave the bay or not by considering its parameters.

Keywords: Image processing, Phase, Right-turn-bay, Traffic

Introduction

The safe driving with minimum road accidents and the congestion controlling within the congested areas are guaranteed using the Traffic controlling light systems worldwide. Existing traffic light system of Sri Lanka, is based on the fixed cycle times, controlling by the electro-mechanical time clocks. The time period remains unchanged either there are available vehicles to pass through the junction or not and the allocated time may be not enough for all the vehicles waited in the lane (Kamalrajh, 2011). The controlling mechanisms depend on the environmental conditions, geometry design and traffic movements of the particular junction. "Right-turn-bay" is one of the geometrical designs that were implemented in the road intersections in Sri Lanka lately with world standards. It is an extra segment of lane which was introduced for the waiting vehicles which are supposed for the right turning movements at the intersection without holding up vehicles going straight through. Since the lane segment is limited, it can be overloaded within seconds in congested times and it leads the difficulties for the vehicles, driven straight forward, in the nearest lane (Gaikwad et al., 2014). Reduction of overflowing at the bay can reduce the congestion in the junction and the proposed solution is to give an extra phase for the right-turn-bay when it is filled together with the aims of minimizing road delays and accidents which are led to the economic and environmental benefits of the country.