

## Classification of vehicles by video analytics for unorganized traffic environments

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### Abstract

Traffic monitoring is essential for infrastructure planning and transportation. The objective of traffic monitoring is to have an effective traffic management system. Traffic management systems would be effective in well-organized traffic environments, where it has very disciplinary behaviors and less in inefficiencies. But in unorganized urban environments like *Sri Lanka*, road traffic behaviours are varying from standard structured ways which lead to discompose the traffic management. An effective monitoring system requires short processing time, low processing cost and high reliability. The paper proposes a novel vehicle detection and classification algorithm based on background filtering and re-engineered with suitable changes in order to be applicable to challenging unorganized traffic environments. The solution is successfully classifying vehicles individually and their trajectories in unorganized traffic environments in order to monitor the behaviors of the drivers. The system gives 74.4% average accuracy in vehicle detection and 55% accuracy in vehicle classification while counting each vehicle passed by. We used *OpenCV* functions for implementing and testing algorithms. Data was collected through pre-recorded video clips from footbridge crossing at *Colombo Fort* in western province Sri Lanka, for the testing. The ultimate objective of this research was to come up with a best-suited algorithm for vehicle detection and classification (hybrid solution) in unorganized traffic environments which would help to analyze the behaviors of road users. The solution will lead to help reduce unorganized traffic congestions by enhancing the efficiency and effectiveness of traffic monitoring and analyzing systems those are used for intelligent traffic management systems and traffic simulation models.

**Keywords:** Big data, Moving object detection, Traffic monitoring, Video analytics

### Introduction

Traffic on local roads has reached such a level that it is necessary to address the issue of traffic congestion and seek complex transport solutions for the city. Countries suffers not only the economic losses but also many other adverse effects such as delays, inability to forecast travel time accurately, wasted fuel increasing air pollution, wear and tear on vehicles, stressed and frustrated motorists, etc.

The main purpose of this research is to devise a method to analyze challenging unorganized traffic environments in order to find solutions for the huge traffic congestion. The study came up with the most suitable algorithm for moving object tracking and classification in object rich environments. This can be used for behaviour analysis of classified vehicles, which will be an input to intelligent traffic management systems and traffic simulation models.

There are several existing traffic monitoring techniques such as Magnetic Loops, Microwave RADAR, Infrared Detectors, Ultrasonic Detectors and Camera Based Systems. In this study we used computer vision and image processing technique