

# Smart Traffic System

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**Abstract**— Monitoring the traffic is one of the most important elements especially in a developing country like India with a mixed traffic flow of vehicles including motorcycles, cars and heavy vehicles. The traffic flow varies with different daytime and location; therefore, the adoption of proper traffic monitoring system is very essential. Thus, our project focuses on monitoring the traffic system and detecting the riders without helmet and solutions for traffic jam. Our project also focuses on creating an automated traffic controller using image processing. The methodology we use here for monitoring the traffic is image processing. This method enables us to implement a simple but efficient traffic control especially in crossroad context compared to other convenient methods.

**Keywords**— Image Processing, Open CV, YOLOv3.

## 1. INTRODUCTION

Fast transportation systems and rapid transit systems are nerves of economic developments for any nation. Mismanagement, traffic rule violation, safety rule violation and traffic congestion results in long waiting time, loss of fuel and money. With the increasing number of vehicles on the road, new methods are being invented to overcome such a problem. One way to improve traffic flow and safety of current transportation system is to apply traffic surveillance using image processing techniques.

Traffic congestion increases especially in cities because of population increasing. In consequence it takes more time to travel and traveller feels stressed. So here our main objectives are to check the traffic condition and to develop a traffic congestion investigating system by image processing from CCTV camera. Which will let the rider know about the condition of traffic know in prior and rider can decide on which route to travel and can save the fuel and time.

Controlling of traffic at the junction where three/four roads meet is very challenging task to be performed manually by human beings. Handling of the traffic can be difficult when there are a greater number of vehicles present in different sides of the road. Handling of the traffic can be done more efficiently at the junction with the help of image processing. Mainly because there are very less room for error with image processing when compared to the manual handling of the traffic.

Motorcycle accidents have been rapidly growing throughout the years in many countries. The helmet is the main safety equipment of the motorcyclists. In case of accident if motorcyclists do not use the helmet, the consequences can be fatal. This paper aims to propose a system for detection of motorcyclists without helmet and notify them about the safety procedure by using image processing techniques.

## 2. GENERAL METHODOLOGY

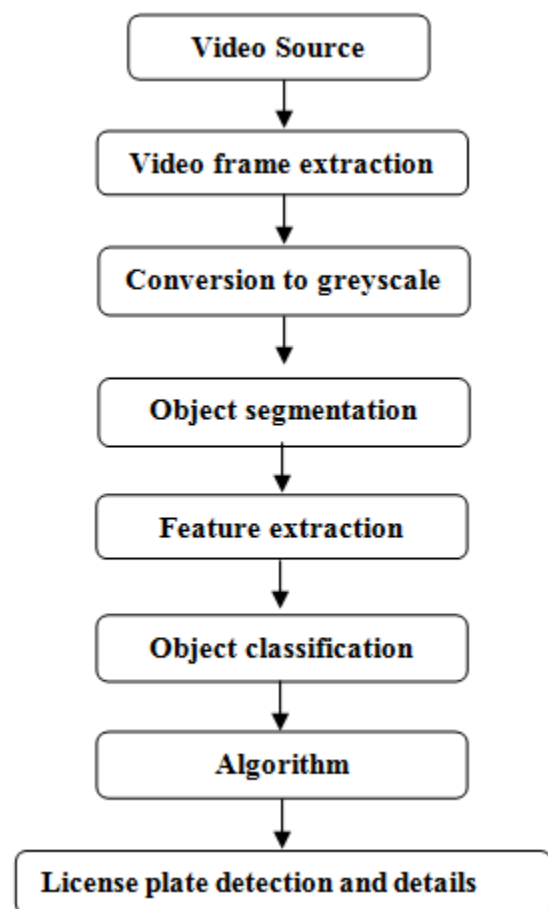


Fig. 1. Method Overview: General methodology flow chart.

The first step of the current methodology which is to record videos or Capture images through the camera. In most of the cases it will be a CCTV camera which will be located near the road. Recorded video will be converted into number of frames so that information of particular

instant can be extracted and further operations can be performed on captured frame. Gray scale is simply reducing complexity. The luminance on a pixel value of a gray scale image ranges from 0 to 255. The conversion of color image into gray scale image is converting RGB values (24 bit) into gray scale value (8 bit). To focus on the required information in a captured frame, background subtraction will be performed. After that digital image will be partitioned into multiple segments (set of pixels). Segmentation is usually done in order to locate objects and boundaries in images. Feature extraction is a dimensionality reduction process, where an initial set of raw variables is reduced to more manageable groups for processing while still accurately and completely describing the original data set. Objects which are present in the captured image will be recognized and classified based on their attributes. The most crucial step in the whole process is application of algorithms and control strategies. The traffic congestion on the road will be measured using edge detection techniques and user will be notified about the condition. Vehicles travelling in the wrong way, vehicles which are breaking the traffic rules or safety rules (not wearing helmet) will be detected using the suitable algorithms.

### 3. RESULT

#### (1) Traffic Congestion



Fig.2 Frames saved from video 1



Fig.3 Frames saved from video 1



Fig.4 Output from IDE for better Route

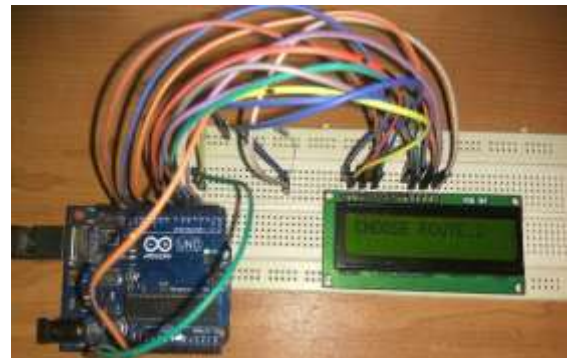


Fig.5 Output from hardware

#### (2) Traffic Signal Controller



Fig.6 Output from IDE for better Route



Fig.7 Output from hardware

### (3) Helmet Detection



Fig.8 Detection of Person and Motorbike



Fig.8 Detection of Helmet



Fig.9 Licence plate detection

### 4. FUTURE WORK

The additional features such as identification of vehicles traveling in the wrong way. Vehicles which break the traffic or safety rules will be added to the system. The license plate recognition will be performed on the vehicles

which are identified to be breaking the rules. All these features can be embedded into an app so that the tracking of vehicles who violated traffic rules can be easily found and they can be fined.

### 5. CONCLUSION

By using the automated system for monitoring the traffic, the need of manual monitoring of traffic is avoided. This system is more efficient and reduces the errors which can take place during the manual monitoring. This system helps people to decide in advance which is the best route to be taken in-order to save time. This system also reduces the number of people who break traffic and safety rules which will result in saving of precious lives.

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