

# Time To Cross – Traffic Light Control System using Image Processing

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**Abstract** – Over the past decades, increasing traffic volume poses many challenges in the society. There are many accidents happening these days due to careless behavior of the pedestrians and vehicles at the traffic signal. In this paper we bring an idea of smart traffic control system using image processing by integrating it into an existing CCTV camera commonly installed on street poles. The cameras placed on the street poles, one will be focusing on the pedestrian and other on vehicles. Both cameras will be capturing images. Then using image processing the density of pedestrian and vehicle in respective images are taken and compare. If the traffic density of vehicles is more than a particular limit and density of pedestrian is normal, then vehicle mode will be on. If the traffic density of pedestrian is more than a particular limit and density of vehicle is normal, then pedestrian mode will be on. When pedestrian mode happened, the microcontroller will send the signal to the connecting speaker to notify those pedestrians about crossing time. If the density of both pedestrian and vehicle more than limit, then there will be a traffic cycle which gives equal time interval for both teams to cross the signal. The system was composed of camera, PIC microcontroller for traffic signal and recorded voice notifier using a portable speaker. The motto behind this research is to reduce the conflict at the traffic by giving equal importance to both vehicles and pedestrian.

**Key Words:** traffic volume, smart traffic control system, traffic density

## 1. INTRODUCTION

Traffic mobbing is a major problem in developed cities. In this traffic mobbing scenarios peoples are wasting vehicles fuel and unable to utilized their time [2]. High utilization of present road capacity by managing traffic efficiently is very important. Due to these traffic congestion people's daily schedules getting disturbed as well as some are going through critical cases [3][5]. If we take example of ambulance having patient in critical conditions and if there is traffic jam on that road, then there are high chances that ambulance will not be able to reach hospital in time. Due to situations like these human lives are in danger. That's why there is need of dynamic intelligent traffic control system who can able to handle these traffic conditions efficiently to circumvent traffic crowding and accidents situations [4][5].

As the problem of urban traffic congestion spreads, there is a pressing need for the introduction of advanced technology

and equipment to improve the state-of-the-art of traffic control. Traffic problems nowadays are increasing because of the growing number of vehicles and the limited resources provided by current infrastructures. The simplest way for controlling a traffic light uses timer for each phase. Another way is to use electronic sensors in order to detect vehicles, and produce signal that cycles. Besides, the highway and roads are incapable of meeting the requirement of increasing number of vehicle. Instead of working on roads to accommodate the growing traffic various techniques have been devised to control the traffic on roads like embedded controllers that are installed at the junction.

We propose a system for controlling the traffic light by image processing. The system will detect the density of vehicles and pedestrians through images instead of using electronic sensors embedded in the pavement. Cameras will be installed alongside the traffic light or street poles. They will capture image sequences. The image sequence will then be analyzed using digital image processing for vehicle and pedestrian density, and according to the density of both pedestrian and vehicle on the road traffic light can be controlled.

## 2. SYSTEM DESIGN

The work is dividing into 4 parts. The first part is to process the video signal of pedestrian and vehicle captured through the existing cameras using Image Processing. The second part is to changing timer according to density of the traffic after the image processing. The third part is to send the signals to the Microcontroller for control the traffic lights. The final part of this work is to send the signal to the speaker to notify the people about the traffic light. Block diagram of the proposed system is given below.

### A. Real Time Image Processing

A system having the cameras which connected to the processor is installed on the traffic light. In a traffic light area two cameras are installed, one is to monitor the vehicles on that lane and other is for pedestrians. Camera will give the traffic images to the processor. In processor, Image Processing algorithms were there which will process the image to extract out the needful information in short span of time.





**Table 1:** Experimental Results

Vehicle Density	Pedestrian Density	Vehicle Mode	Pedestrian Mode
10	2	On	Off
15	7	On	On
2	7	Off	On
5	3	On	Off
1	3	Off	On

## 5. CONCLUSION

Traffic condition on roads is one of the big issue especially for the pedestrian. It is observed that pedestrian needs to spend lot of time to cross the road near the traffic light. Nowadays every smart traffic control system tries to solve the problems of vehicles only. But our current system is a solution to this problem by giving equal priority to both the pedestrian and vehicles. The project guarantees that the average waiting time vehicles and pedestrian at the traffic signals can be reduced. This system can reduce the conflicts between the vehicles and pedestrian at the traffic.

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