

# Image Processing Based Intelligent Traffic Controller

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**Abstract:** -- Traffic congestion is a major problem mainly in developing countries. This shows an effect on the emergency vehicles such as ambulances, fire trucks which has to reach their destinations earlier by wasting their valuable time more at the traffic jams. Emergency vehicles must reach their destinations in order to save many lives. So, there is necessary of a system over the traffic jams which gives priority to the emergency vehicles in order to move on their way. These system proposes the way to emergency vehicles without any obstacles.

**Keywords:**-- Emergency vehicle detection, Traffic light control.

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## I. INTRODUCTION

In imaging science, image processing is processing of images using mathematical operations by using any form of signal processing for which the input is an image, a series of images, or a video, such as a photograph or video frame; the output of image processing may be either an image or a set of characteristics or parameters related to the image. [1] Most image-processing techniques involve treating the image as a two-dimensional signal and applying standard signal processing techniques to it. Images are also processed as three-dimensional signals with the third-dimension being time or the z-axis.

Image processing usually refers to digital image processing, but optical and analog image processing also are possible. This article is about general techniques that apply to all of them. The acquisition of images (producing the input image in the first place) is referred to as imaging. [2]

**Image processing basically includes the following three steps. :**

- ◆ Importing the image with optical scanner or by digital photography.
- ◆ Analyzing and manipulating the image which includes data compression and image enhancement and spotting patterns that are not to human eyes like satellite photographs.

- ◆ Output is the last stage in which result can be altered image or report that is based on image analysis

## II. LITERATURE SURVEY

Traffic congestion of emergency vehicles is becoming more and more serious day by day. The main reason for traffic is increased number of vehicles and increased number of population and development of country as whole. Not only in India but also many countries in the world are facing the problem at traffic light intersection that causes accident between emergency vehicle and other public vehicle. Congestion on roads eventually results in slow moving traffic, which increases the time of travel, thus stands-out as one of the major issues in metropolitan cities. So, there is loss of life due to the delay in the arrival of ambulance to the hospital in the golden hour.

The main reason for this problem is the traffic lights which stops the emergency vehicles in the lane along with the other public vehicles. Vehicles at the traffic lane wait until the green light on. Due to the fixed time interval of red & green light, suppose a road is always crowded with vehicles and go ahead time is short. So, we need a effective system which gives priority to the emergency vehicles such as ambulances, fire trucks etc.,

The problem of traffic light control can be solved by RFID based system. With this system, we can consider the priority of different type of

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vehicles and also consider the density of traffic on the roads by installing RF reader on the road intersections. Radio frequency identification is a technique that uses the radio waves to identify the object uniquely.[3]

The RFID is an acronym for radio frequency identification, which is a wireless communication technology that is used to uniquely identify tagged objects or people. There are three basic components to the RFID systematically.

1. A tag, which is composed of a semiconductor chip, an antenna, and sometimes a battery.

2. An interrogator which is composed of an antenna, an RF electronics module, and a control electronics module.

3. A controller which most often takes the form of a PC or a workstation running database and control.[4]

There was a system provides dynamic time interval for traffic lights according to length of vehicles present at each lane. It also handles the occurrence of emergency vehicle. It makes all the signals red except one from the emergency vehicle passes. The system provides GSM phone interface to the user, with SMS facility to those who wish to obtain the latest traffic information on congested roads. The map of the traffic signal will be provided to the users on their request. The proposed system has been developed using the sensor assembly along with embedded technology.[5]

**III. PROPOSED SYSTEM**

Traffic congestion of emergency vehicles is becoming more and more serious day by day. To solve this problem we need a dynamic system to avoid the traffic congestion over the roads. A camera is fixed at the polls. Images extracted from the video are then analysed to detect and count vehicles. Then depending on the signal-cycle time is allotted to each lane. The system also takes into account the emergency vehicles at the intersection. If such a vehicle is detected, the lane is given priority over the others.

The image sequences from a camera are analyzed using various edge detection and object counting methods to obtain the most efficient

technique. Subsequently, the number of vehicles at the intersection is evaluated and traffic is efficiently managed.

**Emergency Vehicle detection :**

The image sequences from a camera are analyzed. In case a red beacon is detected, the next step is to identify whether it is from an emergency vehicle or not. This is done by identifying the blinking frequency of red light detected in the image sequence and comparing it to the standard used by the emergency vehicles. This will rely on color detection, clustering, and centroid algorithms.

The conditions for detection of red light beacon during various periods of the day are shown below. Once they are satisfied, we scan the intermediate frames for the absence of the beacon by the condition.

**Night time conditions:**

For red light:  $R > 230, G < 250, B < 250$

In the intermediate frames:  $R < 230, G > 230, B > 230$



**Day time conditions:**

For red light beacon:  $R > 230, G < 250, B < 250$

In the intermediate frames:  $R < 230, G < 230, B < 230$



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The frequency of light is detected and the priority to the vehicle is given priority. The vehicle detected is sent to the traffic signals and automatically the traffic signal lights are turned to red except the lane which contains the emergency vehicles such as ambulance, fire truck etc., in all the other lanes are red. The lane containing the emergency vehicle is turned to red and given way to the vehicle.

**CONCLUSION:**

In this proposal, emergency vehicles are given priority over the traffic. Emergency vehicles like ambulance and fire trucks need to reach their destinations at the earliest. If they spend a lot of time in traffic jams, valued lives of many people may be in danger. So by this proposal emergency vehicles would not waste their time over the traffic jams and reach their destinations faster.

**REFERENCES**

- [1] Rafael C. Gonzalez; Richard E. Woods (2008). Digital Image Processing. Prentice Hall. pp. 1–3. ISBN 978-0-13-168728-8.
- [2] Joseph P. Hornak, Encyclopedia of Imaging Science and Technology (John Wiley & Sons, 2002) ISBN 9780471332763
- [3] Suresh Sharma, Alok Pithora, Gaurav Gupta, Mohit Goel, Mohit Sinha "Traffic Light Priority Control For Emergency Vehicle Using RFID"
- [4] V. Daniel Hunt, Albert Pugila, Mike Pugila "A guide to radio frequency Identification"
- [5] Vishakha S. Thakare, Snehal R. Jadhav, Sananaj G. Sayyed, Poonam V. Pawar 4