

Feature Extractor Analysis for Traffic Clearance in Emergency for Ambulance and Fire Engines

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ABSTRACT

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As 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 resource provided by current infrastructures. The simplest way of controlling a traffic light uses timer for each phase. We propose a system for controlling the traffic light by image processing. The system will detect vehicles through images instead of using electronic sensors embedded in the pavement. A camera will be installed near the traffic signal it will capture the image sequences. Setting image of Emergency vehicles as reference image, the captured images are sequentially matched using image matching. Whenever an ambulance enters into the range of camera then it captures image and compare with the reference image. If it matches with reference image then signal will be altered and cleared, so as give a clear way to pass the Ambulance. It helps to save the lives of human being by providing clear way in traffic. Here the ambulance or fire engine vehicle are detected using object detection machine learning technique, The python script is executed in laptop with image processing and uses the SIFT algorithms.

Keywords : Traffic, Image, Vehicles, Camera.

I. INTRODUCTION

Traffic congestion and tidal flow management were recognized as major problems. In India as the population is being increasing day by day the traffic is also increasing with proportionality. So the traffic signals need good coordination for the smooth flow of traffic during the peak hours Moreover road

accidents in the city have been incessant and to bar the loss of life due to the accidents is even more crucial. In this fast moving world we are in a compulsion to rush our self which makes the traffic congestion and accident an inevitable one. In foreign countries, they successfully save human life, because whenever an ambulance comes they move aside to clear out the route till the ambulance passes through.

On the other hand in india, whenever an ambulance comes it is controlled manually at the traffic junction by a traffic officer.

In recent years, a dramatic increase in traffic accidents worldwide has brought the problem of improving traffic safety to the attention of health officials who now approach the problem as they would a biological disease. Road traffic accidents are usually caused by the composite actions of humans, vehicles, road, and weather, and their outcomes often involve casualties and economic loss. The relationship between an accident and the influencing factors is nonlinear and complicated; it cannot be described with an explicit mathematical model.

The pace at which the world is developing is very rapid today. The number of vehicles is increasing on the roads which lead to high traffic jams in big cities due to which number of accidents are increasing and one of the widely affected services due to traffic jams is of an ambulance and fire engines. Many a times, ambulance having patients in critical situation which needs to be taken to the Hospital in minimum amount of time providing proper treatment to the patient so that chances of surviving increases in critical condition.

II. LITERATURE SURVEY

A. Traffic Management using RFID

“Intelligent Traffic Management based on IoT”, this paper was published in International Journal of Computer Applications (0975 – 8887) (2017) by Sonali P. Kshirsagar, Priyanka H. Mantala, Gayatri D. Parjane and Kalyani G. Teke [1]. This paper focuses on reducing traffic congestion to reduce manual interference in controlling traffic. This paper uses IoT based appliances. This paper is based on use of RFID (Radio Frequency Identification) and Raspberry Pi. In this proposed system, RFID tag is placed on

vehicle, containing one unique number. The information from RFID tag is read by RFID reader and passed on to Raspberry Pi by router. The count is maintained and traffic signals are organized accordingly. It can be used to identify stolen vehicles also.

B. Traffic Management for Emergency Services

“Adaptive Traffic Management for Secure and Efficient Emergency Services in Smart Cities”, this paper was published in IEEE PerCom conference (2013), and is published by Soufiene Djahel, Mazeiar Salehie, Irina Tal and Pooyan Jamshidi [2]. The aim of this project is to particularly focus on traffic management for emergency services. The proposed system in this project uses IoT and Machine Learning algorithms. Cameras, controllers and networks play an important role in this system. In this system, the local traffic controller sends the information from CCTV cameras to traffic management controller. If images are in great clusters, a notification is sent to emergency vehicle and emergency service authority, so that they can take further actions.

C. Traffic Management using Image Processing

“Smart Traffic Optimization Using Image processing”, this paper was published in IEEE conference (2015), and is published by Pranav Maheshwari, Deepanshu Suneja, Praneet Singh and Yogeshwar Mutneja[3]. The main aim of this paper is to determine the volume and density of the incoming traffic by using image processing technique. Edge detection and ORB[Oriented FAST and Rotated BRIEF] algorithms are used for processing the snapped images at fixed intervals. Since the objects are not tracked in a video, the system thus has a low computational cost. After snapping the images RGB colors are captured from the image and sent to the central server, where it is converted into grayscale image which then undergoes edge detection. After edge detection, the image is then transformed into binary image. The issues faced while using edge detection algorithm is overcome by using Otsu’s

multiple thresholding over various pixel areas in the image. Distance is detected from the scanned image and after that this distance is multiplied with the width of road which gives the area covered by traffic. The system then extracts feature points from the image using ORB algorithm, the road that is plain will not contribute towards features but the vehicles being mobile will do so. Feature matching is doing further using brute force on two simultaneous images to deduce the traffic jam. Thus, a two-fold cost saving approach is adopted i.e fuel and time cost reduction [refer section IV].

III. PROPOSED METHOD

3.1 BLOCK DIAGRAM

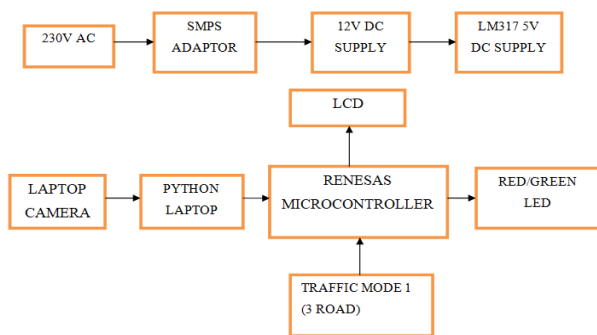


Fig 1: Block diagram of proposed system

IV. METHODOLOGY

R5F100LEA microcontroller from Renesas RL78 series which is a 16-bit microcontroller is used to implement this project. Microcontroller acts as the heart of this project, which controls the whole system. It contains of Flash ROM 64KB, RAM 4KB and Data Flash 4KB, and it has High speed on-chip oscillator, Self-reprogrammable under software control, 58 GPIO's, 3 UART's, Simplified I2C, 10 bit resolution ADC, 28 Interrupt Sources, ISP programming support etc.

This project is to use to make a traffic free road by extending single time. Here python camera will be

placed near the road and that camera will be triggered and capture the image by using Object detection technique that will be stored in python laptop. After capturing, that image undergo image processing by using SIFT(Scale invariant feature transform) and it will be matching with the referred image. If image matched with the referred image, the python will send the signal send to micro controller and signal cleared for that path .Here demo purpose- 3 Red, 3 Green LEDs for respective 3 roads, are continuously controlled by the controller- say for 10 sec. Whenever the ambulance or fire engine enter into the road we need to clear the road, the signal of the path to be taken by the ambulance is delayed by 25 more seconds so that the ambulance can move faster and carry the patient immediately to the hospital. Here the object detection will exist by using image processing and uses the SIFT algorithms.

V. RESULTS AND DISCUSSION

5.1. Whenever ambulance approached into traffic signal



Fig 2 : Ambulance detected by camera

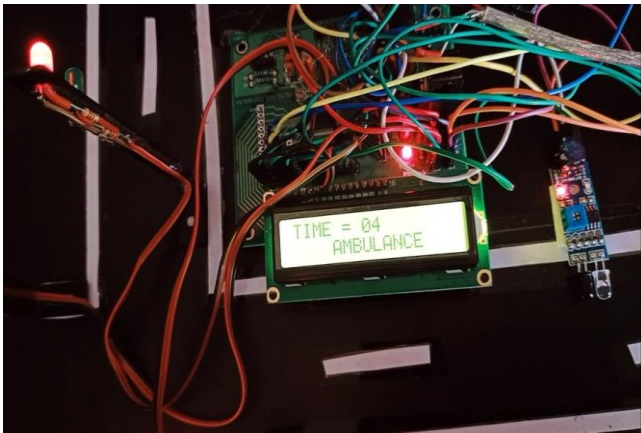


Fig 3 : Ambulance detected showing on LCD

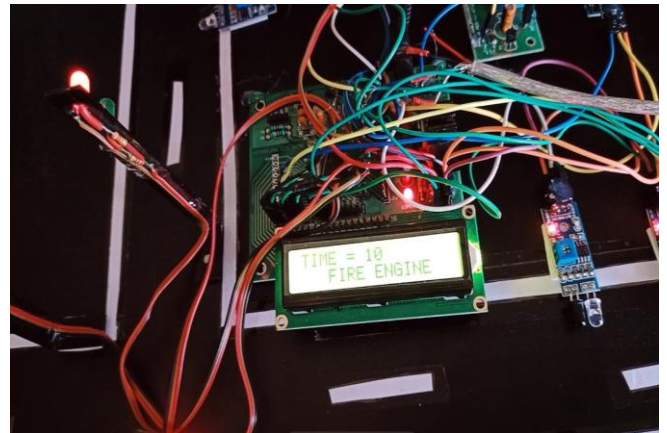


Fig 6: Fire engine detected showing on LCD

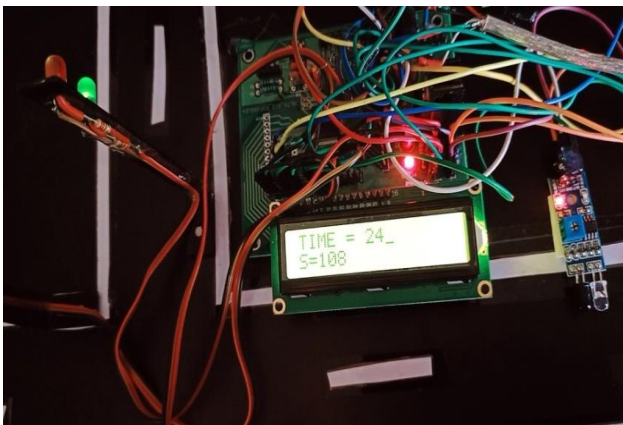


Fig 4: traffic signal cleared for Ambulance

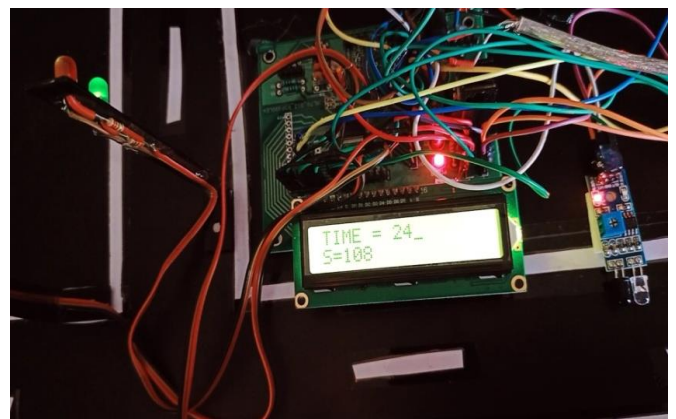


Fig 7: traffic signal cleared for Fire engine

5.2. Whenever Fire engine approached into traffic signal

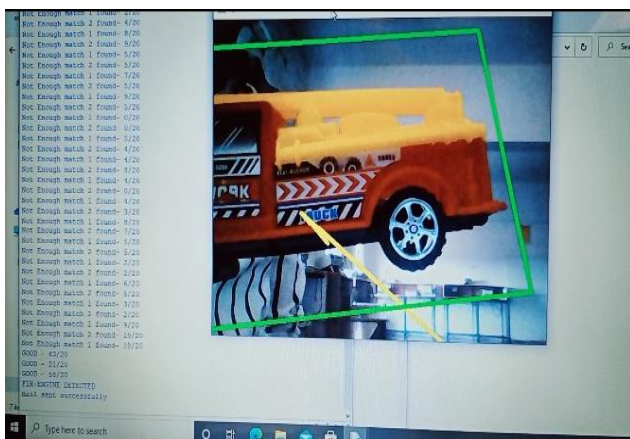


Fig 5: Fire engine detected by camera

VI. CONCLUSION

By this project the problem of traffic can be easily sorted out: the timing of each signal can be automatically adjusted according to fixed time of traffic which is real time operation. It will also clear the path for the ambulance, fire brigade in emergency cases and also it will help to public in taking decisions for reaching their destination in time using auto-routing method.

VII. REFERENCES

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