Density Based Traffic System Using Raspberry PI

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Abstract— **Currently Traffic problems are increasing because of the growing number of vehicles and the limited sources handed by the current structure. The simplest way for controlling a traffic light uses timekeeper for each phase. Another way is to use electronic detectors to identify vehicles and produce signal that cycles. So, we propose our system for controlling the traffic light by image processing. The system will identify vehicles through images and live videos rather of using electronic detectors embedded in the pavement. CC Television camera will be used to capture the images or video capture which is kept alongside the traffic light. It will capture image sequences setting images of all the vehicles as reference image and the captured Images are successively matched using image matching. The design is substantially to Identify the Traffic by using image processing on raspberry pi board and to identify the emergency and special vehicles through the RF module Technology.**

Index Terms: **Image processing, CC Television camera, RF module Technology.**

I.INTRODUCTION

Traffic congestion is a prime trouble in maximum of the cities around the globe. Travelling from unique places within the city turning into more difficult for the travelers in traffic. Because of the site travelers' issues, people losing time, lacking possibilities, and getting upset. Due to travelers' troubles, they will lose the productiveness from labour, buying and selling opportunities can be missed, deliveries might be behind schedule, and consequently the price can be stored on increasing. Traffic manipulate device is a major trouble in the international. The emergency automobiles are allowed to overhaul the bounds, to arrive the destination in time. The emergency vehicles aren't getting the statistics without delay after the accident is happened. So, it wishes a solution for this traffic control, which can be unique from the evolved Countries. The management of

travelers will reduce the terrible impact of congestion. In past few years, wireless networks are overall utilized in the road transport as they offer greater fee powerful. Most of these days' structures are using predetermined timing circuits to operate the traffic signals, which had been now not green due to the fact they do now not operate according to the modern-day device of travelers on the alerts. It is regularly visible in these days' automatic site travelers manipulate systems because of the ones cars we should wait at alerts even though there is less or no travelers in the remaining guidelines. To lessen the site visitor's congestion, sensor-based systems are used for improvement over constant timing-controlled structures. In a sensor-based machine now and again it's miles tough to deal with whilst detecting a couple of connections. These strategies cope with multivehicle, multilane, multi avenue junction locations. It affords an efficient time management machine, in which time schedule is worked out as actual time for the allowance of each site visitor's lane. The actual-time operation of this machine is of the same opinion with the judgment of visitor's policeman on duty. Priority totally based site travelers lighting controller the use of wi-fi sensor networks which become used to offer allowance to any emergency vehicle by way of changing all crimson lighting fixtures to green within the way of emergency vehicle depending on the concern assigned to them. Efficient control of traffic is done by teaching this gadget to make choices primarily based on traffic occurring in its surroundings. The benefit of this system is that those automated systems are being free of manual intervention and can be hired to monitor traffic within the regions wherein it could now not be convenient to people, or which can be prone in injuries variety from Hilly areas to slender tunnels.

II.LITERATURE SURVEY

*i.*Sayanti Banerjee, M.K. Muju-This paper proposes a system for controlling the business light by image processing. A camera will be installed alongside the business light. The image sequence will also be analysed using digital image processing for vehicle discovery, and according to business conditions on the road business light can be controlled[1].

*ii.*Khan Muhammad Nafee Mostafa-This paper suggested the use of automatic business discovery system is needed for smooth and safe living which directly leads us to proper adaptation and controlling of business system. Prof. Uma Nagaraj, Jinendra Rathod, Sayali Thakur, Utsav Sharma-from this paper we can suggests that the analysis can be bettered with the use of multiple successional cameras along a trace which along with localized traffic control, analyzes the traffic make up from the launch to the end point[2].

*iii.*Sai Krishna. C, Chakradhar. B, Phaneendra Kumar. In earlier technology further time was wasted by green light on empty roads. This problem can be answered by using image processing grounded intelligent regulator. Vismay Pandit, Jinesh Doshi, Dhruv Mehta, Ashay Mhatre and Abhilash Janardhan-This paper shows that image processing helps in reducing the business traffic and avoids the destruction oftime by a green light on an empty road. It's more accurate in detecting vehicle presence because of the use of factual business images[3].

iv. The system is good but advancements need to bemade in order to achieve a hundred percent delicacy. The fashion is grounded on calculating the error between a constant background frame and the current bone. Videotape- grounded ways for out-of-door surroundings are fluently told by factors similar as rainfall, change in illumination and stir. Hence, a static background proves inadequate and a robust background model is necessary to deal with change of luminance. We propose the use of the adaptive background fashion. Generating the current background image grounded on segmentation results uprooted from discriminating the image with the former uprooted background is the introductory idea of our system[4]**.**

III.PROPOSED METHODOLOGY

There are numerous procedures proposed already for traffic controlling to avoid the traffic congestion on the road. The previously implemented traffic control system in most of the cities is based on fixed time control or manual control. To control this in a better way we are using this project as a solution and to control the traffic congestion. The Project is to detect the Traffic congestion by using the image processing on Raspberry pi board and to detect the emergency vehicles through the RF Module Technology. Our System can be Capturing the Image, or it can Process the Video and which is used for Identifying or Comparing the images in the database. And the Emergency Vehicles can be detected through The RF Transmitter and receiver where it can give the dynamic Change in the Signals Without having the vehicle to stuck into the traffic. In Now A days the Designed System aims to achieve the following.

a. To give Extension for the green signal timing to the traffic detected path.
b. To Store the Data of the Emergency Vehicles that are crossing the Particular path.
c. To give way for the Emergency vehicles by changing the Signal Alternatively.

A. *System Architecture*

There are many methods of detecting vehicles on road such as motion detection, installing lasers on both sides of the road [5] etc., which is tedious and involves much hardware's. This method uses image processing techniques to count the number of vehicles on road and estimate the density. The number of vehicles found can be used for surveying or controlling the traffic signal. This is one of the best modern methods that countries are seeking to introduce into the traffic system. It organizes the traffic in a smart way, in this way you can organize the traffic without needing for a person to do it. The paper suggests implementing a smart traffic controller using real-time image processing. The sequence of the camera is analysed using different edge detection algorithms and object counting methods. Previously they used matching method that means the camera will be installed along with traffic light. It will capture the image sequence. To set an image of an empty road as a reference image, the captured images are sequentially matched using image matching; but in my paper, we used filtering method, which filtered the image and released all waste objects and only showed the cars, and after it well showed the number of cars in image. In this

paperthe softwaretakes a picture or video. It has been customized to be used in the future to control the traffic light sign by giving each sign sufficient time, depending on the number of cars on each direction.

IV.WORKING OF MODULE

With our proposed system we can modify the present system in various ways. Such as we can control traffic with image processing method by using raspberry pi and RF module technology. By using python and machine learning as an input source for raspberry pi software. The main method we use in this system is Image processing. Image processing is the method which we use for better quality while using in the traffic controlling process. Image processing is the technique where the traffic density is detected through CCTV camera and detected density compares with the image data trained by raspberry pi which is a small sized microcontroller. In this microcontroller we train the images with different angles of the vehicles. This is done by a software programming language python and machine learning. When the density is detected by CCTV camera, and it gives data to raspberry pi software, and it controls the traffic signal using LEDs.

Traffic density is cleared for emergency vehicles like ambulance fire engines and government vehicles by RF module technology. The vehicle is detected through RF transmitter and receiver. The RF module is fixed in between two signals at a place that it detects the special vehicles which have RF tag provided for them. When the emergency vehicles or special vehicles moving on road through a traffic signal path the RF module scans the rf tag provided for the special vehicles and it sends the signal to the raspberry pi software. From there raspberry pi sends the signal to buzzer which is placed at a signal which give alerts to clear the traffic to move emergency vehicles freely. The required power for this system will be provided by the 7805 5v regulation to provide a constant +5v output voltage. 29 And we use the capacitor for storing electrical energy which require to maintain the system. And we also use IN4007 diode for allowing current flow only in one direction and the main purpose to use this diode is from preventing reverse current. In this system we use LEDs as an output indicator. In this, red LED is used to show STOP signal and yellow LED is used to

show READY TO GO and green LED is used to show ALLOW respectively. When a special vehicle arrives suddenly the signal immediately display green signal and stops the other signals.
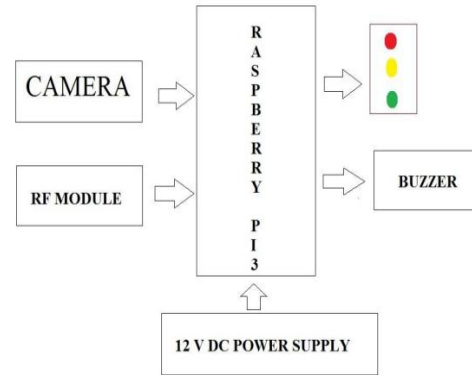

Fig 4.1: Block diagram of System Architecture

V RESULTS

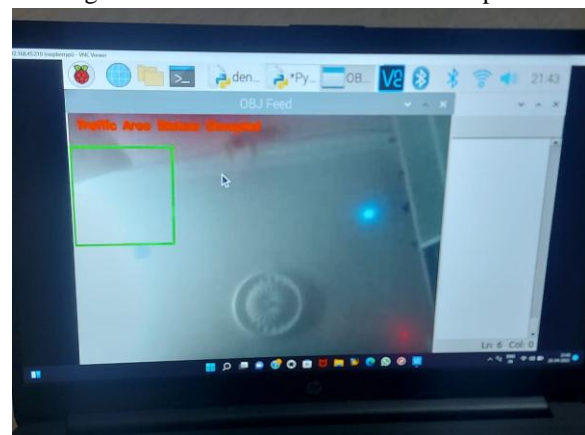Fig5.1: Traffic Area Status When Occupied
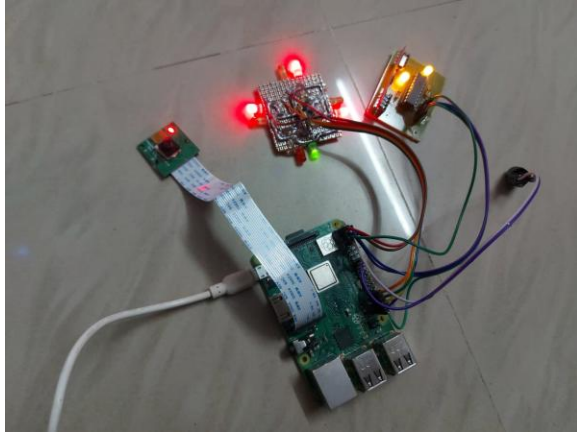

Fig5.2: When any object is detected

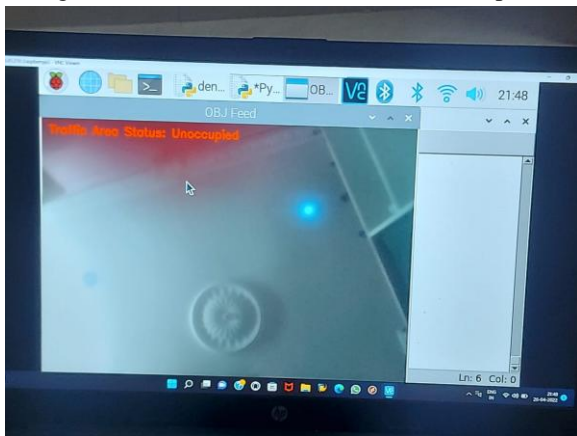Fig5.3: Traffic Area Status When not Occupied

Fig 5.3: When objects are not detected

VI. CONCLUSION AND FUTURE SCOPE

In the paper, the proposed system was relatively easy to acclimatize, and it had framed by using the important point to give extension in the green signal timing and giving the way for exigency vehicles. By which there's no other vision in controlling the system because the programming language is advanced so the working of the system can be made easier. Hence the allocation time is varying so that the design can sustain fluently, and it can fluently be adaptable by the vehicle druggies. Exigency vehicles also get huge advantage in perpetration of this design. In future, we've an idea to store the data by using Cloud Computing technology. The data that are collected through the pall calculating technology is in which path the vehicle travelling the most and the details of the exigency vehicle which are crossing on that path.

REFERENCE

[1] Pallavi Choudekar, Sayanti Banerjee, M.K. Muju, "Implementation of Image Processing in Real Time Traffic Light Control", 978- 9- 4244-8679- 11/3/ 2011, IEEE.

[2] VikramadityaDangi, AmolParab, KshitijPawar &S. SRathod," Image Processing Based Intelligent Traffic Controller," Undergraduate Academic Research Journal (UARJ), ISSN: 2279 – 1329, Volume-1, Issue-1, 201.

[3] Khan Muhammad NafeeMostafa, Qudrat- E-AlahyRatul, "Traffic Jam Detection System," pp 1-5 ¬ Prof. Uma Nagaraj, JinendraRathod, PrachiPatil, Sayali Thakur, Utsav Sharma/ "International Journal of Engineering Research and Applications" (IJERA) ISSN: 2248- 9622 Vol. 5, Issue 1, March - April 2012, pp.1089-1090 1089.

[4] P. Srinivas, Y.L. Malathilatha, Dr.M.V.N. KPrasad," Image Processing Edge Detection Technique used for Traffic Control Problem", International Journal of Computer Science and Information Technologies, Vol4(1),2013,17-20.

[5] N.R. Vikram, S. Sivaraman, R. Balamurugan," Controlling traffic Jam using Feature Detection and Object Detection Technique", IOSR Journal of Mechanical and Civil Engineering, e-ISSN:2278-1684, p-2320-334XPP 07-13.

[6] Chandrasekhar. M, SaiKrishna. C, "Traffic Control Using Image Processing", International Journal of Advanced Electrical and Electronics Engineering, (IJAEEE), ISSN (Print): 2278-8947, Volume-1, Issue-5, 2012.

[7] VismayPandit1, JineshDoshi2, DhruvMehta3, AshayMhatre4 and Abhilash Janardhan, "Smart Traffic Control System Using Image Processing," International Journal of Emerging Trends & Technology in Computer Science (IJETTCS)ISSN 2278-6856 Volume 3, Issue 1, January – February 2014.

[8] Pancharatnam, M. and Sonnadara, D.U.J. (2010) Vehicle Counting and Classification from a Traffic Scene. The 26th National IT Conference, Colombo, Sri Lanka, 72- 78.

[9] Linganagouda, R., Raju, P. and Patil, A. (2016) Automatic Intelligent Traffic Control System. International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, 5, 5902-5906.

[10] Fleet, D.J. and Weiss, Y. (2005) Toronto, Fleet Research Optical Flow Estimation, Flow Chapter 05.