SMART TRAFFIC LIGHT SYSTEM USING CCTV

Muskaan Goswami[1], Nikita Goel[2], Purnima Yadav[3], Amit saini[4]

[4](Assistant Professor, Department of Electronics & Communication Engineering)

[1, 2, 3](U.G. Scholar IV year, Department of Electronics & Communication Engineering)

Meerut Institute of Engineering and Technology, Meerut, U.P. India

*Abstract-*The most purpose of this analysis is to regulate the tie up in metropolitan cities by implementing a system victimization digital technologies named as Image process and Video process with Opencv and Python from CCTV camera that brings traffic footage to be processed within the system as input. The system is predicated on the density of traffic that's to be calculated in every lane by object detection and object count at the same time. there'll be a stoplight shift rule which will adjusts the length of traffic lightweights in step with the density of traffic specified if the density of traffic is additional during a lane than different then therein lane inexperienced light are going to be of additional length and in remainder of the lanes red light are going to be of additional length. This will facilitate to scale back holdup, accidents on roads. Successively it'll offer anodyne journey to individuals and cut back energy ingestion & waiting time.

Keywords- Video processing, image Processing, Traffic Density condition, CCTV camera, Opencv, Python

1. INTRODUCTION

We know that tie up could be a major problem these days. Due to this tie up accidents on roads are increasing day by day, journeys time become longer and conjointly will increase the transport queue. So as to regulate this tie up, traffic lights were developed in 1912.These traffic lights are put in at roads intersections, pedestrian crossings, rail tracks and at different locations. It's eternally cumulative nature makes it authoritative to grasp the road traffic density for advance signal management and effective transportation administration. According to the survey major accidents are because of failure of maintenance. Also traffic signals are operated on fastened predefined program these are supported the time. If there's no vehicle on the road, the time are going to be non-church going for different vehicles that are waiting on the opposite aspect. It is rumored that in [1] 2018 the entire range of accidents were 4, 67,044 within which 1, 51,417 were killed and 4, 69,418 persons get lac. It was determined that rate of accidents in 2018 was 0.46% quite in 2017. In current ages audiovisual & police investigation structures are widely employed in traffic supervision aimed at traveler's info, gradient measurement and apprises in actual time. The traffic density watching will be achieved victimization video watching systems. Our conceptual plan introduces a strategy to use video feeds from cameras in traffic-connected areas for real-time targeting of average photographic users. It aims to focus on the legislation for the replacement of traffic lights associated with traffic volumes, where it is intended to reduce consecutive traffic arrests that can reduce the speed of accidents and can save electricity, cash and time.

2. LITERATURE STUDY

Tahmid. T, Hossain. E [2] conducted a way to regulate the traffic by measure the important time density of vehicles with the assistance of digital image process techniques. Accordingly, this method begins with a technique known as image acquisition for sting detection when using the inexperienced signal time allocation on photographs of various traffic conditions, and therefore the results can be verified using hardware implementation.

Jess Tyeon G. Nodado, Hans Christian P. Morales, Ma. Angelica P. Abugan, Jerick L. Olisea, Angelo C Aralar, Pocholo James M. Lorsco [3] proposed a way that had been developed to manage real time traffic density that is integrated with an automatic and manual control interface in a humanoid based mostly mobile application.

In this approach CCTV cameras were put in on each lane of road intersections that offer the traffic pictures to be feed into raspberry pi three microcontroller as input for traffic density. calculation victimization varied image process techniques. It uses traffic watching systems and traffic signaling operations by humanoid based mostly mobile applications.

Dhakkad. R, Jain. M [4] proposed an approach that uses smartphones put in with a GPS receiver to sight congestion on roads and a measuring instrument to hurry of auto. This approximation system uses an anthropomorphic application to track the location of the user through the GPS receiver, and after verification this knowledge is sent to the Traffic Authority to reflect and report traffic congestion through the offline map feature.

Mehal Z. Talukder, Sheikh S. Towqir, Arifur R. Remon,Hasan U. Zaman [5] projected a way that uses unhearable sensing element integrated with Raspberry Pi supported traffic density to control lanes of intersection that describes the intersection's current condition that may be updated on an user accessible web site. This integration of traffic system is predicated on IoT.

Anurag A. Saikar, Mihir P. Parulekar, Badve. A, Sagar K. Thakkar, Aradhana A. Deshmukh [6] projected an answer to regulate traffic that include real time traffic watching system that is created by a network composed of road aspect units, junction units and mobile units so as to make a decision to shift time of traffic signals which will management the traffic congestion , let alone an online based mostly application for vehicle drivers which will acquire knowledge for real time traffic analysis to point out the flow of native traffic and to prevent the growth of congestion it'll counsel the routes to different incoming vehicles.

Malik A. Tubaishat, Yi Shang, Homgchi Shi [7] conducted a way within which wireless sensing element networks are integrated on the intersection lanes to sight the vehicles count and speed and send this knowledge to all or any nearest control authority that would share this knowledge with different authorities so as to regulate traffic in wider areas.

Prof. Amruta Sankhe, kawade. D, Deshmukh. S, Gamare. S [8] projected an approach to regulate the traffic by using opencv software package. According to this camera is put in on the lane which will capture the pictures of road to calculate traffic density on roads obtained from opencv. To method knowledge from opencv an 8051 microcontroller is employed which will send a command to traffic crystal rectifier timer to change consequently so as to manage traffic.

Vinidha Roc, P.R. Banuprakash, G. Paul Asir Nixon Raj, L. Prasad [9] includes a system within which camera were put in on lanes of a junction which will offer info of traffic on every lane specified in step with it shift of traffic signals will be done and can conjointly counsel inexperienced lightweight signaling to avoid most traffic. In this system emergency vehicles also are detected by employing a sound sensing element placed on the junctions coordinated with microcontroller to create the actual lane free.

Janarthanam. T, Praveen kumar. T, Kamatchi. C [10] projected a way to regulate traffic by calculating traffic density in roads using CCTV camera and image process. According to this stoplight are going to be switched wherever the traffic density is additional. Also victimization this methodology emergency vehicle also are detected to unencumbered the lane.

Prof. S.M. Rokade,Yashashree Joshi, Ashwini Joshi, Neha Tayade, Priyanka Shinde [11] includes use of the infrared sensing element which will offer info and can warn the drivers regarding the traffic condition on the actual lane in order that he may select another appropriate lane to succeed in his destination on time.

3. EXISTING SYSTEM

In existing control systems employed in metropolitan cities the stoplight timers have a hard and fast period of time to change traffic between completely different directions. They act as open loop system with no feedback or networking sensing element because of that vehicles have to be compelled to await an extended time albeit the traffic density is incredibly less. This causes fuel wastage, will increase time consumption and results in accidents on roads.

4. PROPOSED SYSTEM

In the proposed system we will discuss an approach that is centralized around image and video processing using openCV. The thought is to use CCTV cameras put in at junctions of the lanes to induce pictures of the lanes then send that knowledge to the microcontroller. The microcontroller can then method those pictures by using varied image process techniques supported edge detection and will return count of vehicles or the traffic density to the traffic density shift rule. Fig one represents the projected methodology.
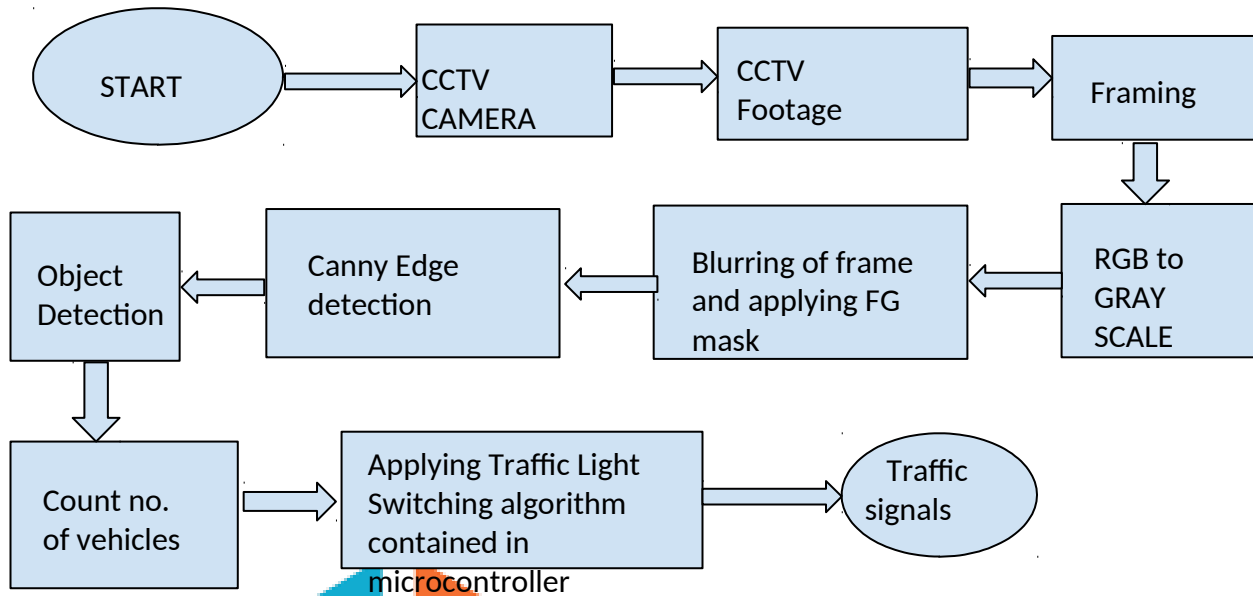
5. PROPOSED METHODOLOGY

Figure: 1 Block Diagram

6. HARDWARE REQUIREMENTS

- **Raspberry Pi:** it's a credit-card sized microcontroller that works on a UNIX system based mostly OS armed with Broadcom BCM2837B0 chip, 1.2 gigacycle 64-bit Quad core processor with 1GB of RAM.
- **CCTV camera:** CCTV camera can capture images or recordings digitally with high resolutions of 1,2,3,4 even up to 11 megapixel. It can measures 1.7m*4.56m*1.6m and have sensitivity of 0.01 lux.
- **Traffic Light:** It is a signaling device to control traffic movement in which different colors of lights indicate what action has to be taken by drivers.

7. SOFTWARE REQUIREMENTS

- **Python:** Python 3.7 (64-bit) AN ASCII text file software package consisting of python libraries and packages for development of applications, algorithms, websites and lots of additional functions.
- **Open CV:** It is an open supply PC vision library which is used for real-time applications that runs on various operating systems with a size of 200 MB.
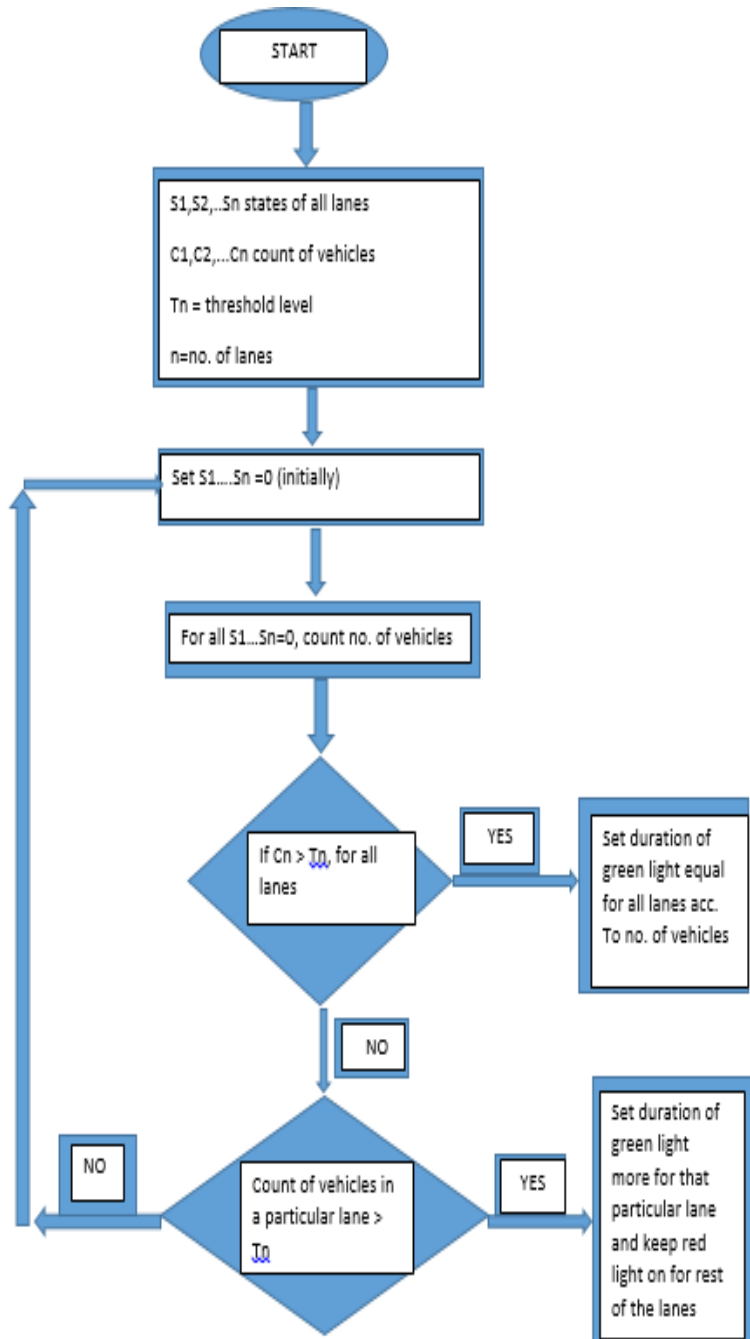
8. PROCESS FLOW CHART

Figure- 2 Flow Chart

9. EXPERIMENTAL RESULTS

Proposed techniques are enforced and verified on our native system. In our experiment we've created a program on our virtual atmosphere victimization python language that embrace all our operating. We took a lane video and applied all our techniques on that so as to get results. The results are shown below:

10. ADVANTAGES OF PROPOSED SYSTEM

1. Less time consumption
2. Fuel saving
3. Helpful in emergency cases

11. CONCLUSION

We have terminated that this projected system is user friendly and straightforward to handle. It uses image and video process techniques to calculate traffic density on roads in order that traffic signals will be switched consequently and conjointly can store all the info during an information for future purpose. It will be accessed by any traffic authority with larger potency. Also it'll cut back the growing rate of accidents and traffic congestion conditions. In this manner it's an economical methodology of dominant traffic in metropolitan cities.

12. ACKNOWLEDGEMENT

13. FUTURE SCOPE:

1. Detection of emergency vehicles can be done using sound sensing devices.
2. Further advancements will be created like Artificial Intelligence and cloud monitoring.
3. It will be IoT based.
4. License Plate detection will be done to control traffic rules violation.

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