ROBUST TRAFFIC MANAGEMENT SYSTEM

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Abstract— Traffic issues these days are increasing as a result of the growing range of vehicles and also the restricted resources provided by current infrastructures. The only manner for dominant a stoplight uses timer for every part. Otherwise is to use electronic sensors so as to discover vehicles, and turn out signal that cycles. Here propose a system for dominant the stoplight by image process. Here counsel a system that implement image process rule in real time stoplight management which can management the stoplight in keeping with density of the traffic. Here still pictures of the road are captured by the camera and in keeping with traffic density on the road, stoplight will be controlled. This avoids traffic jam. The project provides promising results when together with image process in stoplight management. In project with success enforced a color extraction rule for a true -time image process primarily based traffic controller. By victimization the colour extraction rule, in project controlled the traffic lights supported the density of traffic. Hence, this project demonstrates that image process may be a much more economical methodology of Vtraffic management as compared to ancient techniques.

Keywords— *controlling; density; extraction; traffic; Vtraffic.*

I. INTRODUCTION

Traffic issues today area unit increasing as a result of the growing variety of vehicles and therefore the restricted resources provided by current infrastructures. Traffic on roads might accommodates pedestrians, animals, vehicles, streetcars and alternative conveyances, either separately or along, whereas mistreatment the general public manner for functions of travel. traffic jam has been inflicting several crucial issues and challenges within the major and most inhabited cities. because of this traffic jam there's additional wastage of your time.

The steady increase within the variety of vehicles on the road has amplified the importance of managing traffic flow expeditiously to optimize utilization of existing road capability. High fuel price and environmental considerations additionally offer vital incentives for minimizing traffic delays. thus there's a necessity of correct management of stoplight temporal arrangement sequence.

Normally traffic lights area unit controlled manually still as mechanically. Timers for every section area unit the only thanks to management the stoplight mechanically. within the manual dominant system we'd like additional man power. As we've got poor strength of traffic police we tend to cannot management traffic manually altogether space of a town or city. thus we'd like an improved resolution to manage the traffic. For electronic sensors there could also be likelihood of traffic jam if the traffic is variable.

Here we recommend a system that implement image process formula in real time stoplight management which can management the stoplight consistent with density of the traffic. Here still pictures of the road area unit captured by the camera and consistent with traffic density on the road, stoplight is controlled. This avoids traffic jam.

II. TRAFFIC CONTROL SYSTEMS

A. *Manual Control*

Manual dominant needs man power to regulate the traffic. counting on the countries and states the traffic police square measure assigned for a needed space or town to regulate the traffic. The traffic police can have things like sign board, sign light-weight and whistle to regulate the traffic as shown in figure1.They will be educated to wear specific uniforms so as to regulate the traffic. throughout the usage of a traffic police, the road users are going to be confused by the traffic signal indicators likewise because the direction given by the traffic police. Here the chance of traffic police will increase once standing within the middle of the traffic signal intersection which can cause the accident within the traffic signal junction.

Figure 1. Manual controlling method.

B. *Automatic Control*

Automatic stoplight is controlled by timers and electrical sensors. In stoplight every section a relentless numerical price loaded within the timer. The lights can activate and OFF per amendment in timer price. whereas mistreatment electrical sensors it'll capture the provision of the vehicle and signals on every section, betting on the signal the lights can mechanically

activate and OFF[1] .The conventional stoplight system is build with only 1 sensing element placed at the road finish before junction. The sensors square measure typically visible black rectangular line as shown in figure

Figure 2. The Magnetic loop sensor placed at the road end before the junction.

The usage of one sensor is not practical for all applications. Such a practice creates an inefficiency system because with only one sensor to detect the presence of a vehicle approaching the road end. If the sensor is activated, a signal will be send to the traffic light controller to notify the availability of the vehicle. In the case of the sensor malfunction or faulty, the traffic light control system will operate in a preprogrammed mode while the presence of a vehicle could not be detected at all time.

C. Traffic Light Controlling Using Image Processing

Traffic light ar controlled by image process. The system can observe vehicles through pictures rather than exploitation electronic sensors embedded within the pavement. A camera are going to be put in aboard the light. it'll capture the $64000 time pictures and edge detection operation is performed. when edge detection procedure each reference and real time pictures ar matched and traffic lights is controlled supported proportion of matching.

Another methodology for control exploitation image process is predicated on Moore neighborhood technique that is employed for object tally. per the quantity of vehicles counted traffic lights ar controlled.

Image process may be a higher technique to manage the natural process of the light. It shows that it will cut back the tie up ANd avoids the present wasted by a inexperienced light-weight on an empty road. it's conjointly additional consistent in detective work vehicle presence as a result of it uses actual traffic pictures. It visualizes the fact thus it functions far better than those systems that have faith in the detection of the vehicles' metal content.

III. SYSTEM ARCHITECTURE

A. algorithm for NO traffic condition

1. Start.

2. Display project name "ROBUST TRAFFIC MANAGEMENT".

3. LCD display initial signal time i.e. 10sec.

4. Rotate camera by using motor.

5. MATLAB continuously check whether the" #" is received from hardware through serial communication.

6. If the "#" is received then goes to next step else goes to step 5.

7. Camera will take the snapshot of respective road and stores the image.

8. Perform image enhancement operation on store image.

9. Extract the green component from enhanced image.

10. Perform RGB to gray operation on enhanced image.

11. Subtract the gray scale image from green component image.

12. Convert the subtracted image into binary image.

13. Perform morphological operation on binary image to remove the small object from image.

14. Label the connected component in binary image.

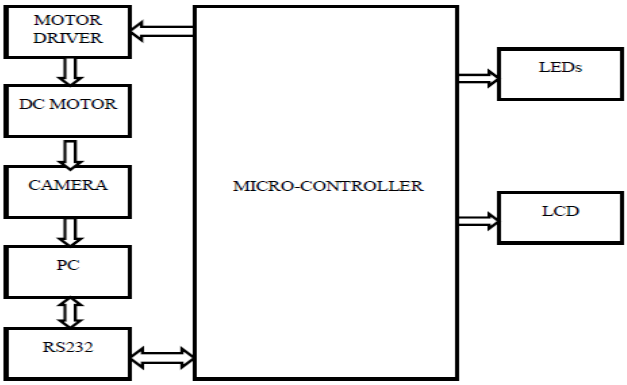
15. Calculate the count of green pixel in labeled image.

16. If pixel count is greater than 8000 then send *1 to hardware.

17. If hardware receive *1 it will on green light on 10 sec.

18. Display the timing of respective road as10 sec.

19. After 2 sec motor will rotate the camera to next road and goes to step 5.



B. algorithm for NO traffic condition

1. Start.

2. Display project name "ROBUST TRAFFIC MANAGEMENT".

3. LCD display initial signal time i.e. 10sec.

4. Rotate camera by using motor.

5. MATLAB continuously check whether the" #" is received from hardware through serial communication.

6. If the "#" is received then goes to next step else goes to step 5.

7. Camera will take the snapshot of respective road and stores the image.

8. Perform image enhancement operation on store image.

9. Extract the green component from enhanced image.

10. Perform RGB to gray operation on enhanced image.

11. Subtract the gray scale image from green component image.

12. Convert the subtracted image into binary image.

13. Perform morphological operation on binary image to remove the small object from image.

14. Label the connected component in binary image.

15. Calculate the count of green pixel in labeled image.

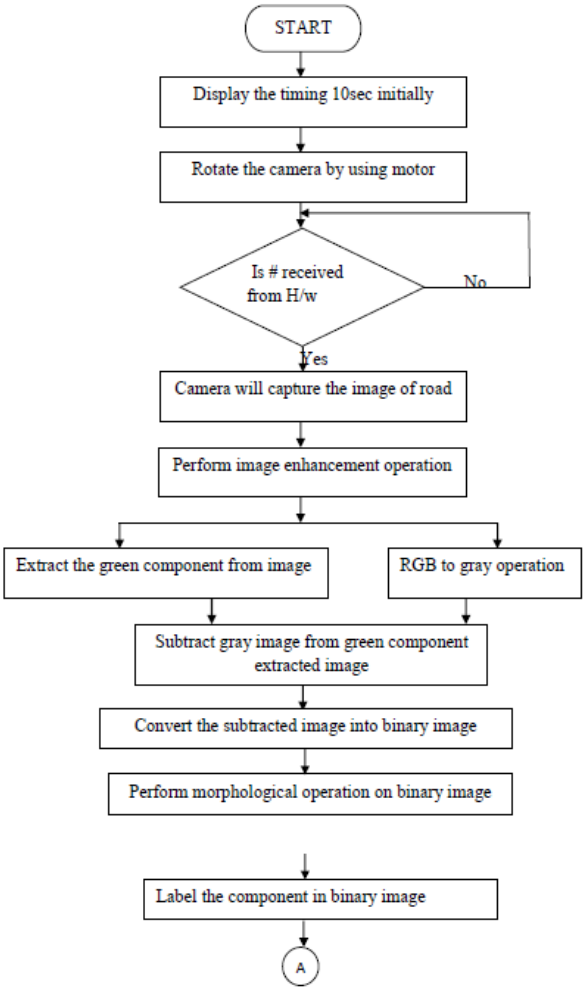
16. If pixel count is greater than 7000 then send *2 to hardware.

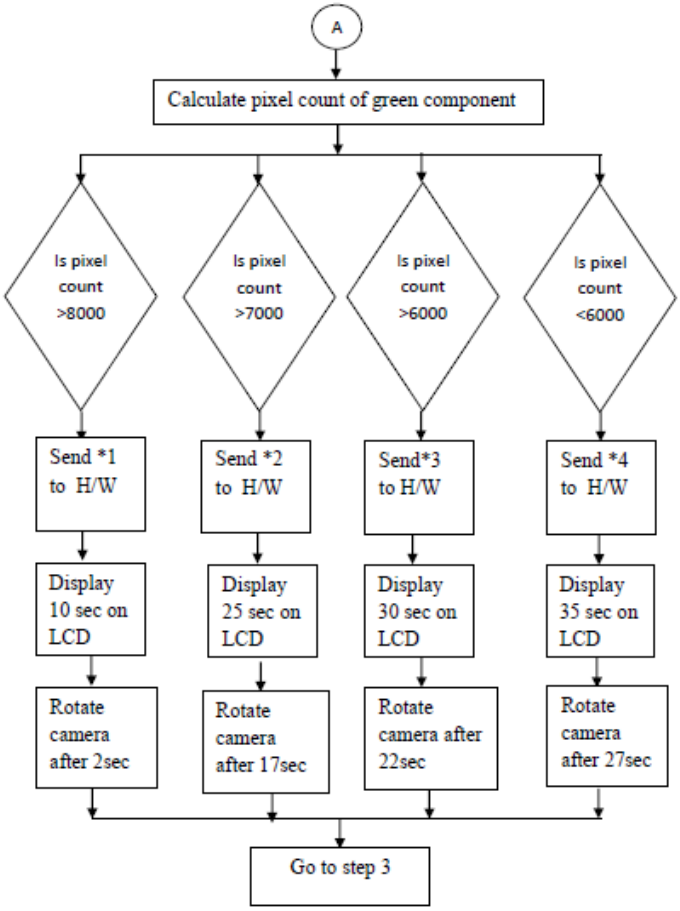
17. If hardware receive *2 it will on green light on 25 sec.

18. Display the timing of respective road as 25 sec.

19. After 17 sec motor will rotate the camera to next road and goes to step 5.

C. Flowchart





IV. OBSERVATION AND RESULTS

After the acquisition of real time image sweetening operation is performed. Image sweetening operation is performed mistreatment decorrelation stretch. Decorrelation stretching enhances the colour separation of a true time image so as to boost the visual sweetening of the image. Then 2 operations area unit performed on the improved image, 1st is extraction of inexperienced element from the improved image and second is RGB to grey conversion of the improved image. In RGB to grey conversion grey scale digital image is a picture within which worth|the worth} of every constituent may be a single value, that is, it carries solely intensity data. Then this grey image is ablated from the inexperienced color extracted image. This ablated image is reborn into binary image by mistreatment grey thresholding, if the brightness of ablated image is larger than grey threshold then it replaces those pixels by one and replaces all alternative pixels with zero.The constituent that area unit painted by one area unit inexperienced pixels. Then gap operation is performed on the binary image therein the element that area unit but two hundred pixels area unit removed. Label the connected element in binary image. Next, image analysis is performed on labelled image. Then calculate the constituent count of the labelled image that's the amount of inexperienced pixels in a picture.. Next, temporal order is allotted supported the constituent count.

• If terribly high constituent count that's bigger than 8000 pixels - inexperienced light-weight is on for ten seconds.(No traffic condition)

• If high constituent count that's bigger than 7000 pixels - inexperienced light-weight is on for twenty five seconds. (Low traffic condition).

• If medium constituent count that's bigger than 6000 pixels - inexperienced light-weight is on for thirty seconds. (medium traffic condition).

• If low constituent count that's but 6000 pixels - inexperienced light-weight is on for thirty five seconds. (high traffic condition) .

Real time image is captured and processed mistreatment image process. varied operations area unit perform like image sweetening operation ,subtraction operation, grey scale operation, binary arithmetic operation, gap operation and afterward space is calculated that's the amount of inexperienced constituents in processed image and per pixel count no traffic, low traffic ,medium traffic and high traffic conditions area unit determined ..

A. No Traffic Condition

Figure 3 Real Time Image1

Figure 4 Final Image1

In figure 3 we have captured the empty road image and after processing the result is obtained as shown in figure 4. In that all the 3 green strips are visible so that the green pixel count is greater than 8000, hence no traffic condition is detected. Then this result is given to microcontroller through serial communication using RS232 by sending *1 and according to that it will decide the duration of green light signal on that road. For no traffic management green light will be on for 10 sec.

B. Low Traffic Condition

Figure 5 Real Time Image2

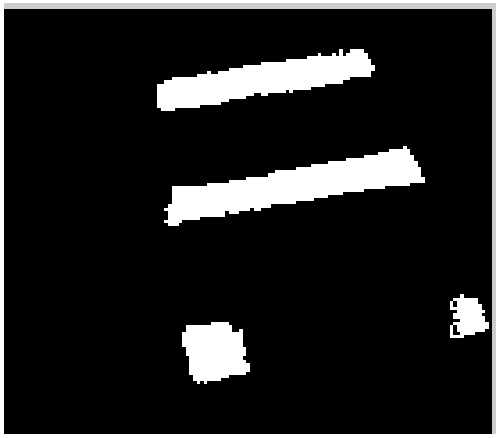


Figure 6 Final Image2

In figure 5 we have captured the empty road image and after processing the result is obtained as shown in figure 6 In that all the 3 green strips are not visible so that green pixel count is greater than 7000, hence low traffic condition is detected. Then this result is given to microcontroller through serial communication using RS232 by sending *2 and according to that it will decide the duration of green light signal on that road. For no traffic management green light will be on for 25 sec.

C. Medium Traffic Condition

Figure 7. Real Time Image3

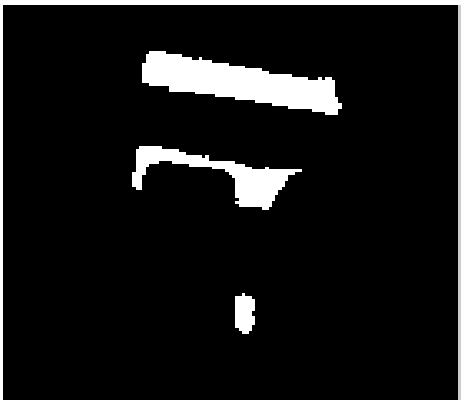


Figure 8 Real Time Image3

In figure 7 we have captured the real time road image and after processing the result is obtained as shown in figure 8. In that all the 3 green strips are not visible completely for that green pixel count is greater than 6000, hence medium traffic condition is detected. Then this result is given to microcontroller through serial communication using RS232 by sending *3 and according to that it will decide the duration of green light signal on that road.For medium traffic management green light will be on for 30 sec.

D. High Traffic Condition

Figure 9. Real Time Image4

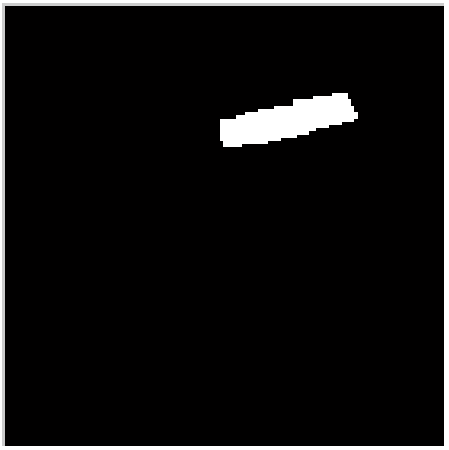


Figure 10. Final Image4

In figure 9 we have captured the real time road image and after processing the result is obtained as shown in figure 10. In that all the 3 green strips are not visible completely for that green pixel count is less than 6000, hence high traffic condition is detected. Then this result is given to microcontroller through serial communication using RS232 by sending *4 and according to that it will decide the duration of green light signal on that road. For medium traffic management green light will be on for 35 sec.

Conclusion

The paper gives promising results after including image processing in traffic light control. In automatic traffic control, use of timer had a drawback that the time is being wasted by green light on the empty road. This technique avoids this problem. In this project, we have successfully implemented a colour extraction algorithm for a real -time image processing based traffic controller. By using the colour extraction algorithm, we have controlled the traffic lights based on the density of traffic. Hence, this project demonstrates that image processing is a far more efficient method of traffic control as compared to traditional techniques.

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