



Smart Traffic Light using CCTV

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Abstract:

Traffic congestion becomes a serious problem and has spread like a plague from major metropolitan areas to numerous small to mid-size cities. It increases human travel time, fuel consumption and air pollution, traffic congestion in urban areas is becoming unavoidable these days. Real time Traffic light control is evaluated using Image processing. Our research is on density based traffic control to avoid traffic jam by using CCTV. Here Vehicle congestion is monitored for certain period of time. Vehicles are detected in the lane. If more vehicles predicted in the lane then accordingly traffic light will be changed. In case of any ambulance emergency vehicle found, then the traffic lights changed accordingly. Number of emergency vehicles such as Fire engine, ambulance can be passed will be determined.

Problem Statement: Use CCTV cameras installed on junctions to figure out which side has maximum traffic and accordingly adjust duration of red/green light automatically.

Keywords: Arduino Board, Mat lab, Camera, Led Light, ThinkSpeak Cloud.

I. INTRODUCTION

One of the important things in the smart cities is the Intelligent Transportation System[ITS]. In this quick moving world everything is mechanized. Beginning from home apparatuses to following of vehicles every last framework is implanted. Managing traffic signal timing is one if the key thing in the urban areas. Managing to time on the road will decrease the waiting time of the drivers on the road, and that will help to reduce the fuel consumption. This is done with the help of the Image Acquisition. In this system, we are trained different kind of vehicles to identify the value of traffic Congestion. Road transport is one of the primitive modes of transport in many parts of the world now-a-days. The number of vehicles using the road is increasing exponentially every day. Our research is on density based traffic control with priority to emergency vehicles like ambulance and fire brigade. So, it is very much important to prevent security for accidents, collisions, and traffic jams. The reason for traffic congestion is due to poor traffic prioritization, due to less traffic than the other and the equal green signal duration for both affect the wastage of resources and drivers are stressed.

1. EXISTING SYSTEM

In the Existing System, two-level strategy is evaluated through simulations in the grid network. The results reveal the influences of some major parameters, such as the route-changing rates of vehicles, operation time interval of the proposed strategy, and traffic density of the traffic network on a congestion dissipation process. The results can be used to improve the state of the art in preventing urban road traffic congestion caused by incidents

DISADVANTAGES IN EXISTING SYSTEM

- 1.Congestion may occur.
- 2.Pollution will take place.
- 3.Accident can happen due to improper traffic control.

2. PROPOSED SYSTEM

In the proposed system, Real time Traffic light control is evaluated using Image processing. Here Vehicle congestion is

monitored for certain period of time. Vehicles are detected in the lane. If more vehicles predicted in the lane then accordingly traffic light will be changed. In case of any ambulance emergency vehicle found, then the traffic lights changed accordingly. Number of emergency vehicles such as Fire engine, ambulance can be passed will be determined.

ADVANTAGES IN PROPOSED SYSTEM

- 1.Ambulance can be predicted easily.
- 2.By CCTV Camera movements can be captured easily.
- 3.Pollution can be controlled.

3. METHODOLOGY USED

- 1.Video Preprocessing
- 2.Feature Extraction
- 3.Design of Hardware Interface & cloud Host

4.1. VIDEO PREPROCESSING

This module consists of design of image preprocessing through video captured from the camera through IMTOOL toolbox. Image is preprocessed by converting the RGB image into gray conversion, Resizing etc.

4.2. FEATURE EXTRACTION

This module consists of multi-modal feature extraction method contains SURF features, MSER feature to be combined and get the featured vectors.

4.3. DESIGN OF HARDWARE INTERFACE & CLOUD HOST

After feature extraction the modules are classified using deep neural network and ambulance can be predicted, Heavy congestion can be predicted and Low traffic can be predicted. According to the Traffic Level, the Traffic Signal panel can be varied to manage the traffic smartly. The resultant is hosted in Thing Speak Cloud for Surveillance purpose.

5. SOFTWARE REQUIREMENT

1. **Operating System:** Windows 10 and above.
2. **DevelopmentTool:** Arduino Board, Mat lab, Camera, Led Light, ThinkSpeak Cloud.

3. Language: C

6. SYSTEM ARCHITECTURE

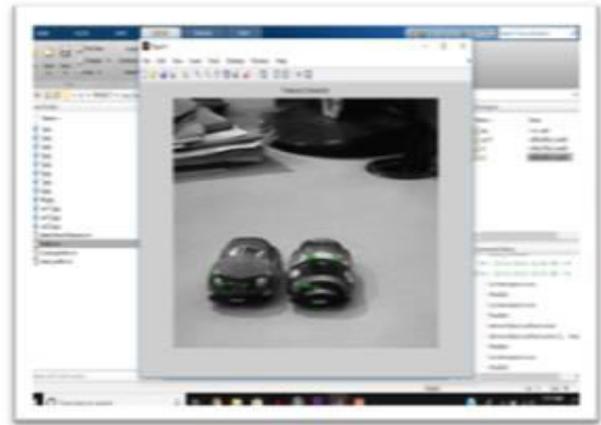
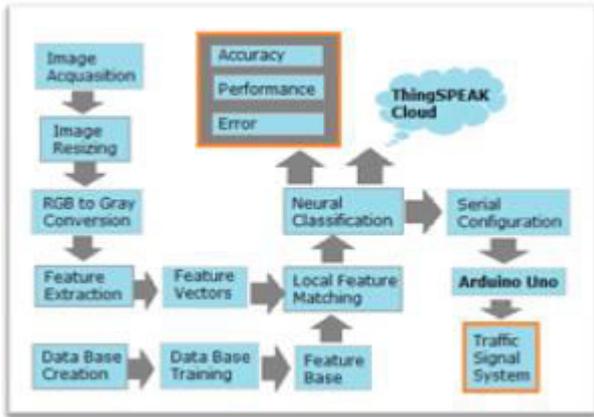


Figure .4. OUTPUT for Feature Extraction.

7. MODULES IMPLEMENTATION

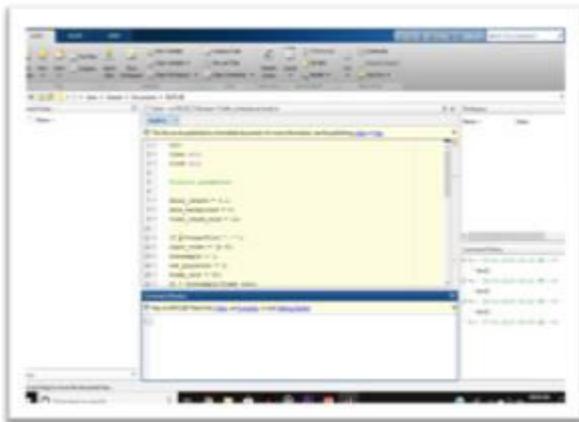


Figure.1. Screenshot of Capturing Video and Calculating distance between two cars

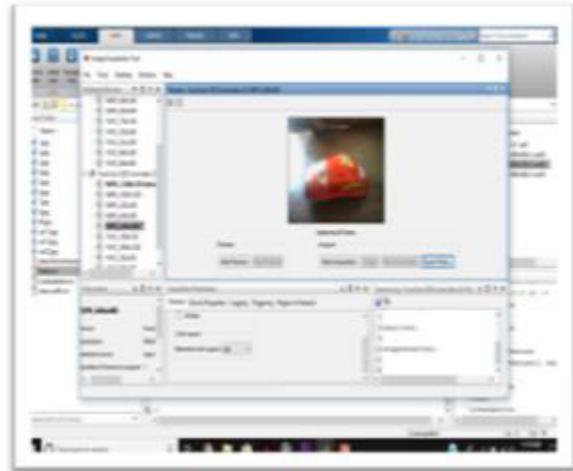


Figure.5. Preview of Checking whether the Camera is Captured Corectly or not

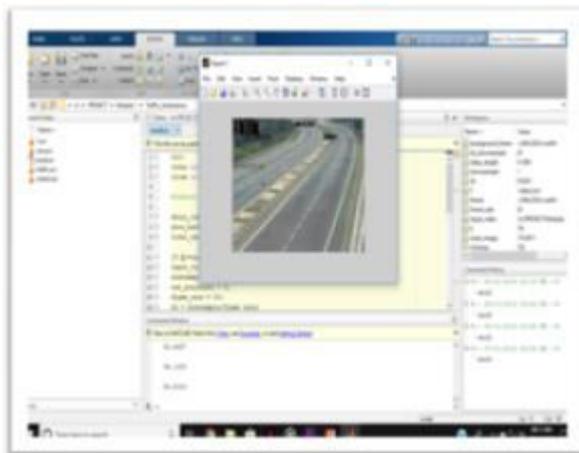


Figure.2. after Capturing picture, it converts into RGB into GREY Conversion.

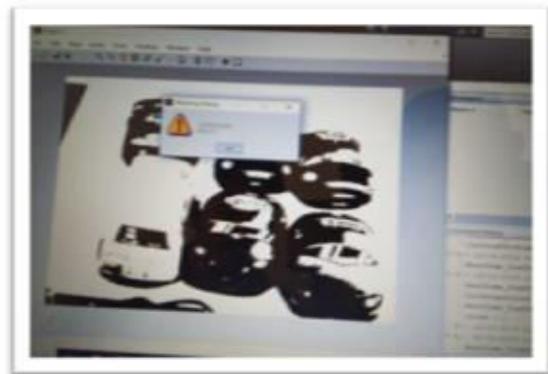


Figure.6. FIGURE to determine whether CONGESTION Value is HEAVY or LOW.

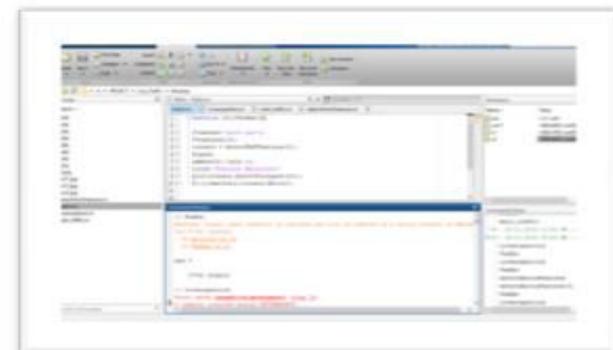


Figure.3. Code for Extracting Features from Video.

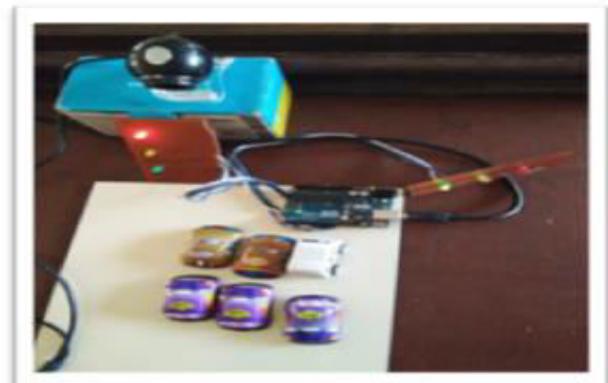


Figure.7. Publish Result, It indicates TRAFFIC LIGHT based on value of CONGESTION Value

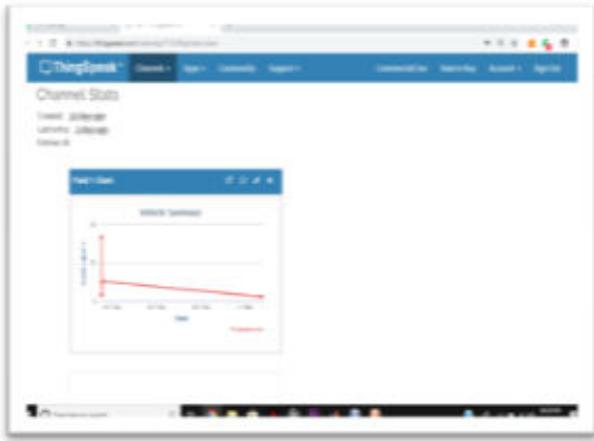


Figure.8. Result page, Final Result to Display the Congestion value in the form of graph.

II. CONCLUSION

In this paper, Traffic optimization is achieved using Math Lab platform for efficient utilizing allocating varying traffic signal according to available vehicles congestion in road path. So in this way, apart from operating the signal manually or by keeping them constant, the signal can be changing and traffic can be controlled using the image acquisition and by measuring the green will be signaled automatically by matching database. On this image acquisition is used to find the congestion value to clear the traffic. so the Traffic police stress can be reduced. The traffic density on each lane is also estimated and the traffic signal is prioritized accordingly. In Future enhancement the value of congestion data stored in ThinkSpeak cloud. By predicting the ambulance data in every time on the same lane then we can build hospital near to it by using ThinkSpeak Cloud.

III. REFERENCES

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