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# DENSITY BASED SMART TRAFFIC CONTROL SYSTEM USING CANNY EDGE DETECTION BY MATLAB

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***ABSTRACT-***

Traffic congestion is one of the major modem-day crisis in every big city in the world. As the problem of urban traffic congestion intensifies, there is a pressing need for the introduction of advanced technology and equipment to improve the state of the art of traffic control. The current methods used such as timers or human control are proved to be inferior to alleviate this crisis. In this paper, a system to control the traffic by measuring the real-time vehicle density using canny edge detection with digital image processing is proposed. This method of traffic control system offers significant improvement in response time, vehicle management, automation, reliability and overall efficiency over the existing systems. Besides that, the complete technique from image acquisition to edge detection and finally green signal allotment using four sample images of different traffic conditions is illustrated with proper schematics and the final results are verified by hardware implementation. Recent study of World Bank has shown that average vehicle speed has been reduced from 21 km to 7 km per hour in the last 10 years in Dhaka . Inter- metropolitan area studies suggest that traffic congestion reduces regional competitiveness and redistributes economic activity by slowing growth in county gross output or slowing metropolitan area employment growth . As more and more vehicles are commissioning in an already congested traffic system, there is an urgent need for a whole new traffic control system using advanced technologies to utilize the already existing infrastructures to its full extent. Since building new roads, flyovers, elevated expressway etc. needs extensive planning, huge capital and lots of time; focus should be directed upon availing existing infrastructures more efficiently and diligently.

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## *1. INTRODUCTION-*

As the problem of urban traffic congestion intensifies, there is a pressing need for the introduction of advanced technology and equipment to improve the state-of-theart of traffic control. The current methods used such as timers or human control are proved to be inferior to alleviate this crisis. In this project, a system to control the traffic by measuring the real time vehicle density using canny edge detection with digital image processing is proposed. This imposing traffic control system offers significant improvement in response time, vehicle management, automation, reliability and overall efficiency over the existing systems. Besides that, the complete technique from image acquisition to edge detection and finally green signal allotment using four sample images of different traffic conditions is illustrated with proper schematics.Traffic congestion becoming serious day by day. It is said that the high tone of vehicles, the scanty infrastructure and irrational distribution of the development are main reason for argumented traffic jam.Dynamic traffic signal times to regulate traffic based on traffic density image pre-processing is perfomed to convert the raw images into

more accessible images.Some of them count total number of pixels , some of the work calculate number of vehicles .These methods have shown promising results in collecting traffic data. However, calculating the number of vehicles may give false results if the intra vehicular spacing is very small (two vehicles close to each other may be counted as one) and it may not count rickshawor auto- rickshaw as vehicles which are the quotidian means of traffic especially in South-Asian countries. And counting number of pixels has disadvantage of counting insubstantial materials as vehicles such as footpath or pedestrians. Some of the work have proposed to allocate time based solely on the density of traffic. But this may be disadvantageous for those who are in lanes that have less frequency of traffic. Edge detection technique is imperative to extract the required traffic information from the CCTV footage. It can be used to isolate the required information from rest of the image. There are several edge detection techniques available. They have distinct characteristics in terms of noise reduction, detection sensitivity, accuracy etc. Among them,Prewitt , canny ,Sobel, Roberts and LOG are most accredited operators. It has been observed that the Canny edge detector depicts higher accuracy in detection of object with higher entropy, PSNR(Peak Signal to Noise Ratio), MSE(Mean Square Error) and execution time compared with Sobel, Roberts, Prewitt, Zero crossing and LOG

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.Here is a comparison between distinct edge detection techniques.

## *2.* EARLIER WORK-

The existing system proposes for controlling the traffic light by image processing. The vehicles are detected by the system through images instead of using electronic sensors embedded in the pavement. A camera will be placed along side the traffic light. It will capture image sequences. Image processing is a better technique to control the state change of the traffic light. It shows that it can decrease the traffic congestion and avoids the time being wasted by a green light on an empty road. It is also more reliable in estimating vehicle presence because it uses actual traffic images. It visualizes the practicality, so it functions much better than those systems that rely on the detection of the vehicles mental content.

## *3.* PROPOSED SYSTEM-

The proposed system helps in changing the traffic lights dynamically, which helps in reducing the congestion of the traffic and more importantly, allows smooth functioningof the traffic. The proposed system changes RGB images to Gray-Scale images for further processing. Canny Edge Detection Algorithm is used for the edge detection.
Images are smoothed by applying Gaussian filter. At last, with the help of white point count, the density of the traffic is calculated for various lanes, which helps in varying thetime of the traffic signals. We are using image processing which is far more Efficientmethod of traffic control as compared to traditional Techniques. The use of this technique remove the need for extra hardware and the accuracy in calculation of time due to single moving camera depends on the registration position while facing roadeverytime.

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we change the static camera which

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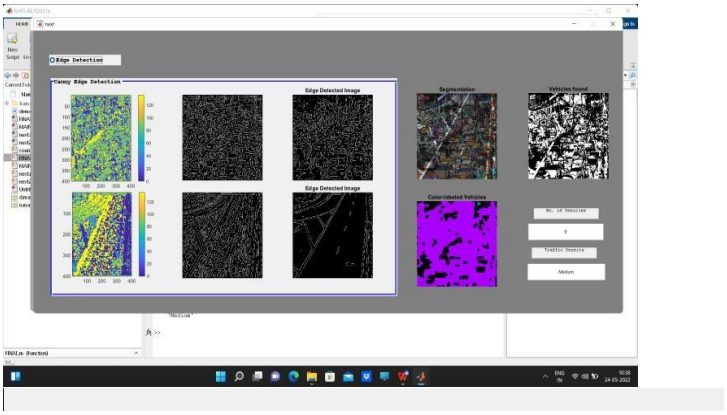
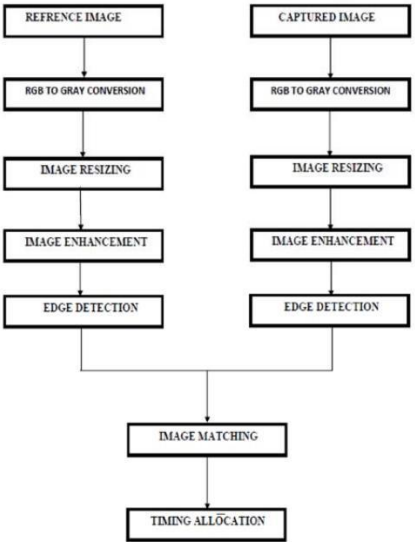
is being used in the existing system into the video camera. The images are captured in theform of video frame inputs. We use the Video Object Detector to capture the video

**BLOCK DIAGRAM OFPROPOSED METHOD-**






## *4.* CONCLUSION

The system presents a novel approach, based on Canny Edge Detection (CED) algorithm to construct a traffic management system, with the aim of improving the traffic conditions. In this proposed system, the images are captured at intersections, and

then they are processed using CED algorithm. After that, the calculation of the density of the traffic is done using the white point count, and dynamically the signal times are changed depending on the intensity of traffic. Therefore, the system autonomously controls the traffic, involving lower human power with virtually no new installation cost. This model is an attempt to detect the density of vehicles on road in real time. The implementation of the proposed system will help in attaining great accuracy. The increase in accuracy for the tested dataset will help a lot by avoiding the traditional edge detection methodology, which are not so effective in

achieving the proper traffic management. Moreover, this will also contribute in a much faster overall computing process.

## RESULT

We can calculate detection of vehicles anddensiy and it can be dtected to it.*FUTURE WORK*

The focus shall be to implement the controller using DSP as it can avoid heavy investment in industrial control computer while obtaining improved computational power and optimized system structure. The hardware implementation would enable the project to be used in real-time practicalconditions. In addition, we propose a system to identify the vehicles as they pass by, giving preference to emergency vehicles and assisting in surveillance on a large scale. In future work Raspberry pi microcontroller can be used which will directly integrate the open cv software thereis no need to install the open cv in the system. With the help of raspberry pi we can provide the view of the traffic to the traffic controller room so that the green signal will be provided for the longer time in the required area during the signal in order to avoid the unnecessary waiting time during the signal.

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