Density Based Traffic Signal System

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ABSTRACT:

As the population of the modern cities is increasing day by day due to which vehicular travel is increasing which lead to congestion problem. Traffic congestion has been causing many critical problems and challenges in the major and most populated cities. The increased traffic has lead to more waiting times and fuel wastages. Due to these congestion problems, people lose time, miss opportunities, and get frustrated.Traffic load is highly dependent on unpredictable situations such as accidents, special events or constructional activities. If these parameters are not taken into account, the traffic control system will create delays. To solve congestion problem new roads are constructed. The only disadvantage of making new roads on facilities is that it makes the surroundings more congested. So for that reason there is a need to change the system rather than making new infrastructure twice. A traffic control system can solve these problems by continuously sensing and adjusting the timing of traffic lights according to the actual traffic load is called an Intelligent Traffic control System. The advantages of building Intelligent Traffic Control System which reduce congestion; reduce operational costs; provide alternate routes to travellers, increases capacity of infrastructure. One such traffic control system can be built by image processing technique like edge detection to find the traffic density, based on traffic density can regulate the traffic signal light.

1.INTRODUCTION :

Digital image processing is meant for processing digital computer. It is the use of computer   algorithm to perform image processing on digital images. It is a technology widely used for digital image operations like feature extraction, pattern recognition, segmentation, image morphology etc. Edge detection is a well developed field on its own within image processing. Edge is the important characteristic of image. Edges characterize boundaries and are therefore a problem of fundamental importance in image processing.

Edges typically occur on the boundary between two different regions in an image. Edge detection allows user to observe those features of an image where there is a more or less abrupt change in gray level or texture indicating the end of one region in the image and the beginning of another. It finds practical applications in medical imaging, computer guided surgery diagnosis, locate object in satellite images, face recognition, and finger print recognition ,automatic traffic controlling systems, study of anatomical structure etc. Many edge detection techniques have been developed for extracting edges from digital images. There are two different edge detection operators: Gradient based classical operators like Robert, Prewitt, Sobel operator and Laplacian based operators like canny detection. Edge detection technique specially addresses the problem of image enhancement, segmentation, recognition and registration. It is also important research issue in computer vision and pattern recognition.

2. PURPOSE OF THE SYSTEM:

Objective of proposed system is to improve efficiency of existing automatic traffic signalling system. The system will be image processing based adaptive signal controlling. The timing will be calculated each time change automatically depending upon the traffic load. Proposed system will functioning based on traditional system along with automated signalling. System will have artificial vision with the help of digital camera mounted on motor for its rotation to face lanes and sense the traffic on the road. The camera is controlled by PC through microprocessor to change its direction in steps of 90 degree to face each lane and capture image. This single image of lane will be processed using image processing techniques to estimate traffic load. Estimated traffic load on particular road will be used to calculate the required time duration for controlling of signal lights based on in comparison with experimental results. System will be intelligent and will calculate the time every time and operate in a cyclic clockwise signal lights control. Maximum and minimum time limit will be maintained to prevent over waiting of vehicle in queue of other lanes which would be found out

experimentally. Controls of the signal will be routed through the microcontroller. MATLAB® programming environment will be used for simulating and developing the proposed system. Further the emergencies will be handled using GSM techniques. The signal will be controlled by interrupting the normal functioning. The emergency will set the priority and the requested lane will be open closing all others. After emergency is removed the system starts normal functioning.

3.SCOPE OF THE SYSTEM:

In this paper discussed about existing traffic control system and their drawback, to overcome from those drawbacks can build a flexible traffic light control system based on traffic density. To find traffic density edge detection techniques can be used. The edge detection is a well known technique in image processing in identifying an image object, image segmentation, image enhancement. Each edge detection techniques have its own advantages and disadvantages in various fields. Gradient- based or first order edge detection and laplacian based or second-order edge detection operators are discussed in this paper can be implemented in MATLAB.

Enhancing the Traffic Control:

•Controlling of signal lights
•Emergency
•Edge detection
•First order edge detection
•Robert operator
•Sobel operator
•Prewitt operator
•Second order edge detection
•Laplacian edge detection:
•Canny edge detection

4.ORGANIZATION OF REPORT:

The Report deals with the following chapters

Literature Survey deals with the overall view of density based Image processing
State of Art Technology deals with The state of the art is the highest level of development, as of a device, technique, or scientific field, achieved at a particular time.
Proposed Method describes the methodology of proposed system.

System Analysis involves a detailed study of the current system, leading to specifications of a new system and study of various operations performed by a system and their relationships within and outside the system.
Design blue print of a computer system solution to a given problem having the same components and inter-relationship among the same components as the original problem
Coding is done in matlab.
Testing after codifying the whole programs of the system, a test plan is developed and run on a given set of test data
Maintenance eliminates errors in the system during its working life and to tune the system to any variations in its working environment.

5.CONCLUSION:

System is estimated to be accurate 80% and even more depending on the accuracy of ROI used to estimate occupancy. Major advantage is the variation in signal time which control appropriate traffic density using artificial vision. The accuracy in calculation of time due to single moving camera depends on the registration position while facing road every time. The handling of emergency with the help of assigning priority has an advantage since safety human is maintained. Limitation of GSM network may sometime create problem of delay in delivery of message, but is not frequent phenomenon and could be taken care with the help of service provider. Automatic caution mode is new feature of this system that will ensure the withdrawal of signal control at night after predefined time when the traffic is lowest and brings it normal when needed. Thus the system will be close to traditional system with improved efficiency and safety.

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