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INTELLIGENT TRAFFIC CONTROLLING AND MONITORING SYSTEM BASED ON IMAGE PROCESSING

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ABSTRACT:

The change in automobile fleet size and consequently within the quantity of traffic isn't accompanied through boom within the space of the road in all of the time. This causes traffic congestion commonly in all the urban areas. In order to avoid traffic jams, we are in situation to come up with an new solution. In preceding decades many technology were evolved and designed solutions to make road transportation safer. Some amongst these techniques were conventional where as other are incorporated. New designed systems are capable of informing drivers about the traffic situations and feasible hazards of the road way with the help of Artificial Intelligent transportation system. This project work proposes Internet of Things-based approach that remedies troubles raised by using traffic congestion this offers strategy to raising traffic associated pollution also. This structure consists of two modules, 1. Hardware module and 2. Software program module. The device makes use of new technology for actual-time collection, employer and transmission which offer the statistics to estimate the correct site traffic density exploited by using traffic-conscious applications.

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I. INTRODUCTION:

Traffic congestion is a condition on transport networks that occurs as use increases, and is characterized by slower speeds, longer trip times, and increased vehicular queueing. When traffic demand is great enough that the interaction between vehicles slows the speed of the traffic stream, this results in some congestion. While congestion is a possibility for any mode of transportation, this article will focus on automobile congestion on public roads.

As demand approaches the capacity of a road (or of the intersections along the road), extreme traffic congestion sets in. When vehicles are fully stopped for periods of time, this is colloquially known as a traffic jam or traffic snarl-up. Traffic congestion can lead to drivers becoming frustrated and engaging in road rage. In our modern life we have to face with many problems one of which is traffic congestion becoming more serious day after day. It is said that the high tome of vehicles, the scanty infrastructure and the irrational distribution of the

development are main reasons for augmented traffic jam. The major cause leading to traffic jam is the high number of vehicle which was caused by the population and the development of economy.

II. LITERATURE SURVEY:

1. REAL –TIME TRAFFIC LIGHT CONTROL AND CONGESTION AVOIDANCE SYSTEM

ABSTRACT:

As the city road network is growing day by day, the question of how to obtain information about the road is becoming more and more challenging. Traffic problems nowadays are increasing because of the growing number of vehicles and the limited resources provided by current infrastructures. This paper presents an automatic road traffic control, monitoring system and an efficient way to avoid traffic congestion for daytime sequences using Image processing techniques and wireless communication networks. A camera will be installed alongside the road-side unit /traffic light. It will capture image sequences. According to traffic conditions on the road, traffic light can be controlled. Based on that analysis, system will wirelessly transmit the information (using ZIGBEE protocol) of road scene to the nearby Road –side units (RSU) and the message will be displayed there. It can help people by providing pre-knowledge of traffic congestion/jams.

AUTHOR: Sabya sanchi kanojia,

PUBLISH: International Journal of Engineering Research and Applications (IJERA), pp.925-929, Vol. 2, Issue 2, Mar-Apr 2012.

2. A TAXONOMY AND ANALYSIS OF CAMERA CALIBRATION METHODS FOR TRAFFIC MONITORING APPLICATIONS

ABSTRACT:

Many vision-based automatic traffic-monitoring systems require a calibrated camera to compute the speeds and length-based classifications of tracked vehicles. A number of techniques, both manual and automatic, have been proposed for performing such calibration, but no study has yet focused on evaluating the relative strengths of these different alternatives. We present a taxonomy for roadside camera calibration that not only encompasses the existing methods (VVW, VWH, and VWL) but also includes several novel methods (VVH, VVL, VLH, VVD, VWD, and VHD). We also introduce an over constrained (OC) approach that takes into account all the available measurements, resulting in reduced error and overcoming the inherent ambiguity in single-vanishing-point solutions. This important but oft-neglected ambiguity has not received the attention that it deserves; we analyze it and propose several ways of overcoming it. Our analysis includes the relative tradeoffs between two-vanishing-point solutions, single-vanishing-point solutions, and solutions that require the distance to the road to be known. The various methods are compared using simulations and experiments with real images, showing that methods that use a known length generally outperform the others in terms of error and that the OC method reduces errors even further.

AUTHORS: Neeraj K. Kanhere Stanley T. Birchfield

PUBLISHED IN: IEEE Transactions on Intelligent Transportation Systems (Volume: 11, Issue: 2, June 2010)

3. ROADSIDE CAMERA CALIBRATION AND ITS APPLICATION IN LENGTH-BASED VEHICLE CLASSIFICATION

ABSTRACT:

Video surveillance system is widely used in the current traffic monitoring system. Existing commercial image processing system works well in vehicle detection and tracking, but it has difficulties in vehicle classification if the camera is not calibrated. A priori camera calibration is used in many systems, which is a complicated process. In this paper, a very simple roadside camera calibration is proposed. Our algorithm is based on some reasonable assumptions, which only requires a traffic video for calibration. The camera is calibrated by estimating the lane boundaries and the vanishing point. Then the position in image coordinate is transformed to real-world reference systems. After calibration, the vehicles are classified by their lengths on the road. Finally, the performance of our classification approach is illustrated and discussed.

AUTHORS: Lili Huang

PUBLISHED IN: Informatics in Control, Automation and Robotics (CAR), 2010 2nd International Asia Conference on 6-7 March 2010.

4. COMPUTER VISION BASED GAZE TRACKING FOR ACCIDENT PREVENTION

ABSTRACT:

Distracted driving is one of the main causes of vehicle collisions in India. Passively monitoring a driver's activities constitutes the basis of an automobile safety system that can potentially reduce the number of accidents by estimating the driver's focus of attention. Automotive vehicles are increasingly being equipped with accident avoidance and warning systems for avoiding the potential collision with an external object, such as another vehicle or a pedestrian. Upon detecting a potential factor, such systems typically initiate an action to avoid the collision and/or provide a warning to the vehicle operator. In this paper a complete accident avoidance system is proposed by determining the driver's behavior. As the main causes of vehicle accident were related to human factors, they could be labeled in one of the two main driver's distraction categories (Alcohol Consumption, Drowsiness and distracted vision). The aim of the proposed system is to help in analyzing the factors associated with driver's behavior for the development of accident avoidance systems. The main causes of the traffic accidents, discovered in the analysis of the driver behavior with the help of our system, will be used for the development of assistant devices and alarm systems that could help the driver to avoid risky situations. In this project we are implementing two image processing tool to get the facial geometry based eye region detection for eye closure identification, combined tracking and detection of vehicles. Frequencies of eye blinking and eye closure are used as the indication of sleepy and warning sign is then generated for recommendation; (b) outside an ego vehicle, road traffic is also analyzed.

AUTHORS: Mrs.P.Sheela Rani, P.Subhashree, N.Sankari Devi

PUBLISH: Futuristic Trends in Research and Innovation for Social Welfare (Startup Conclave), World Conference on 29 Feb.-1 March 2016.

5. DETECTION AND CLASSIFICATION OF VEHICLES FROM VIDEO USING MULTIPLE TIME-SPATIAL IMAGES

ABSTRACT:

Detection and classification of vehicles are two of the most challenging tasks of a video-based intelligent transportation system. Traditional detection and classification methods are computationally highly expensive and become unsuccessful in many cases such as occlusion among the vehicles and when differences between pixel intensities of vehicles and backgrounds are small. In this paper, a novel detection and classification method is proposed using multiple time-spatial images (TSIs), each obtained from a virtual detection line on the frames of a video. Such a use of multiple TSIs provides the opportunity to identify the latent occlusions among the vehicles and to reduce the dependencies of the pixel intensities between the still and moving objects to increase the accuracy of detection performance as well as to achieve an improved classification performance. In order to identify the class of a particular vehicle, a two-step k nearest neighborhood classification scheme is proposed by utilizing the shape-based, shape-invariant, and texture-based features of the segmented regions corresponding to the vehicle appeared in appropriate frames that are determined from the TSIs of the video. Extensive experimentations are carried out in vehicular traffics of varying environments to evaluate the detection and classification performance of the proposed method, as compared with the existing methods. Experimental results demonstrate that the proposed method provides a significant improvement in counting and classifying the vehicles in terms of accuracy and robustness alongside a substantial reduction of execution time, as compared with that of the other methods.

AUTHOR: Mithun, N.C.; Rashid, N.U.; Rahman, S.M.M.,

PUBLISHED IN: IEEE Transactions on Intelligent Transportation Systems (Volume: 13, Issue: 3, Sept. 2012)

III. EXISTING SYSTEM:

In existing system there are two different standard traffic control systems, they are Manual controlling and Automatic controlling. Manual controlling is the name itself implies that it require man power to control the traffic. Depending on the countries and states the traffic polices are allotted for a required area or city to control traffic. The traffic police men's will carry sign board, sign light and whistle to control the traffic. Automatic traffic light is controlled by timers and electrical sensors. In traffic light each phase a constant numerical value loaded in the timer. The lights are automatically getting ON and OFF depending on the timer value changes. Present Traffic Light Controllers are based on microcontrollers & microprocessors. These TLC have limitations because it uses the pre-defined hardware, which is functioning according to the program that does not have the flexibility of modification on real time basis.

Limitations of Existing system;

1. Heavy Traffic Jams With increasing number of vehicles on road, heavy traffic congestion has substantially increased in major cities. This happened usually at the main junctions commonly in the morning, before office hour and in the evening, after office hours. The main effect of this matter is increased time wasting of the people on the road.
2. No traffic, but still need to wait At certain junctions, sometimes even if there is no traffic, people have to wait. Because the traffic light remains red for the preset time period, the the road users should wait until the light turn to green. If they run the red To avoid the above mentioned limitations, the paper implements feedback based traffic management system. The main emphasis is given to control traffic in minimum amount of time and building an efficient solution for traffic jams.

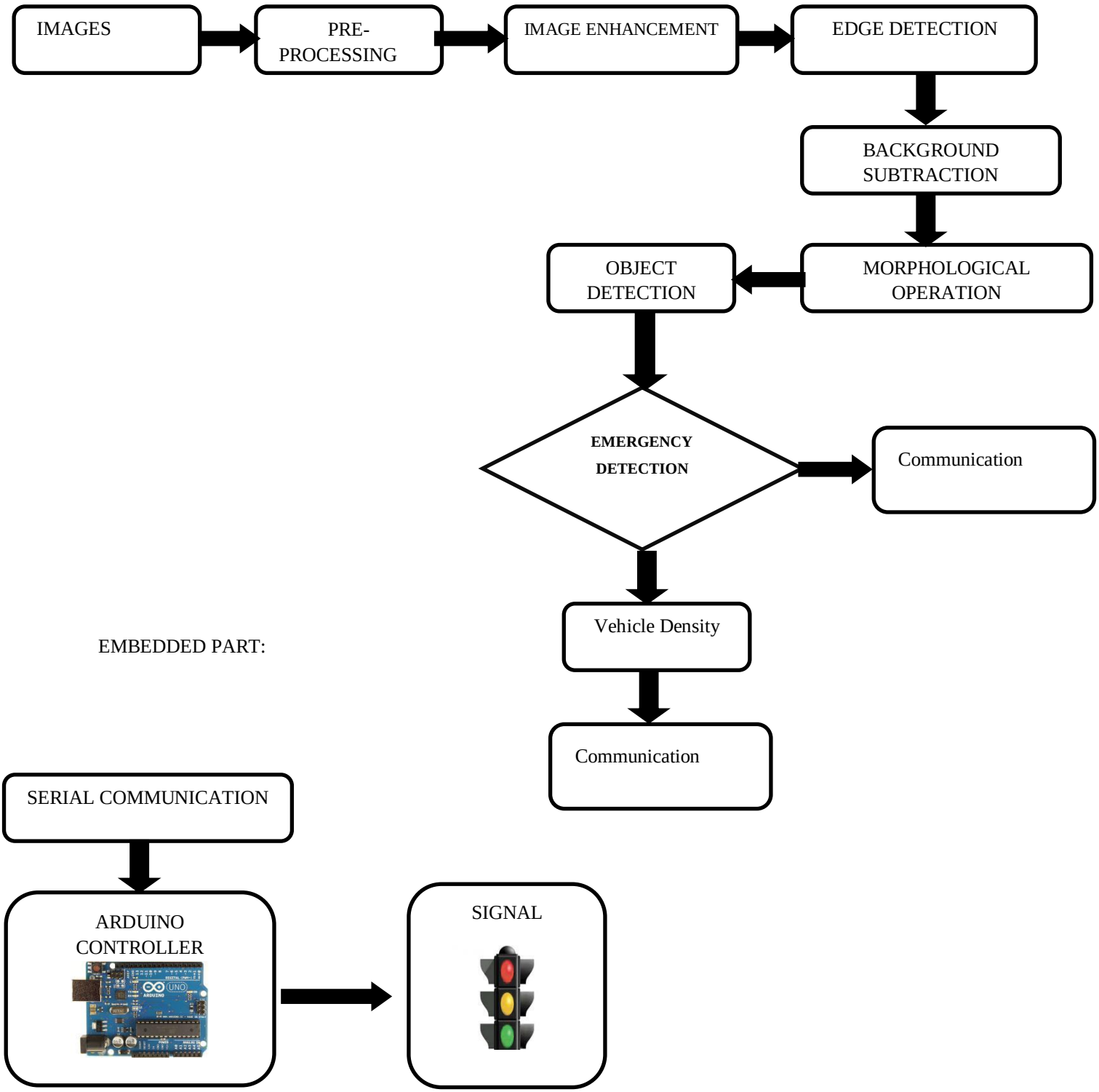
IV. PROPOSED SYSTEM:

The vehicles are detected by way of the camera device thru snap shots rather than the usage of digital sensors embedded in the pavement. A digital may be placed alongside the traffic light. It will capture photo sequences. Image processing is a better technique to manipulate the state change of the traffic light. It shows that it could decrease the traffic congestion and avoids the time being wasted via a green light on an empty lane. It is also more reliable in estimating automobile presence as it makes use of actual traffic photos. It visualizes the practicality, so it functions a whole lot better than the ones systems that rely upon the detection of the automobiles' metal content.

The machine has the capacity to revolutionize traffic surveillance and manipulate technology due to its low cost and capability for huge scale. The main objective of the proposed system with the processing of Image acquisition in image processing is broadly defined as the action of retrieving an image from the source, usually a hardware-based source, so it can be passed through whatever processes need to occur afterward. The image that is acquired is completely unprocessed and is the result of whatever hardware was used to generate it. Image enhancement-it refers to accentuation, or sharpening, of image features such as boundaries, or contrast to make a graphic display more useful for display or analysis. This process does not increase the inherent information content in data. It includes Gray level and contrast manipulation, noise reduction, sharpening, filtering and magnification and so on.

In our proposed method illustrates that image processing is the best way to control traffic when it comes to real time feedback.

V. ARCHITECTURE DIAGRAM:



EMBEDDED PART:

VI. CONCLUSION:

In this modern era as the population is increased rapidly the usage of vehicles has also increased tremendously. The cause of it is heavy traffic. In order to avoid this problem it is better that we flow new communication methods such as image processing based intelligent traffic controlling and monitoring system using ARDUINO. This is more beneficial for the emergency travelling. In the proposed method, the amount of traffic on roads is estimated through measuring the total area occupied by vehicles on the road instead of vehicle count in terms of the traffic density. Variable traffic cycle is selected depending on the total traffic density of all the roads at the junction. Depending on the traffic density a weight is determined for each road and total traffic cycle is weighted for the roads. This way an intelligence based traffic signalling system is designed. With the proposed system, the challenges involved in the traditional signalling system can be overcome. This model could be extended to incorporate a large number of interconnected traffic junctions and using their traffic density to adjust adjacent junction's time allocation. In this project, emergency conditions are not considered, so at that situation this smart traffic system fails and manual mechanism to be implemented. This problem can be overcome with some improvements.

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