IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 7.105 ⁜ Vol. 9, Issue 3, March 2022

DOI: 10.17148/IARJSET.2022.9345

Literature Survey on Smart Traffic Violation Ticketing

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Abstract: Population explosion leads to an unprecedented increase in the number of physical objects or vehicles on road. As a result, the number of road accidents increases due to a very heavy traffic flow. In this project, rash driving and traffic violation is monitored by using computer vision and RFID technology and MEMS sensor, where images or sequence of images provides a better road view the proposed system captures video stream of vehicles in the monitored area to compute the information and transfer the compressed video stream for providing video based solution that is mainly implemented using Open CV and Python Programming and to avoid the breaking the signal we will be detecting the Vehicle number plate by using the RFID tag situated on vehicle And then resulting data is used to compare with the records on a database and data extracted from RFID Tag. And in database there can be specific information like vehicle's owner name, place of registration, or address, etc. If the ID and the number are matched with the database then it show the message "authorized person" else "unauthorized person". Both should be match with the database and rash driving with the help of MEMS sensor .The proposed method is considered as an economical solution for industries in which cost-effective solutions are developed for traffic management.

Keywords: Sensor, Traffic Management, Image Processing, Rash Driving, RFID Technology.

I. INTRODUCTION

It is observed that, the major hindrance on road is due to heavy traffic flow during peak hours especially when people commute to work. The total number of vehicles or objects exceeds its capacity by causing a blockage for emergency vehicles such as fire fighter and rescue vehicles, furthermore wastage of fuels adds more to the environmental pollution which is not adoptable for a country's economic growth. In order to develop an efficient, reliable, cleaner and safer mode of transportation, it is necessary to make the road transportation system automated as much as possible. The primary research focus is dedicated towards the detection and tracking of objects, where it finally keeps the count of vehicles in the particular monitored area. The need of traffic surveillance system is to provide construction engineers and other associates to plan in an economical way and proper decisions were taken based on density of the vehicles and the statistics obtained by the low cost electronic devices. Moreover, it also provides solution to major problems such as vehicle accidents, vehicle theft detection, managing parking areas, and other security threats. The main cause for the interest in traffic management activity is to utilize the computer vision techniques in real-time conditions. The major challenge that caused hindrance to our work is vehicle segmentation in various atmospheric conditions such as night, snowy or dusty weather conditions. As a solution to it we have used a different pre-processing unit based on Histogram Equalization to improve the resolution of video and morphological processing to add or remove pixels in the boundaries of objects, where video depends on shape and size of the structuring elements before processing towards the next stage.

II. LITERATURE REVIEW

Gustav Nilsson _ Giacomo Como [4] focused on a class of dynamic feedback traffic signal control policies that are based on a generalized proportional allocation rule. There results in a differential inclusion for which there prove existence and, in the special case of orthogonal phases, uniqueness of continuous solutions via a generalization of the reflection principle. Stability is then proved by interpreting the generalized proportional allocation controllers as minimizes of a certain entropy-like function that is then used as a Lyapunov function for the closed-loop system[1].

Another approach based on Active-Contour tracking uses tracking of active contour models. This technique has a reduced computational complexity. The next approach tracks sub-features in the image which can be of distinguishable importance [2].

The Global status report on road safety 2018, launched by WHO in December 2018, highlights that the number of annual road traffic deaths has reached 1.35 million. Road traffic injuries are now the leading killer of people aged 5-29 years. The burden is disproportionately borne by pedestrians, cyclists and motorcyclists, in particular those living in developing countries. The report suggests that the price paid for mobility is too high, especially because proven measures

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exist. Drastic action is needed to put these measures in place to meet any future global target that might be set and save lives.[3].The advantages of this approach are that even when partial occlusion occurs some of the features of the moving object are distinguishable[4].

Jianhua Guo et al [5] introduced a new method for area-wide traffic signal timing optimization under user equilibrium traffic. The optimization model was formulated as a multi-dimensional search problem aimed to achieve minimized product of the total travel time associated with urban street network and the variance of travel time for unit distance of travel. A genetic algorithm was developed to derive the model solution. A simulation control protocol embedded in PARAMICS software tool capable of conducting area-wide micro simulation is adopted to design the logic frame and function module of the area-wide traffic signal control system. His results shown that mobility improvements are achieved after applying the proposed model along with the genetic algorithm for area-wide signal timing optimization, assessed by extended capacity ratio, and reductions in through and turning movement delays, as well as average and variance of travel time for unit distance of travel.

In this paper by using RFID technology, vehicles are connected to computerized systems, intelligent light poles and other available hardware along the way. Intelligent control system is capable of tracking all vehicles, crisis management & control, traffic guidance and also recording driving offences along the highway. Each and every vehicle is equipped with RFID to hold the data like Car ID, position, etc. Along the highway, intelligent light poles are equipped with RFID reader, solar cells, etc. to cover both sides of the highway and to carry the data such as traffic conditions, accidents, the weather, etc. Vehicle and intelligent poles are communicating with the help of Short Range Communications protocol. When the vehicle crosses the highway, record the information on RFID tag. Information will be exchanged between vehicle and intelligent light pole. If the vehicle went into any one of the dangerous driving violation, information about the vehicle will send to the police station or else information on tag will be transferred to driver's license while leaving the highway. Provide the right exist before issue the license[6].

This paper is to report the driver about some specific traffic violations like a no parking, no entry, speed limit, red signal and lane change. These Violations will be recorded in the local data-base and allow to visualization of the spatial and temporal information of the traffic violations in a geographical map using the standard Google Earth tool. The test-bed is composed by two parts. Traffic sign detection and recognition is observed by computer vision subsystem in both day and night time. The above mentioned traffic Violations is recorded by Event data recorder (EDR). In manual controlling system we need more manpower to control traffic violation. In manual controlling system we need more manpower to control traffic violation. Vehicle detectors were using to collect the data to find the actual flow and to get signal timing according to the present rules and regulation of traffic Control. These vehicle detectors detect the vehicle on the basis of lane[7].

Traffic congestion could be a condition in transport where it has huge crowds, slows the speed of vehicles and even it increases the vehicular lengths. Traffic congestion on city road networks has increased rapidly, since the 1950s. When the traffic demand is great then the interaction between the vehicles reduces the speed of the traffic and finally results in traffic congestion. To overcome such circumstances in present scenario, smart traffic management system can be initiated and we are in study to find a solution to make traffic free city. This system helps in monitoring the traffic signals and flow of vehicles by means of image processing with CCTV cameras[8].

III. METHODOLGY

The proposed model has two sections/scheme which are signal section and vehicle section. In signal section we place RFID reader along with a ESP-EYE pi camera for image processing, where we use a manual signalling. Where as in vehicle section, every vehicle will be mounted with RFID tag that has a unique number and a mems(ADXL) sensor for rash driving detection is mounted at the handle or steering of vehicles.

When the signal is green the RFID reader won't work or specifically won't get activated but when signal is red the RFID reader placed at the signal gets activated and if any vehicle's jumps/cross the signal, the RFID reader will scan/read the tag of those vehicle's as stated before this tag will be having unique number, this number is matched with the vehicle's details like mail id, phone number, license and DL information present in the cloud and within 5 minutes of his violation a mail as well as a message regarding the violation along with penalty will be sent to his mail id and phone for signal jumping. As for the rash driving detection as mentioned above with help of an ADXL sensor which is mounted at handle or steering. If this sensor senses that the vehicle is moving in a zig-zag manner too often or it exceeds a certain threshold value then it will take action on it and then sends it to the cloud following which the violator will get mail and message

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about the violation. If any vehicle breaking the signal or found rash driving we will be detecting the Vehicle number plate and vehicle number is recognized using API and fine is allotted for that particular vehicle owner.

Plate extraction Detection

The crucial and initial step in ALPR system is to extract the characters of number plate from the vehicle image. The procedure for detecting is done in several stages. The number plate extraction is started with the horizontal and vertical edge detection techniques that are based on the characteristics of the edge displayed by the edges of the character on the vehicle's number plate. The procedure used to for number plate extraction out of total image is discussed as follows.

1. Read Photo of vehicle as Input Image (I) and Crop the Image with Proper Dimensions(IC).
2. Use Morphological Operation like Closing with Proper Structuring Element.
3. Obtain Difference between I-Ic and Find all candidates for Number Plates by Labelling Connected Component in it. Measure Properties in above Image like Area, Major Axial Length Area>70
4. Select Candidates Who's Major Axis Length is greater than and Remove Objects that will be never Number Plate using Closing and Dilation Process.
5. Select Largest Connected Component as Number Plate and Crop it and display it.

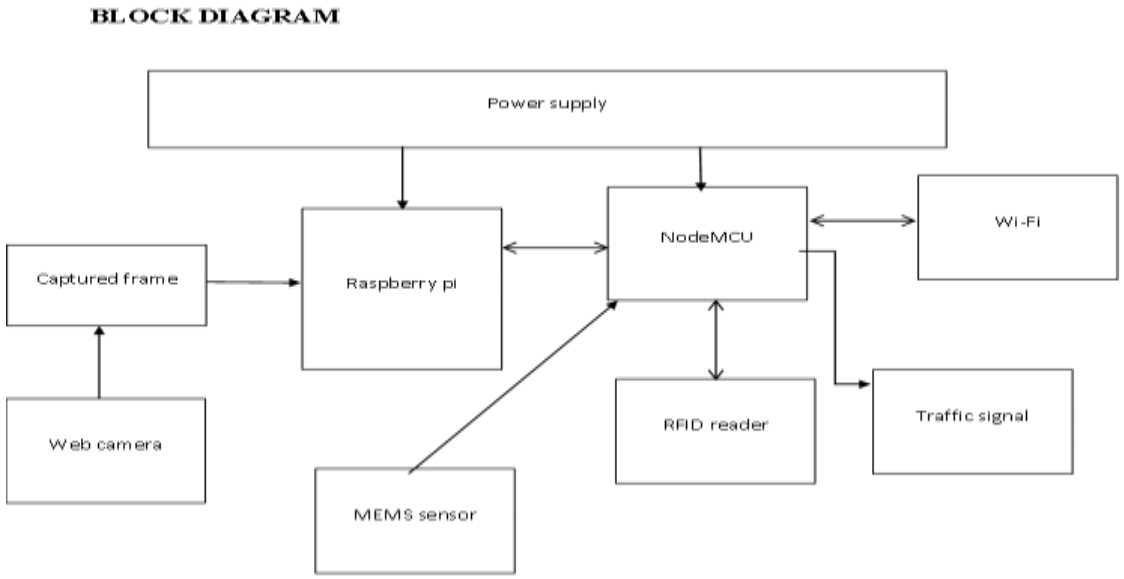

Fig. 1 Block Diagram

IV. CONCLUSION

After successful installation of this system, traffic volume is reduced about 16% in NH 08 Bangalore to Mysore Road. Better results can be obtained by widening the road in future which would be moreeffective. The traffic in SH 80 is also declined by 19.5% as compared to early cases. This process is carried out in particular area of Annur town as the traffic is very heavy in peak hours at morning and evening. Initiating this process in every place where traffic congestion is heavy and the road is narrow gives better result in monitoring and controlling of the traffic in cost effective way. It mainly results in fuel consumption which will enrich our economy.

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