

Intelligent Transportation System by Controlling Traffic using Video Processing in Mat Lab



Vijay.J, Akshaykumar.K, Jeevarathinam.K, Sriram.D, Anand.K

Abstract: Laptop vision techniques square measure used for analysis of traffic police investigation videos that is gaining a lot of importance. This analysis of videos is helpful for public safety and for traffic management. In recent time, there has been Associate in nursing exaggerated scope for analysis of traffic activity mechanically. Laptop based mostly police investigation algorithms and systems square measure won't to extract info from the videos that is additionally known as as Video analytics. The method of distinguishing instances of planet objects is understood as object detection. It detects the quantity of vehicles on every road and betting on the vehicles load on every road, this technique assigns optimized quantity of waiting time (red signal light) and period (green signal light). This technique could be a totally machine-driven system that may replace the traditional pre-determined fixed-time based mostly traffic system with a dynamically managed traffic system.

Keywords: Object detection, video analysis, bounding box, holes filling, KNN classifier.

I. INTRODUCTION

Every individual in homes have their own transportation vehicle for sort of functions. In the current context of smart city, specifically within the industrial and market zones, the traffic state of affairs is extremely full most of the time significantly at the height time of business hours. Due to increasing growth of population and vehicles in smart and metropolitan cities people face ton of draw back at the key traffic points of the business cities. Tostay aloof from such severe issues many radiant urban communities are instantly implementing smart management frameworks, that job on the standards of traffic automation with interference of traffic problems. The fundamental plan lies in assortment of holdup information quickly and payment the alternate strategy to vehicles what is more as passengers, with on-line traffic information system and effectively applying it to specific traffic stream.

By exploitation the thing detection methodology the vehicles square measure detected and that they square measure counted for the density in several lanes. Prioritizing the density in drizzling order the lanes square measure turned inexperienced for a particular amount of your time, following them is that the another lane that stands next within the priority. So the traffic will be controlled mechanically exploitation the trendy digital pictures or frames.

II. LITERATURE SURVEY

There are square measure several literatures work on the market on intelligent transportation System (ITS). The Intelligent transportation System (ITS) provides services associated with completely different modes of transport associate degree traffic management systems with an integration of control centers. Video-Based investigation for traffic investigation has been a major section of ITS. The traffic police investigation in urban surroundings became tougher compared to the highway thanks to numerous factors like camera placement, littered background, cause variation, object occlusion and illumination changes.[1] The background subtraction technique is employed to seek out foreground objects. To sight the moving vehicles, thresholding, hole filling and adaptative morphology the square measure is applied. The vehicles were detected and counted with their virtual detection zone. However the disadvantage is that the virtual detection zone should be massive. For shadow detection and shadow removal masking techniques is enforced.[2] Later the vehicles square measure known exploitation MSER feature detection, wherever correspondences between image parts from 2 pictures with different viewpoints. Feature matching compares one feature of image to a different image to sight of a vehicle. In future generalization of car should be taken under consideration. [3]

To overcome this cagy edge detection methodology is applied wherever the sides square measure detected and therefore the image is born-again into binary image. Here the white pixels square measure calculated and compared with reference image. The matching proportion is calculated during which the matching proportion is directly proportional to the time delay.[4] Later background subtraction is completed by mathematician Mixture model(GMM) wherever the vehicles square measure detected by blob analysis. Vehicles square measure counted by incrementing counter by bounding box for vehicle. The disadvantage is that this methodology fails to removes the shadow and occlusion in input video.[5].

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Author Sedakul combined the work of background subtraction and blob analysis to spot the article. [6] Haar feature based mostly cascaded Adaboost classifier has been planned for face detection. YOLO (You solely look once) treats detection method as a regression downside to map the image in to object bounding boxes. In this, the input pictures divides in to grids, and every grid on place the bounding boxes on image. [7]

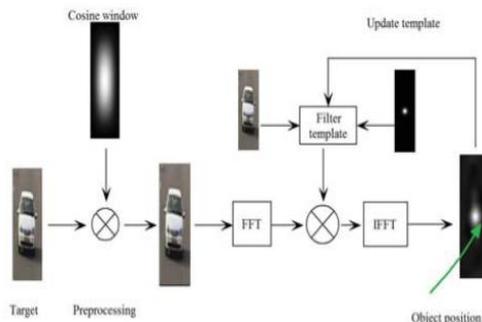


Fig.1

III. PROPOSED WORK

The system is meant to spot variety of vehicle on every traffic node with laptop vision. System considers roads going a stoplight as outgoing edge and roads returning towards a stoplight as incoming edge. By considering variety of waiting cars on road ismight investigation supported the segmentation method. Then mark the cars victimization Bounding box for count to open the signal supported cars count. In our planned system, use of HSV plane separation to urge feature of every vehicle to form the dataset. Then, we've got to use KNN classifier algorithmic rule for classification. It'll offer precise the classification of every vehicle with exact result. The advantage is that we tend to get actual results of seed and weed, HSV feature offers additional correct result. It is User friendly and easy method. Time delay can scale back.

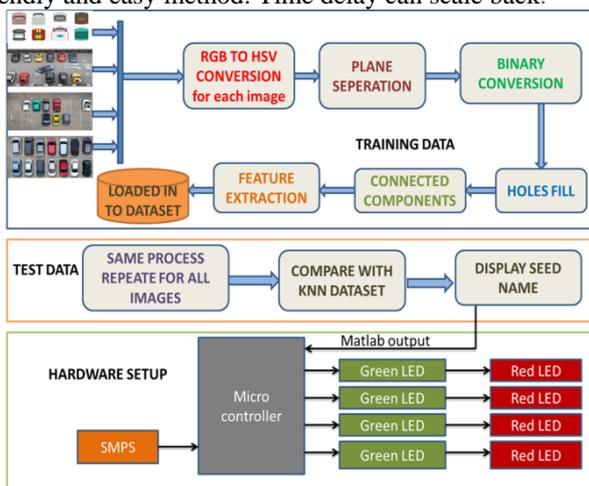


Fig.2

IV. WORKING

In this the traffic videos area unit given as inputs that is then reborn into frames for more process. The frames area unit then reborn into HSV(Hue-saturation value) pictures during which the planes area unit separated. We have a tendency to take into account the saturation plane for binary conversion because it contains most of the data scrutiny of

the 3 planes. The binary conversion is completed by fixing a threshold worth, during which below threshold is taken as 0(Black) and on top as one (White). To get a correct image of a vehicle the holes area unit crammed by KNN(K-Nearer neighbor) classifier. Finally the bounding box is created and therefore the vehicle count has been taken. This method is applied for all the four lanes and therefore the density is measured in line with the priority the signals area unit modified in decreasing order severally. Then the mat workplace output is given to the hardware and verified.

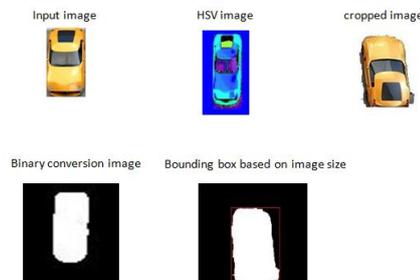


Fig.3

V. HARDWARE IMPLEMENTATION

Peripheral Interface Controller (PIC) is microcontroller developed by a silicon chip, PIC microcontroller is quick and straightforward to implement the program once we contrast different microcontrollers like 8051. The benefit of programming and straightforward to interfacing with different peripherals PIC become triple-crown micro controller. PIC principally created of Harvard design and additionally supports reduced instruction set computing (Reduced Instruction Set Computer), thus it is quicker than different microcontrollers. It works at 5V DC. Here we have a tendency to use PIC16f883 for implementation of traffic signals.

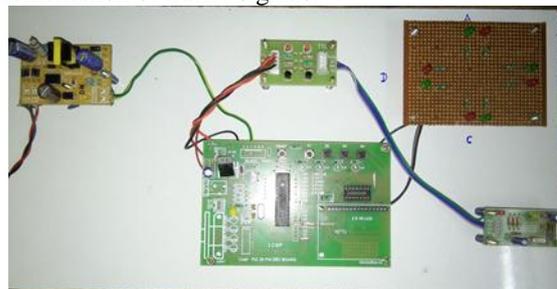
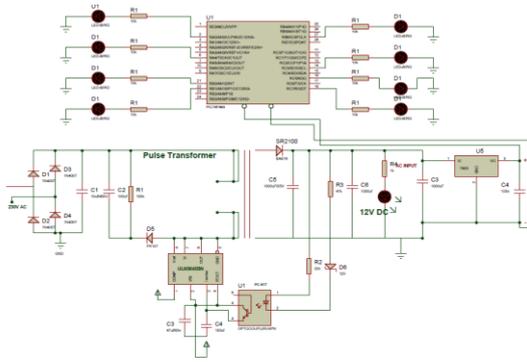


Fig.4

The SMPS (switched mode power supply) is employed to convert the High voltage AC into low DC voltage. The electrical device in SMPS step downs the AC voltage. TTL (Transistor-transistor logic) communicates between totally different voltages by equalizing them. UART named CH34 is employed for serial communication between the software system and also the hardware. The ultimate results square measure additional verified through LED's.



VI. RESULTS

Case 1:

In case 1 we consider four lanes of traffic with various vehicles. According to the density of vehicles the traffic signals are varied with specific time delay. Comparing the four lanes B lane has more number of vehicles. Hence it has been considered as first priority. Later the other lane traffics are released according to their density.

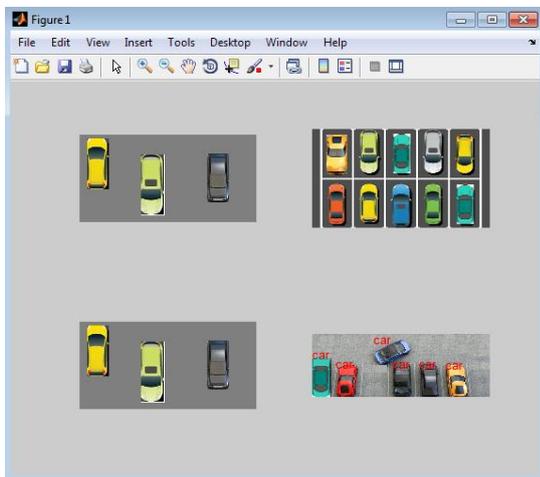


Fig.5



Fig.6

Case 2:

In case 2 we have a tendency to take into account four lanes of traffic with varied vehicles as well as automobile. The lane having automobile is given as 1st priority. Later in line with the density of vehicles the traffic signals are varied with specific time delay. Comparison of the four lanes, automobile is gift in lane A. Hence it has been thought as 1st priority. Later the oppositelane traffics are discharged in line with their density.

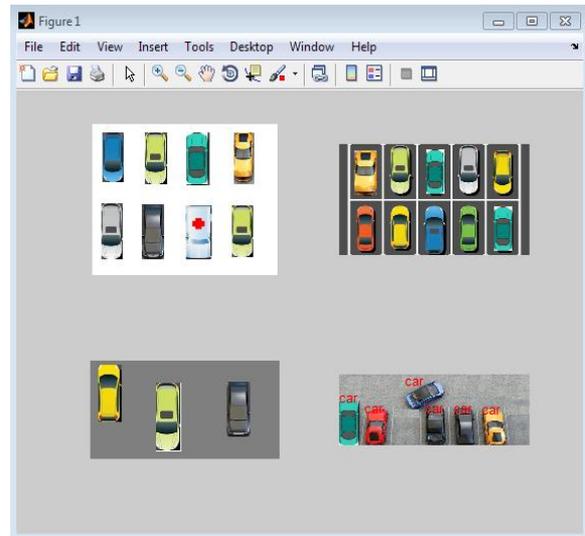


Fig.7

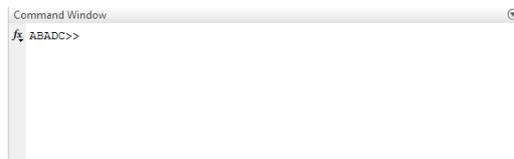


Fig.8

VII. CONCLUSION

The main advantage of this project is four lanes are taken into thought. We are going to get precise results of seed and weed, HSV feature offers additional correct result. The major advantages of this method is User Friendly, Easy to Implement and reduced Time delay. During this a way for estimating the traffic and to order the lanes in stoplight victimization Image process is conferred. It additionally detects the presence of machine and offers first priority to permit it. This is often done by victimization the camera pictures captured in every lane. Every image is processed on an individual basis and therefore the range of vehicles has been counted for every lane. Supported the amount of vehicles, mechanically the lane with high congestion are allowed 1st to maneuver. PIC microcontroller is additionally interfaced to demonstrate this method. Of this new technique embrace such benefits as use of image process over sensors, low cost, simple setup and comparatively sensible accuracy and speed. As a result of this technique has been enforced victimization Image process and Mat science laboratory software package, production prices are low whereas achieving high speed and accuracy. Thus, it is enforced in metropolitan town wherever there's significant traffic at some stage in the day.

REFERENCES

1. Bin Tian, Brendan Tran Morris, Ming Tang, Member, IEEE, Yuqiang Liu, Yanjie Yao, Chao Gou, Dayong Shen, and Shaohu Tang, Hierarchical and Networked Vehicle Surveillance in ITS: A Survey in IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS



2. NilakornSeenouvong ,UkritWatchareeruetai, ChaiwatNuthong, A Computer Vision Based Vehicle Detection and Counting System in 978-1-46783-8139-0/16/\$31.00©2016IEEE
3. Ashwini B., Deepashree B., Dr.Yuvaraju B. N., Venugopala P. S., Identification of Vehicles in Traffic Video in International conference on Signal Processing, Communication, Power and Embedded System (SCOPE5)-2016978-1-
4. TaqiTahmid , EklasHossain, Density Based Smart Traffic Control System Using Canny Edge Detection Algorithm for Congregating Traffic Information in 2017 3rd International Conference on Electrical Information and Communication Technology (EICT), 7-9 December 2017, Khulna, Bangladesh
5. T.SrideviKuruvaHarinathP.Swapna, automatic generation of traffic signal based on traffic volume in 2017 IEEE 7th International Advance Computing Conference
6. SedaKul, SüleymanEken, AhmetSayar, A Concise Review on Vehicle Detection and Classification in ICET2017, Antalya, Turkey.
7. Asha C S, A V Narasimhadhan, Vehicle counting for traffic management system using YOLO and correlation filter in 978-1-5386-1112-8/18/\$31.00©2018 IEEE0.
8. Ying Li1, Lingfei Ma1, Yuchun Huang, Jonathon Li Segment based traffic signal detection from mobile laser scanning data 978-1-5386-7150-4/18/\$31.00 ©2018 IEEE
9. Tousif Osman, ShahreenShahjahan Psyche, J. M. ShafiFerdous, Hasan U. ZamanIntelligent Traffic Management System for Cross Section of Roads Using Computer Vision978-1-5090-4228-9/17/\$31.00 ©2017 IEEE
10. Jing Chen, Ming Chen, Xianglin Wei, Bing Chen, "Matrix Differential Decomposition-Based Anomaly Detection and Localization in NFV Networks", *Access IEEE*, vol. 7, pp. 29320-29331, 2019.

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