

On The Basis Of AI Automatically Releases Signal and Control the Traffic

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Abstract: almost all (metropolitan) cities together with the main ones, like Los Angeles, Beijing, New York, are struggling from heavy visitors congestion. Statistics exhibit that, in 2015, 43 cities in China are suffering an extended tour time of greater than 1.5 h each day for the duration of rush hours. In the meanwhile, traffic accidents are plaguing the financial development as well. In order to attain a higher performance of detection and consciousness of multi-vehicle aims in complex city environment, a step of detection algorithm based on the points of Histogram of Oriented Gradients (HOG). This algorithm makes full use of HOG characteristic blessings for target vehicles, i.e., the appropriate descriptive capability of HOG feature. With the ever-increasing demand in city mobility and current logistics sector, the vehicle population has been gradually growing over the past various decades. One herbal final result of the automobile populace boom is the make bigger in traffic congestion. In our proposed method, the machine is designed to control visitors sign timings based totally on the density of visitors on its corresponding road. Detecting traffic thru roadside CCTV cameras. It acts as multi-class classification which is recognizing traffic. The system realize site visitors match in real-time. We right here advise a density based traffic sign scheduling algorithm.

Index Terms: Multi-class classification, Histogram of Oriented Gradients, Detection, Recognition, scheduling algorithm.

I. INTRODUCTION

With the ever-increasing demand in city mobility and present day logistics sector, the vehicle populace has been progressively growing over the previous several decades. One natural end result of the vehicle population increase is the make bigger in visitor's congestion. The regular characteristic of traffic lights requires more than moderate manage and coordination to make sure that site visitors and pedestrians pass as smoothly, and safely as possible. A range of one-of-a-kind manage systems are used to accomplish this, ranging from easy clockwork mechanisms to state-of-the-art computerized manage and coordination systems that self-adjust to minimize delay to human beings using the junction.

This innovative software initiatives are a high quality site visitor's scene perception venture that lets in for managing way visitors signal administration system. The gadget consists of four alerts corresponding to every road. We here advise a density based totally visitors sign scheduling algorithm. The system is designed to manage visitors sign timings based totally on the density of site visitors on its corresponding road. The system represents the site visitor's electricity of a road graphically the usage of traffic judgments. By measuring the traffic lined up on a precise street the signal timings are adjusted to let that unique way clear out and then the next populated one. The complete gadget works in accordance to an algorithm that approves for smooth and environment friendly visitors float across all 4 ways. It additionally consists of an emergency override that approves traffic authorities to remotely let go a specific signal in case an ambulance or essential car arrives on that way.

II. LITERATURE REVIEW

Several researchers have studied on various types of techniques for multitraffic scene based perception and also in the field of social network, that how it is helpful in this multitraffic scene base perception for vehicle detection [1]. P Naveen Kumar oriented to analyzed and implemented twitter stream by real-time traffic detection and find the framework that checked the activity occasion location through the examination of twitter stream [2]. Alberto Rosi studied on social sensors and pervasive services approaches and perspectives they explored how this social sensing technique integrated into computing system [7].

We studied on multi-vehicle detection algorithm through combining Harr and HOG features they developed the system to achieving the better performance for detection of multi-vehicle in complex urban environment with two step detection algorithm. This system provides a higher accuracy in detection of vehicle and also higher time efficiency [12]. Dr. Pradeep K. Gupta and Ishant Sharma are design a project to developed an automatic traffic signal system for Chandigarh city. This system monitor automatically flow of traffic in traffic signal. In this system sensors was also which senses the road data in traffic. This system provided real-time detection of traffic and eliminates the wastage of green time allotted to phase. Chiung-Yao Fang examined automatic change detection of environment for drivers in a vision-based driver assistant system. They developed a computational model for explored critical changes of environment for driver in assistance system of driver. In this they demonstrated practicability of both computational model and changed in system which getting explored [9]. Hulin Kuang was improved the detection method of vehicle based on Bio-Inspired image enhancement approach weighted score level feature fusion technique. By using this technique detection of vehicle was possible at night time. Because of this system there was possible to deal with number of different types of scenes including vehicle of different types and sizes. It also identified vehicle at various location and numbers of vehicle [4].

Ravi Kumar Satzoda studied on the vehicle detection used active learning and symmetry derived analysis. They developed system that performed on on-road vehicle detection which was very crucial operation. In this system they use seven kinds of datasets

that captured road, weather and traffic condition [10]. Olivier Regniers developed multivariate model for a classification of high resolution optical images which was wavelet-based textural features. This model was based on strategy of supervised classification framework which classified the images according to learning database stored information that enabled classifier to take decision [11].

III. PROPOSED SYSTEM

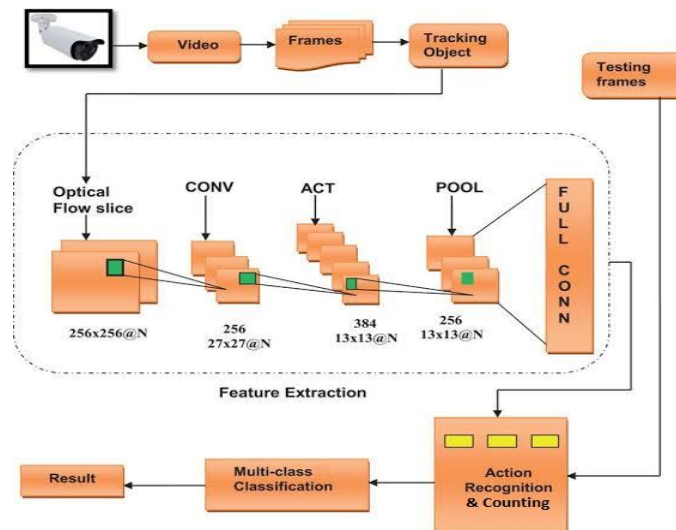


FIGURE 1: PROPOSED SYSTEM ARCHITECTURE

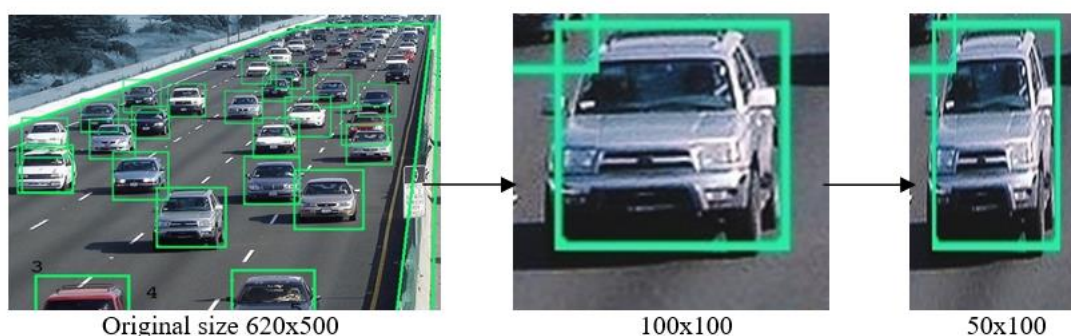
IV. METHODOLOGY

A Convolutional Neural Network (CNN) is one of the most popular algorithm for deep learning. CNN are used to image and video recognition and classification problems. In our system we use this algorithm for calculate density of traffic. In each stage feature extraction is done and it produces the large feature set for original input. These feature sets helps for describing the characteristics of data. Each frame is classified and the resulting value is output on the video frame window.

Mechanism of CNN algorithm

1. Preprocessing

As referenced before Hoard highlight descriptor utilized for vehicle discovery is determined on a 64×128 fix of a picture. Obviously, a picture might be of any size. Commonly fixes at different scales are examined at many picture areas. The main limitation is that the patches being broke down have a fixed angle proportion. For our situation, the patches need to have a viewpoint proportion of 1:2. For instance, they can be 100×200 , 128×256 , or 1000×2000 yet not 101×205 .



2. Calculate the Gradient pictures

To calculate a HOG descriptor, we want to initial calculate the horizontal and vertical gradients; finally, we would like to calculate the bar graph of gradients. This can be simply achieved by filtering the image with the subsequent kernels.

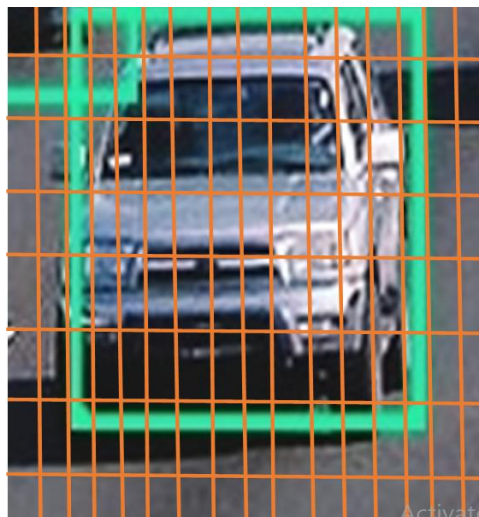


3. Compute Histogram of Gradients in 8x8 cells

In this step, the image is split into 8x8 cells and a bar graph of gradients is calculated for every 8x8 cells.



4. 16x16 Block Normalization



In the above step, we made a histogram dependent on the angle of the picture. Gradient of a picture are touchy to in general lighting. On the off chance that you make the picture darker by separating all pixel esteems by 2, the inclination greatness will change considerably, and along these lines the histogram esteems will change significantly. In a perfect world, we need our descriptor to be free of lighting varieties. As such, we might want to "standardize" the histogram so they are not influenced by lighting varieties.

5. Compute the HOG feature vector

To compute the last element vector for the whole picture fix, the 36x1 vectors are linked into one goliath vector. What is the size of this vector? Allow us to compute 1. How numerous places of the 16x16 squares do we have? There are 7 level and 15 vertical positions making a sum of 7 x 15 = 105 positions. 2. Each 16x16 square is spoken to by a 36x1 vector. So when we link them all into one giant vector we acquire a 36x105 = 3780 dimensional vector.

V. PROBLEM STATEMENT

The present arrangement of traffic light have been gives a fixed traffic control plan, which settings depend on earlier traffic checks however might be physically changed. It is the most widely recognized type of sign control for the present a days and result in wrong conduct in rush hour gridlock which varies from that which the arrangement was based, for example, the utilization of superfluous stages when the traffic is light.

VI. MATHEMATICAL MODEL

A System has represented by a 5-different phases, each phase works with own dependency System $S = (Q, \Sigma, \delta, q_0, F)$ Where, Q is a finite set of states.

S is a finite set of symbols called the alphabet.

δ is the transition function where $\delta : Q \Sigma \rightarrow Q$

q_0 is the initial state from where any input (*video) is processed ($q_0 \in Q$).

F is a set of final states (*signal) of Q ($F \subseteq Q$).

All $t(n)$ policies will return 1 then from training patterns and it generate the similarity weight of fitness function of specific rules.

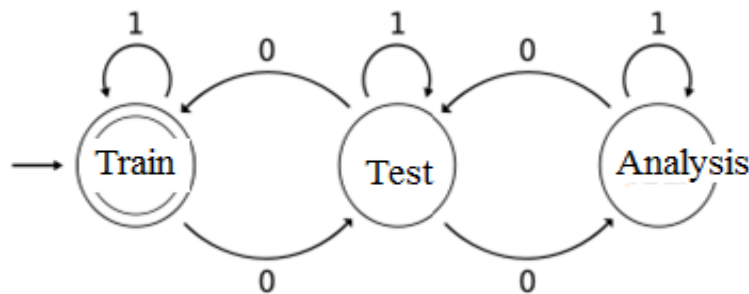
$Q = \{VaiSet [i=0 \dots \dots \dots n]\}$ set of generated attribute of various images as initial set

$\Sigma = \{data\ conversion, \ saveinDB\}$

$D = \{_CorrectlyclassifiedInstnaces*100/SumF(x)\}$

$q_0 = \{First\ event\ generated\ by\ sensor\ function\ S\ i=0\}$

$F = \{Generated\ report\ according\ to\ class\ [a, b, c, \dots, n]\}$



VII. RESULT AND ANALYSIS

1. Vehicle Detection Study

The recorded 24 hour video is analyzed by counting the number of different types of vehicles by video playback in slower speed in media Player. This 24hr Video is divided into 2 hrs. time like 6 to 8am, 8to 10am and so on and analyze how many different types of vehicle detected.

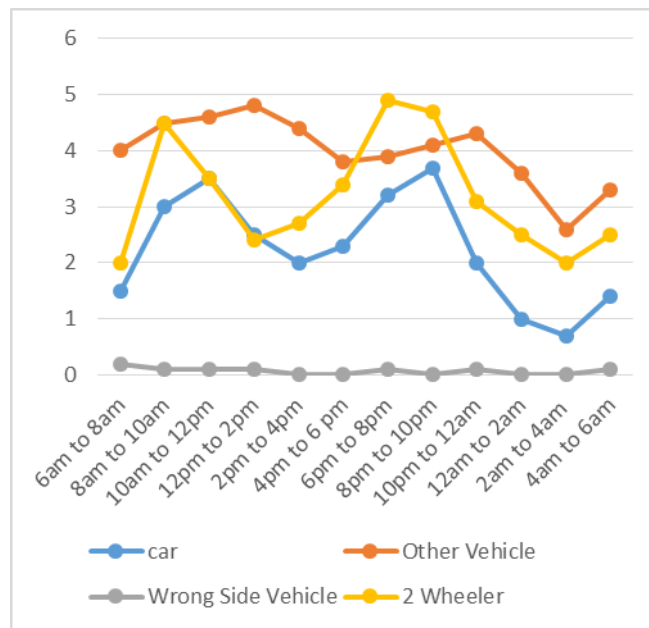


Fig. Vehicles detected during entire day

After analyzing the video, within 2 hour count how many different vehicles i.e. cars, 2Wheelers,wrong side vehicles and other vehicles are detected. During the 6am to 8am 30% cars, 25% 2 wheelers and 5% other vehicles detected.

2. Vehicle Count Study

After Detecting vehicle count no of vehicle on single road. In which road heavy traffic are display then that road assign priority as 1.In above fig. or chart road 4 having high traffic flow then it assign priority 1 and road 2 having moderate traffic flow then it assign priority 2 and so on. After counting assign time period for that road i.e road 4 having 8 vehicle detected then automatically assign 19.2 seconds signal time.

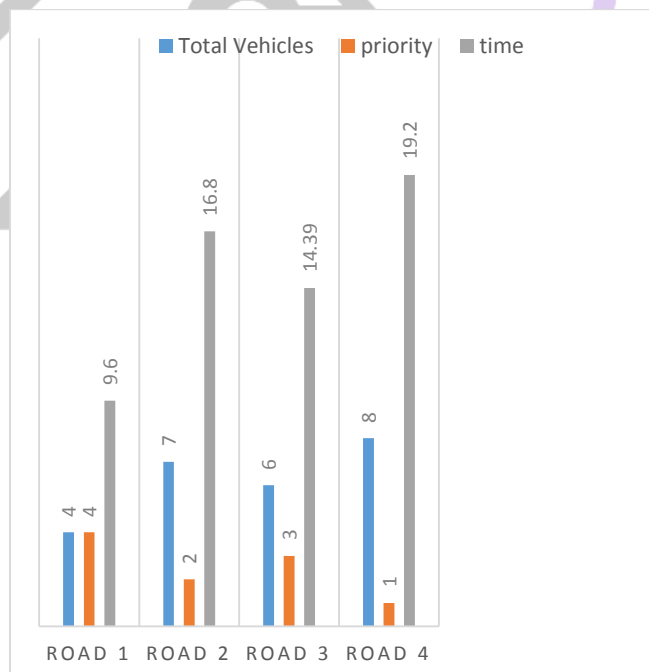


Fig. Total vehicle detected during that time period and assign priority and time for each road

3. Display signal

After counting and assigning time then automatically display signal.

- Design a real-time detection system for traffic analysis.
- Signal Timing change as per the vehicle arrival.

- Remove manual work when traffic arrived.
- System take self-decision to change signal time as per vehicle count on that particular lane.
- To avoid traffic related problem like traffic jam, etc.

Table 1. Priority Calculation and Signal Type

Signal No	Total vehicles	Priority	Time	Signal Type
Signal 1	4	4	9.6	Red
Signal 2	7	2	16.8	Orange
Signal 3	6	3	14.39	Red
Signal 4	8	1	19.2	Green

VIII. Conclusion

The proposed system divided in two modules first module is web service and second module is traffic signal released as per vehicles. In web service they have database. Traffic database is used for fast processing and storing high amount of data in to Database. For the classification algorithm is used for classify the traffic related notification. The main aim is detection traffic related event from social network. It acts as multi-class classification which is recognizing traffic, non-traffic due to the crash or congestion and traffic due to the external events. The system detects traffic event in real-time.

IX. Acknowledgement

We are grateful to our Guide Prof. Jondhale S. S. and HOD of Computer Engineering, Prof. Borhade B. M. for providing us the necessary help and encouragement whenever we needed, which has resulted in the success of our project. We take this opportunity to thank Dr. Goje A. S., Principal of SGOI's Samarth College of Engineering, Belhe, Pune for providing a healthy environment in the college, which helped us in concentrating on our task. We would also like to thank Prof. Shingote S. N., all the faculty members of our department, without whose constructive suggestions and valuable advice, the simple idea, which had borne by us, would not have been able to blossom forth to give such a beautiful bloom Completion of our research work. Special thanks to our family and friends for supporting us throughout our work.

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