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Real Time Smart Traffic Control System

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***Abstract*: Rising traffic blockage is an unpreventable condition in enormous and developing metropolitan territories over the world from Bengaluru to Los Angeles, from Sydney to New York. Peak-hour traffic clog is inalienable consequence of the cutting edge social orders operate. everyone detests traffic congestion, and it continues deteriorating until we make move to defeat it. The goal of this paper is to propose a savvy traffic model utilizing Image Processing, Deep Learning and Cloud Computing. We are implementing in three stages wherein first stage we will keep camera modules in every intersection of highway where there is tremendous number of tech parks or market regions and afterward, with camera module, we will prepare a model with picture and video as an information and discover traffic pattern utilizing Machine Learning and Deep learning and request that driver take elective road before showing up to high traffic zone utilizing announcement put before street starts. And in the second stage, we are controlling traffic light continuously utilizing Image Processing and in the third stage we are helping go for crisis vehicle, for example, ambulance and fire bridge in extraordinary rush hour gridlock utilizing FasTag, NavIC and Cloud Computing.**

***Keywords*: Image Processing, Deep Neural Networks, Support Vector Machine, Microsoft Azure, NavIC, FasTag, Silt-scan camera algorithm.**

1. Introduction

In the developing technical era, the traffic in each city has been incremented at a more noteworthy degree, in some cases, it is even uncontrollable. This circumstance is normal in each city with an increment of the vehicle on the street every day as shown in fig 1. Growing traffic can't be halted however we can control utilizing various Technologies. This condition has an unmistakable impact on everyday life and different exercises of the general public. At the point when it is the matter of wellbeing over the streets and the crisis circumstances like fire and wellbeing, high traffic makes a threat to the individuals. It is even hard to assign an uncommon path for crisis vehicles. The current arrangements face numerous issues. To facilitate the snapshots of these vehicles we have thought of the arrangement of "Ongoing Smart Traffic Management System". The explanation for this work is to give a smooth and quick stream to crisis vehicles to arrive at the goal in time, hence by diminishing the number of causalities. The cloud enables the driver of the crisis vehicle to arrive at the goal in time by furnishing a legitimate course with synchronous traffic lights at each sign in the way.in this paper, we think about rescue vehicles as our crisis vehicle. An overview said that 90% of heart patient can be dealt with if they reach in time, with no traffic blockage. It is one of the serious issues of current developing reality where individuals consistently incline toward a solace method for transportation purchasing a vehicle or bicycle, therefore, expanding the clog it might even deteriorate later on. Existing arrangements requires the consideration of the individuals where they should organize and help crisis vehicles go through, this paper proposes the framework that is important to execute to stay away from such debacles. The circumstance today has prompted numerous passings and misfortunes because of the expanded populace the expanded number of vehicles. The picture handling technique for vehicle following works great during the free progression of the traffic however they experience issues with blockage, shadows, and lighting advances.

Subsequently to determine this developing issue we purposed a framework where Technologies such as Deep Learning, NavIC, Microcontroller, Microsoft Azure, Slit-scan algorithm are brought into a picture so as to take control and coordinate the trafficking framework progressively.

Fig. 1. Traffic blockage

1) Use of Image Processing

For second stage we are utilizing camera module that is kept at going across street where for the most part traffic light is put it takes picture and video for handling utilizing Deep neural system .Image Processing is a method to upgrade crude pictures got from cameras/sensors put on space tests, airplanes and

satellites or pictures taken in typical day-today life for different applications. An Image is a rectangular graphical item. Picture handling includes issues identified with picture portrayal, pressure systems, and different complex activities, which can be done on the picture information. The tasks that go under picture handling are picture improvement activities, for example, honing, obscuring, lighting up, edge upgrade and so forth. Picture preparation is any type of sign handling for which the info is a picture, for example, photos or edges of video; the yield of picture handling can be either a picture or a lot of attributes or parameters identified with the picture. Most picture preparing procedures include the picture as a two-dimensional sign and applying standard sign handling strategies to it. Picture handling, as a rule, alludes to advanced picture preparing, however optical and simple picture preparing are likewise conceivable.

2) Use of Deep Neural Network

. A deep neural network is a neural network with a certain level of complexity, a neural network with more than two layers. Deep neural networks use sophisticated mathematical modeling to process data in complex ways A neural network, in general, is a technology built to simulate the activity of the human brain – specifically, pattern recognition and the passage of input through various layers of simulated neural connections like in fig. 2. Deep Neural Network is Used in all phase in this paper. In the first phase, this is required to find out the traffic pattern each day so that it can give accurate information for the driver on the billboard.in the second phase, it is required to compare the density of traffic to change the traffic signal. In the third phase, it is required to analyze the time taken by emergency vehicle to arrive in respective traffic junction so that it can clear all vehicle before two minutes' arrival of an ambulance

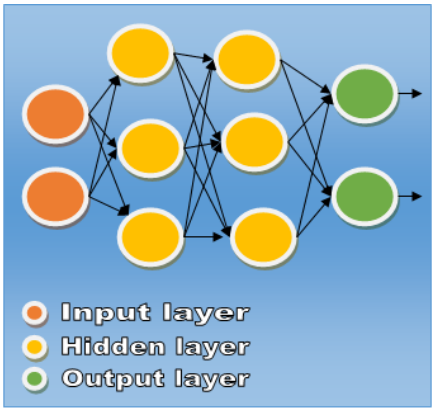

Fig. 2. Nodes in neural network

3) Use of Cloud, NavIc and FastTag in Emergency Vehicles

Cloud is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user. The term is generally used to describe data centers available to many users over the Internet. We are especially using Azure the platform which helps in processing and storing data on a real-time basis.

NavIC is the operational name of the Indian Regional Navigation Satellite System (IRNSS) developed by ISRO. NavIC satellites utilize dual-frequency (L5-band and S-band), which is the reason the framework is generally more exact than GPS (that utilizes a solitary band and makes up for mistake because of sign disintegration by the climate).FasTag is an electronic toll collection system in India, operated by the National Highway Authority of India (NHAI).It employs Radio Frequency Identification (RFID) technology that contains a unique ID for each vehicle where the system can be more secured and no one can misuse it.

2. Existing system

In order to find the density of vehicles on the road, numerous models of traffic control systems have been introduced [1]. An image processing framework is addressed in [2] in which the whole traffic can be measured using image processing methods. The other similar system being proposed uses image processing techniques that can be deployed in real-time to control traffic lights [3]. At each point of the traffic light, a web camera is being used in order to record images of the specified traffic lane. Such images are then compared with an image matching a reference picture of the empty road [4]. The image boundaries are evaluated using the Canny edge detection method. The traffic here is controlled based on how much the images match. Many papers are based on methods for edge detection [5].

Manual control refers to the use of workers to monitor traffic [6]. A designated traffic management area is allocated to the traffic police. Automatic control is known for controlling traffic signals via timers and electrical sensors [7]. In this method at each point of the traffic light, a constant numeric value is inserted into the timer. The traffic lights are automatically turned on or off depending on the changes in the timer value. The electric sensors monitor the presence of commercial vehicles and provide adequate signals at every point, controlling automatic off light switching [8].

For the third phase, currently used navigation system is GPS and based on data provided by GPS the location and time of arrival is estimated by the machine learning model but, in comparison to the GPS, which depends on the L-band only, the NavIC has a dual-frequency (S & L banding) [9]. This is not the case with GPS, but with its location accuracy 20 to 30m [10]. When the low-frequency signal travels in the atmosphere, its intensity varies because of atmospheric disturbances which make NavIC provide the accurate location to calculate the exact arrival time.

3. Methodology

1) Phase 1

In the city, there are tech parks where most companies are found and there are market zone and some school zone whose time is different. For example, people go office at morning and as a rule return around evening time and furthermore

individuals who goes to advertise they regularly go at evening time which has distinctive time of traffic thickness so we will fix camera module in every intersection where traffic light is found and decide the traffic example and thickness at particular time so the driver ready to take that street can prematurely end to another course if possible. this period of the venture is fundamental so as to limit traffic at a particular time where traffic thickness is high.

We use Azure Machine Learning because it saves time, cost and encourages growth. In Azure Machine Learning Lab, this is possible, and it offers nearly every big algorithm incorporated for work. After model is trained the information is shown in bill board at correct time so that driver can be alerted to take alternative route

Although there is Google map is there to decide traffic status, but driver regularly doesn't use the telephone while driving and google use GPS Density around there to decide traffic however here we are utilizing ongoing video and picture with AI calculation to discover an example of traffic in particular interstate.

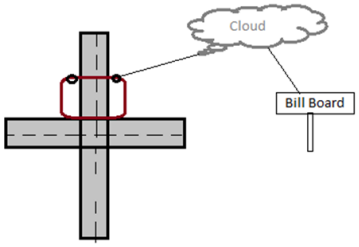

Fig. 3. Sending data to cloud and back to board

2) Phase 2

Second phase includes way to control the traffic signal according to the density of vehicle in the road. This phase is important phase in order to control traffic in minimal amount of time. Many types of traffic control systems have been introduced in order to find the density of vehicles on road such as installing laser and so on. Here we use image processing technique to determine the count of vehicle which is used as a data. After getting the data now it automatically starts to control the traffic based on the density of traffic in each road in the junction. As shown in fig 4 the proposed approach first takes a picture of the object The picture in RGB shading position is changed over into HSV shading space. The point of this change is to have the option to acquire the subtleties of the picture all the more plainly, free of the light conditions. After reducing the image to single channel, this image is subjected to a Gaussian filter. The general mathematical expression of this filter used to eliminate the noises on the image. The next step is to detect the edge of road in order to count the objects in within the edge detected. There are numerous strategies by and by being used to identify vehicles on street, for example, movement finders, establishment of lasers on the two roadsides, and so forth., which expands the equipment prerequisites.in our system we are using silt-scan camera algorithm broadly utilized in the game for enrolling a champ crossing the end goal, as for aesthetic purposes with Low computational cost, High accuracy: the tallying precision arrives at 99.5% , as it is equipped for isolating contacting items in lopsided columns

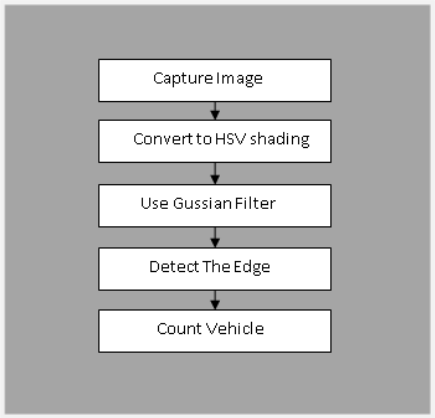

Fig. 4. Flow diagram for vehicle density detection

In the wake of checking the quantity of vehicle, the model beginnings controlling the traffic light by utilizing the recently prepared information through Support Vector Machine(SVM) Algorithm.it controls such that the road loaded up with a huge number of vehicles are given first need to go first then the road with less number of vehicles.

3) Phase 3

The rising issue of traffic congestion is a certain condition in enormous and developing urban communities over the world. The rise in the populace has expanded the number of autos prompting a sheer development in rush hour gridlock. Life, as we probably are aware of it, is valuable. It is best in class and once lost can't be brought back. During disasters, the reaction time taken by the crisis administrations assume a vital job whether it be clinical administrations, Fire motors or police powers. The significant snag they face is traffic blockage.

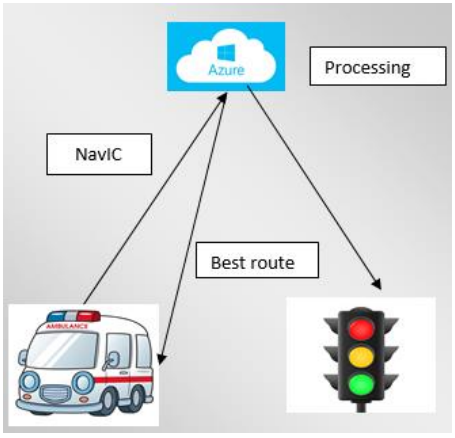

Fig. 5. Data transfer between ambulance, cloud, signal

As shown in fig. 5 we are utilizing NavIC for the following vehicle which is progressively exact than the current GPS. Most

advanced mobile phone will be equipped with NavIC framework so we can utilize NavIC for more precision and it additionally doesn't influence in extraordinary climate. FasTag contains one of a unique number code or each vehicle so nobody can abuse the traffic light controller other than crisis vehicle. also, RFID will show the traffic light that it has bypassed the traffic area. As shown in fig. 6 when ambulance gets call from patient then from that opportunity to going emergency clinic is crucial stage so for each vehicle so nobody can abuse the traffic light controller other than crisis vehicle. Also, RFID will show the traffic light that it has bypassed the traffic area. when ambulance gets call from patient then from that opportunity to going emergency clinic is crucial stage so when patient offers call to ambulance. Ambulance will begin by making its FasTag code dynamic through cloud, presently through cloud, they get the shortest route utilizing Dijkstra algorithm.

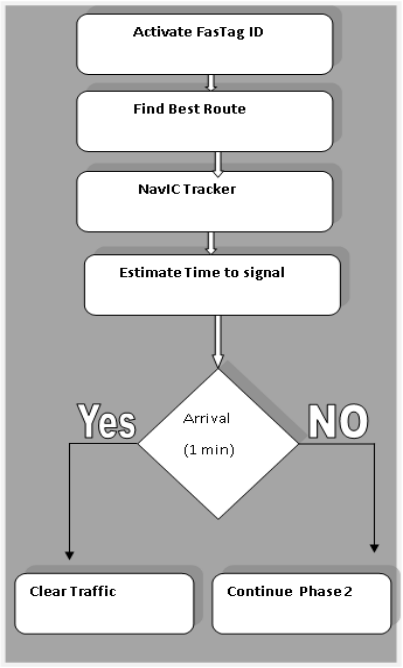

Fig. 6. Data flow for phase 3

4. Conclusion

The proposed framework can be utilized by the "Real-Time Smart Traffic Management System" to viably deal with the traffic and furthermore movement of Emergency Medical Services [EMS], for example, rescue vehicles during high traffic blockage. The fundamental endeavor of this paper is to control traffic beginning from the alarming driver in certain course with a certain season of traffic, also controlling traffic signal carrying innovations to picture and limit the passing's of basic patients by ensuring that the rescue the vehicle arrives at the crisis area and the clinic in time for treatment

References

[1] Engelmann, Frederick C. (1996) A History of the Austrian Migration to Canada, Carleton University Press, ISBN 978-0-88629-283-6, p. 184
[2] Department for Transport, General Principles of Traffic Control by Light Signals TAL 1/06 https://www.gov.uk/government/publications/traffic-advisory-leaflets-1989-to-2009
[3] Chakravorty, Pragnan (2018). "What is a Signal? [Lecture Notes]". IEEE Signal Processing Magazine. 35 (5): 175–177.
[4] Wang, Ching Yang, Ph.D. "Edge Detection Using Template Matching (Image Processing, Threshold Logic, Analysis, Filters)". Duke University, 1985, 288 pages; AAT 8523046
[5] Azriel Rosenfeld, Picture Processing by Computer, New York: Academic Press, 1969.
[6] NYCDOT Infrastructure & Traffic Signals.
[7] roakis, John G.; Manolakis, Dimitris G. (2007-01-01). Digital Signal Processing. Pearson Prentice Hall. ISBN 9780131873742.
[8] Canny, J., A Computational Approach to Edge Detection, IEEE Transactions on Pattern Analysis and Machine Intelligence, 8(6):679–698, 1986.
[9] "NavIC support in upcoming Mobile, Automotive and IoT Platforms is poised to deliver superior Location-Based services to India's Industries and Technology Ecosystem Through Qualcomm". Indian Space Research Organisation.
[10] "India's desi GPS 'NavIC' all set to navigate you".