Using Machine Learning to Detect Vehicle Speed

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Abstract: - Number of Transport in the roadway rapidly grows. According to the latest NCRB (National Crime Records Bureau) report on accidental deaths, over 80% of fatalities in road accidents in India happened due to speeding. Vehicles speed detection is difficult. All the existing methodologies can be adoptable only for city roads but it is ineffective for highways.
Radar Speed Gun: It has wide signal beam divergence, individual vehicle cannot be targeted   Jammers are used.
Lidar Speed Gun: Like radar, lidar is subject to cosine error effect. Jammers are used.

I. INTRODUCTION

Nowadays, the number of transports in the roadway rapidly grows since high standard vehicles are fabricated by satisfying the prime calibration. Due to the mushrooming of vehicles on highway and superhighway, the roads are prone to a multiplication of accidents. Taking it into concern a lot of systems contribute in the affordable detection speed and acknowledging the drivers to take a pathway which has less dense of vehicle and free from traffic issues. Similarly, measuring the speed of the vehicles is a very complex and difficult task, as the resulting accuracy depends on varies kind of situations stated as peak time traffic, the regular drivers of familiar path, climatic changes, the state of highway and also the component flexibility in the diagnosis process.

Many new inventions focus on different types of modules for the purpose of integrating the composed data with the surfing module of traffic.

Many promoted machineries are advancing to evaluate the travelling time with the usage of Global Positioning System (GPS), Radio Frequency (RF), etc.

These kinds of devices are commonly used by the people for the purpose of tracking their destination. There is an important need of the module in highways for the purpose of providing the number of vehicles and a number of high-speed adapting vehicles. use, of detecting the roadway vehicles but there is still an emptiness found in the qualified property of detection. All the existing methodologies can be adoptable only for city roads but it is ineffective for highways. Thus, the emerging of embedded plays a vital role in the detection process by interference with the computer.

The upcoming system is just a combination of hardware and software like embedded with the video and image processing methodology. In video / image processing the primary goal of material detection is to obtain the clearest image without blurring of a vehicle in motion even before applying the image processing methods.

For the purpose of object/Material detection most commonly adaptable methodology is backward subtraction.

Even after extraction of the required region from the video frame the important processing is to extract the wheels of the moving vehicle. Most commonly the required area in a video frame appears to be blurred.

II. PROPOSED SYSTEM

The flowchart indicates the methodology of vehicle speed detection using raspberry pi masking only, the required region of processing is given as input to the next stage. Then the extracted region undergoes the centering in order to obtain the

exact position of the wheels of the vehicle at varying time periods. This varying time period is useful in order to obtain the variety and amount of movement happened in the vehicle within that slot. According to the analysis if the speed is high an email of the image of the vehicle, vehicle number and speed of the department. On receiving the mail required actions are taken by the authorized organization and thus avoid the number of accidents in highway. If the speed is reasonable, then the system ends.

Video surveillance is the use of video cameras to transmit a signal to a specific place, on a limited set of monitors. It differs from broadcast television in that the signal is not openly transmitted, though it may employ point to point (P2P), point to multipoint, or mesh wireless links.

In the U.S. television system for the first and foremost time came into the picture in the year 1949 which was named as Vericon.
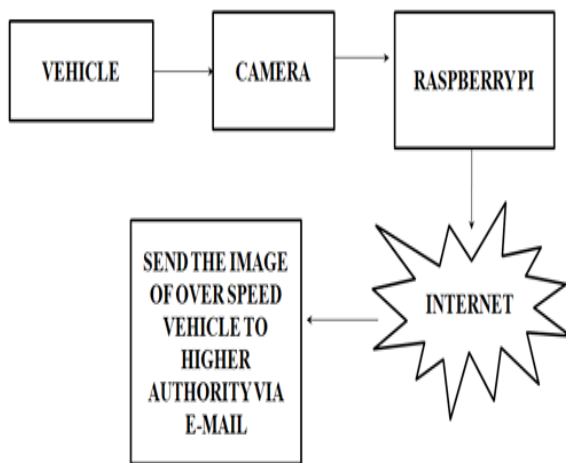

Fig.1. Working

The Pi camera is pointed at the road. Before you running carspeed.py, the constant DISTANCE to the distance from the front of the Pi camera lens to the middle of the road is modified. the v flip and h flip are adjusted to match the camera's orientation. Python carspeed.py is used in the terminal to run the code. The mouse pointer is used to draw a rectangle around the area you wish to monitor. It is recommending a height just sufficient to capture the whole car and a width about one half the frame, centered. The 'c' is pressed to begin monitoring the road. As cars pass through the monitored area, an image will be written to disk with the speed. To exit the code 'q' is pressed.

Fig.2. Results

The proposed system is capable to detect the motion using the open cv logic, track the moving object until it reaches the opposite side of the frame and calculate the speed of the car. Finally, a picture of the image labeled with the speed calculated is saved. The system was tested in the Trichy Road highway to detect the speed of the Random moving vehicles. The outcomes that we got here are built on actual monitoring of car speed &calculation at a specific given time of the day. The system was mounted on a local shop in Coimbatore location. The camera was positioned 50 feet away from the moving vehicles and the contour was taking almost 25% of the screen. The cars were running at a slow speed of 18Mph which reached up to 22Mph peak.

The video resolution of 480p is obtained for the recording speed of 60 FPS. This is high resolution and the hardware of our system was not capable to operate properly and record the real-time scene with this resolution. Hence, to operate the system efficiently.
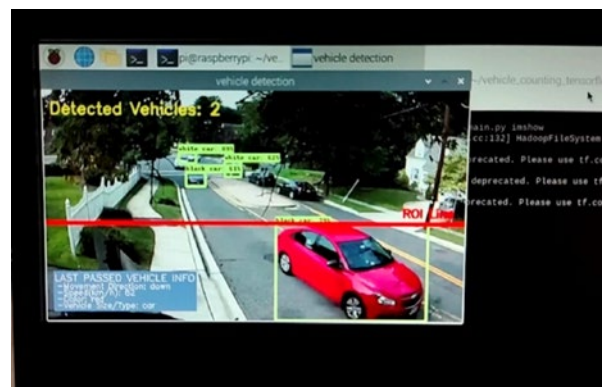

Fig.3 Output

III. CONCLUSION

The intension of this approach is to measure vehicle average speed. From the results this paper the speed of the random

vehicles have been detected and verified. The hardware unit of the proposed scheme is composed of a Raspberry Pi and Pi camera. The Trichy Road of Coimbatore was chosen as testing site to record traffic flow in real-time environment. Since it is a rush road, the implementation was done in a less rush time of the given road. As video streaming use large data and consume more power hence, we avoid video streaming to send data to control rooms for processing. We process the data at edge in order to avoid video streaming. Also, the data we collect are large in amount and the storage capability of Raspberry Pi is limited so we only see the output visually. In summary, a cost efficient and automated solution is plausible for replacing the manual, expensive task of detection of speed. vehicles have been shown to have a 100% detection accuracy followed by speed calculations having an accuracy of greater than 80%. The system was found more robust, reliable and costly effective in terms of cost, data usage and power consumption.

Additional functionality to implement the classification of vehicle types i.e, car, truck, and commercial truck. And to send SMS to higher authority when the vehicle exceeds the speed limit is being planned as future scope.

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