“Automatic Traffic Management System Using YOLO”

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Abstract- Traffic congestion is one of the major problem in today’s world, which is need to be solved to improve traffic control and management. Vehicle flow detection appears to be an important part in today’s traffic management system. In this project, we propose an automatic traffic management system for vehicle detection and counting and automatic signals Scheduling. The camera supplies video input to the processing engine. Initially the video will be streaming on all four roads of the traffic circle. The values will be read frame by frame in the streaming video of these roads. Camera sends all the captured input images to the processing engine and this works based on the neural network. The traffic flow shows the traffic state in fixed time interval and helps to manage and control the traffic especially when there is a heavy traffic and will consider emergency vehicles like ambulance and fire brigades, giving them priority to go.

Keywords-object detection, YOLO, signal scheduling, deep learning, computer vision

1. INTRODUCTION

Traffic is a major issue in every city. The traffic mostly affects the emergency service vehicles such as ambulances and fire brigades badly. Traffic congestion is one of the major problem in today’s world, which is need to be solved to improve traffic control and management. Vehicle flow detection appears to be an important part in today’s traffic management system. In this project, we propose an automatic traffic management system for vehicle detection and counting and automatic signals Scheduling. Ambulances and fire brigades are usually allowed by all the co-travelling vehicles on the road on humanity grounds. But when it comes to huge cities with lot of traffic jam, these emergency vehicles are not able to provide its services on time. In this project, these emergency vehicles are detected and are allowed to move even in any traffic condition by keeping the rest of the vehicles on other ends in standby. The emergency vehicles will be given prominence in all the traffic signals.

2. LITERATURE SURVEY

TITLE:” Yolo Flow Real-time Object Tracking in Video”

YOLO is a fast, accurate object detector, in TensorFlow. It contains publicly-available dataset containing several million natural images. WeusethePASCALVOC2007, a set of RGB images labeled with bounding box coordinates and class categories. The CNN learns high-quality, hierarchical features automatically, eliminating the need for hand-selected features. It Solve the object detection and object classification tasks. This function simultaneously penalizes incorrect object detections as well as considers what the best possible classification would be[1].

TITLE :“ Smart Traffic Control System Using Image Processing”.

This paper used for estimating the traffic and this method has been implemented using Image

Processing and Mat lab software. This is done by using the camera images captured from the highway and videos taken are converted to the image sequences. Each image is processed separately and the number of cars has been counted. If the number of cars exceeds a specific threshold, warning of heavy traffic will be shown automatically [2].

TITLE:“ “RFID and GPS based Automatic Lane Clearance System for Ambulance”

The lack of efficient traffic control and management has many a times lead to loss of lives due to ambulances getting stuck in traffic jams. To overcome this problem, we propose a RFID and GPS based Automatic Lane Clearance System for Ambulance. The focus of this paper is to reduce the delay in arrival of the ambulance to the hospital by automatically clearing the lane in which ambulance is travelling, before it reaches the traffic signal. This can be achieved by turning the traffic signal, in the path of the ambulance, to green when the ambulance is at a certain distance from the traffic junction. The use of RFID distinguishes between the emergency and non-emergency cases, thus preventing unnecessary traffic congestion. The communication between the ambulance and the traffic signal post is done through transceivers and GPS [3].

TITLE: “An Object Detection System Based on YOLO in Traffic Scene”

We build an object detection system for images in traffic scene. It is fast, accurate and robust. Traditional object detectors first generate proposals. After that the features are extracted. Then a classifier on these proposals is executed. But the speed is slow and the accuracy is not satisfying. YOLO an excellent object detection approach based on deep learning presents a single convolutional neural network for location and classification. All the fully-connected layers of YOLO’s network are replaced with an average pool layer for the purpose of reproducing a new network. The loss function is optimized after the proportion of bounding coordinates error is increased. A new object detection method, OYOLO (Optimized YOLO), is produced, which is 1.18 times faster than YOLO, while outperforming other region-based approaches like R-CNN in
accuracy. To improve accuracy further, we add the combination of OYOLO and R-FCN to our system. For challenging images in nights, pre-processing is presented using the histogram equalization approach. We have got more than 6% improvement in map on our testing set[4].

TITLE: “Evaluating State-of-the-art Object Detector on Challenging Traffic Light Data”

Traffic light detection (TLD) is a vital part of both intelligent vehicles and driving assistance systems (DAS). General for most TLDs is that they are evaluated on small and private datasets making it hard to determine the exact performance of a given method. In this paper we apply the state-of-the-art, real-time object detection system You Only Look Once, (YOLO) on the public LISA Traffic Light dataset available through the VIVA-challenge, which contain a high number of annotated traffic lights, captured in varying light and weather conditions. The YOLO object detector achieves an AUC of impressively 90.49 % for daysequence1, which is an improvement of 50.32 % compared to the latest ACF entry in the VIVA challenge. Using the exact same training configuration as the ACF detector, the YOLO detector reaches an AUC of 58.3 %, which is in an increase of 18.13 % [5].

3. PROBLEM STATEMENT

The purpose of this project is to provide high priority for the emergency vehicles like ambulances, fire brigades and VIP vehicles to go in traffic signals. In a busy schedule thousands of vehicles passing through the traffic, it may not always be possible for traffic police officer to schedule the signal instantly and usually the

traffic signals will not do this automatically based on the traffic strength.

4. METHODOLOGY

Initially the video will be streaming on all four roads of the traffic circle. The values will be read frame by frame in the streaming video of these roads. Camera sends all the captured input images to the processing engine and this works based on the neural network. It is one of the algorithm in machine learning and it has three layers in it. First one is input layer, it stores captured data. Second one is hidden layer, it divides the images into regions and predict boundary boxes and probabilities for each region, this boundary boxes are weighted by the predicted probabilities. Third one is output layer, It has trained set of data. The counter value is set to 60 seconds. When the emergency service vehicle enters the non-green lane, that will be detected using YOLO and the signal wait timing is reduced and the vehicles in that lane are allowed to move. After this the signal timing works on the round robin fashion.After the emergency vehicle moves, the signal will become green at the next lane and the vehicles are allowed to pass. This works in clock –wise direction.Where the emergency vehicle was allowed to pass, that lane's signal waiting timing will be reduced to half of its actual timing i.e., 30seconds.If the two or more emergency vehicles are encountered at different lanes, then it works on "First come first serve" method.

4.1 DESIGN

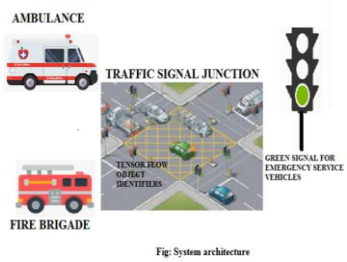
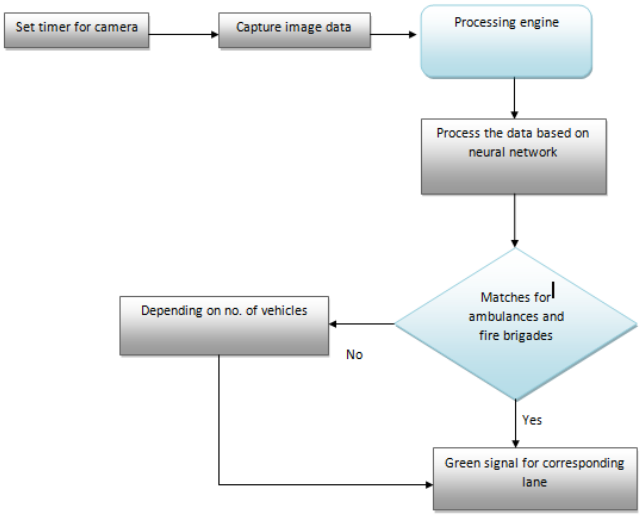


Fig: System architecture

5. SYSTEM ARCHITECTURE



In our system architecture, first we will set timer for the camera. Then camera captures all the images coming through the lane. After that, it sends all captured input to the processing engine and it works based on the neural network. It is one of the learning algorithm in machine learning and it has three layers in it. First one is input layer, it stores an captured data. Second one is hidden layer, it divides the images into regions and predict boundary boxes and probabilities for each region, this boundary boxes are weighted by the predicted probabilities .Third one is output layer ,it has trained set of data. If the captured data matches with ambulances or fire brigades ,automatically traffic light releases an green signal color to the corresponding lane otherwise depending on the no. of vehicles it changes the traffic signal color to green .

6. CONCLUSION

This system is a video based traffic controlling system which is a real time application. TensorFlow implementation of 'YOLO: Real-time object detection' (train and test). This project helps to manage and control the traffic especially when there is a heavy traffic.

Emergency vehicles like ambulance and fire brigades are given first priority to move.

7 . REFERENCES

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