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DENSITY BASED TRAFFIC MANAGEMENT SYSTEM

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Abstract

Density based traffic management system -

A platform for traffic management system. The aim of the project is to use the modern way of managing the traffic using the technological solution. Which brings ease in traffic congestion problem. It helps in reducing the work force of traffic department.

Traffic congestion is becoming a serious problem with a large number of cars on the roads. Vehicle queue length waiting to be processed at the intersection is rising sharply with the increase of the traffic flow, and the traditional traffic lights cannot efficiently schedule it. In fact, we use computer vision and machine learning to have the characteristics of the competing traffic rows at the signalized road intersection. This is done by state-of-the-art, real-time object detection based on a deep Convolutional Neural Networks called You Only Look Once . Then traffic signal phases are optimized according to collected data, mainly queue density and waiting time per vehicle, to enable as many as vehicles to pass safely with minimum waiting time.

Keywords – Python, Machine learning, Density, traffic management

1. INTRODUCTION

Traffic congestion is the bigger problem now a days in many metro cities this creates bigger issues of traffic management, it increases the burden on traffic department of the country also it creates harm to the humanity as there is lot of pollution in air due to this traffic congestion. To solve this, we bring this technology to make work easy for traffic department.

3.OVERVIEW

- Our vision is to design the system that helps in traffic management.
- A machine learning system that will help traffic department.

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2. NEED

This system is to reduce the workforce and to make the work easy for traffic department also to manage the real time crowd and traffic on the road.

4. LITERATURE SURVEY

As we mentioned above, the existing approaches for managing traffic flow at intersection still have some problems, especially during high traffic we get to see larger number of vehicles, so to solve this problem we used round robin algorithm.

Its advantage is that, there will be no traffic density and each and every lane will get a chance to pass-by properly. Time allocation depends on various factors like width of lane average speed of vehicles etc. So, all the above-mentioned criteria are taken into consideration while designing the algorithm.

5. Technology Stack

5.1 OpenCV

OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in commercial products.

The library has more than 2500 optimized algorithms, which includes a comprehensive set of both classic and state-of-the-art computer vision and machine learning algorithms. These algorithms can be used to detect and recognize faces, identify objects, classify human actions in videos, track camera movements, track moving objects, extract 3D models of objects, produce 3D point clouds from stereo cameras, stitch images together to produce a high resolution image of an entire scene, find similar images from an image database, remove red eyes from images taken using flash, follow eye movements, recognize scenery and establish markers to overlay it with augmented reality, etc.

But for better accuracy and greater speed and also to increase performance we use the YOLO (You Only Look Once) algorithm that uses neural networks.

OpenCV is supervised i.e. there is no need to train data, whereas YOLO is unsupervised learning is a type of machine learning in which models are trained using unlabelled dataset and are allowed to act on that data without any supervision.

6.2 YOLO

You only look once (YOLO) is a state-of-the-art, real-time object detection system YOLO, a new approach to object detection. Prior work on object detection repurposes classifiers to perform detection. Instead, we frame object detection as a regression problem to spatially separated bounding boxes and associated class probabilities. A single neural network predicts bounding boxes and class probabilities directly from full images in one evaluation. Since the whole detection pipeline is a single network, it can be optimized end-to-end directly on detection performance. The object detection task consists in determining the location on the image where certain objects are present, as well as classifying those objects. Previous methods for this, like R-CNN and its variations, used a pipeline to perform this task in multiple steps. This can be slow to run and also hard to optimize, because each individual component must be trained separately. YOLO, does it all with a single neural network.

5. Proposed System

To create a system which help traffic management system through time allocation decisions for particular lane with the help of cameras, image processing modules.

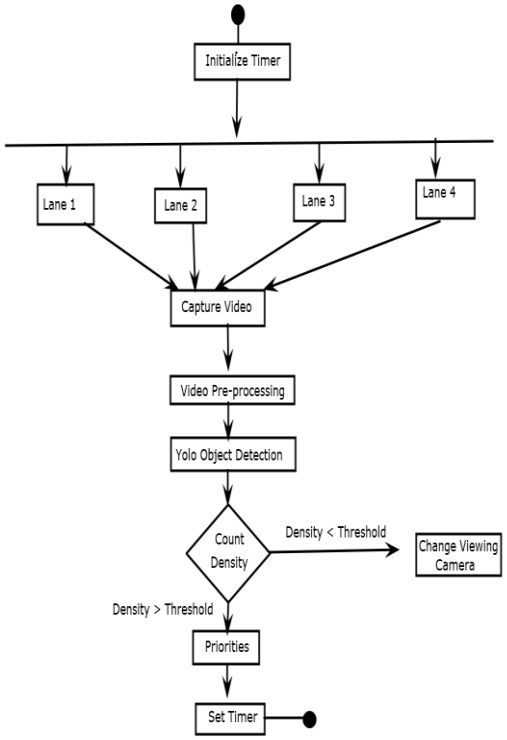
5.1 Objectives:

- To study the use of opencv.
- Save the travelling time by reducing traffic Congestion by allocating time for lane dynamically.

5.2 System Description:

- Input: Demo video
- Output: Accuracy of algorithm.

6. System Design



9. Algorithm

As we mentioned above, the existing approaches for managing traffic flow at intersections still have some problems, especially in case of high traffic volume such as traffic congestion, the large number of waiting vehicles in queue lanes, and vehicles crash at intersections because of conflicting directions of vehicles.

So we wrote a round robin algorithm. It's advantage is there will not be any starvation and each and every lane will get a chance. Time allocation depends on various factors like width of the lane, length of traffic signal, average speed of vehicles at traffic signals. So all above mentioned criteria's are taken into consideration while designing the algorithm.

From above conditions firstly we have calculated the time required to cross the vehicles present in the first row. That will act as a base time. We have also calculated the estimated number of rows of vehicles based on vehicles count. Now using these two values we have calculated the time quantum.

7. Advantages

- There is no need of workforce to manage the traffic
- Time efficiency
- Reduce the accident rates

8. LIMITATIONS

- Cannot capture tiny images.
- Cannot store large data.

9. ACKNOWLEDGEMENT

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10. CONCLUSION

The goal of this work is to improve the transport system by bringing the technology which is based on machine learning. This new system is to track movement of vehicles in intersection, resulting reducing traffic, so as to reduce CO2 emissions. This density traffic management system aims to bring the modern way of managing the traffic.

11. REFERENCES

[1.] G. Dimitrakopoulos and P. Demestichas, "Intelligent transportation systems," IEEE Vehicular Technology Magazine, vol. 5, no. 1, pp. 77–84, 2010.

[2]. K. Zaatouri and T. Ezzedine, "A Self-Adaptive Traffic Light Control System Based on YOLO," 2018 International Conference on Internet of Things, Embedded Systems and Communications (IINTEC), Hammamet, Tunisia, 2018, pp. 16-19

[3] Ashwini D. Bharade, Surabhi S. Gaopande,Robust and Adaptive Traffic Surveillance System for Urban Intersections on Embedded Platform, 2014

[4] Heba A. Kurdi, Review of Closed CircuitTelevision (CCTV) Techniques for Vehicles Traffic

[5] Road Traffic Congestion Monitoring andMeasurement using Active RFID and GSMTechnology by Koushik Mandal, Arindam Sen

[6] Image Processing Based Intelligent Traffi Controller by VikramadityaDangi, KshitijPawar and S.S Rathod. Undergraduate