

Traffic Analysis using Image Processing to Alert Traffic Control

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Abstract: *In this paper, we present a scheme for traffic analysis using Image Processing to alert traffic control. In this, the vehicles are not being detected by sensors as we are detecting by images with the use of python language we are going to implement it in our project. Once image is captured from digital media, it is fed into image processing after that it detects vehicles from image using open cv libraries, after that at the end vehicles are detected on basis on vehicle count, and time will be set as per so reduce the road traffic congestion. This system contains the solution to three problems of traffic system. First one being the pre-defined set of timings set for each traffic signal despite the density circumstances. For this we have changed the signal timings. The working would be as follows, in a traffic junction of four lanes the density is measured on each lane at distance of 50 meters through the Image Processing. After that count the vehicle and turn on green light for time period deepening on vehicle count ratio. this is done so that the lane having highest density is allowed to clear the traffic first, the other lanes will be given green signal after this in a circular pattern. If in cases where the density is greater, the signal timing is increased seconds.*

Keywords: Traffic control, Computer Vision, Image Processing, Edge Detection, artificial intelligence.

I. INTRODUCTION

One of the very essential issue in our country is road congestion. Most nations have automobiles, buses, trucks, motor vehicles, motors, scooters and bicycles. However, in India, more n more to the current routine small scale transportation, and together substantially to the traffic, are networks of vehicles, two wheelers still as heavy cars. This has led to the more n more of traffic, higher number of accidents, cases and increase in commuting time over the years.

Traffic means a lot of vehicles coming and going on the road and in a big city a lot of vehicles are seen on the road . And it has become very difficult to manage this traffic so there are a lot of accidents on the road. And this traffic is having a huge impact on people's health, spreading various diseases. we have to use a lot of techniques to stop this traffic. People don't use public transport, they have their own private vehicles, so the traffic is increasing, we have to reduce , and use image processing to control traffic and alert traffic signals.

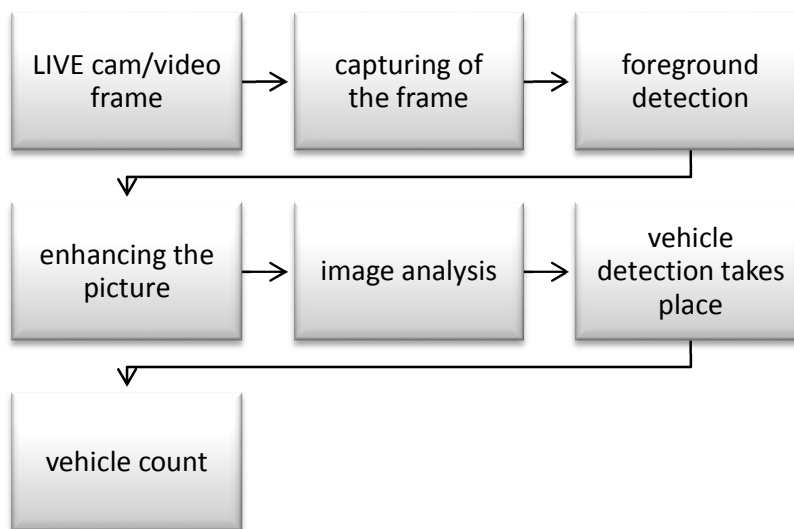
The intention in our research paper is that we are going to count the vehicles on the road and Depending on how many vehicles are on the road, we will decide which road to assign the time to traffic signals . Each road will have a camera that will take a photo every second of every time And from that photo, the time will be decided according to which road have the vehicles and how many time assign to the road. All these techniques will not only decrease the traffic but also control the traffic and reduce the accidents.

1.1 Problem Statement

System for controlling traffic congestion on road using image processing methods to detect vehicle on road and schedule traffic signal light pattern to manage and avoid vehicle congestion.

II. RELATED WORK

In [1] this research the author has suggested to implement a intelligent traffic controller using real time computer vision. Filtering method is used to capture the image and video, i.e. it filters the image and removes the unwanted background and only focuses on the cars as an object. Image processing technique is used to detect the count of cars on the road and the detection of cars is also done by video. It follows these steps:



As in the [2] paper, the suggestions are cost friendly using the image processing techniques with much more effective techniques for accurate detection of the vehicles and determining the density for tackling the traffic congestion. The author has also suggested for more camera installation on the traffic lane. System based on microwave RADAR, video processing based sensors have been used for the intelligent traffic management. The author has also imposed that efficient and cost friendly techniques of image processing based on the algorithms used for tracking the vehicles will lead to more effective performance for determining the count of cars and other vehicles.

The [3] paper proposes the control of traffic using MATLAB code which changes the time green, red light and orange according to traffic density and the count of vehicles. Two Arduino is used for managing green and amber light the other for managing the red light. In this system the waiting time is deducted for the roads which are empty on the lane using MATLAB which is very useful for traffic control. The images of empty road is captured through the live camera. The number of cars present on the road are together using the MATLAB functions. The density and the number of vehicles on empty road will calculate the green light which will be less. More time will be given to the denser lane. As the current traffic signals are preprogrammed. They are independent to the traffic congestion on the road. Empty roads waste a lot of time. This system provides better time control approach for controlling the traffic congestion.



The above figure shows the process of controlling the traffic light and the timer. In [4] The paper implies method to analyze the congestion by evaluating real time cars count using canel car model detection and image processing. This vehicle detection meyhod is essential to extract the data from the video. Methods seem to show promising results in collecting the required data.

III. PROPOSED WORK

Results:

Screenshots- Module 1 to 6

Camera/Video

To take the pictures through video it is used to capture the frame. Here every frame in camera is captured as one single image. We are using night vision camera for frame capturing

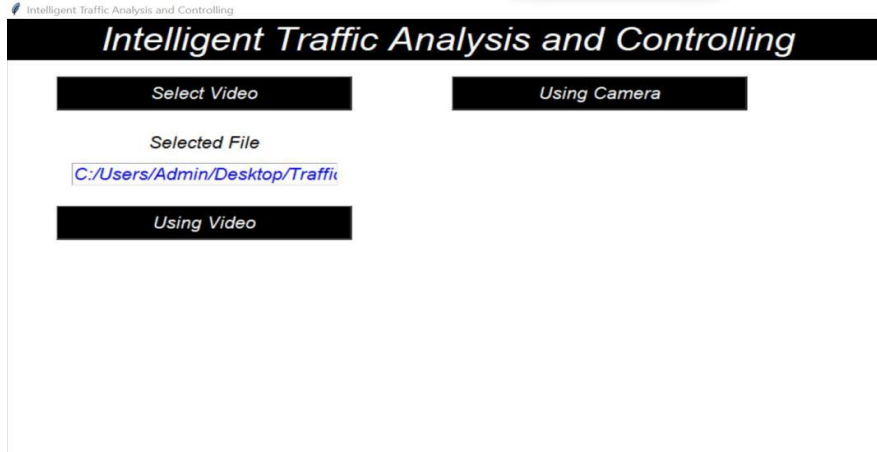


Image Frame Capture

Images are captured as frames, Frames are used to capture images one by one on video we see images only which are bombarded one after another rapidly.

Selected File



Image Processing

An image is made up of number of pixels, whereas a pixel is very minute in an image. It is a process of making some experiments on image in a way to get proper image and to make some useful data from it. There are two types to do image processing one is digital and another is analog. In order to get a better quality of image we use image processing. It is one of the rapidly growing technologies now-a-days.



Vehicle Detection

Detects vehicles from images using open cv based classification techniques.

Open cv package in that classified techniques are there open cv classification is class in that cascade classifier object detection module we get in that the cascade classifier is set in open cv obj detection is done now currently in our project we have given vehicle detection module and due to that vehicle detection is been done.

Canel is function used for edge detection in grayscale here vehicle key points are stored

Storage-cascade classifier in that we are detecting object car module are we have put there ready data set of car model data set in image processing.

Before Image Processing:

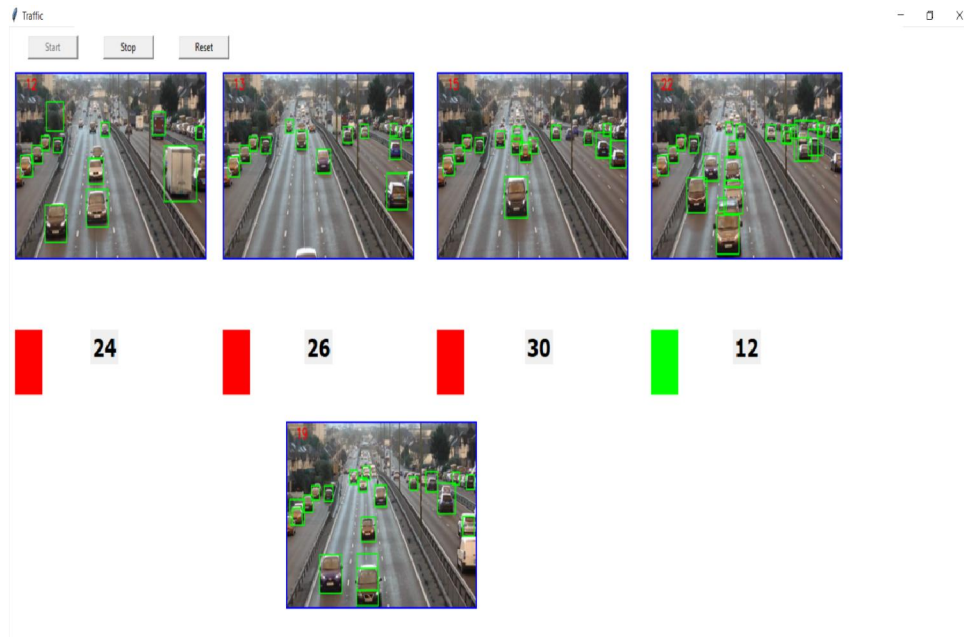


As we can on read cars are moving from one place to another this is been done before image processing. Vehicle detecton Is composed of identifying the detected vehicle constantly in a video order. It is done by making the boundary around the captured vehicle. This system goes on without any persons interference and is completely automatically generated, As it uses intelligent traffic control and analysis using image processing.

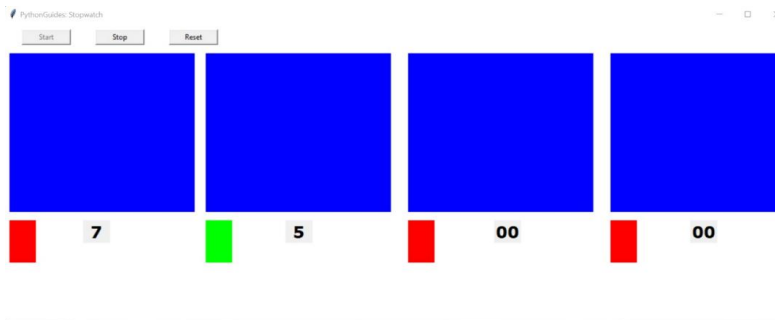
IV. AFTER IMAGE PROCESSING DONE VEHICLE DETECTION

4.1 Vehicle Count

Counting vehicle is a custom function that detects the count of cars that crossed through the road. Every moving car object below ROI(Region of Interest) is tracked based on its place and can be mixed with the number of detected things placed.for a latest position or position not including in the criteria of tracked objects .it will be added as a new vehicle,if the initial place was mixed in the list of positions or previous tracked objects ,it means the place had already been gathered as a detected vehicle .The car will be detected till it goes out of region,every image is compared with the previous image, if the vehicle is present in the both the images and difference in their x and y coordinates is lower than max(width, height) pixels, then we consider them as 2 separate vehicles. Vehicle tracking Is composed of the detected vehicle continuously in a video sequence. It is done by making the boundary around the captured vehicle. This system works without any persons interference and is completely automatically generated, As it uses intelligent traffic control and analysis using image processing.



Timer Control



After vehicle detection on the basis of vehicle count time will be set as per the traffic. After counting number of vehicle Calculate time required to traffic signal light ON/OFF time period and send command to hardware as per time schedule. With the timer controller, we can control heavy traffic congestion in just couple of seconds (100 seconds).

Advantages Over Existing System:

- In the previous system for controlling road traffic and to avoid congestion manpower was used but that was not sufficient so traffic signal system was developed but now in our project we are using intelligent traffic control system using image processing.
- Here we are using night vision camera for detecting the vehicles where every image in camera frame is going to be captured like one single image.
- Major moto of our project is to save time while travelling on road and to avoid congestion.
- For that we are going to set timer as per vehicle count for that car models are set in dataset.
- After detection every vehicle is going to get equal time to pass away, which avoids traffic congestion.

V. CONCLUSION

Prior manpower was used but that was not sufficient due heavy road traffic congestion. Then occurred traffic light signals but it was not sufficient and was time consuming now in our project we have used “Intelligent traffic control system using image processing”. It helps in reducing time and passes vehicle easily using edge detection and image processing technique we conclude our project that using open cv Classification techniques we are reducing road traffic congestion.

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