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Optimal Route Prompting Using Image Segmentation and Machine Learning

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Abstract
Traffic congestion could be a condition in transport where there are huge crowds, slows thespeed of vehicles and even increases the vehicular lengths. Traffic congestion on city road networks has increased rapidly since the 1950s. When the traffic demand is great then the interaction between the vehicles reduces the speed of the traffic and finally results in traffic congestion. To overcome such circumstances in the present scenario, smart traffic management system can be initiated and we are in study to find a solution to make traffic free city. This systemhelps in monitoring the traffic signals and flow of vehicles by means of image processing with CCTV cameras. CCTV cameras help in image processing and identifying the number of vehicles passing in the road surface. It helps in abating the traffic congestion in the road and fuel consumption of the automobiles.

Sensors are used for detecting the number of vehicles and speed. By coordinating the CCTV cameras and sensors the collected information can be sent to Variable Message Sign (VMS)Boards. This board displays the information regarding traffic to the road users. It helps indiverting and altering the roads at the earliest where the waiting time is reduced. Though the waiting time is reduced, fuel is consumed automatically. Therefore, reduction in the fuel consumption helps to control the air pollution. By creating the control system and detecting the problems faced in the road, traffic congestion can be reduced and provide traffic free environment. As we face rapid growth of our country's population, smart traffic management system provides people to have smooth transportation network which would find a w ay to reachtheir destination soon and make their journey better forever.

Introduction

This Project "Optimal route prompting using machine learning and image segmentation." The increasing traffic congestion has become a major problem in manyof the developing metropolitan areas across the globe. Peak hour traffic congestion has become something everyone has to face due to the way in which current society operates. The timings which are in place in various parts of the world have led to the inevitable overloading of the existing roads every day. A smart traffic advisory system is a system that can be used to provide real-time monitoring of the traffic on the roads.This uses many subsystems like CCTVs at traffic signals and other devices on roads toprovide 24/7 traffic advice. This system uses the images captured and calculates the waiting time. The system is trained to calculate waiting time with the help of the predefined dataset of images. All the information is sent to the driver on their smartphones.

Existing System

No proper existing system, the driver must go through all the signals. The trafficis controlled only with the help of traffic signals.

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Disadvantages
• Time taking.
• Causes more pollution due to heavy traffic.
• Causes problems in emergency situations.

Proposed Model
In this system the system uses the images captured by the cameras at the trafficsignals and at other places and calculates the waiting time with the help of the trained data set and the best route is suggested to the driver.

Advantages
• Reduces the traffic and Cost effective
• Helpful to the driver to avoid traffic.

Literature Survey
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The increasing traffic congestion has become a major problem in many of the developing metropolitan areas across the globe. Peak hour traffic congestion hasbecome something everyone has to face due to the way in which the current society operates. The timings which are in place in various parts of the world have led to the inevitable overloading of the existing roads every day. A smart traffic advisory systemis a system that can be used to provide real-time monitoring of the traffic on the roads.This uses many subsystems like CCTVs at traffic signals and other devices on roads to provide 24/7 traffic advice. This system uses the images captured and calculates the waiting time. The system is trained to calculate waiting time with the help of the predefined dataset of images. All the information is sent to the driver on their smartphones.

Traffic congestion could be a condition in transport where there are huge crowds, slows the speed of vehicles and even increases the vehicular lengths. Traffic congestion on city road networks has increased rapidly since the 1950s. When the traffic demand is great then the interaction between the vehicles reduces the speed of the traffic and finally results in traffic congestion. To overcome such circumstances inthe present scenario, smart traffic management system can be initiated and we are in study to find a solution to make traffic free city. This system helps in monitoring the traffic signals and flow of vehicles by means of image processing with CCTV cameras

CCTV cameras help in image processing and identifying the number of vehiclespassing in the road surface. It helps in abating the traffic congestion in the road and fuelconsumption of the automobiles. Sensors are used for detecting the number of vehicles and speed. By coordinating the CCTV cameras and sensors the collected information can be sent to Variable Message Sign (VMS)Boards. This board displays the information regarding traffic to the road users. It helps in diverting and altering the roads at the earliest where the waiting time is reduced. Though the waiting time is reduced, fuel is consumed automatically. Therefore, reduction in the fuel consumption helps to control the air pollution. By creating the control system and detecting the problems faced in the road, traffic congestion can be reduced and provide traffic free environment. As we face rapid growth of our country's population, smart traffic management system provides people to have smooth transportation network which would find a w ay to reach their destination soon and make their journey better forever.Keywords: Traffic congestion, image processing, CCTV cameras.

A Review on Smart Traffic Management System
Traffic congestion could be a condition in transport where it has huge crowds, slows the speed of vehicles and even it increases the vehicular lengths. Traffic congestion on city road networks has increased rapidly, since the 1950s. When the traffic demand is great then the interaction between the vehicles reduces the speed of the traffic and finally results in traffic congestion. To overcome such

circumstances inpresent scenario, smart traffic management system can be initiated and we are in studyto find a solution to make traffic free city. This system helps in monitoring the traffic signals and flow of vehicles by means of image processing with CCTV cameras. CCTVcameras help in image processing and identifying the number of vehicles passing in the road surface. It helps in abating the traffic congestion in the road and fuel consumptionof the automobiles. Sensors are used for detecting the number of vehicles and speed. By coordinating the CCTV cameras and sensors the collected information can be sent to Variable Message Sign (VMS) Boards.

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Machine Learning Assisted Active Net Segmentation of Vehicles for Smart Traffic Management

Vehicle segmentation, traffic density estimation and vehicle tracking are some of the important functionalities in smart traffic management. Segmentation of vehicles from traffic surveillance videos can help to realize many applications like speed monitoring, traffic estimation etc. Vehicle segmentation from surveillance videos becomes incredibly challenging due to presence of occlusions, cluttered backgrounds, and traffic density variations. In this work, we propose a deep learning adapted active net segmentation modelfor vehicle segmentation. The proposed solution involves three stages: adaptive background model-based subtraction, active net sub netting with CNN, refined from CNN results with ETAN optimization. Adaptive background modeling is based on an adaptive gain function which is constructed from the pixels of the frames in the video. The gain function can compensate for the shadow and illumination problems affecting the vehicle segmentation. Deep learning assisted topological active net deformable model can provide higher segmentation accuracy in presence of occlusions, cluttered backgrounds, and traffic density variations.

Smart Traffic Control System with Application of image Processing Techniques

In this paper we propose a method for determining traffic congestion on roads using image processing techniques and a model for controlling traffic signals based on information received from images of roads taken by video camera. We extract traffic density which corresponds to total area occupied by vehicles on the road in terms of total amount of pixels in a video frame instead of calculating number of vehicles. We set two parameters as output, variable traffic cycle and weighted time for each road based on traffic density and control traffic lights in a sequential manner.

Smart Traffic Control System Using Image processing

The fact is that, the population of city and numbers of vehicles on the road are increasing day by day. With increasing urban population and hence the number of vehicles, need of controlling streets, highways and roads is major issue. The main reason behind today's traffic problem is the techniques that are used for traffic management. Today's traffic management system has no emphasis on live traffic scenario, which leads to inefficient traffic management systems. This project has been implemented by using the Mat lab software and it aims to

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prevent heavy traffic congestion. Moreover, for implementing this project Image processing technique is used. At first, film of a lane is captured by a camera. A web camera is placed in a traffic lane that will capture images ofthe road on which we want to control traffic. Then these images are efficiently processed to know the traffic density. According to the processed data from mat lab, the controller will send the command to the traffic LEDs to show particular time on the signal to manage traffic.

Algorithm

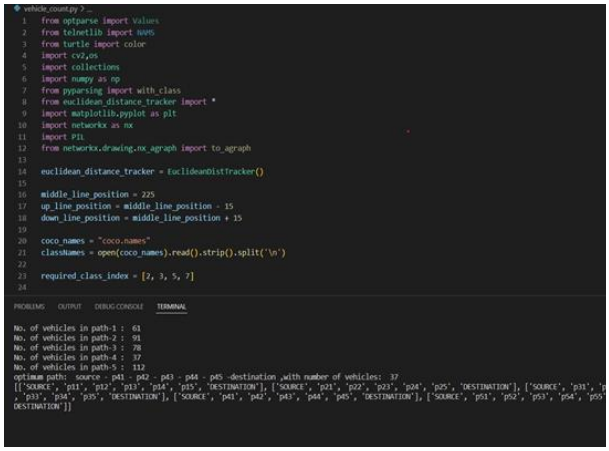
yolov3:

- YOLOv3 (You Only Look Once, Version 3) is a real-time object detection algorithm that identifies specific objects in videos, live feeds, or images. YOLO uses features learned by a deep convolutional neural network to detect an object.
- YOLO is implemented using the OpenCV deep learning libraries.
- YOLO predicts an objectness score for each bounding box using logistic regression.
- YOLO threshold segmentation to assign one bounding box.

OPENCV

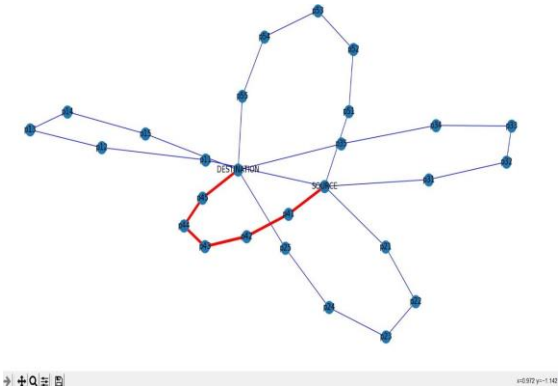
OpenCV is a cross-platform library using which we can develop real-time computer vision applications. It focuses on image processing, video capture and analysis including features like face detection and object detection.

Results



Screenshot of Detecting System

Screenshot of detecting system



Screenshot of detecting

Conclusion

In this project we propose a method for detecting the best path by utilizing the implementation of YOLO and pre-trained models. In prior methods separate systems weredeveloped to detect the best path based on vehicular area. But this is an agglomeration of all which can detect the best path based on the vehicular density. Therefore, a method that produces a better result by extracting and suggesting the best path to the driver. In conclusion we believe that the method proposed in this project has the potential to be implemented in traffic signal regions in every part of the world.

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