

Geo Cache Optimized Multi-Traffic Scene Perception Based on Supervised Learning and Artificial Intelligence

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Abstract - The venture is intended to foster a thickness based unique traffic light framework. The sign timing changes consequently on detecting the traffic thickness at the intersection. Gridlock is an extreme issue in many significant urban communities across the world and it has turned into a bad dream for the workers in these urban areas. Traditional traffic signal framework depends on fixed time idea allocated to each side of the intersection which can't be changed according to fluctuating traffic thickness. Intersection timings apportioned are fixed. Some of the time higher traffic thickness at one side of the intersection requests longer green time when contrasted with standard allocated time. The item identification in the traffic light is handled and changed over into test system then, at that point, its limit is determined in view of which the shape has been attracted request to ascertain the quantity of vehicles present nearby. In the wake of working out the quantity of vehicles we will come to realize in which side the thickness is high in light of which signs will be distributed for a specific side. On account of its high recognition rate, CNN can be used to realize various computer vision tasks. Tensor Flow is used to implement CNN. In the German data sets, we are able to identify the circular symbol with more than 98.2% accuracy.

Keywords: Traffic congestion, object detection, Classification, Junction timings, traffic signal.

I. INTRODUCTION

We can integrate our system with an application for analyzing the official traffic news web sites, so as to capture traffic condition notifications in real-time. Thus, our system will be able to signal traffic-related events in the worst case at the same time of the notifications on the web sites. Further, we are investigating the integration of our system into a more complex traffic detection infrastructure. This infrastructure may include both advanced physical sensors and social sensors such as streams of social media. In particular, social sensors may provide a low-cost wide coverage of the road network, especially in those areas (e.g., urban and suburban) where traditional traffic sensors are missing.

Imaging to pattern and object recognition for different purposes. One such application is object detection of mobile targets in a particular environment. Vehicle detection on roads is an example of such object detection which is used for traffic analysis, monitor and control. Hence, an initial step for traffic controlling is vehicle detection and classification using traffic measuring techniques. Image processing based techniques are one of the most widely used techniques which achieve this objective. Many algorithms have been proposed connected with vehicle detection and classification. In, image segmentation and edge detection methods are employed. Background extraction and estimation techniques are used to isolate the vehicles of interest. Similarly vehicle detection can be achieved with the help of vehicle shadows. This approach becomes difficult if shadows of other objects like overhead bridges overlap with the shadows of Classification of vehicles based on their sizes or shapes play an importation role in traffic management and flow control. Irrespective of the algorithm or technique being employed, camera positioning and the quality of camera play an important and critical role in vehicle detection. High altitude aerial camera is an example of camera positioning which is often used due to its wide area coverage.

II. LITERATURE SURVEY

[1] Xiaoyuan Liang, Xusheng Du, "Deep Reinforcement Learning for Traffic Light Control in Vehicular Networks". In this paper, we study how to decide the traffic signals' duration based on the collected data from different sensors and vehicular networks. We propose a deep reinforcement learning model to control the traffic light. In the model, we quantify the complex traffic scenario as states by collecting data and dividing the whole intersection into small grids. The timing changes of a traffic light are the actions, which are modeled as a high-dimension Markov decision process. The reward is the cumulative waiting time difference between two cycles. To solve the model, a convolutional neural network is employed to map the states to rewards. The proposed model is composed of several components to improve the performance, such as dueling network, target network, double Q-learning network, and prioritized experience replay. We evaluate our model via

simulation in the Simulation of Urban Mobility (SUMO) in a vehicular network, and the simulation results show the efficiency of our model in controlling traffic lights.

[2] lishengjin, meichen, yuyingjiang, and haipengxia, "Multi-Traffic Scene Perception Based on Supervised Learning." In this system present vision driver assistance systems are designed to perform under good-natured weather conditions. Classification is a methodology to identify the type of optical characteristics for vision enhancement algorithms to make them more efficient. To improve machine vision in bad weather situations, a multi-class weather Classification method is presented based on multiple weather features and supervised learning. First, underlying visual features are extracted from multi-traffic scene images, and then the feature was expressed as an eight-dimensions feature matrix. Second, five supervised learning algorithms are used to train classifiers. The analysis shows that extracted features can accurately describe the image semantics, and the classifiers have high recognition accuracy rate and adaptive ability. The proposed method provides the basis for further enhancing the detection of anterior vehicle detection during nighttime illumination changes, as well as enhancing the driver's field of vision on a foggy day.

[3] Caixia Zheng, Fan Zhang, Huirong Hou, Chao Bi, Ming Zhang, and Baoxue Zhang, "Active Discriminative Dictionary Learning for Weather Recognition". This paper presents a novel framework for recognizing different weather conditions. Compared with other algorithms, the proposed method possesses the following advantages. Firstly, our method extracts both visual appearance features of the sky region and physical characteristics features of the non sky region in images. Thus, the extracted features are more comprehensive than some of the existing methods in which only the features of sky region are considered. Secondly, unlike other methods which used the traditional classifiers (e.g. SVM and K-NN), we use discriminative dictionary learning as the classification model for weather, which could address the limitations of previous works. Moreover, the active learning procedure is introduced into dictionary learning to avoid requiring a large number of labeled samples to train the classification model for achieving good performance of weather recognition. Experiments and comparisons are performed on two datasets to verify the effectiveness of the proposed method.

[4] Hamid Reza Riahi Bakhtiari, Abolfazl Abdollahi, Hani Rezaeian, "Semi-automatic road extraction from digital images". This paper proposes a semi-automatic approach to extract different road types from high-resolution remote sensing images. The approach is based on edge detection and SVM and mathematical morphology method. First the outline

of the road is detected based on Canny operator. Then, Full Lambda Schedule merging method combines adjacent segments. Then the entire image was classified using Support Vector Machine (SVM) and various spatial, spectral, and texture attributes to form a road image. Finally, the quality of detected roads is improved using morphological operators. The algorithm was systematically evaluated on a variety of satellite images from Worldview, QuickBird and UltraCam airborne Images. The results of the accuracy evaluation demonstrate that the proposed road extraction approach can provide high accuracy for extraction of different road types.

[5] Andrew J. Davison, Ian D. Reid, Member, IEEE, Nicholas D. Molton, and Olivier Stasse, "MonoSLAM: Real-Time Single Camera SLAM". We present a real-time algorithm which can recover the 3D trajectory of a monocular camera, moving rapidly through a previously unknown scene. Our system, which we dub Mono SLAM, is the first successful application of the SLAM methodology from mobile robotics to the "pure vision" domain of a single uncontrolled camera, achieving real time but drift-free performance inaccessible to Structure from Motion approaches. The core of the approach is the online creation of a sparse but persistent map of natural landmarks within a probabilistic framework. Our key novel contributions include an active approach to mapping and measurement, the use of a general motion model for smooth camera movement, and solutions for monocular feature initialization and feature orientation estimation. Together, these add up to an extremely efficient and robust algorithm which runs at 30 Hz with standard PC and camera hardware. This work extends the range of robotic systems in which SLAM can be usefully applied, but also opens up new areas. We present applications of Mono SLAM to real-time 3D localization and mapping for a high-performance full-size humanoid robot and live augmented reality with a hand-held camera.

III. PROBLEM STATEMENT

Recently Social as well as Road networks have been employed as a source of information for event detection, with specific reference to road traffic activity like jamming, congestion and accidents. So we implement a system to address the real time traffic detection and released signal as per vehicles arrived.

IV. PROPOSED SYSTEM

The proposed system divided in two modules first module is web service and second module is traffic signal released as per vehicles. In web service they have database. Traffic database is used for fast processing and storing high amount of data in to Database. For the classification algorithm is used for classify the traffic related notification. The main aim is

detection traffic related event from social network. It acts as multi-class classification which is recognizing traffic, non-traffic due to the crash or congestion and traffic due to the external events. The system detect traffic event in real-time.

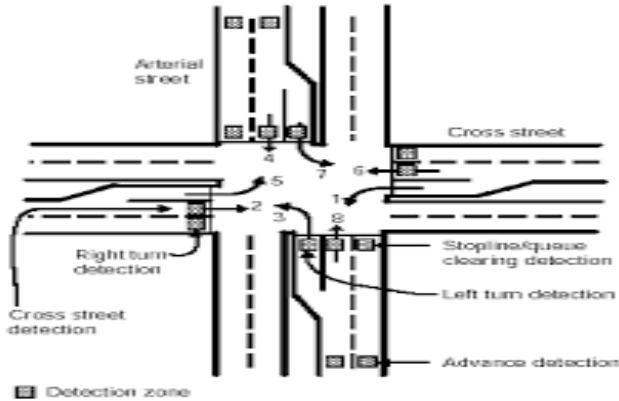


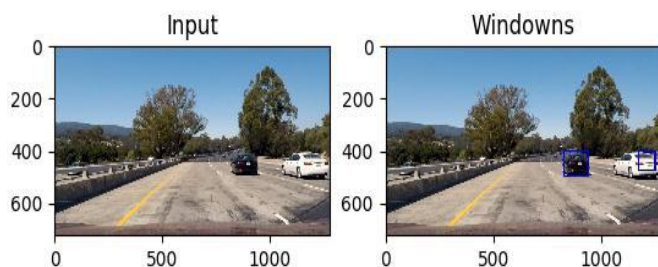
Figure 1: Architecture Diagram

It is generally found that traffic signals are installed and deployed at a geo location for a long period of time. It would be optimal to store the 2D image of the structure of such a signal in a cache with geo-coordinates (vicinity) as key. Next time a self-driven vehicle goes past such a traffic sign, a quick comparison of cache would return in optimally fetching data for validation, thereby reducing the computation and speeding up the feedback loop to the vehicle in detecting the scan. In case a sign post is temporarily masked with a tape or material which otherwise invalidates the sign needs to be properly captured in cache to avoid false positives.

Vehicle Detection Details

This project consists of a python script to detect vehicles from an image for traffic control purpose. It uses Image Recognition techniques to identify vehicles and draw contour boxes over the vehicles on the original image. The script itself can work over one or a sequence of images (i.e. video).

The main goals of this project is to develop a sequence of operations (pipeline) that gets as input a raw image and outputs an annotate image where the vehicles are marked inside blue boxes.



Figures 2: Depicts the input and output images

V. EXPERIMENTAL RESULTS ANALYSIS AND DISCUSSION

Proposed system releases traffic signal as per the vehicle count using algorithm to detect the vehicle for using the object detection input taken by traffic signal camera signal. The object detection in the traffic signal is processed and converted into simulator then its threshold is calculated based on which the contour has been drawn in order to calculate the number of vehicles present in the area. After calculating the number of vehicles we will come to know in which side the density is high based on which signals will be allotted for a particular side.

VI. CONCLUSION

We can integrate our system with an application for analyzing the official traffic signal, so as to capture traffic condition notifications in real-time. Thus, our system will be able to signal traffic-related events in the worst case at the same time of the result display by the console on the web sites. Further, we are investigating in feature scope the integration of our system into a more complex traffic detection infrastructure. This infrastructure may include both advanced physical sensors and social sensors such as streams of social media. In particular, social sensors may provide a low-cost wide coverage of the road network, especially in those areas (e.g., urban and suburban) where traditional traffic sensors are missing.

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