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Vehicle Classification and Counting for Traffic Video Monitoring Using YOLO-v3

Dr. Chaudhari.N. J[1], Tekude Sonal Babaji[2], Aher Sagar Machhindra[2], Kamble Sakshi Dnyaneshwar[2]

Professor, Department of Computer Engineering, Samarth Group of Institutions, College of Engineering, Belhe, India[1]

Students, Department of Computer Engineering, Samarth Group of Institutions, College of Engineering, Belhe, India[2]

ABSTRACT: With the rapid development of intelligent video analysis, traffic monitoring has become a key technique for collecting information about traffic conditions. Using the traditional sensors such as loop detectors, ultrasonic sensors may cause damage to the road surface. Meanwhile, many of these sensors need to be installed in urban areas, the cost of this work is high. Surveillance video cameras are commonly used sensors in the traffic monitoring, which can provide video stream for vehicle detection and counting. Vehicle counting process provides appropriate information about traffic flow, vehicle crash occurrences and traffic during the peak times in roadways. An acceptable technique to achieve these goals is by using digital image processing methods on roadways. Our project describes the methodology used for image processing or video processing for traffic flow counting with real time videos using a programming language.

KEYWORDS: Vehicle Classification, Vehicle Counting, traditional sensors, video processing, roadways, traffic monitoring

I. INTRODUCTION

The traffic issue is a significant issue occurring in numerous urban areas in the world. There are numerous significant reasons for the traffic issue. The quantity of individuals moving into a metropolitan region has developed generously, prompting an emotional expansion in the quantity of vehicles. However, the street limit has become generally lethargic and get lacking. This causes an irregularity between the quantities of vehicles and streets, bringing about street gridlock, particularly in enormous urban areas. An insufficiency of public transportation frameworks likewise causes a similar issue. Vehicle detecting and counting have a significant influence in numerous system that helps to regulate and control traffic in urban areas. The fundamental goal is to detect and count moving vehicles with clear accuracy and to have the option to do as such on streets, highways and in little paths, etc. OpenCV-analysis and understanding of images and videos taken by an advanced camera-has acquired more approval and been utilized in numerous fields including industry, medication, robotics, and so on. Computer vision has likewise been applied for addressing traffic and transportation problems.

II. LITERATURE SURVEY

[1] Kyung-Soo Lim, Seoung-Hyeon Lee, Jong Wook Han, Geon-Woo Kim proposed some Design considerations for an intelligent video surveillance system using cloud computing. Deep neural network and cloud computing based intelligent video surveillance technology are growing interests in the industrial and academia. The synergy with both technologies emerges as a key role of the public safety and video surveillance in the field. Reflecting these trends, we have been studying a cloud-based intelligent video analytic service using deep learning technology. INCUVAS (cloud-based INCUbating platform for Video Analytic Service) is a platform that continuously enhances the video analysis performance by updating real-time dataset with the deep neural network on a cloud environment.

[2] Paawan Sharma, Mukul K Gupta, Amit K. Mondal, Vivek Kaundal proposed a HAAR like feature-based car key detection using cascade classifier which has paper reports of effective real-time implementation for specific object detection in an image or sequence of images. For the present work, car key has been taken as an object under consideration. The classifier is developed using OpenCV-Python. The procedure encompasses training and detection. A wide variety of object images are used for training purpose. The developed xml classifier is then tested on separate test images. The classifier has a good success rate with minimal false object detection rate.

[3] Qi Wang, Zhougyuan Wang and Jing Xiao proposed Fine-grained vehicle recognition in traffic surveillance. Finegrained vehicle recognition in traffic surveillance plays a crucial part in establishing intelligent transportation

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system. The major challenge lies in that differences among vehicle models are always subtle. In this paper, we propose a part-based method combining global and local feature for fine-grained vehicle recognition in traffic surveillance. Besides, we collect a comprehensive public database for 50 common vehicle models with manual annotation of parts, which is used to evaluate the proposed method and serves as supportive dataset for related work. The experiments show that the average recognition accuracy of our method can approach 92.3 %, which is 3.4 %–7.1 % higher than the state-of-art.

[4] Shaif Choudhury, Soummyo Priyo Chattopadhyay and Tapan Kumar Hazra proposed Vehicle detection and counting using haar feature-based classifier. In this paper we would describe a vehicle detection technique that can be used for traffic surveillance systems. An intelligent traffic surveillance system, equipped with electronic devices, works by communicating with moving vehicles about traffic conditions, monitor rules and regulations and avoid collision between cars. Therefore, the first step in this process is the detection of cars. The system uses Haar like features for vehicle detection, which is generally used for face detection. Haar feature-based cascade classifiers are an effective object detection method first proposed by Viola and Jones. It's a machine learning based technique which uses a set of positive and negative images.

III. PROPOSED SYSTEM

Traffic accident is a serious problem with many cars/bikes etc. on the road. We often see police directing traffic instead of using lights. This project will help police track when and where a crisis is happening. We will create a web application that displays real-
time status to help you manage traffic. Yolo algorithm will be used to track vehicles and classify vehicle types. Increasing world population and transportation has benefits now and in the future.

IV. PROPOSED SYSTEM ARCHITECTURE

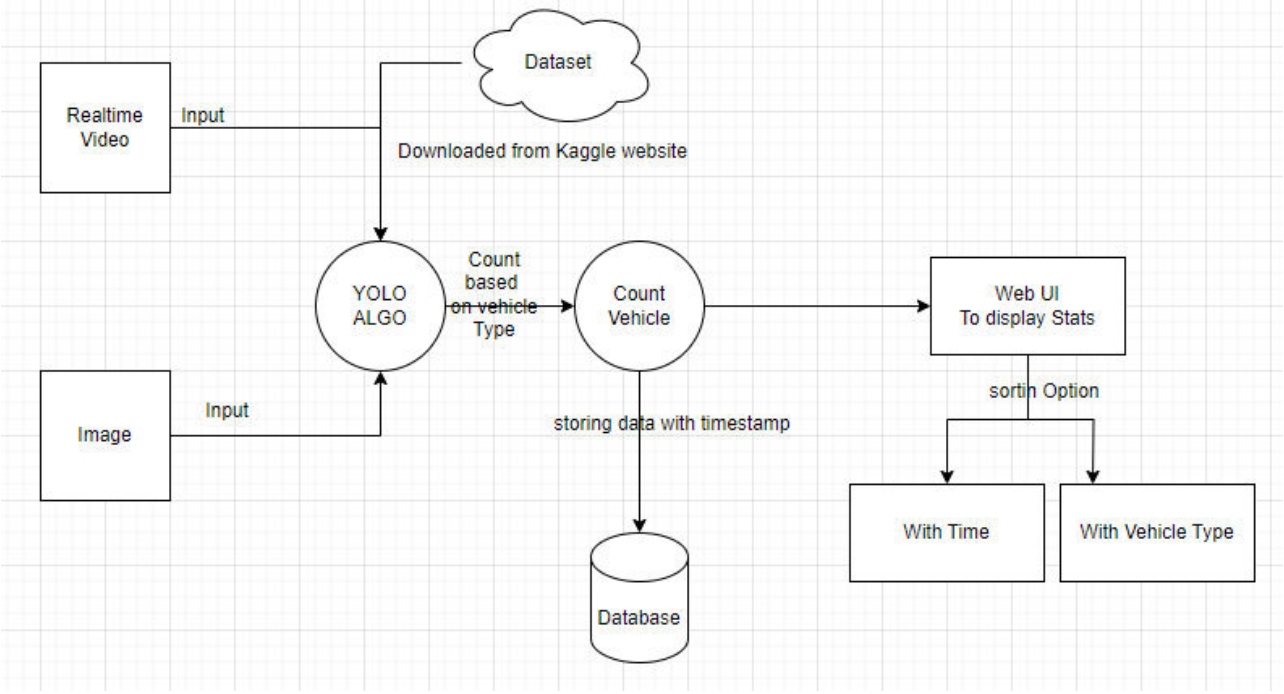

Fig 1. Proposed System Architecture

V. OBJECTIVES OF SYSTEM

1. To develop a system which will help to track and count vehicles using video-based vehicle counting method in a highway traffic video captured using handheld cameras.
2. To monitor vehicle Flow.
3. To detect incidents like accidents.
4. To detect traffic jam and deploy traffic police at exact location.
5. To detect illegal vehicle type.
6. To Classify vehicle Type like cars, bicycle ,motorcycle etc.

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VI. CONCLUSION

This single project produces multi domain outputs. It can count and classify vehicles on highways by the methods mentioned above and help with highway management and toll collection, it can calculate traffic density on busy traffic roads for better monitoring. Some more work is needed in reducing the occlusions present in the image.

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