



Vehicle Detection and Tracking System

Swaranjali Dilip Jadhav¹, Ankita Anil Choudhari²,

Varsha Subhash Chavan³, Gowri Mane⁴, Prof. Amol Hindurao Pudale⁵

Student, CSE Department, Adarsh Institute of Technology and Research Centre, Vita, India¹⁻⁴

Asst.Prof, CSE Department, Adarsh Institute of Technology and Research Centre, Vita, India⁵

Abstract: Nowadays eventually road accidents are rapidly increasing due to the irresponsibility of citizens regarding traffic rules like overspeed, not wearing helmet, rash driving, overloading of transport vehicles and also not having proper indicators lights or indicator cloth especially for the sugarcane loaded trucks or tractors etc... This problem needs to be reduced by proper monitoring on vehicle motion for 24X7 hours. The project aim proposes an accurate and effective moving vehicle detection method which can be used in complex traffic environment. Vehicle detection process on road is used for vehicle tracking, counts the vehicle, average speed of each individual vehicle, traffic analysis, vehicle categorizing objectives, detects the highlighter cloth of vehicles like tractor, truck etc. It also detects the indicator of the vehicles.

Keywords: Highlighter cloth, Vehicle detection, CCTV.

I. INTRODUCTION

As increase in road accidents in the urban areas which cause huge loss of lives as well as even physically disabled. For this problem continuous monitoring on vehicles is needed. For this vehicle detection and maintain its data record in the system needed to be happened. In this system vehicle detection will play and major role and an initial step of the system. In vehicle detection the video of the vehicle will be captured by the CCTV camera which will also act as a smart traffic survey. From this video the vehicle clear images are captured and further process on the image is processed on it. Here we are using the image processing technology to overcome this problem. We are using computer vision algorithms like R-CNN, YOLO for detection and tracking purpose in this projects

II. LITERATURE REVIEW

A Advanced Research Journal in Science, Engineering and Technology. Introduced the difficulty of obtaining the initial background there is the inaccuracy of real-time background update and the difficulty of controlling the update speed in moving vehicle detection of traffic video. The project aim proposes an accurate and effective moving vehicle detection method which can be used in complex traffic environment. Vehicle detection and tracking system plays an important role for civilian and military applications such as in highway traffic surveillance control, management and urban traffic planning. Vehicle detection process on road is used for vehicle tracking, counts the vehicle, average speed of each individual vehicle, traffic analysis and vehicle categorizing objectives and may be implemented under different environments changes. In this review, we present a concise overview of image processing methods and analysis tools which used in building these previous mentioned applications that involved developing traffic surveillance systems. More precisely and in contrast with other reviews, we classified the processing methods under three categories for more clarification to explain the traffic system.

B Bhargava R, Sanchit Kumar Dikshit, Pranshu Pratyush and Shubham Yadav, et al provides The vehicle number plate recognition system plays a crucial role in traffic control and helps to avoid traffic incidents/crimes. In this system, vehicle numbers are identified and later they are used to retrieve vehicle owner details for verification purposes. This system is used for capturing the vehicle number and obtaining the owner's information from a pre-registered database. Thus, the image processing technique is used to recognize the number plate and the recognition process helps display the owner's detail. Here the visual contents are used to recognize alphabets and numeral characters of the vehicle license number. This system is implemented using a mobile application. The main objective of the project is to find the owner details digitally without doing it manually.

C M.N Tondra and EbrahimKarami,et al introduced Object detection is a computer technology related to computer vision and image processing that deals with detecting instances of semantic objects of a certain class in digital images and videos. Machine learning can be used to detect and classify objects in images and videos. Vehicle detection, also known as computer vision object recognition, is basically the scientific methods and ways of how machines see rather than human eyes. Vehicle detection is one of the widely used features by companies and organizations these days. We can use computer vision to detect different types of vehicles in a video or real-time via a camera. Vehicle detection and tracking finds its applications in traffic control, car tracking, creating parking sensors and many more



D Prem Kumar Bhaskar and Suet-Peng Yong, et al this paper presents Vehicle detection and tracking plays an effective and significant role in the area of traffic surveillance system where efficient traffic management and safety is the main concern. In this paper, we discuss and address the issue of detecting vehicle / traffic data from video frames. Although various researches have been done in this area and many methods have been implemented, still this area has room for improvements. With a view to do improvements, it is proposed to develop an unique algorithm for vehicle data recognition and tracking using Gaussian mixture model and blob detection methods. First, we differentiate the foreground from background in frames by learning the background. Here, foreground detector detects the object and a binary computation is done to define rectangular regions around every detected object. To detect the moving object correctly and to remove the noise some morphological operations have been applied. Then the final counting is done by tracking the detected objects and their regions.

III. EXISTING SYSTEM

The existing system or traditional system contains the basic detection of vehicles like count of vehicles, identifying vehicles parking in no parking zone, violating any basic traffic rule etc. In this system the detection of vehicle is even not clear due to light intensity, weather conditions or any obstacles.

One of the existing systems of vehicle detection and tracking system is Radar-Based vehicle detection and tracking: this system uses radar sensors to track the vehicles.

IV. METHODOLOGY AND EXPERIMENTATION

Vehicle detection and tracking system project is based on computer vision techniques. Here are some steps that are followed for this project.

1. **Data Collection:** collecting data for vehicle detection and tracking is mandatory. There are various publically available datasets that can be used. Also you can collect your data through drone and CCTV.
2. **Data Preparation:** once the data is collected we need to process on it. This method involves the images or videos there various annotation tools are available for processing.
3. **Model Selection:** choosing the right model is essential for successful project. Some of the models used in this project are YOLO, CNN.
4. **Model Training:** After the selection of model next step is to train the model using data. This process leads to minimize the errors in the project.
5. **Model Evolution:** once the model training is done then it is evaluated for the performance and accuracy.
6. **Real-time Implementation:** the final step is implanting vehicle detection and tracking system in real time. This process involves tracking and detecting the vehicles and shows the result on the screen.

V. RESULTS AND DISCUSSION

Vehicle detection and tracking system involves computer vision algorithms and machine learning techniques to analyze video frames and identify vehicles in the traffic. This system uses object detection algorithms such as YOLO, Faster R-CNN, or SSD to detect vehicles in each frame of the video. Once the system has detected the vehicles, it can then use object tracking algorithms such as particle filtering to track the vehicles as they move through the scene.

The results of vehicle detection and tracking system might be evaluated using various metrics, such as precision, recall, and F1 score, which measure how accurately the system is able to detect and track vehicles in the scene. Additionally, the system's performance might be measured in terms of processing speed, memory usage, and other technical factors.

Discussion of the results might focus on areas where the system performed well, as well as areas where it struggled or failed. The discussion might also consider ways to improve the system's performance, such as by using more advanced object detection or tracking algorithms, optimizing the system's parameters, or incorporating additional data sources or sensors.

Overall, vehicle detection and tracking system can be a useful tool for a variety of applications, such as traffic monitoring, surveillance, or autonomous vehicles. With careful design and implementation, such a system can provide accurate and reliable results, helping to improve safety and efficiency on the road.



Dialog

Login Form

User Name

Password

Login Form

Dialog1

Registration Form

Full Name

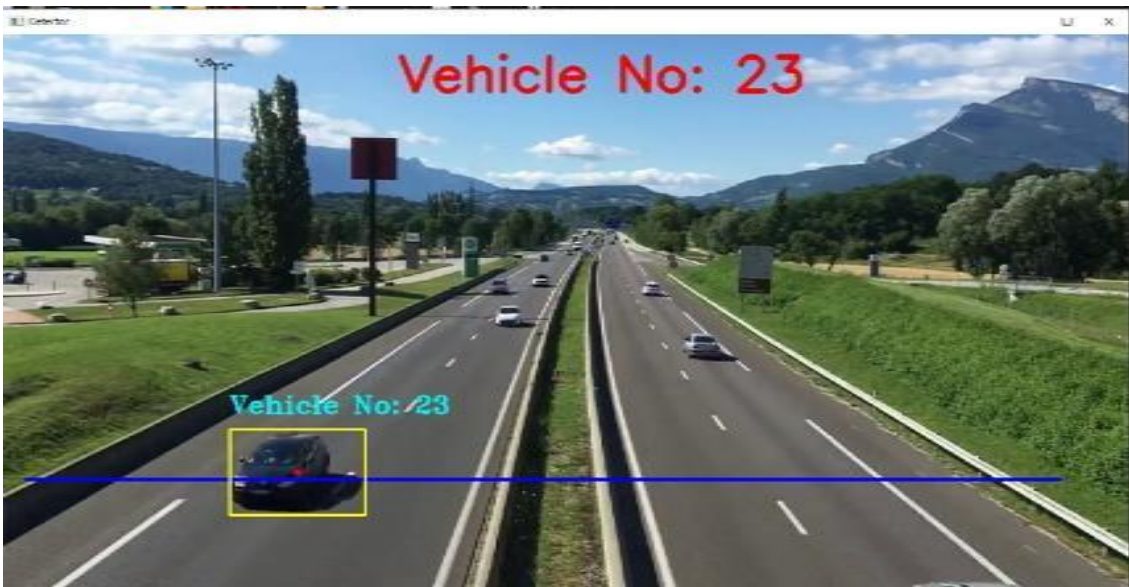
User Name

Password

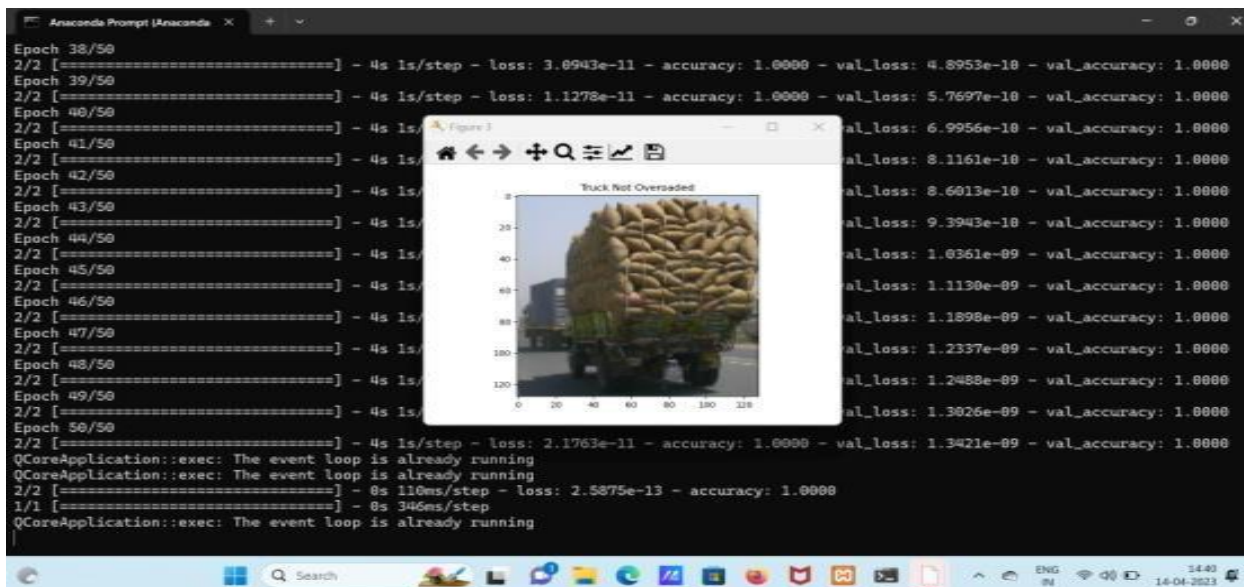
Registration Form



Dashboard



Vehicle Detection



Vehicle Overloading

VI. ACKNOWLEDGMENT

It gives us a great pleasure to remain deeply indebted to our project guide Asst. Prof. Mr. A.H. Pudale under whom we have privilege to work. The faith & confidence shown by her in us boost our moral and motivate us to perform better in this project. We convey our sincere thanks to (H.O.D., Dept. Of Computer Science and Engineering) for his timely co-operation. Finally, thanks to all Staff Members and all friends and colleagues who support us in the development of project.

VII. CONCLUSION

This paper provides summarized study of the techniques that are used in vehicle detection and tracking system. The vehicle detection system detects the vehicle characteristics like color, company, model and the proposed system will also track the speed of the vehicles. And many much more facility regarding the vehicle detection and tracking system. We have used different algorithms to obtain good result. As a future work, this can be extended to detect the overload trucks and tractors.

REFERENCES

- [1]. Poonam A. Kandalkar, Gajanan P. Dhok (2017) "Image Processing Based Vehicle Detection And Tracking System", International Advanced Research Journal in Science, Engineering and Technology.
- [2]. M.N.Tondra, EbrahimKarami (2021) "Vehicle detection and tracking" Memorial University of New Foundland.
- [3]. (Bharava R, Sanchit Kumar Dikshit, PranshuPratyush, Shubham Yadav published "Vehicle Number Plate Recognition using Image Processing" by Dept. of omputer Science and Engineering, NCET, Bangalore, India)
- [4]. (Prem Kumar Bhaskar; Suet-Peng Yong published "Image processing-based vehicle detection and tracking method" by IEEE (Institute of Electrical and Electronics Engineers)
- [5]. (Raad Ahmed Hadi, GhazaliSulong, Loay E. George published "Vehicle Detection and Tracking Techniques: A Concise Review" by www.researchgate.net) [6]. (Aishwarya V; Sudarshan Patil Kulkarni published "Image Processing Based Vehicle Detection and Tracking: A Comparative Study" by ieeexplore.ieee.org)