COUNT VEHICLES ON VIDEO USING OPENCV AND DEEPLEARNING

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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.

Keyword: Intelligent video analysis, Traffic monitoring, Vehicle counting, Digital image processing, Real-time.

1. INTRODUCTION

An image is a visual representation of something. In information technology, the term has several usages. An image is a picture that has been created or copied and stored in electronic form. An image can be described in terms of vector graphics or raster graphics. Digital image processing deals with manipulation of digital images through a digital computer. It is a subfield of signals and systems but focus particularly on images. DIP focuses on developing a computer system that is able to perform processing on an image. The input of that system is a digital image and the system process that image using efficient algorithms, and gives an image as an output. It allows much wider range of algorithms to be applied to the input image and can avoid problems such as build-up of noise and signal distortion during processing. An image can be classified into the following three types.

A binary image is one that consists of pixels that can have one of exactly two colours, usually black and white. Binary images are also called bi-level or two-level. This means that each pixel is stored as a single bit—i.e., a 0 or 1. Grey is an intermediate colour between black and white. It is a neutral colour or achromatic colour, meaning literally that it is a colour "without colour" because it can be composed of black and white. It is the colour of a cloud-covered sky, of ash and of lead. A (digital) colour image is a digital image that includes colour information for each pixels, which are interpreted as coordinates in some. The process is environmentally friendly since it does not require chemical processing. Digital imaging is also frequently used to help document and record historical, scientific and personal life events.

2. LITERATURE SURVEY AND RELATED WORK

[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. Fine- grained vehicle recognition in traffic surveillance plays a crucial part in establishing intelligent transportation 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 for training purpose. Results show this method is quite fast and effective in detecting cars in real time CCTV footages.

3. EXISTING SYSTEM

In the existing system, vehicle counting in images is typically done manually, requiring human effort and time. An individual needs to visually inspect each image and manually count the vehicles, which can be tedious and prone to human errors. This manual process is inefficient, especially when dealing with a large number of images or real-time applications.

Disadvantages of the Existing System:

1. Time-consuming: Manual counting of vehicles in images is a time-consuming task, particularly when dealing with a large dataset or real-time scenarios.
2. Human errors: Manual counting is prone to human errors, leading to inaccurate results.
3. Lack of scalability: The manual approach lacks scalability as it cannot handle a large volume of images efficiently.

4. PROPOSED SYSTEM

The steps that are involved in the process of vehicle detection and counting are given as follows.

Input Video

In this type of processing typically needs input data provided by the computer vision system and acting as a vision sensor and providing a high-level information. Then the video frames which are captured by the surveillance cameras are given as an input video for vehicle detection and counting.

Background Registration

The Background registration technique is used to construct a reliable background image from the accumulated frame difference information. The moving object region is seperated from that background region by comparing the current frame with the background image. In background registration, the history of the frame difference mask is considered in constructing and updating the background buffer. If a pixel is marked as changing in the frame difference mask, the corresponding value in the stationary map is cleared to zero. Otherwise, if the pixel is stationarythe corresponding value is incremented by one. The value in the stationary map is indicate that the corresponding
pixel has been not changing for how many consecutive frames. If the pixel is stationary for the past several frames, then the probability is high that it belongs to the background region.

Image Subtraction

Image subtraction or pixel subtraction are process where the digital numeric value one pixel or whole image are subtracted from another image. This is primarily done for one of two reasons levelling uneven sections of an image such as half an image having a shadow on it, or detecting changes between two images. This detection of changes can be used to tell if something in the image move. In which the target is moving and would be in one place in one image, and another from an image one hour later and where using this technique would make the fixed stars in the background disappear leaving only the target.

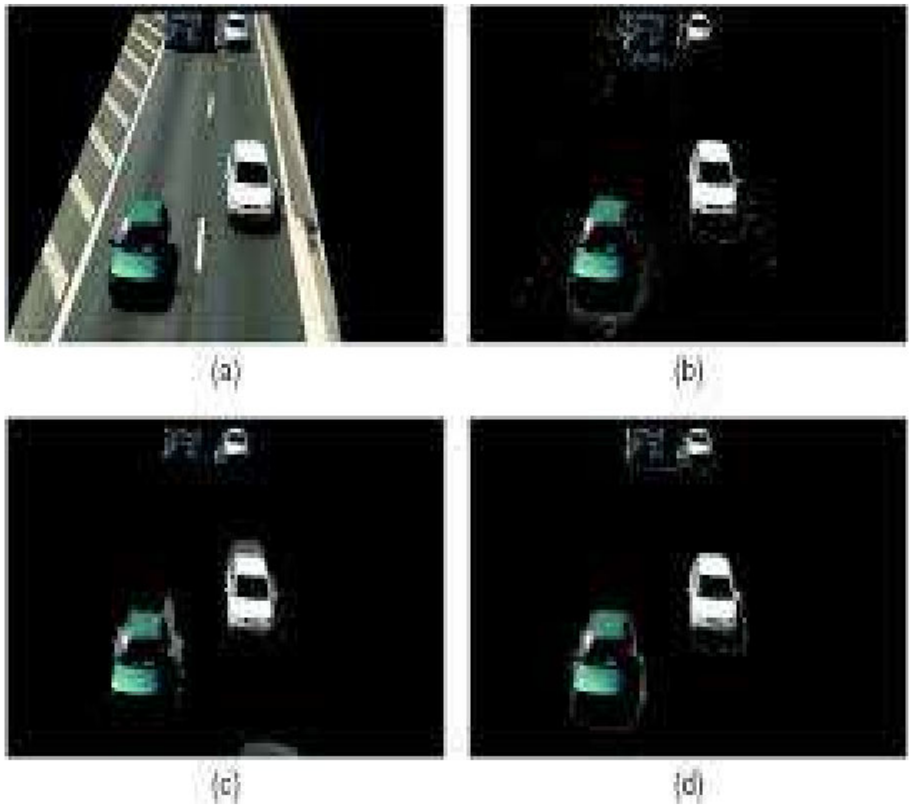

Fig 1 image segmentation

Foreground Detection

Foreground detection is one of the major tasks in the field of computer vision and image processing whose aim is to detect changes in image sequences. Background subtraction is any technique which allows an image's foreground to be extracted for further processing (object recognition etc.). Foreground detection separates foreground from background based on these changes taking place in the fore ground. It is a set of techniques that typically analyse video sequences recorded in real time with a stationary camera.

Image Segmentation

Image segmentation techniques are interested in segmenting out different parts of the image as per the region of interest. As videos are sequences of images, motion segmentation aims at decomposing a video in moving objects and background by segmenting the objects that undergo different motion patterns. The analysis of these spatial and temporal changes occurring in the image sequence by separating visual features from the scenes into different groups lets us extract visual information. Each group corresponds to the motion of an object in the dynamic sequence.

Vehicle Detection

Vehicle detection is a technique used in computer vision and image processing. Multiple consecutive frames from a video are compared by various methods to determine if any moving object is detected. Moving objects detection has been used for wide range of applications like video surveillance, activity recognition, road condition monitoring, airport safety

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Fig 2 Detection of vehicles

Vehicle Counting

In counting step, a counter is used to store the sum value of them. A counter should count the vehicles which are passing in the specific direction. So, if any vehicle stops, move turn in any direction in detection zone which are not counted. In this technique, counting is according to the number of moving vehicles detected in the detection zone.

5. METHODOLOGIES

MODULE

DATASET

This paper utilizes the dataset provided by revolution analytics for the detection of the fraudulent credit card transaction from Kaggle. Dataset has 51149 legal transactions and 3312 fraudulent transactions. The dataset is divided as 60%, 20% and, 20% in the Train, Valid and Test set, respectively.

DATA PREPROCESSING

For efficient implementation of the classification algorithm, data preprocessing is performed before feature selection. Under-sampling is performed to make the dataset balanced to avoid the biasing of the classification algorithm towards the majority class. Feature Selection is implemented on a balanced dataset.

FEATURE SELECTION

Feature selection methods are used to remove unnecessary, irrelevant, and redundant attributes from a dataset that do not contribute to the accuracy of a predictive model or which might reduce the accuracy of the model. In this paper seven feature selection techniques namely Select-K-best, Feature Importance, Extra tress classifier, Person's correlation, Mutual Information, Step forward selection and Recursive feature elimination are used.

FEATURE IMPORTANCE

Feature importance is a class of techniques for assigning scores to input features to a predictive model that indicates the relative importance of each feature at the time of making a prediction. It reduces the number of input features. In this paper, feature importance is implemented using an extra tree classifier from the decision tree. Extra Trees is similar to Random Forest, it builds multiple trees and splits nodes using random subsets of features, but unlike Random Forest, Extra Tree samples without replacement and nodes are split on random

6. RESULTS AND DISCUSSION SCREEN SHOTS

UPLOADING VIDEO

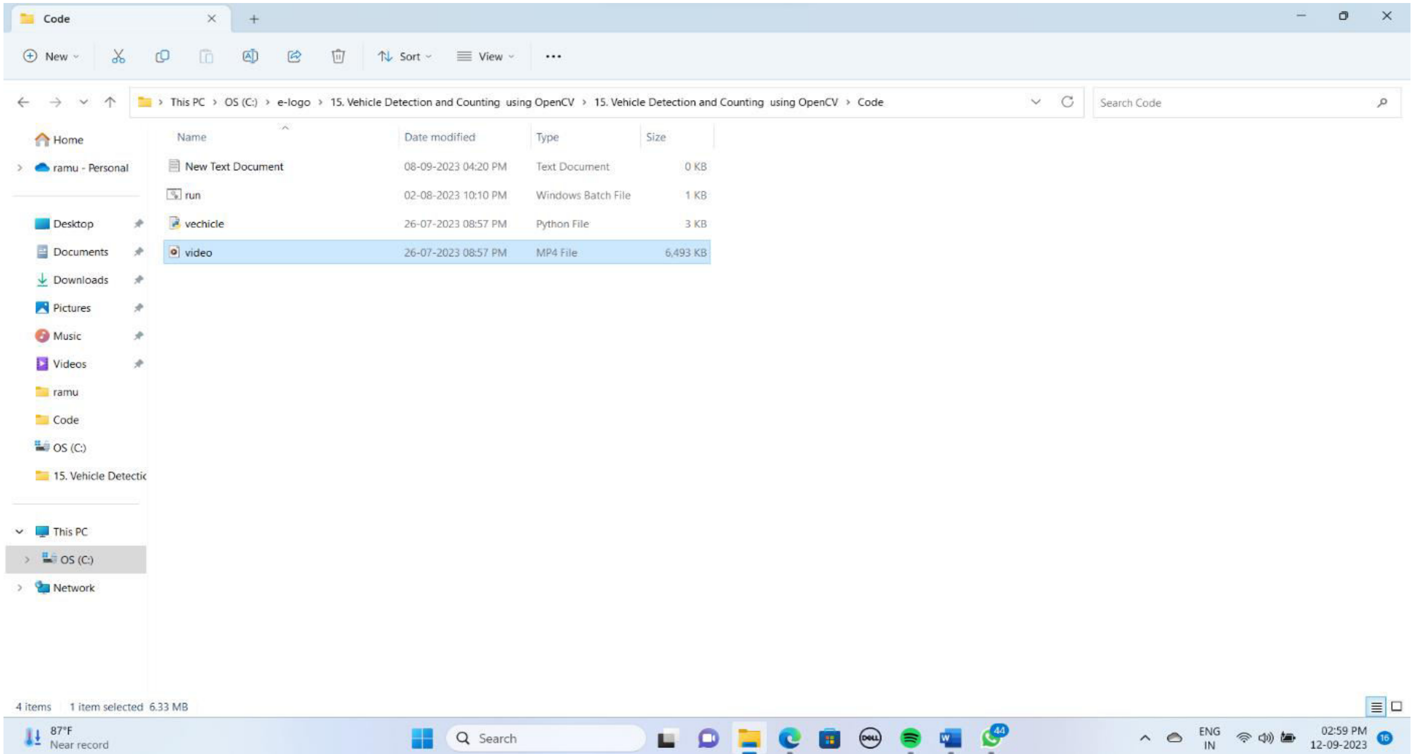

Fig 3 upload video

VIDEO SREAMING AND VEHICLE COUNTING

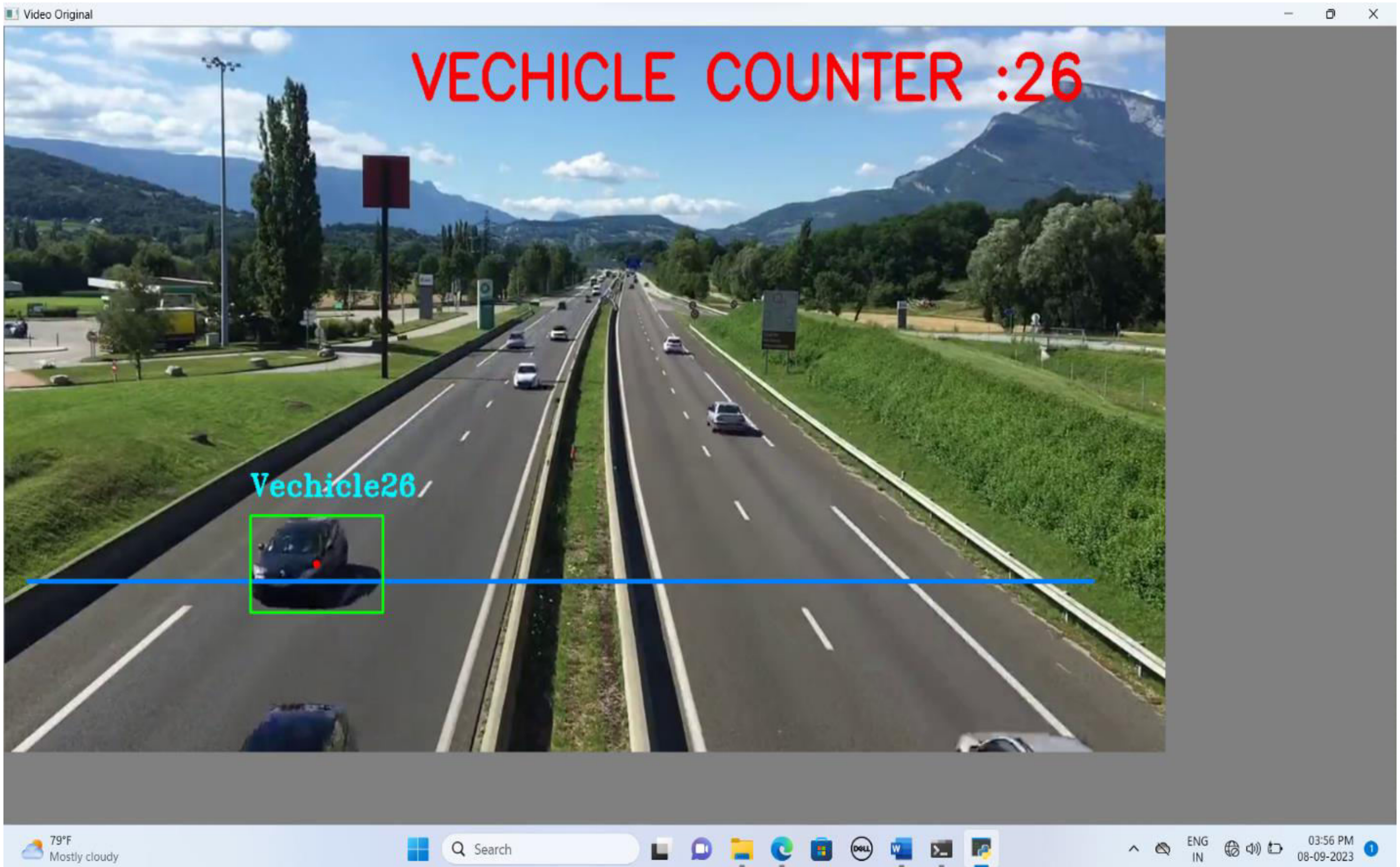

FIG.4 VEHICLE COUNTING

OUTPUT SCREEN SHOT -1

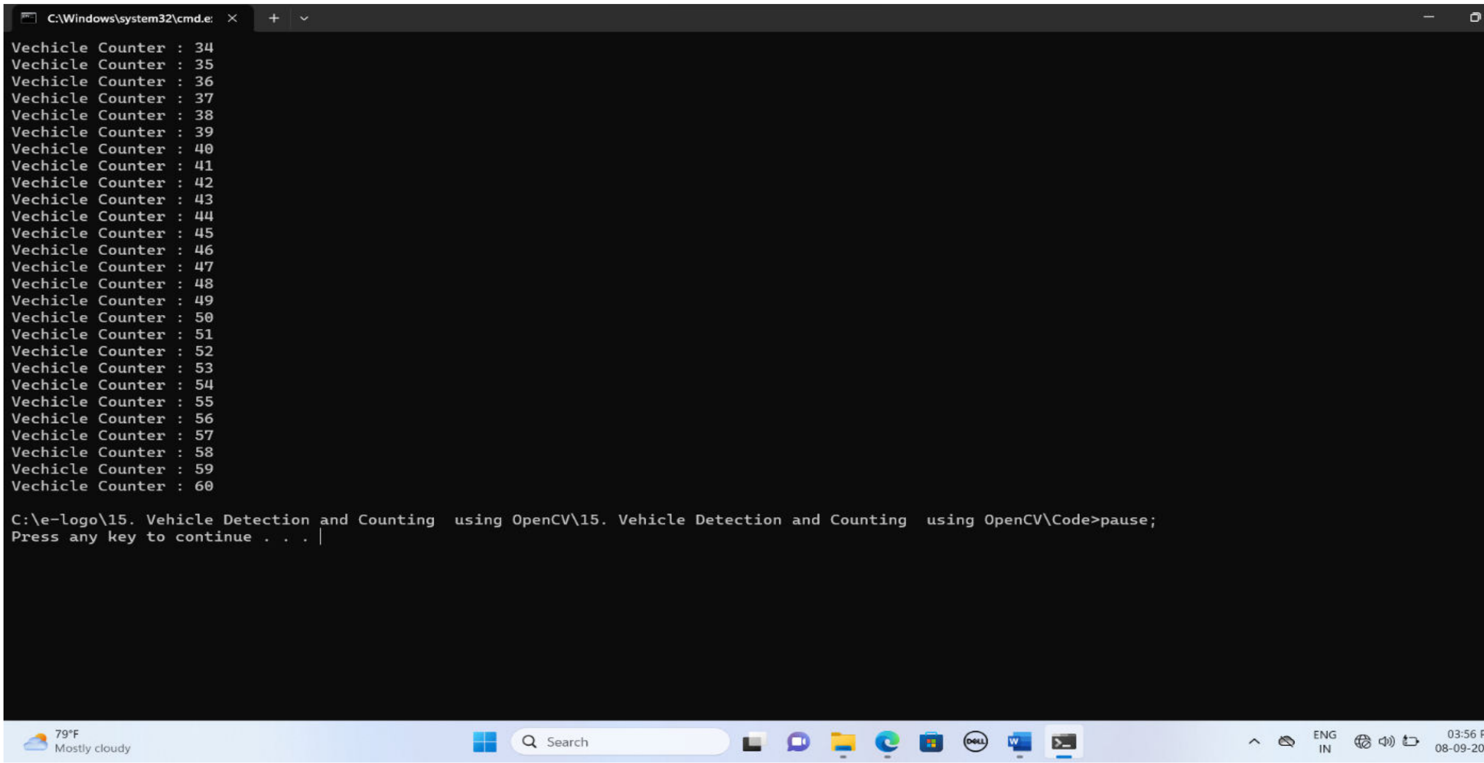

Fig 5. OUTPUT SCREEN

OUTPUT SCREEN-2

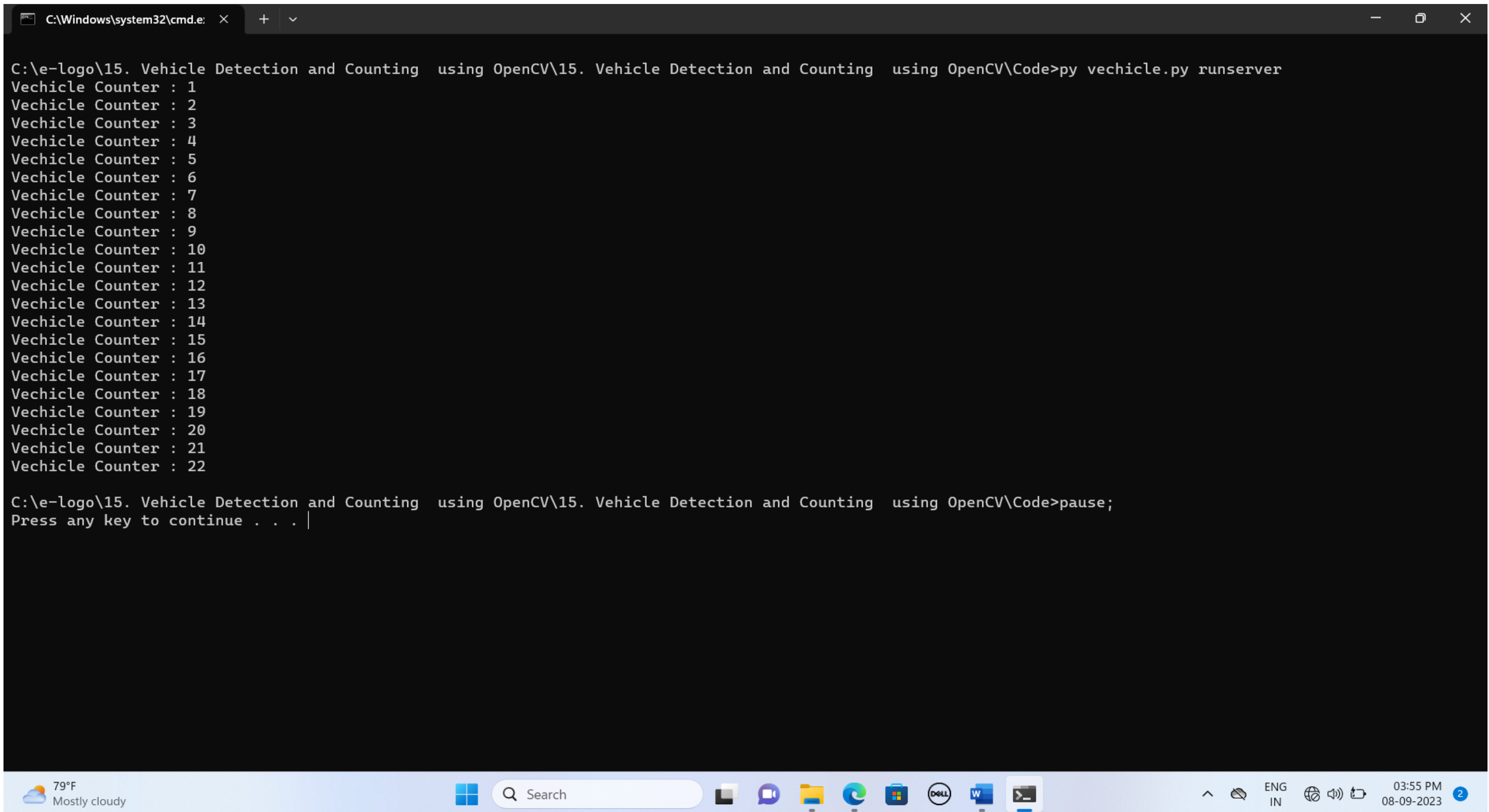

Fig. 6 OUTPUT SCREEN-2

7. CONCLUSION AND FUTURE SCOPE

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.

8. REFERENCES

[1] Dormido-Canto, S., G. Farias, J. Vega, and I. Pastor. "Image processing methods for noise reduction in the TJ- II Thomson Scattering diagnostic", Fusion Engineering and Design, 2012.

[2] H. Rabiu, "Vehicle detection tracking and colour-based classification in video," International Journal of advanced and innovative Research (IJAIR), vol. 2, no.1, pp. 97-100, 2013.

[3] OPENCV with PYTHON, by Prateek Joshi.

[4] Rohit Tiwari1 Dushyant Kumar Singh2 proposed “Vehicle Control Using Raspberry pi and Image Processing”, Innovative Systems Design and Engineering (ISSN 2017).

[5] Kyung-Soo Lim, Seoung-Hyeon Lee, Jong Wook Han, Geon-Woo Kim proposed “Design considerations for an intelligent video surveillance system using cloud computing” in the year 2019.

[6] “HAAR like feature-based car key detection using cascade classifier” in the year 2017.