PROJECT TITLE: - ROAD OBJECT DETECTION USING DEEP LEARNING

AUTHOR: - ABHI PARAKHIYA

DATE: - 28/06/2023

Abstract: -

There is a need for an intelligent transportation infrastructure and now there are technologies which could help us. Artificial Intelligence (deep learning in particular) could help with a lot of solutions to increase the efficiency of the current systems. The ability to detect and classify vehicles accurately is of paramount importance for the intelligent systems to succeed. In a country like India with growing population and limited space, these systems could play a vital role in helping us get around in the near future. Here, the focus of this project is to solve a few problems that are very relevant in the context of India. The aim is to detect and classify vehicles efficiently on a real time basis. This sets the base for further actions to be taken. For example, these actions can be detecting helmet, detecting triples, detecting seat-belt etc... (Depending on the type of vehicle). This system could potentially help reduce traffic violations and also improve upon the safety of those using the road network.

Introduction: -

Traffic accidents are one of the major causes of death, injuries and property damage. The reasons that lead to these accidents are driving over speed limit, driving under influences and not using helmets and seatbelts. It is reported in India there are almost 5 lakh traffic related accidents which have caused over 1 lakh deaths. Out of this approximately half of them are motorcycle related accidents. Travelling by a motorcycle has a higher risk of accidents than driving by a car or other vehicles. Motorcycle accidents have a high likelihood in resulting in an injury most of which are concussions and brain damage. This risk is higher for the riders who are not wearing a helmet. Wearing a helmet can somewhat prevent the rider from fatal injuries to the head and thus preventing death. In our country, the law asks the citizens to wear a helmet when riding or travelling in a motorcycle but there are many people violating it. So in order to make sure that the motorcycle riders are wearing helmet, a system should be there to detect helmet on a motorcycle riders and issue a penalty to these not wearing it. The existing systems used are either manual detections or using algorithms that are slow or less accurate. The proposed system uses YOLO model for detection which is fast and has high accuracy. The process of issuing the penalty is also automated in the system by detecting the registration number of the vehicle by means of the optical character recognition (OCR) and messaging the owner of the vehicle. This system can be further developed to detect more safety equipment.

MOTIVATION: -

I Got Motivation from the world where I used to Live Because during night time or the Day time there is so accident occurs to reduce the number of casualities is being held during casualities. So this is I had work on this project.

PRIOR WORK(BACKGROUND): -

* Using Ultralytics is a breakthrough machine learning and deployment platform that's created to make AI accessible to anyone. Create and train your model to recognise patterns for it to grow into one integrated tool.
* Using cvzone a Computer vision package that makes its easy to run Image processing and AI functions.
* Using the math module to perform various mathematical calculations, such as numeric, trigonometric, logarithmic, and exponential calculations.
* YOLO (You Only Look Once): YOLO is a popular object detection algorithm that has been widely used for road object detection. It divides the input image into a grid and predicts bounding boxes and class probabilities for each grid cell simultaneously. YOLOv3 and YOLOv4 are the most commonly used versions.

OUR APPROACH: -

My Approach is using through the libraries like ultralytics, yolov8n, cvzone, math, OpenCV in which we are using the text to speech converter so there is detection of the road object is there.

RESULTS: -

The results of road object detection using deep learning can vary depending on several factors, including the specific deep learning model and architecture used, the dataset used for training and evaluation, the quality and size of the dataset, and the evaluation metrics employed. However, deep learning-based road object detection methods have generally shown promising results and have achieved significant advancements in recent years..

REFERENCES: -

[1] Kuutti, S.; Bowden, R.; Jin, Y.; Barber, P.; Fallah, S. A Survey of Deep Learning Applications to Autonomous Vehicle Control. IEEE Trans. Intell. Transp. Syst. 2020.

[2] C. Vishnu, Dinesh Singh, C. Krishna Mohan, Sobhan Babu, “Detection of Motorcyclists without Helmet in Videos using Convolutional Neural Network”, International Joint Conference on Neural Networks, 2017.

[3] Zhiheng Yang, Jun Li, and Huiyun Li, “Pedestrian detection and vehicle detection for autonomous vehicles”, IEEE Intelligent Vehicles Symposium (IV) Changshu, Suzhou, China, June 26-30, 2018.

[4] Soumen Santra, Prosenjit Sardar, Sanjit Roy, Arpan Deysai, “RealTime Vehicle Detection from Captured Images” IEEE Xplore, 2019.

[5] Rohith C A, Shilpa A Nair, Parvathi Sanil Nair, Sneha Alphonsa, “An Efficient Helmet Detection for MVD using Deep learning”, Proceedings of the Third International Conferen Trends in Electronics and Informatics, 2019.

URL: - https://github.com/AbhiParakhiya/intelunnati\_Abhi-Parakhiya