Project Title: SMART ASSISTANCE SYSTEM

TEAM NO.:

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Project Details:

1. Design and develop a completely automated and robust tool for drivers, especially for heavy vehicle drivers that acts as an alternative to a physical assistant while driving.
2. Sign Boards, Path holes, Optimal track, Location and weather detection on live camera mounted focusing outside, having the efficiency and accuracy significantly higher than existing models.
3. Drowsiness detection through another camera mounted inside the vehicle focusing on the driver and alerting whenever he/she doesn't respond for a threshold time limit.
4. Design and develop a web application for the purpose of demonstrating details and a hardware tool to integrate within.

Problem Statement:

Development of a Smart Driving Assistance tool to automate and replace the physical assistance and reduce the number of accidents caused by negligence of drivers.

Need of Project:

According to the stats provides by the Indian government, 1.3L people were dead due to road accidents in 2020 and 1.5L people were dead in 2021. Despite the advancements in the technologies, there is a spike in this number. One of the main reasons can be the negligence of the drivers. As the road safety is a vast area where one can explore ideas and research upon, we tried of contributing from our side in this area.

Our agenda and motive of this project is to devise a tool using deep learning techniques and python development which are the most widely used topic in the recent times. This tool functions as a replacement for the need of having a physical assistant. And use simpler but effective pythonic ways to keep the things simpler.

This can also be treated as a mandatory tool for a smart vehicle if the results are satisfactory because at the end of the day it is an automated safety tool.

The end users of this project are the ones who are having less or no knowledge over the sign boards, the people in hurry to reach their destination who might not concentrate on their surroundings, elder people and normal users as well.

Proposed Solution:

The solution for the problem described is to make use of various Deep Learning techniques for creating custom image classification models, various python modules for making the framework simple and legible and various predefined and available data.

The main objective is to include all the mentioned topics and create features out of those such that they are user friendly in terms of both budget and usage. These features can perform sign board detection over 44 different signs available and maps them to the complimentary messages, path

holes or plain road detection and display them, drowsiness detection and alerting the user. Along with this we display the climatic conditions at that area using the location which we previously found out using IP-address of that network.

Thus, developing this application makes the drivers life easier by assisting them during their hard times such as the conditions when they are in hurry, when they have no prior knowledge of the sign boards, when they where new to a place. This finally reduces the huma intervention of interpreting the environment and reduces the number of accidents caused by human negligence by a considerable amount.

Technology Used:

1. OpenCV
2. Deep Learning
3. Python Development
4. Flask Development
5. StreamLit

Project Outcomes:

A web application made in flask environment whose responsibility is to take live feed from the camera and process the works mentioned in the problem statements and give out the complimentary action for each successful task. The backend of this makes use of custom trained image classification models of higher accuracy, some pre built files available on internet, making API calls along with retrieving IP address of the network.
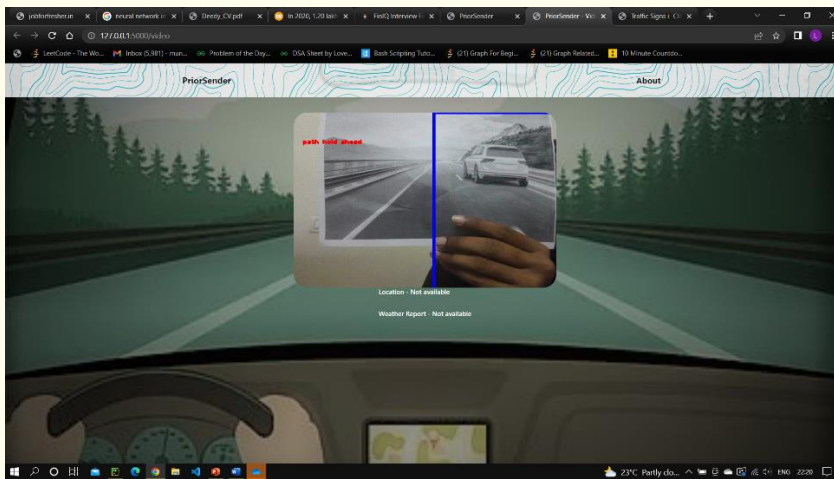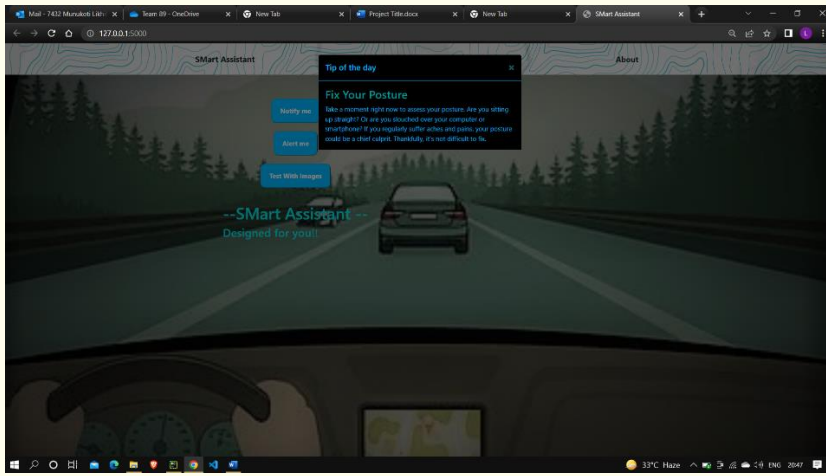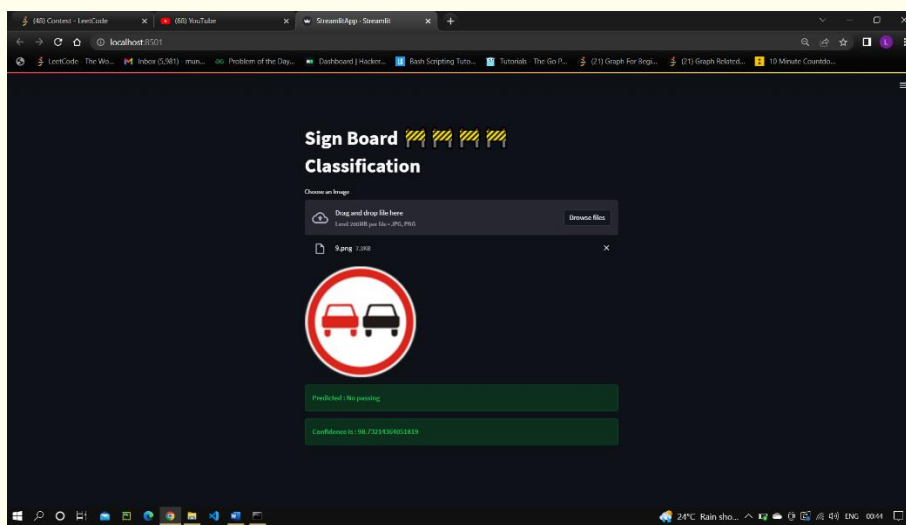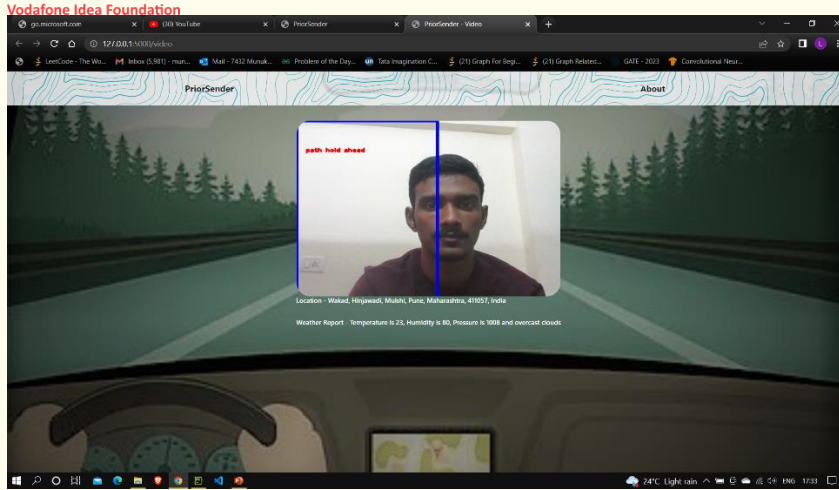
Modelling:

Signboard & Path-holes classification results
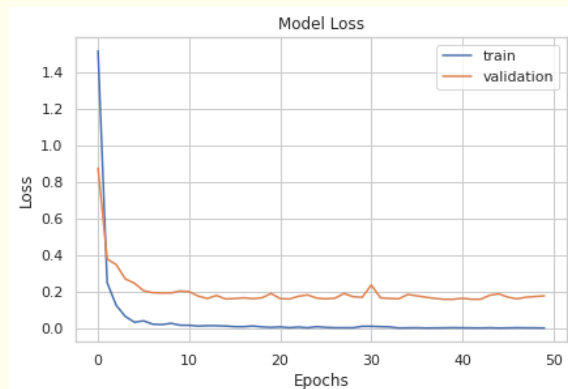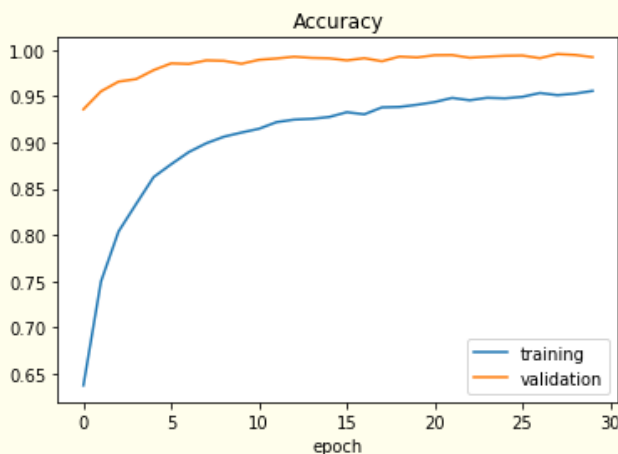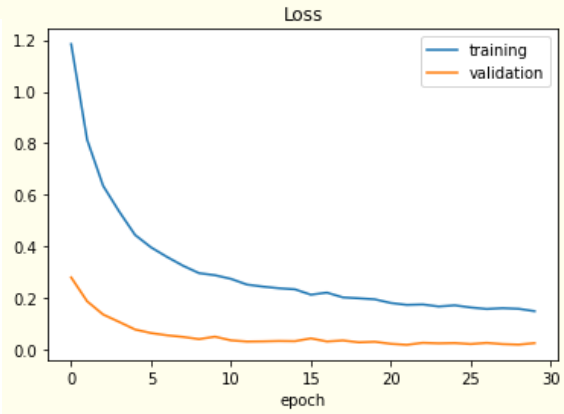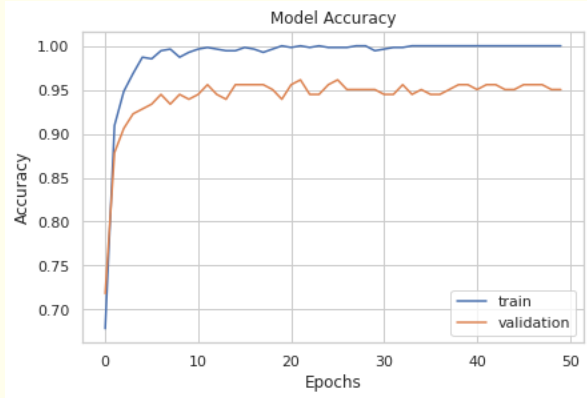
Results:

Future scope for project enhancement:

The tool as of now is a software product and we are compromised due to camera and network issues. If provided a camera with higher resolution, the results get more accurate and get the best results out of it.

As this is a field where most of the research happens, there is a lot of scope for the development and improvements. Few of them according to our knowledge are:

1. Message delivery to relatives if accident occurs
    a. Deliver a message if the user didn't respond to the alert for a certain number of times, such that the relatives can have a look on the user.
2. Lane detection.
3. Optimal sensors used for night vision for live feed.
4. Hardware integration of executable files and integrating them into the vehicles