Project Title: (Student to specify)

TEAM NO.: 22

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Project Details:

Lane Line detection is a critical component for self driving cars and also for computer vision in general. This concept is used to describe the path for self-driving cars and to avoid the risk of getting in another lane. Therefore, using computer vision techniques in Python, we will identify road lane lines in which autonomous cars must run.

Problem Statement:

Increasing safety, reducing road accidents and enhancing comfort and driving experience are the major motivations behind the idea of Automated cars.

Need of Project:

As there are so many new people who use cars these days, and the number of car accidents is increasing every year, intelligent vehicle technologies have advanced significantly in recent years. According to the WHO, road traffic crashes claim the lives of around 1.25 million people each year. Non-fatal injuries affect between 20 and 50 million individuals, with some resulting in disability. Thus, by implementing this system, vehicles can avoid crashes and provide a warning system by detecting lane markings.

Proposed Solution:

The proposed technique detects a single lane boundary set for autonomous vehicles from an input video feed. It also tracks car's position relative to lanes, departure, entry etc and extracts the radius of the detected lane's curvature. The technique is feasible and works with a high recognition rate. Also the proposed system is put to the test with a variety of inputs and weather conditions. In addition to input video, real time video feed can be utilised to evaluate the system.

Technology Used:

Computer Vision and Machine Learning

Project Outcomes:

The system has been tested on various weather conditions like rainy, day and night. The model worked successfully in attaining the lane lines in these conditions.

Modelling:

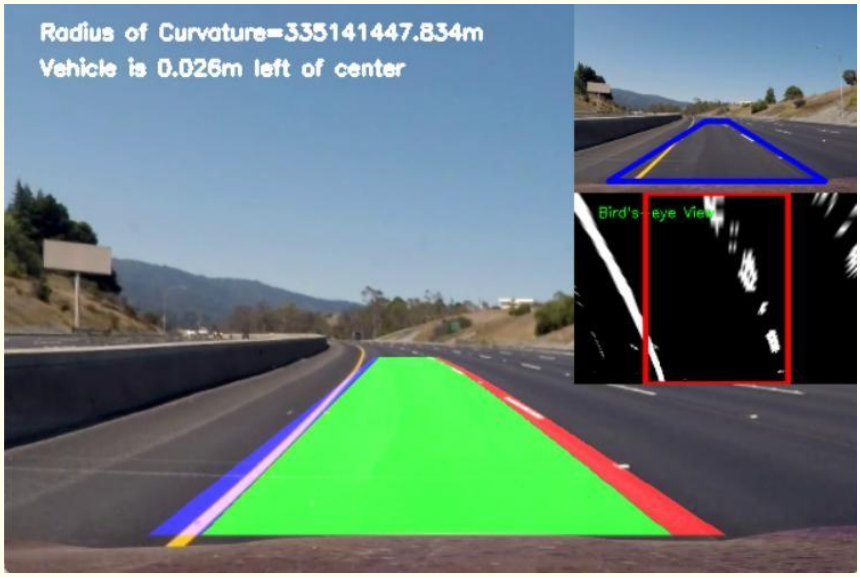
1) Calibration of camera and finding distortion coefficients. This will help to eliminate the distortion occurred in the video frame.

2) Read the input video file and decode it into frames for further processing.
3) Apply the distortion correction to raw frames and undistort the frames coming from the camera and thus improving the quality of shapes.
4) Create a thresholded binary image using sobel edge detection and color threshold.
5) Apply perspective transform on image, thus creating a bird eye's view.
6) Then after finding the coordinates of road lane, we will highlight the line by joining the coordinates and return the output video by joining the frames.

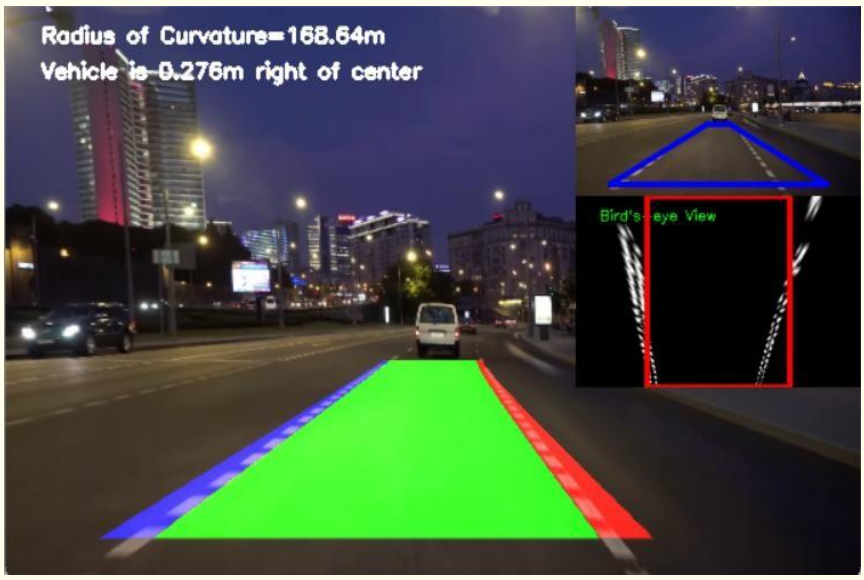
Results:

The System is implemented using Python and OpenCV. The results of the system in different conditions are shown in the figure below:

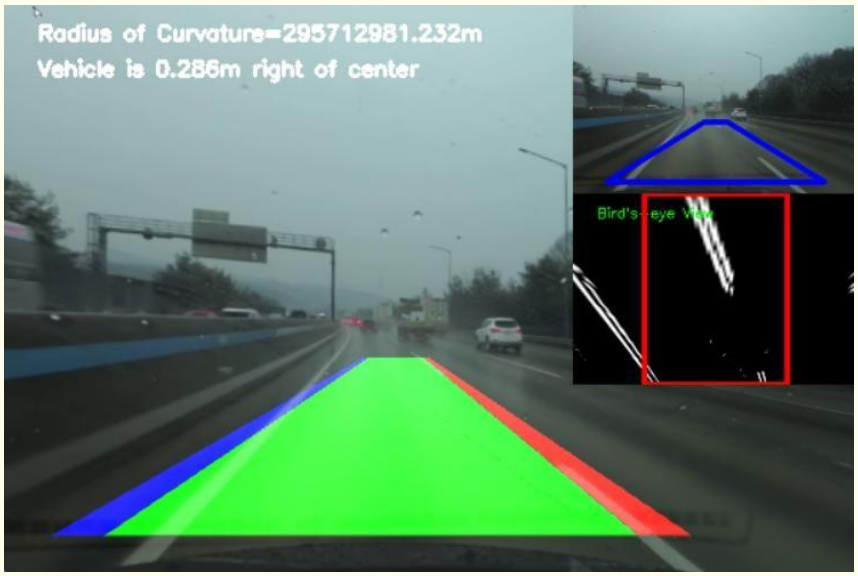
a. Day



b. Night



c. Rainy



Future scope for project enhancement:

This system has many difficulties that arrive from shadows, occlusion by other vehicles, changes in the road surfaces itself, and differing types of lane markings. To overcome this difficulty, we will be using convolutional neural network for training of the model and using the model for predicting the lane lines.