

## **Abstract:**

- This project will introduce you to the main planning tasks in autonomous driving, including mission planning, behavior planning and local planning.
- By the end of this project, you will be able to find the shortest path over a graph or road network using Dijkstra's and the A\* algorithm, use finite state machines to select safe behaviors to execute, and design optimal, smooth paths and velocity profiles to navigate safely around obstacles while obeying traffic laws.
- We'll also build occupancy grid maps of static elements in the environment and learn how to use them for efficient collision checking.
- In this project, we will implement a hierarchical motion planner to navigate through a sequence of scenarios in the CARLA simulator, including avoiding a vehicle parked in your lane, following a lead vehicle and safely navigating an intersection.

## **Repository link:**

[https://github.com/Padmanabha123/Self\\_Driving\\_Using\\_carla/tree/main/Part%204%20-%20Motion%20planning](https://github.com/Padmanabha123/Self_Driving_Using_carla/tree/main/Part%204%20-%20Motion%20planning)

## **How to run it:**

- First clone this repository and put it under **PythonClient** directory.

### **1. Load the simulator:**

- Open a terminal and do `cd ~/opt/CarlaSimulator`.
- Then do `./CarlaUE4.sh /Game/Maps/Course4 -windowed -carla-server -benchmark -quality-level=Low -fps=30`

### **2. Run the LKA controller:**

- Open another terminal and do `cd ~/opt/CarlaSimulator/PythonClient/Course4FinalProject`.
- Run `python3 module_7.py` to execute the controller
- The car will start to track the lead car and avoid obstacles, stopping in front of the stop sign.

## **Simulation results:**

- The images shown below is the result of vehicle trajectory.
- The green line is the track(ground truth) and the orange line is the trajectory.

**YouTube link :** <https://youtu.be/Mmpbg4ztdn8>

## Vehicle Trajectory



