Report 7 - Nihal Afsal

Introduction to Carla

Note: Homework must be uploaded as a **<u>single pdf file</u>**, not a zip file. If a problem solution requires a video, add it as a hyperlink in the pdf. The hyperlink should open the video file which is stored on your Google Drive. Any problem that requires Python code must show the entire code as well as a description of how the code works. Duplicate code submissions will result in a zero.

1. Create a Carla simulation in Jupyter Notebook for recording data from 2 or more autonomous vehicle sensors during some type of driving (city, highway, dense traffic, rainy weather, etc.). Output the recorded data directly to external files.

You can work with your group to troubleshoot issues but each student must turn in individual and unique code and unique markdown comments. Duplicate submissions will receive a zero

    a. Justify the driving environment (Town, Vehicles, Walkers) you chose in markdown text above the associated python code. *(10 pts)*

- I chose to use a different version for the town because I wanted the weather in my world to be different. Because I didn't care which vehicles were involved, I used Carla's randomly selected cars. Finally, I included pedestrians in my world because I wanted to see an encounter between a car and a pedestrian.

    b. Justify the sensor types and sensor locations you chose in markdown text above the associated python code. *(10 pts)*

- I used about three sensors in my Carla simulation: the Camera, GPS, and Lidar.

Camera: Cameras are used to capture visual data of the vehicle's surroundings. They can detect and identify other vehicles, pedestrians, road signs, and traffic lights. Cameras are also used for lane detection, which helps the vehicle to stay within the lanes and avoid collisions.

GPS: Global Positioning System (GPS) provides accurate location information for the vehicle. This information is used to navigate the vehicle from one point to another and to calculate the vehicle's speed and direction.

Lidar: Light Detection and Ranging (Lidar) is a sensor technology that uses laser beams to create a 3D map of the vehicle's surroundings. It can detect objects' distance, size, and shape, even in low light or adverse weather conditions. Lidar is especially important for autonomous vehicles because it can detect obstacles and other vehicles from a distance, allowing them to react and avoid collisions.

I put these sensors on top of the car to help create a detailed and accurate understanding of the vehicle's environment, allowing the car to make informed decisions and react appropriately to changing conditions.

    c.   Provide a video of your Carla simulation working *(15 pts)*

- https://drive.google.com/file/d/1Na3csu6KnwRxjB2XssC_m6mO_2aezxeY/view?usp=sharing

    d.   Show an example output from each sensor *(30 pts)*

- *Camera:*

- *GPS Data:*
  https://docs.google.com/document/d/1_3uPMQtOstM588B_HD2ChvR2a2eg4Z0DYr0STOYvZJo/edit?usp=sharing

- *Lidar Data:*