Parking Tests

Goal of the test

Evaluate the ability of the car to identify that there is a parking spot available and to execute the appropriate manoeuvre to park.

These tests will first require accurate sign detection and identification of the parking sign. Then the car will have to identify where the parking space is, if it is occupied or not, and then park without crossing the markings. Two separate stages of tests will be done :
- Parking with no other vehicle
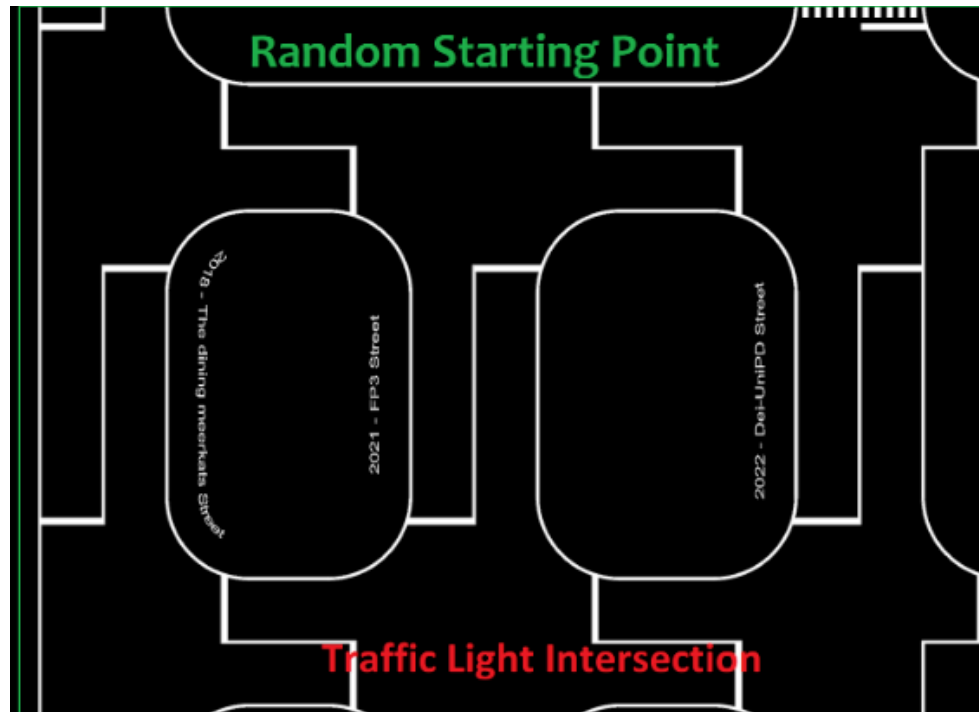- Parking with other vehicles already parked

Testing Area

Figure 1 : Intersections to be used in the test

Parking with empty spots
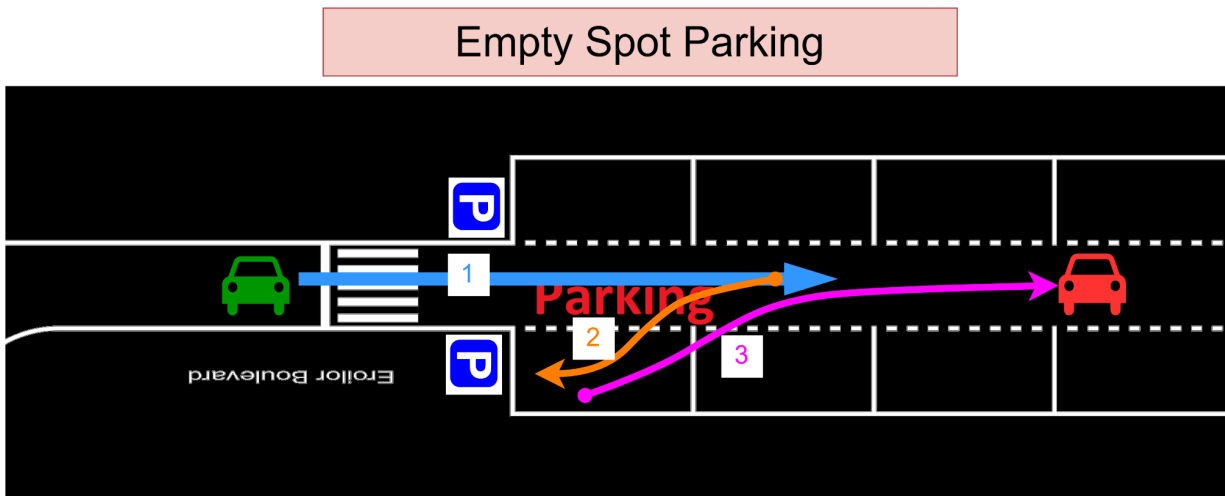
Projected Trajectory & Object Placement

Figure 2 : Proposed trajectory for parking in an empty spot

Figure 2 shows the proposed trajectory for evaluating the car's ability to park in an empty parking spot. The car begins by going in a straight forward trajectory, identifying that there is a parking spot because of the parking signs (1). It then initiates the parking maneuver at the appropriate time, parking into the first empty spot (2). Once it has parked, it should stay put for a second or two, before initiating another maneuver to exit the parking spot and ending its trajectory a few car lengths later (3).

Required Props
For the purpose of this test, which evaluates if the car can correctly park, only the parking signs are required.
i.e.
- Track
- Car
- Parking sign (2 units)

Required Running Scripts
This test will require the control algorithm to run with the car. The camera node will also have to be launched with sign detection set to true.
i.e.
- Controller
- Dashboard
- Camera node, sign :=true

Estimated Time for Completion

The time allocated for this test should be around 10 minutes. If the parking maneuver fails miserably, care should be taken to troubleshoot and identify the behaviour that makes it fail. Multiple attempts should be made to see how the sign position influences the car's parking accuracy.
i.e. 10 minutes

Evaluation Criteria
- Ability for the car to identify that there is a parking spot
- Ability for the car to park on the correct side of the road
- Ability for the car to stay within the boundaries of the parking space
- Smoothness of the maneuver
- Does the car crash into the signs, or take too much space and overlap into other parking spots?

Parking with other parked vehicles

Projected Trajectory & Object Placement

Figure 3 : Proposed trajectory for parking with other spots occupied by vehicles

Figure 3 shows the proposed trajectory for testing out parking when other vehicles occupy parking spots. The car begins by moving in a straight line and detecting that there are parking spots ahead because of the parking signs. It detects that there is a car in the first spot and therefore does not stop directly (1), stopping to park in the second spot. It initiates the parking maneuver and parks in the second spot, between the two cars without hitting them (2). After stopping for some time, it then proceeds to exit the parking spot (3), continuing its trajectory before stopping a few car lengths away.

Required Props
For the purpose of this test, which strictly evaluates both the car's ability to park when it identifies that it is in the parking zone and if there are other vehicles already parked in parking spots, parking signs and other vehicles are required. Since the other vehicles are stationary, car shells can be used instead of the full vehicles.
i.e.
- Track
- Car
- Vehicle/Car Shell (2 units)
- Parking sign (2 units)

Required Running Scripts
This test will require the control algorithm to run with the car. The camera node will also have to be launched with sign detection set to true.
i.e.
- Controller
- Dashboard
- Camera node, sign :=true

Estimated Time for Completion
A single run of this test should take no longer than 10 minutes to complete. It is recommended to run this test more than once, with the vehicle placements changing slightly in the parking spots to evaluate how these slight changes affect detection and decision making. Each of these following tests should take about 5 minutes. For a total of 3 tests, this would equate to 20 minutes.
i.e. 20 minutes.

Evaluation Criteria
-   Ability for the car to identify that there is a parking spot
-   Ability for the car to identify that other vehicles occupy the parking spot
-   Ability for the car to park on the correct side of the road
-   Ability for the car to stay within the boundaries of the parking space
-   Smoothness of the maneuver
-   Does the car crash into the other vehicles?
-   Does the presence of other vehicles affect how the car performs its maneuver?
-   Does the car crash into the signs, or take too much space and overlap into other parking spots?