

Position Estimate Test

Goal of the test

Evaluate the accuracy of the position estimate of the car using the distance between the car and a sign at a given intersection. This test will take place in two stages. First, the quality of the distance estimate will be evaluated, then the accuracy of the relocalization from this computed sign distance will be evaluated. These are the following subtests:

- Accuracy of sign position estimate
- Accuracy of relocalization

Testing Area

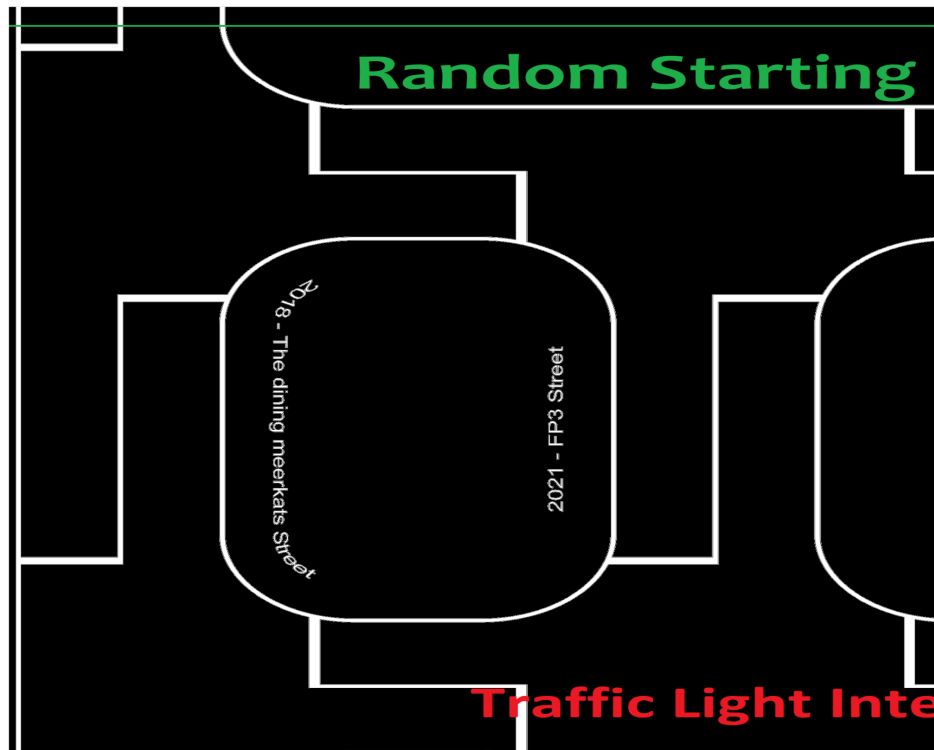


Figure 1 : Intersection to be used in the test

In the test, the leftmost intersection will be used to measure the distance from a sign. This intersection has been chosen as a tape measurer can be conveniently placed alongside the track to measure the actual distance.

Accuracy of Sign Position Estimate

Projected Trajectory & Object Placement

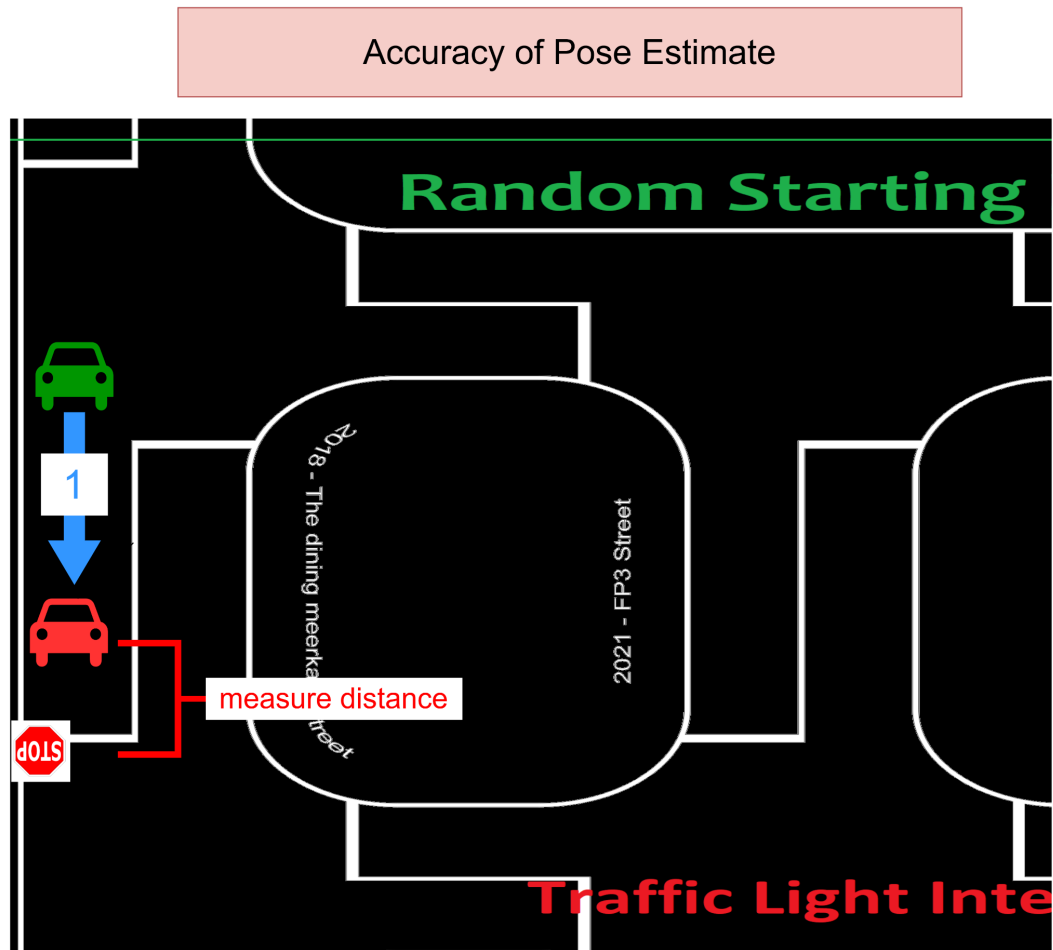


Figure 2 : Proposed positioning of the car

Figure 2 shows the placement of the car and of the sign for the testing of the pose estimate. The sign should be placed precisely according to where it is expected in the simulator. The car should be slowly brought close to the sign, using either keyboard control or manually pushing the car. At regular intervals, the distance between the car and the sign should be compared to the actual distance measured with the tape measurer. Both these distances should be logged in an excel file.

Required Props

For the purposes of this test, only one sign is required, the stop sign. A tape measurer is also required to compute the distance.

i.e.

- Stop sign (1 unit)
- Tape measurer (1 unit)

Required Running Scripts

This test may require the keyboard control to run with the car. The camera node will also have to be launched with sign detection set to true.

i.e.

- Dashboard
- Camera node, sign :=true

Estimated Time for Completion

The time allocated for this test should be around 15 minutes. Multiple measurements should be made and noted down. Proper care should be taken to place the signs in the adequate location and for measurements to be precise.

i.e. 15 minutes

Evaluation Criteria

- Ability to obtain distance from the sign
- Quality of the sign distance estimate
- Average difference between distance estimate and actual distance
- Factors that influence the distance estimate

Accuracy of Sign Position Estimate

Projected Trajectory & Object Placement

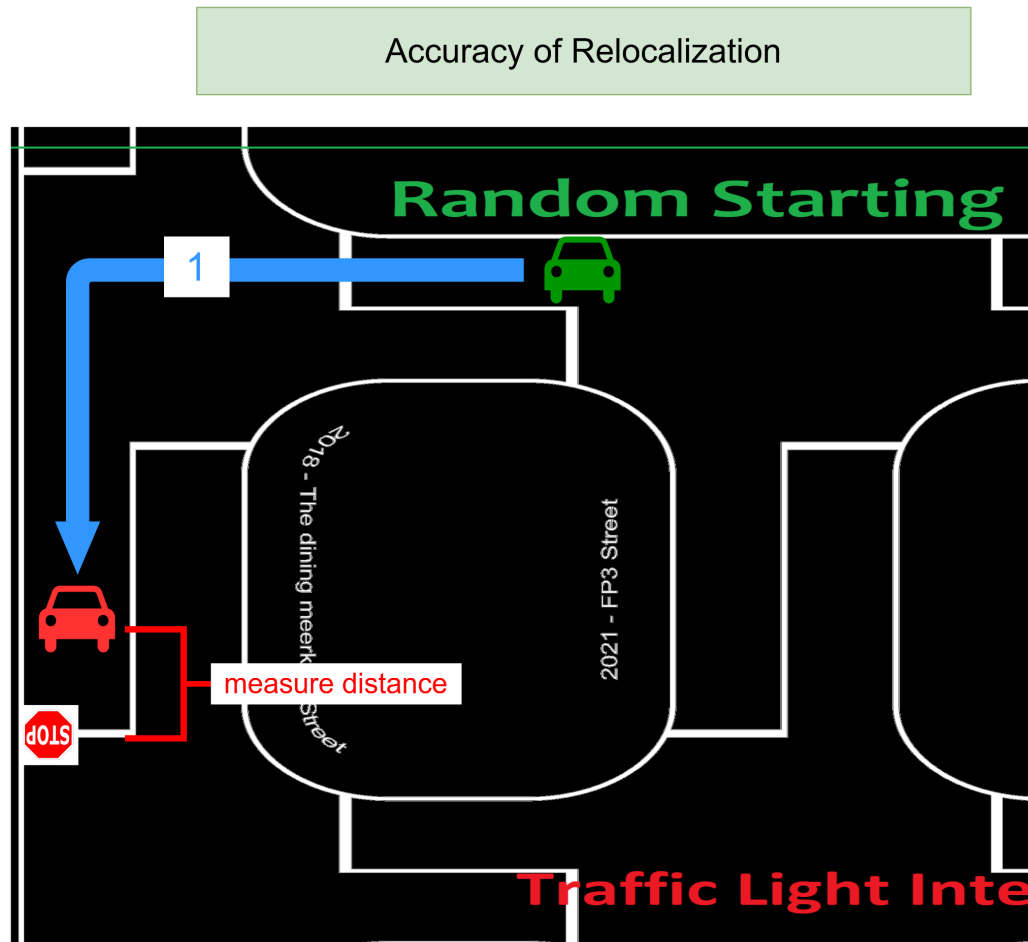


Figure 3 : Proposed trajectory of the car, relocalization testing

Figure 3 shows the proposed trajectory of the car to evaluate its ability to relocalize itself after having moved a little bit. The car will start by moving in a straight line before turning left when it reaches the intersection (1). As it gets close to the following intersection, it will stop when it sees the stop sign and relocalize itself. The position if relocalizes itself to should be compared with the actual position of the car on the track.

Required Props

For the purposes of this test, only one sign is required, the stop sign. A tape measurer is also required to compute the distance.

i.e.

- Stop sign (1 unit)
- Tape measurer (1 unit)

Required Running Scripts

This test requires the controller to run 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 15 minutes. Multiple measurements should be made and noted down. Proper care should be taken to place the signs in the adequate location and for measurements to be precise.

i.e. 15 minutes

Evaluation Criteria

- Ability to obtain position of the car from the sign
- Quality of the sign estimated position
- Average difference between position estimate and actual position
- Factors that influence the distance estimate
- Comparison with position estimate from pure odometry