Module 1 - Lesson 3

Course 1 - Introduction to Self-Driving Cars

Module 1
Autonomy Requirements

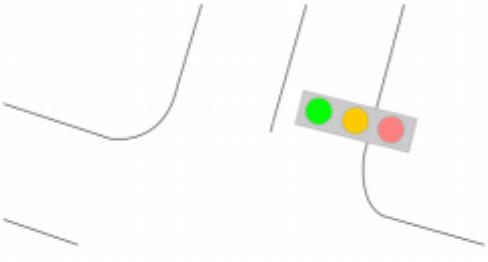
Lesson 3
Driving Decisions and Actions

Planning :
Making decisions :

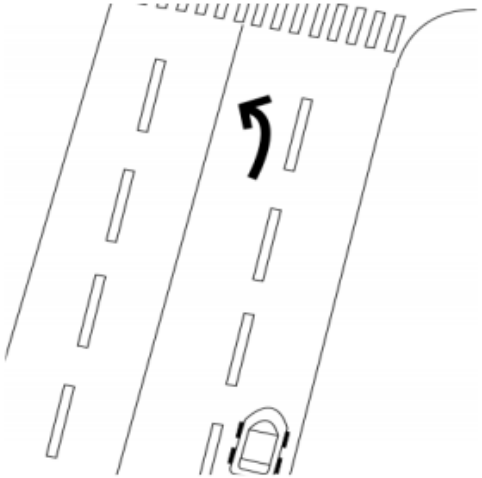
1. Long term
    1. How to navigate from New York to Los Angeles ?
2. Short term
    1. Can I change my lane to the lane right of me ?
    2. Can I pass this intersection and join the left road ?
3. Immediate
    1. Can I stay on track on this curved road ?
    2. Accelerate or brake, by how much ?

Example: Turning left at an intersection

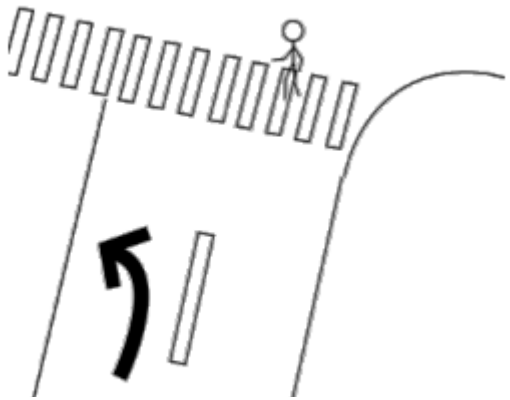
1. Approaching an intersection to turn left.
2. Assume
    1. Intersection has traffic lights

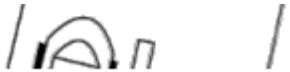


3. Identify turning lane for left turn.

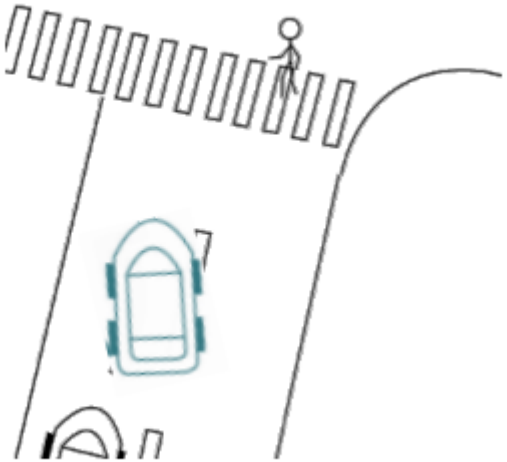


4. Approach the intersection, decelerate smoothly to the stop line.

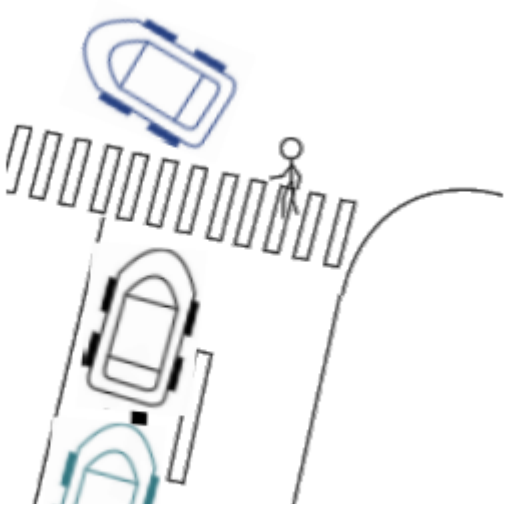




5. What if,
    1. Vehicle enters turn lane ?
    2. Pedestrians are crossing ?



6. What if,
    1. There are cars behind you ?



This was a simple maneuver, yet it **takes 3-4 levels of decisions and control to execute.** Consider how many rules would it take to drive.

1. Safely.
2. Efficiently.
3. Following all listed traffic rules.
4. Only follow those rules everyone else is following.

There are two types of Planning:

1. Reactive Planning
2. Predictive Planning

Reactive Planning:

1. Rule based and it involves decision tree.
2. In reactive rule based planning, we have rules that take into account the current state of ego and other objects and give decisions.

Example:

1. If there is a pedestrian on the road, stop.
2. If speed limit changes, adjust speed to match it.

Predictive Planning:

1. Make predictions about other vehicles and how they are moving. Then use these predictions to inform our decisions.

Example:

1. That car has been stopped for the last 10 seconds. It is going to be stopped for the next few seconds.
2. Pedestrian is jaywalking. She will enter our lane by the time we reach her.