Launch Instructions:

1. Go to f110\_ws directory by running command in terminal from home directory-> cd f110\_ws
2. Then run -> source devel/setup.bash
3. Go to lab\_pure\_pursuit folder under f110\_ws directory and in the launch file “pure\_puruit.launch” and search for argument for file path “pure\_pursuit.py” and change it to “pure\_pursuit\_ob.py” using any text editor of your choice.
4. pure\_pursuit\_ob.py has the code for obstacle avoidance over pure pursuit and it is located in the ‘scripts’ folder under ‘lab\_pure\_pursuit’ directory.
5. Run -> roslaunch lab\_pure\_pursuit pure\_pursuit.launch

Code Algorithm:

* Created three search points at 80°, 90° and 100° (90° being directly in front of car), anything that lies outside this angle range won’t restrict the car from moving ahead considering the lookahead distance.
* Created a bubble around these three points which covers a radius for +-5° from each of the three points if any obstruction is found at those angles. Setting the distance values from laser scan to 0 inside these bubbles which will be used to find the max. gap where car should go.
* Scanning the range around obstacle to know which side has maximum gap for car to go through that gap using the update distance values in the ranges array from scan.
* Finding the angle from the edge of the obstacle to a point 0.1m left/right (depending on where the gap is) where car should steer. I chose 0.1m since that is the car width and it would be the minimum deflection that car must perform to avoid obstacle, instead of steering all the way through the center of gap.
* The last code kept on searching for the next goal point as soon as it found the first, this wasn’t working when obstacle is there so I had to update it to keep following an angle until it reaches the current goal point before moving on to the next goal point in the presence of an obstacle