SC 627
Assignment 4: Understanding Consensus

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Implementation Details

The framework for communication between the different bots as required was done using ROS. With ROS server every bot was made available with the data of the bot left to it and right to it.

In our application we needed the bots to balance which was achieved by giving a velocity command proportional to the difference in the distance between the bot and the right bot and the distance between bot and left bot (i.e $v = u * (dist(bot, rightBot) - dist(leftBot, bot))$).

As all the bots are aligned in a single line, the velocity vector was also aligned with the same line and the calculated velocity vector was converted into Linear and angular velocity for the bot using the current heading direction and the required velocity direction and was published to the robot.

Simulation results

We get the following results upon simulation:

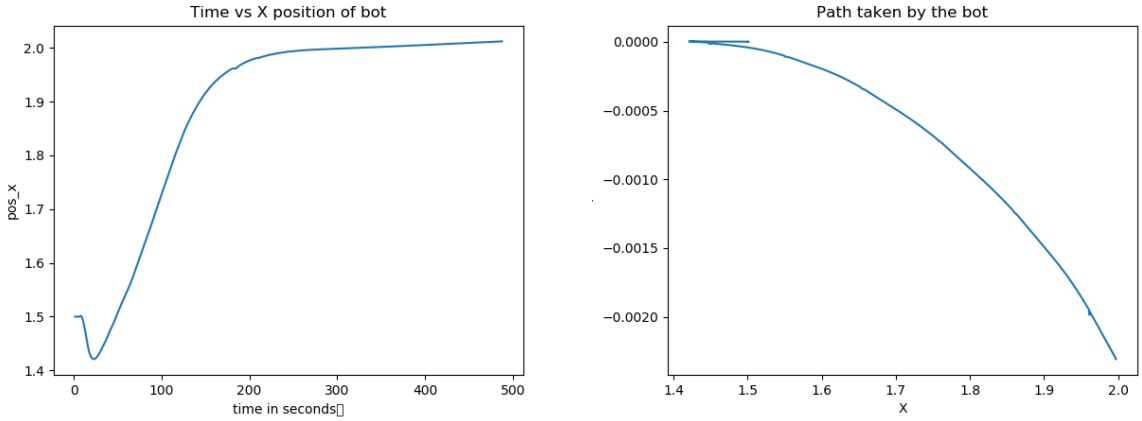

Figure 1: Robot 2

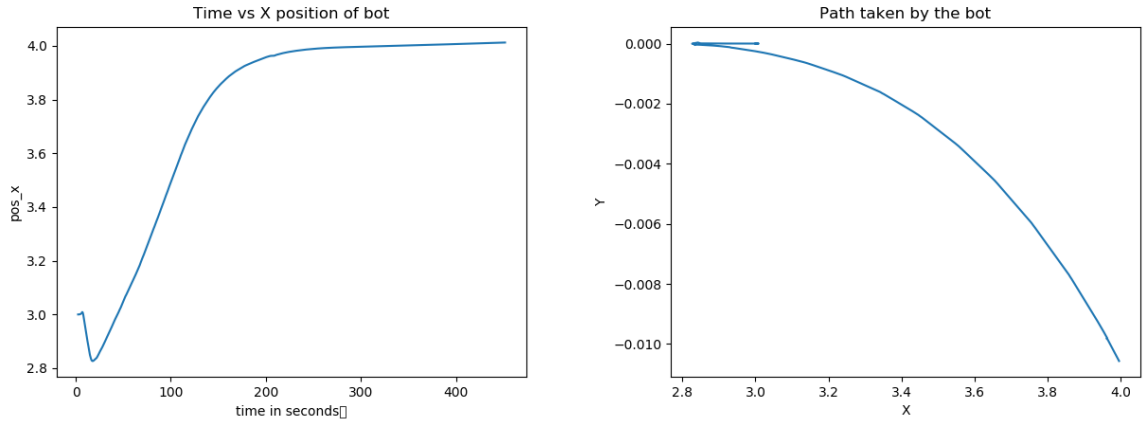

Figure 2: Robot 3

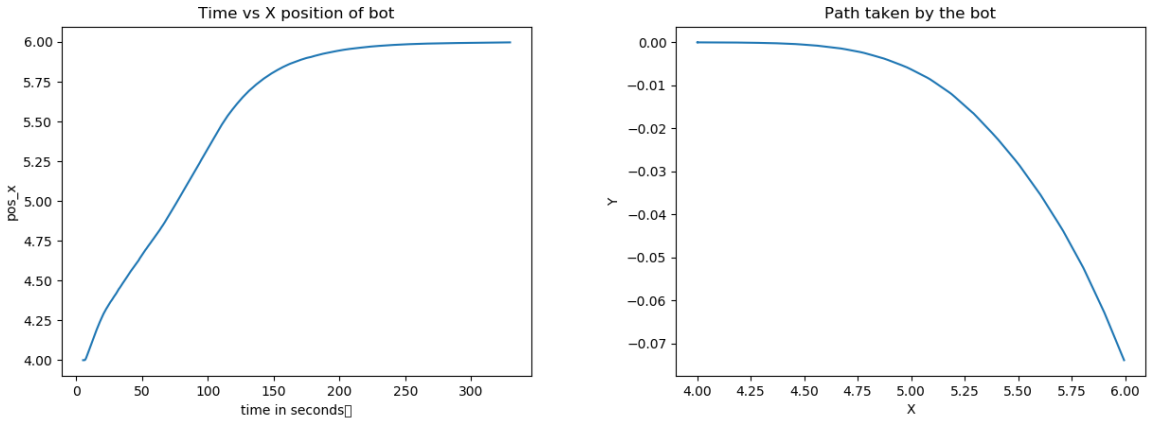

Figure 3: Robot 4

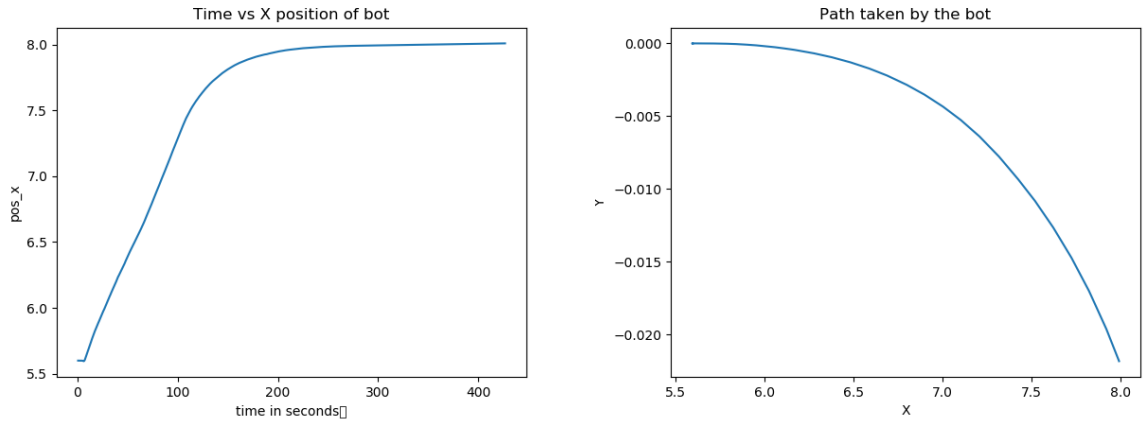

Figure 4: Robot 5

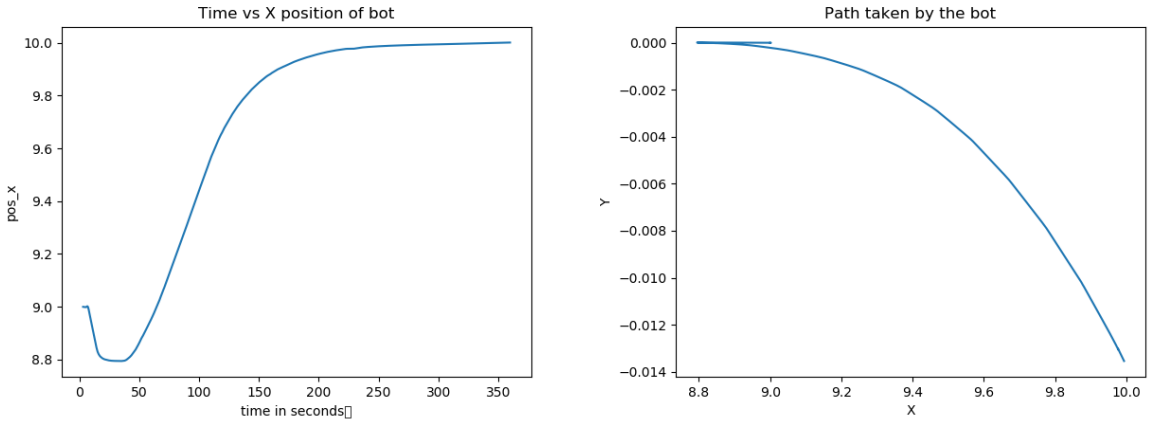

Figure 5: Robot 6

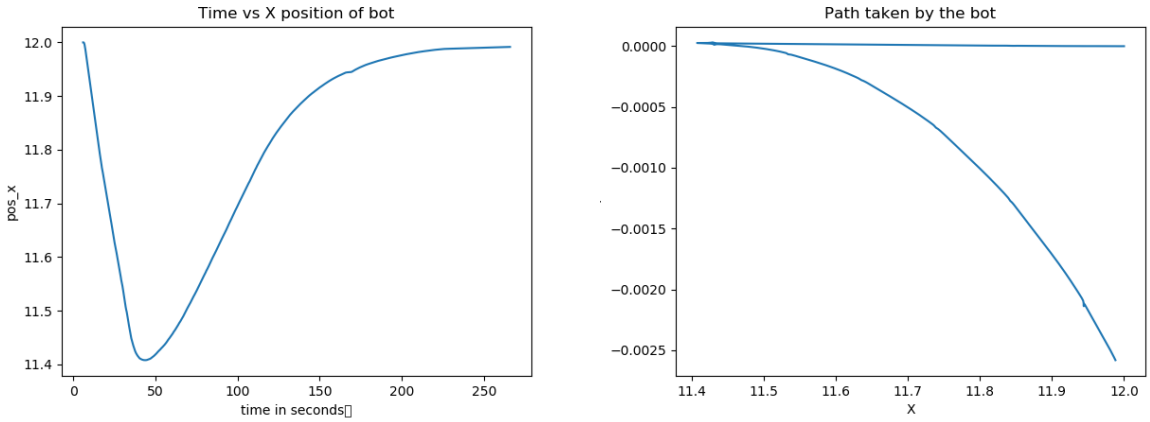

Figure 6: Robot 7

In the plots it can be seen the the significant motion of the bot is in the x axis. The slight motion in y must be because of uncertainties and frictional error in the simulation environment.

Also, we can observe that each bot moves to and fro in x direction a bit to reach to a common consensus (that is equidistant).