

Autonomous Robotics Lab 1 Report

Master in Computer Vision



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Aim:

- Our aim was to Move the robot forward and stop at 2 cm of the wall.
- Wall following robot (aprox. 1cm).

About The First Code:

It's very important first to know about the code before doing any experiment to the code. So, here are some points to know about the code in details:

- For the First Problem (Move the robot forward and stop at 2 cm of the Wall), open the webot software and choose “your Project” among four options. Now click on open world icon and in the appeared Windows open folder Project_1.1 (attached in mail).
- In Project_1.1, open worlds and select “e-puck” file. A world will appear on the screen with editor and console.
- In this code, we first declared device tag variables for storing robot sensor values. And then enabled all sensors we want to use and after enabling we get values from sensors.

And if any one of the sensors values exceeds 440 (440 is the intensity of infrared light detected at IR receiver), the infinite for loop will break and robot will stop. Otherwise in else condition, the robot will move forward till the sensor values are less than 440 (which means wall is not being detected yet).

{The code is fully commented for better understanding of the reader}

About The Second Code (Wall following robot):

- For the second Problem (Wall following robot), we need to follow the same steps, open the webot software and choose “your Project” among four options. Now click on open world icon and in the appeared Windows open folder Project_1.2 (attached in mail).
- In Project_1.2, open worlds and select “e-puck” file. A world will appear on the screen with editor and console.
- In this code too, we first declared device tag variables for storing robot sensor values. And then enabled all sensors we want to use and after enabling we get values from sensors.

And then we implemented seven “if conditions” for wall following. That is explained in details below:

1. In First “if conditions”, if the sensor value of any one of 0,1,6,7 sensors exceeds 500 AND if sensor value of sensor 5 is less than 500 it will turn right. Which means robot is either facing towards wall or inclined towards it. The syntax is shown below:

```
if(((sensors_value_0>=500)||((sensors_value_1>=500)||((sensors_value_6>=600)||  
    (sensors_value_7>=500))) && (sensors_value_5<=500))
```

2. In Second “if condition”, now the robot is turned, and the sensor value of sensor 5 will toggle from less than 500 to greater than 500 as the left side of the robot will face towards wall. The syntax is shown below:

```
elseif(((sensors_value_0>=500)||((sensors_value_1>=500)||((sensors_value_6>=6  
    00)||((sensors_value_7>=500))) && (sensors_value_5>=500))
```

So if the sensor value of any one of 0,1,6,7 sensors exceeds 500 AND if sensor value of sensor 5 is greater than 500 it will continue turning right till the sensor value of any one of 0,1,6,7 sensors decreases from 500.

3. In third “if condition”, till the values of all the sensors 0,1 AND sensors 6,7 is less than 500 and the value of sensor 5 ranges from 500 to 550 it will go straight so in this condition, the robot is maintaining a particular distance of 1 cm from wall. As shown in fig 1. The syntax is shown below:

```
elseif((((sensors_value_0<=500)||((sensors_value_1<=500))&&((sensors_value_  
    6<=500)||((sensors_value_7<=500))) && (550>sensors_value_5 &&  
    sensors_value_5>500))
```

4. In forth “if condition”, till the values of all the sensors 0,1 AND sensors 6,7 is less than 500 and the value of sensor 5 ranges from 400 to 500 which means the robot is going far from the wall, so it will take slight left turn and will come in the third if condition to maintain 1 cm distance from wall. As shown in fig 1. The syntax is shown below:

```
elseif(((sensors_value_0<=500))/((sensors_value_1<=500))&&((sensors_value_
6<=500))/((sensors_value_7<=500))) && (500>sensors_value_5 &&
sensors_value_5>400))
```

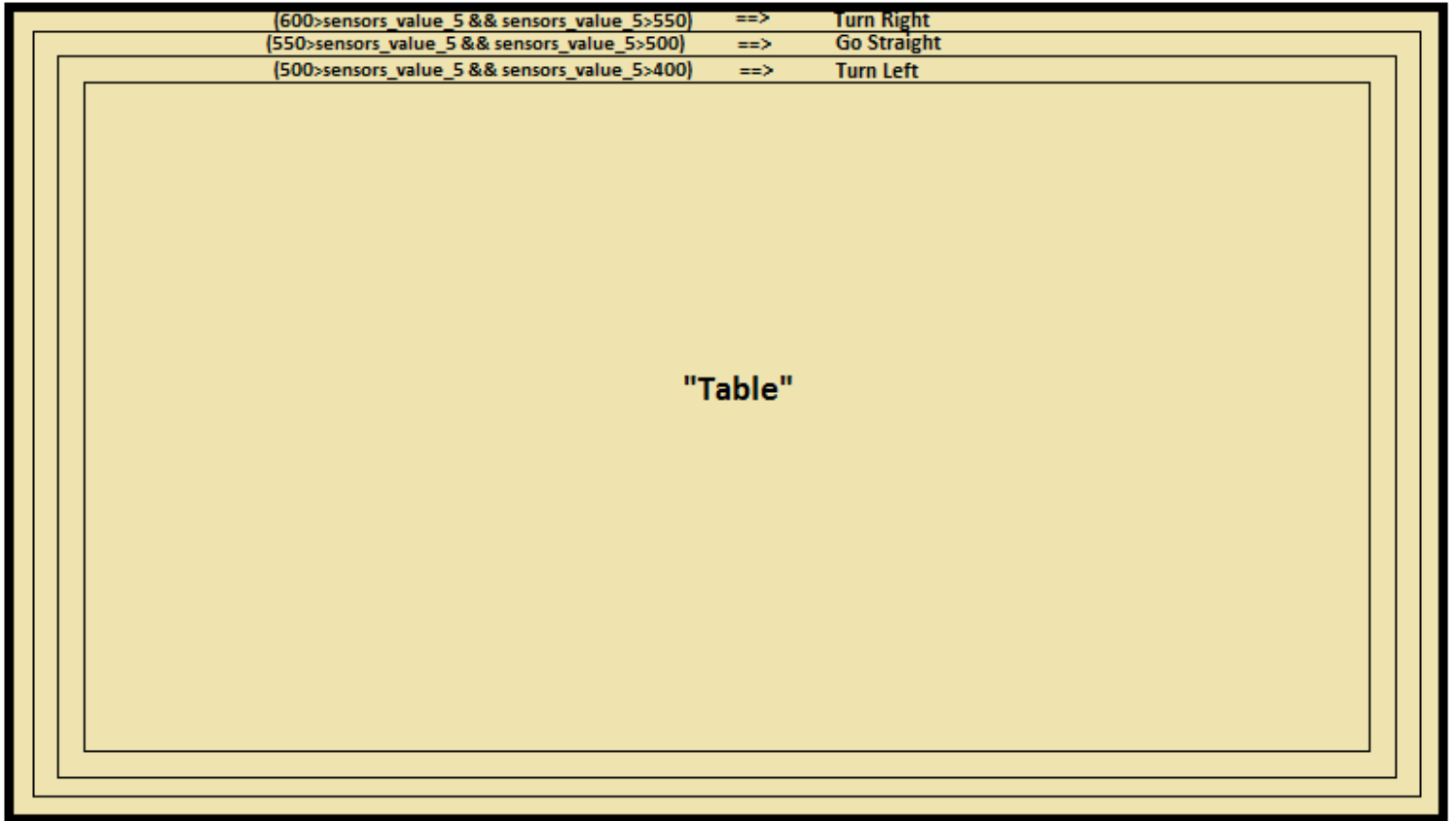


Figure 1

5. In fifth “if condition”, till the values of all the sensors 0,1 AND sensors 6,7 is less than 500 and the value of sensor 5 ranges from 550 to 600 which means the robot is going near to the wall, so it will take slight right turn and will come in the third if condition to maintain 1 cm distance from wall. As shown in fig 1. The syntax is shown below:

```
elseif(((sensors_value_0<=500))/((sensors_value_1<=500))&&((sensors_value_6<=500))/((sensors_value_7<=500))) && (600>sensors_value_5 && sensors_value_5>550))
```

6. In Sixth condition which is now “else condition”, if none of the if conditions is being executed which means that the wall is not being detected yet, the robot will move forward.

{The code is fully commented for better understanding of the reader}

Youtube Link’s: For better understanding of wall follower program, how it runs in simulation and in real world, I made a video and you can find the links below:

1. Simulation Link: <https://youtu.be/UsGxmrpDySw>
2. Real World Video Link: <https://youtu.be/2mLdl265S0Q>