Mobile Robotic, automated Turtlesim

Mobile Robotic (BA MECH 22)

Bachelor program - Mechatronics

4th semester

Lecturer: Daniel T. McGuiness

Group: BA-MECH-22

Authors: Til Neubauer

7. Juli 2024

Inhaltsverzeichnis

1   Introduction

The aim of the assignment was to learn the basics of Linux and work on a simple Ros2 project. Therefore the simulator Turtlesim was used in the Ros2 environment. The goal was to write a Turtlesim Node that automatically detects if the turtle is at an Edge, than the forward motion should stop, the Turtle should rotate 90° and continue with the forward motion. This operation should continue as long as the code is operating. In addition, every time the Turtle detects an edge the message "edge detected" should be printed on the Terminal. Furthermore everything needed for the automated Turtlesim should be installed and executed automatically using a bash script.

2   Discussion

At first the Node $turtlesim\_auto\_move\_node$ was created. Using the code examples given in the ROSGroundwork from chapter 11 $Writing\ a\ simple\ publisher\ and\ subscribe$ the subscriber was modified so that it could get the current location of the Turtle. The Node is a subscriber of the topic $turtle1/pose$ and gets the position of the Turtle via the message type $turtlesim/msg/Pose$. The publisher was modified so it would publish to the topic $/turtle1/cmd\_vel$ with the message type $geometry\_msgs/msg/Twist$. This modification allows the publisher to control the Turtle.

When the Turtle detects an edge, it first moves backwards to avoid bumping in the edge again, then it turns clockwise. After the rotation is finished the turtle continues with the forward movement. One problem I encountered was that the Turtle did not rotate approximately 90°. To solve this the rotation speed was reduced and the rotation time was adjusted over several iterations.

The automated start using a bash script also made some problems. After implementing the right folder structure these problems where mostly solved.

In order to ensure that the Turtle would reliably continue the process of rotating every time it gets to an edge, the program was running for approximately 10 minutes without crashing or doing something unexpected. The print statement to the terminal also worked fine.

3   Start of the Program

To start the program extract the zip-file in your Download directory. Open a new Terminal, navigate to Download directory using $cd\ Downloads/$ and then to the turtlesim_mo_ro directory with $cd\ turtlesim\_mo\_ro/$. When you are in the right directory start the bash script using $bash\ turtlesim\_mo\_ro.bash$.
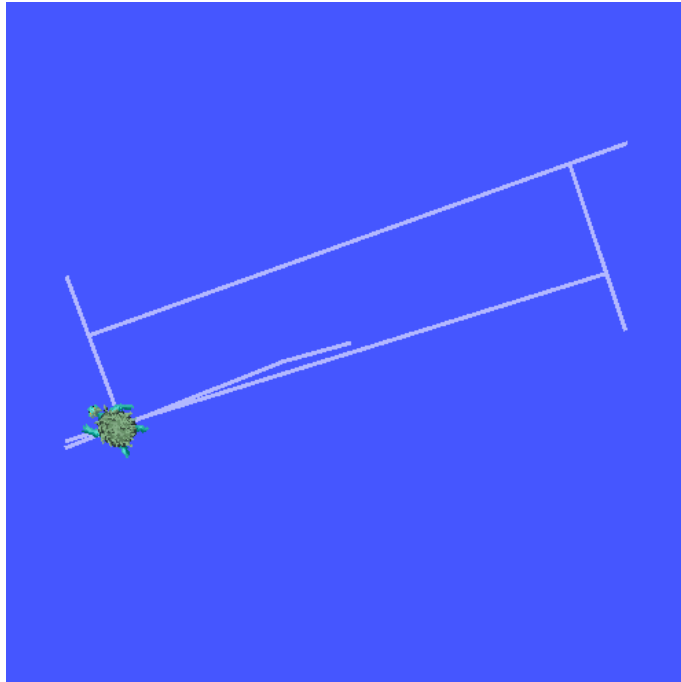
Abbildung 3.1: Automated movement

Abbildung 3.2: Terminal output

Abbildung 3.3: Start of program

Abbildungsverzeichnis