TurtleBot Guide

Basic Setup

In order to properly set up TurtleBot for personal use, you can follow the setup guide.

Here is a quick overview of the steps that need to be followed:

Installing ROS 2 in the user's PC

IMPORTANT: TurtleBot dependencies require Ubuntu 20.04. In case your operating system is not Ubuntu 20.04, you can use a virtual machine or distrobox to run Ubuntu 20.04. I tried running it via a docker container, but no success was achieved.

The recommended version of ROS 2 is ROS 2 Humble. Make sure to install it properly following the ubuntu installation guide here.

Installing TurtleBot 4 Desktop dependency

Once ROS 2 is installed, install TurtleBot4_desktop dependency by running:

```
sudo apt update && sudo apt install ros-humble-turtlebot4-desktop
```

Follow the Basic Setup

The basic setup. includes some short and easy steps that explain how to connect and set up TurtleBot for the first time.

Set up Simple Discovery

TurtleBot can function with two different network configurations: Simple Discovery, and Discovery Server.

By default, simple discovery is selected as the network configuration in a fresh install. However, in order to properly detect the topics published by TurtleBot, some configurations need to be done to the user's computer. This guide explains the necessary setup.

To make use of Turtlebot's topics you will need to install the following dependency

```
sudo apt install -y ros-humble-irobot-create-msgs
```

Connecting to an already set up TurtleBot

If you are trying to connect to a TurtleBot that has already been set up. and thus, it does not appear as an Access Point as the `Basic Setup` suggested. You can log in into it by looking up the IP address in the LCD display and SSH'ing into it.

In Unix operating systems, you can run the following command where XX... depicts the IP address that appears in the LCD screen.

```
$ ssh ubuntu@XX.XX.XX.XX
```

Important Points

Set TurtleBot to Access Point before transporting it

If you move TurtleBot to a new location without setting it to Access Point Mode, TurtleBot will not be able to connect to a new wifi.

Outdated TurtleBot Operating System

If you posses an older versions of TurtleBot 4, it probably has `ROS 2 Galactic` which has reached its EOL (end-of-life) and it is no longer supported. Therefore, it is recommended to re-flash the SD card that contains TurtleBot's operating system to a newer image. You can check the current version of the operating system by entering in the Create 3 WebServer. The first letter of the version shows the current `ROS` installed. For example, version H.1.0 means that TurtleBot has `ROS 2 Humble` installed, while G.1.0 would mean that `ROS 2 Galactic` is installed

Troubleshooting

The WiFi network that TurtleBot was connected no longer exists

If TurtleBot was moved to a different place without being set up as an Access Point or the previous WiFi network has changed, it won't be possible to access TurtleBot's console over WiFi. In that case, there are 3 choices:

1. Restore the previous WiFi network
2. SSH via an ethernet adapter
    - Note: at the time of writing this guide, I had no success in connecting to TurtleBot via an ethernet adapter.
3. Re-flash the Raspberry PI
    - Note: This will delete every configuration and the set-up process will have to be done again.

Can't SSH into TurtleBot

No IP address displayed in the LCD screen

If the LCD screen is not showing any IP address to ssh to, there are 2 options.

The LCD screen is not working properly

This issue occurs from time to time. In order to check if this is the case, you need to log in into your router configuration page and check the list of connected devices. TurtleBot's device name should be something similar to `ubuntu`. If the device appears, try ssh'ing into that IP address.

Alternatively, you can make use of ros2 topics to check the IP address. If simple discovery was successfully configured, you can run the following command in your computer:

```
ros2 topic echo /ip
```

The WiFi network that TurtleBot was connected no longer exists

If this is the case, you can read the previous point.

If everything else fails, you can always re-flash the SD card and start from scratch.