2 - Setting up ROS2 & SLAM on Raspberry Pi

After installing the Ubuntu server 22.04 on your Raspberry Pi follow this guide to install ROS2.

Good tip when writing these commands manually make sure to check every character you wrote and see if it matches the command you are trying to write, also if there is any error don't skip it repeat the command again and if there is still an error ask for help before continuing with the rest of the commands.

1) connect the Raspberry Pi to a display and a keyboard then the power supply.

2) login with your username and password.

3) make sure it's connected to the internet by running "ping -c 3 8.8.8.8" and if there is 0% packet lost then it's connect to the internet.

4) we will start by making sure that we have the right format for encoding text, time and date as it's really important when setting up ROS packages by running the following commands:

- "sudo apt update && sudo apt install locales"
- "sudo locale-gen en_US en_US.UTF-8" :--> generates the necessary format en_US.UTF-8
- "sudo update-locale LC_ALL=en_US.UTF-8 LANG=en_US.UTF-8" :--> updates the formats being used to the one we just made in the whole system.
- "export LANG=en_US.UTF-8":--> this line changes the value of the LANG variable in the current shell session.
- "locale" :--> you can run this command to see your changes in the formatting.

5) Ensuring that the Ubuntu Universe repository is added to the available repos you can install from.

- "sudo apt install software-properties-common"
- "sudo add-apt-repository universe"

6) since we are installing packages from a new source to apt we need to give it that package key so it can verify that this installation is okay.

- "sudo apt update && sudo apt install curl -y"
- "sudo curl -sSL https://raw.githubusercontent.com/ros/rosdistro/master/ros.key -o /usr/share/keyrings/ros-archive-keyring.gpg" :--> NO NEWLINE it's a single command on 2 lines
- "echo "deb [arch=$(dpkg --print-architecture) signed-by=/usr/share/keyrings/ros-archive-keyring.gpg] http://packages.ros.org/ros2/ubuntu $(. /etc/os-release && echo $UBUNTU_CODENAME) main" | sudo tee /etc/apt/sources.list.d/ros2.list > /dev/null" :--> NO NEWLINE it's a single command on 3 lines

7) Update your apt repository caches after setting up the repositories.

- "sudo apt update" :--> run this command twice if you got any warnings until there aren't any warnings.
- "sudo apt upgrade"

8) Install ROS2 minimal without GUI as we have server Ubuntu

- ***"***sudo apt install ros-humble-ros-base --fix-missing***" :-->*** it will ask you if you want to install everything write Y and if there is a network error and it stopped try the command again after making sure the raspberry Pi is connected to the internet "ping -c 3 8.8.8.8".

9) when you install only the core/minimal version of ROS 2 (like you did with ros-humble-ros-base), it doesn't include colcon by default — so you need to install it yourself to be able to build your own packages later.

- "sudo apt install python3-colcon-common-extensions"

10) Setup your environment for ROS2 so you don't have to do the same command every time you open the Raspberry Pi.

- "echo "source /opt/ros/humble/setup.bash" >> ~/.bashrc"
- "source ~/.bashrc"

11) Now everything is ready to go to make sure ROS2 is set up run the following command

- "ros2 pkg list | head" :--> it shouldn't give you an error
- "ros2 topic list" :--> this also should give the installed topics

12) Finally to install slam-toolbox which you will need in navigation run the following command

- "sudo apt install ros-humble-slam-toolbox --fix-missing" :--> it will ask you if you want to install everything write Y and if there is a network error and it stopped try the command again after making sure the raspberry Pi is connected to the internet "ping -c 3 8.8.8.8".

13) To make sure SLAM is working you can run the following command

- "ros2 pkg list | grep slam_toolbox" :--> this should print to you slam_toolbox in red when it successfully installed.

Thank You