Requirements:

OS: Ubuntu 22.04
Python: 3.10.12

In Ubuntu Software:
Arduino
Terminator (sudo apt install terminator)
Brave (Optional, browser without adds)

Install pip:
sudo apt install python3-pip

Install VS Code:
sudo snap install code –classic
Install VS Code Extensions:
ROS – Developer has to be Microsoft
Python – Developer has to be Microsoft
Turn on auto save: File -> Auto Save OR File -> Preferences -> Settings →(Write “auto save”) -> Select afterDelay

Install Dynamixel Wizard:
https://emanual.robotis.com/docs/en/software/dynamixel/dynamixel_wizard2/

Install Git and configure:
https://www.digitalocean.com/community/tutorials/how-to-install-git-on-ubuntu-22-04

To create a github SSH authentication key follow this tutorial, but DO NOT PUT PASSWORD:
Hit Enter when asked for password:
https://www.youtube.com/watch?v=WgZIv5HI44o

Install NVIDIA drivers:
https://www.cherryservers.com/blog/install-cuda-ubuntu
(Follow until step 5)

Arduino Libraries:
Sketch → Include Libraries → Manage Libraries
Adafruit NeoPixel

Install ROS2 humble:
https://docs.ros.org/en/humble/Installation/Ubuntu-Install-Debians.html

Follow Tutorials (include ROS2 installation):
https://www.youtube.com/playlist?list=PLLSegLrePWgJudpPUof4-nVFHGkB62Izy

This tutorial includes a lot more than intalling ROS2 and subs and pubs examples, it does:
- adds ws sources to ~/.bashrc

To work with UFACTORY xArm 6:
- https://www.ufactory.cc/ufactory-studio/
- Download Linux

To install realsense-viewer:

Follow the following link until the part that states: "Uninstalling the packages"
https://github.com/IntelRealSense/librealsense/blob/master/doc/distribution_linux.md

To install librealsenseand some more necessary libraries:
First follow these instructions:
https://dev.intelrealsense.com/docs/compiling-librealsense-for-linux-ubuntu-guide
Then follow the “Step 3: Install Intel® RealSense™ ROS2 wrapper”:
https://github.com/IntelRealSense/realsense-ros/blob/ros2-development/README.md

Please check ANEX to see possible errors during COLCON BUILD:

To save vídeos for dataset:

- sudo apt-get install ffmpeg x264 libx264-dev
- ros2 run charmie_debug save_videos_for_dataset
- vídeo is saved at home directory with date: “2024-07-04 00-14-19charmie.avi”
- to put in roboflow we must convert using ffmpeg to mp4 using:
  ffmpeg -i 2024-07-04 00-14-19charmie.avi 2024-07-04_00-14-19_charmie.mp4

PACKAGES:

low_level:
  pip install pyserial
ps4_controller:
  pip install pyPS4Controller
neck_dynamixel:
  pip install dynamixel-sdk

xarm:
  Follow steps in: https://github.com/xArm-Developer/xarm_ros2/tree/humble?tab=readme-ov-file
  sudo apt install ros-foxy-xacro ros-foxy-joint-state-publisher-gui
  sudo apt install ros-foxy-gazebo-ros-pkgs
  sudo apt install ros-foxy-ros2-control ros-foxy-ros2-controllers ros-foxy-gazebo-ros2-control

yolos:
  pip install ultralytics
  to get the characteristics in yolo_pose:
    pip install keras
    pip install tensorflow

audio:

pip install SpeechRecognition
pip install pulsectl
sudo apt-get install portaudio19-dev
pip install PyAudio

if you get an ffmpeg error:

sudo apt update
sudo apt install ffmpeg

receptionist:

pip install face_recognition

debug_visual:

python3 -m pip install pygame-widgets

speakers novos:
- pip install TTS
- export PATH=$PATH:/home/utilizador/.local/bin (so tts commands can be used in terminal)
- pip install pydub
- (editar depois install espeak)
- pip install pygame

Possible ROS2 Errors:

When doing colcon build after creating the first package:

“/usr/lib/python3/dist-packages/setuptools/command/install.py:34: SetuptoolsDeprecationWarning: setup.py install is deprecated. Use build and pip and other standards-based tools.
  warnings.warn(
---”
pip3 list | grep setuptools
pip3 install setuptools==58.2.0
pip3 list | grep setuptools

If you have error such as the following when doing colcon build:
Finished <<< charmie_point_cloud [10.3s]
--- stderr: charmie_restaurant
/home/charmie/.local/lib/python3.10/site-packages/setuptools/command/easy_install.py:157: EasyInstallDeprecationWarning: easy_install command is deprecated. Use build and pip and other standards-based tools.
  warnings.warn(

It means that you have the wrong version of setuptools. For ROS a specific version must be installed: setup tools version 58.2.0 (last version to work with ros2 python packages without any warnings)

`pip install setuptools==58.2.0` (all above versions do not work)

Please check for more info:
https://answers.ros.org/question/396439/setuptoolsdeprecationwarning-setuppy-install-is-deprecated-use-build-and-pip-and-other-standards-based-tools/

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when doing colcon build realsense packages (on charmie_ws) it might get some erros related with gazebo, install gazebo using:

The error indicates that your workspace depends on the `gazebo_ros` package, but it is either not installed or not properly sourced in your environment. Here's how to resolve this issue:

1. Install the `gazebo_ros` Package

`gazebo_ros` is part of the ROS 2 Humble distribution. Install it by running:

```
sudo apt update
sudo apt install ros-humble-gazebo-ros-pkgs
```

2. Verify the Package Installation

Check if `gazebo_ros` is installed:

```
ros2 pkg list | grep gazebo_ros
```

You should see `gazebo_ros` and related packages listed.

3. Set `CMAKE_PREFIX_PATH` if Needed

If you installed `gazebo_ros` but CMake still cannot find it, manually set the `CMAKE_PREFIX_PATH` to include the installation directory of `gazebo_ros`.

Add this to your `~/.bashrc` or run it in your terminal:

```
export CMAKE_PREFIX_PATH=$CMAKE_PREFIX_PATH:/opt/ros/humble
```

Then source your `.bashrc`:

```
source ~/.bashrc
```

--- stderr: xarm_controller CMake Error at CMakeLists.txt:38 (find_package): By not providing "Findhardware_interface.cmake" in CMAKE_MODULE_PATH this project has asked CMake to find a package configuration file provided by "hardware_interface", but CMake did not find one. Could not find a package configuration file provided by "hardware_interface" with any of the following names: hardware_interfaceConfig.cmake hardware_interface-config.cmake Add the installation prefix of "hardware_interface" to CMAKE_PREFIX_PATH or set "hardware_interface_DIR" to a directory containing one of the above files. If "hardware_interface" provides a separate development package or SDK, be sure it has been installed.

1. Install `ros-humble-ros2-control`

The `hardware_interface` package is provided by the `ros2_control` framework. Install it using:

```
sudo apt update
sudo apt install ros-humble-ros2-control ros-humble-ros2-controllers
```

Links for new team members:

RoboCup@Home official website:
https://athome.robocup.org/

RoboCup@Home official Github:
https://github.com/RoboCupAtHome/

Rulebook Link:
https://robocupathome.github.io/RuleBook/rulebook/master.pdf

CHARMIE Project Github:
https://github.com/SparkRibeiro21/charmie_ws

CHARMIE Dataset:
https://github.com/SparkRibeiro21/charmie_ws/blob/main/objects/LAR_objects/LAR%20Dataset%20Objects.pdf

Requirements nos vossos Pcs:
OS: Ubuntu 22.04 LTS (Aconselho vivamente que façam dualboot, máquina virtual vai dar erros no ROS)

ROS2: Humble

Para instalarem ROS2, aconselho a seguirem este set de tutoriais, eles instalam também o VSCode que é o interface que usamos para programar o robô, portanto é só seguir estes tutoriais. Além disso nestes tutoriais também vos explicam bem as bases todas que vão precisar de ROS2.

https://www.youtube.com/playlist?list=PLLSegLrePWgJudpPUof4-nVFHGkB62Izy

Arm (UFACTORY xArm 6): xArm Humble Repo To setup the arm in your workspace, please follow the preparation steps on the xArm Humble repository.

(Isto vemos depois, para já podem ir analisar as características do braço)

Terminator Keyboard Shortcuts:

Split Vertically	Ctrl + Shift + O
Split Horizontally	Ctrl + Shift + E
Switch Next Terminal	Ctrl + Shift + N
Switch Previous Terminal	Ctrl + Shift + P
New Tab	Ctrl + Shift + T
Next Tab	Ctrl + Tab
Previous Tab	Ctrl + Shift + Tab
Copy	Ctrl + Shift + C
Paste	Ctrl + Shift + V
Zoom In	Ctrl + +
Zoom Out	Ctrl + -
Reset Zoom	Ctrl + 0
Fullscreen Mode	F11
Close Terminal	Ctrl + Shift + W