## **Extract & Publish 2D Coordinates of Objects**

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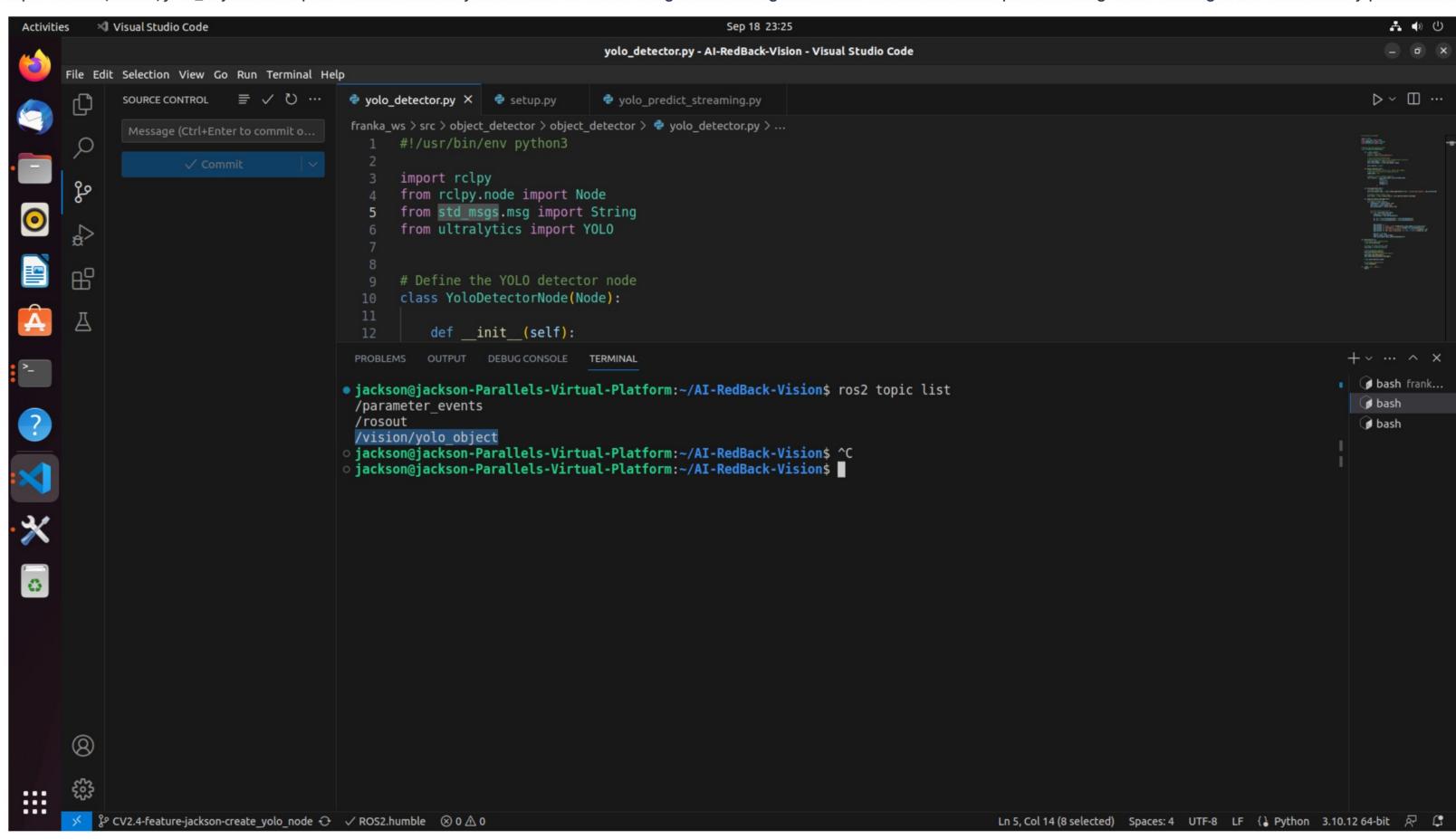
## Install Ultralytics Library

Ultralytics library is a prerequisite for using YOLO pre-trained models. PyTorch will also be installed as part of the dependencies since YOLO models are trained and supported by PyTorch.

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               jackson@jackson-Parallels-Virtual-Platform: ~/AI-RedBack-Vision/franka_ws/src 🔍 📃
   from ultralytics import YOLO
ModuleNotFoundError: No module named 'ultralytics'
jackson@jackson-Parallels-Virtual-Platform:~/AI-RedBack-Vision/franka_ws/src$ pip install ultralytics
Defaulting to user installation because normal site-packages is not writeable
Collecting ultralytics
 Downloading ultralytics-8.0.180-py3-none-any.whl (617 kB)
                                            - 617.0/617.0 KB 5.6 MB/s eta 0:00:00
Collecting numpy>=1.22.2
 Downloading numpy-1.26.0-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (18.2 MB)
                                            — 18.2/18.2 MB 6.5 MB/s eta 0:00:00
Collecting opency-python>=4.6.0
 Downloading opencv_python-4.8.0.76-cp37-abi3-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (61.7 MB
                                            - 61.7/61.7 MB 5.8 MB/s eta 0:00:00
Requirement already satisfied: scipy>=1.4.1 in /usr/lib/python3/dist-packages (from ultralytics) (1.8.
Requirement already satisfied: matplotlib>=3.2.2 in /usr/lib/python3/dist-packages (from ultralytics)
(3.5.1)
Collecting tqdm>=4.64.0
 Downloading tqdm-4.66.1-py3-none-any.whl (78 kB)
                                            - 78.3/78.3 KB 11.3 MB/s eta 0:00:00
Collecting py-cpuinfo
 Downloading py_cpuinfo-9.0.0-py3-none-any.whl (22 kB)
Collecting seaborn>=0.11.0
 Downloading seaborn-0.12.2-py3-none-any.whl (293 kB)
                                            — 293.3/293.3 KB 6.9 MB/s eta 0:00:00
Collecting torch>=1.8.0
 Downloading torch-2.0.1-cp310-cp310-manylinux1_x86_64.whl (619.9 MB)
```

## **Check Active Topics**

The yolo\_detector node under the object\_detector package will try to recognise and extract pixel coordinates of objects. The extracted information will be encapsulated into ROS 2 messages and published to a topic named /vision/yolo\_object. All topics that are currently active can be listed using the following command. This could be helpful to debug if the messages are successfully published to the topic.



## Messages Published to Topic

The relevant information extracted from the objects detected by YOLO models will be encapsulated in the form of std\_msgs.msg.String and published to /vision/yolo\_object topic every second.

The published message will include the following:

- Object class
- Confidence rate
- Top left coordinates (pixel)
- Bottom right coordinates (pixel)

While the YOLO is configured to show the real-time object detection results on screen, we can launch rqt\_graph to verify that node yolo\_detector is active and publishing messages as expected.

