Installation Step (Skip this step)

mkdir kobuki_ws

cd kobuki_ws/

mkdir src

cd src

sudo apt install git

git clone https://github.com/kobuki-base/kobuki_ros.git

git clone https://github.com/kobuki-base/kobuki_ros_interfaces.git

References

https://github.com/kobuki-base/kobuki_ros

https://github.com/kobuki-base

Testing Step

ros2 launch kobuki_node kobuki_node-launch.py

ros2 run kobuki_keyop kobuki_keyop_node --ros-args -r motor_power:=/commands/motor_power cmd_vel:=/commands/velocity

ros2 topic echo /button

Command Line:

ros2 topic pub /commands/velocity geometry_msgs/msg/Twist "{linear: {x: 0.1, y: 0.0, z: 0.0}, angular: {x: 0.0, y: 0.0, z: 0.1}}"

Install Realsense Camera (Skip this step)

sudo apt-get install ros-humble-realsense2-camera

sudo apt-get install ros-humble-realsense2-description

sudo apt-get install librealsense2-dkms

sudo apt-key adv --keyserver keyserver.ubuntu.com --recv-key F6E65AC044F831AC80A06380C8B3A55A6F3EFCDE || sudo apt-key adv --keyserver hkp://keyserver.ubuntu.com:80 --recv-key F6E65AC044F831AC80A06380C8B3A55A6F3EFCDE

sudo apt-get update

sudo apt-get install ros-humble-usb-cam

ros2 launch realsense2_camera rs_launch.py enable_pointcloud:=true device_type:=d435

ros2 launch realsense2_camera rs_launch.py enable_pointcloud:=true device_type:=d435 initial_reset:=true enable_sync:=true --debug

sudo apt-get install ros-humble-librealsense2

colcon build

source ./install/setup.bash

ros2 launch realsense2_camera rs_launch.py device_type:=d435 initial_reset:=true --debug

sudo apt-get install ros-humble-image-view

ros2 run image_view image_view image:=/camera/color/image_raw

or

cd src

git clone https://github.com/IntelRealSense/realsense-ros.git

git checkout

Install RPLidar (Skip this step)

cd asha_ws

cd src

git clone -b ros2 https://github.com/slamtec/rplidar_ros.git

cd ..

colcon build --symlink-install

source ./install/setup.bash

ros2 launch rplidar_ros view_rplidar_a3_launch.py

References:

https://index.ros.org/repos/page/2/time/

https://index.ros.org/r/usb_cam/

https://github.com/allenh1/rplidar_ros

https://index.ros.org/r/realsense2_camera/

https://github.com/IntelRealSense/librealsense

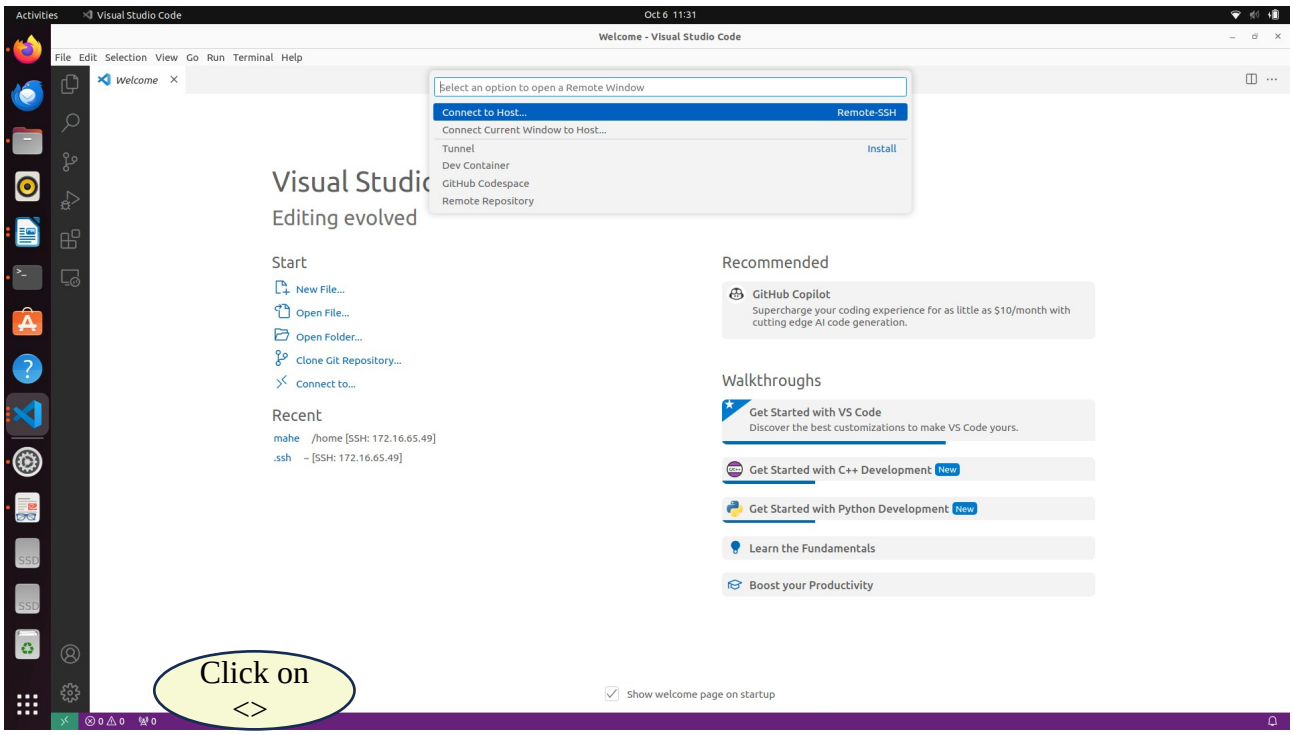
https://github.com/IntelRealSense/librealsense/blob/master/doc/distribution_linux.md

https://github.com/klintan/ros2_usb_camera

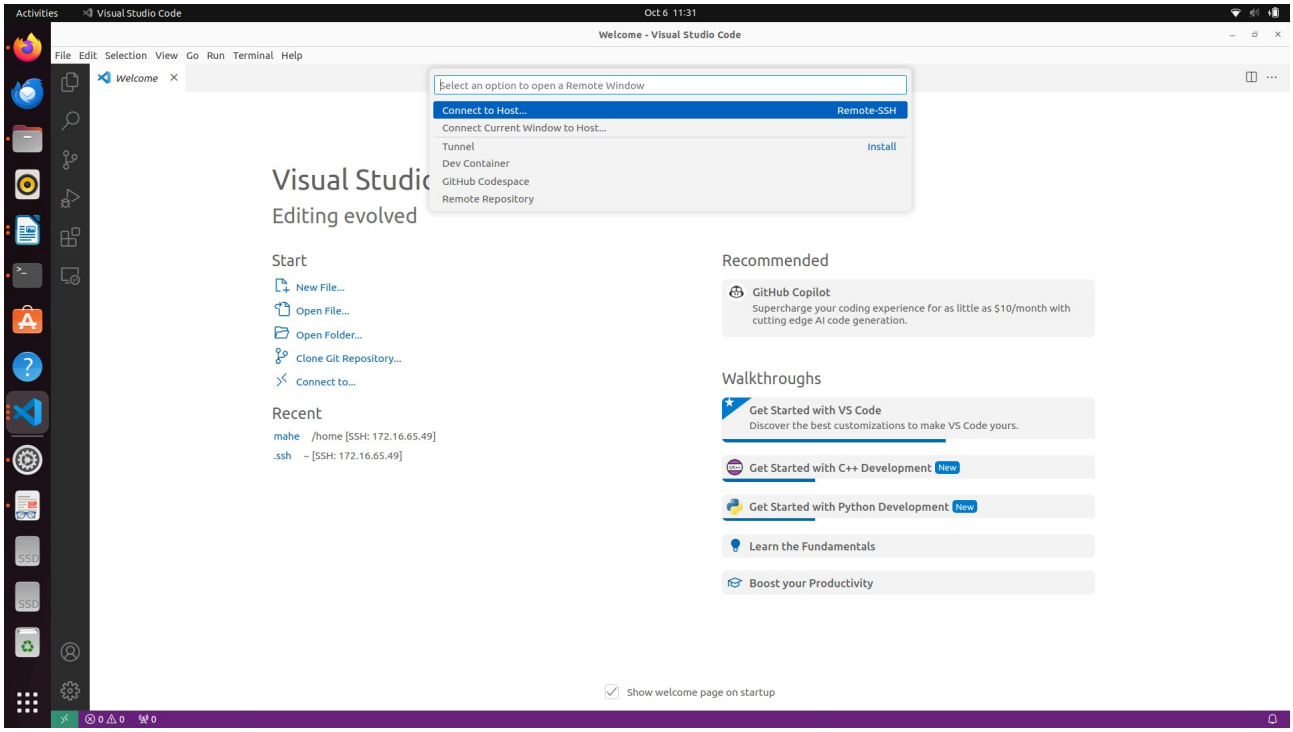
https://github.com/Slamtec/rplidar_ros/tree/ros2

Remotely control Kobuki laptop

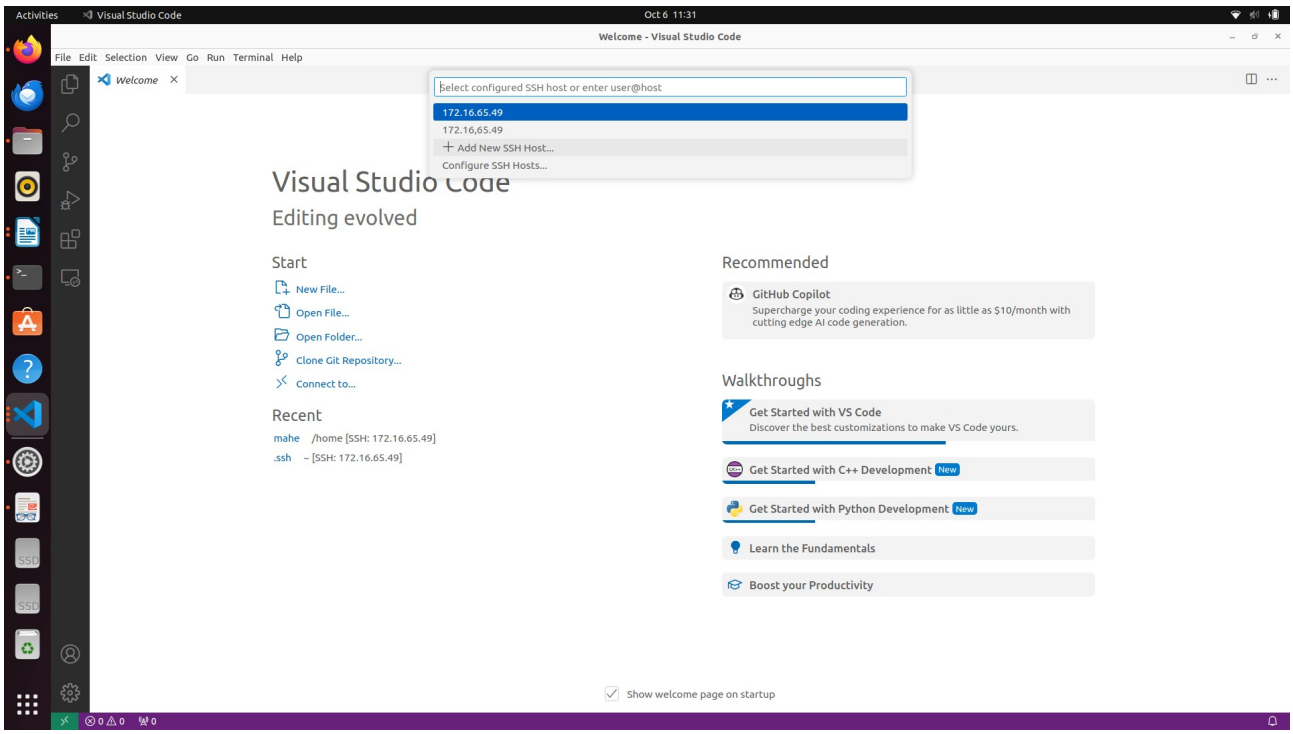
1. Open Visual Studio



2. Connect to host



or add new host



3. type

ssh mahe@172.16.65.49

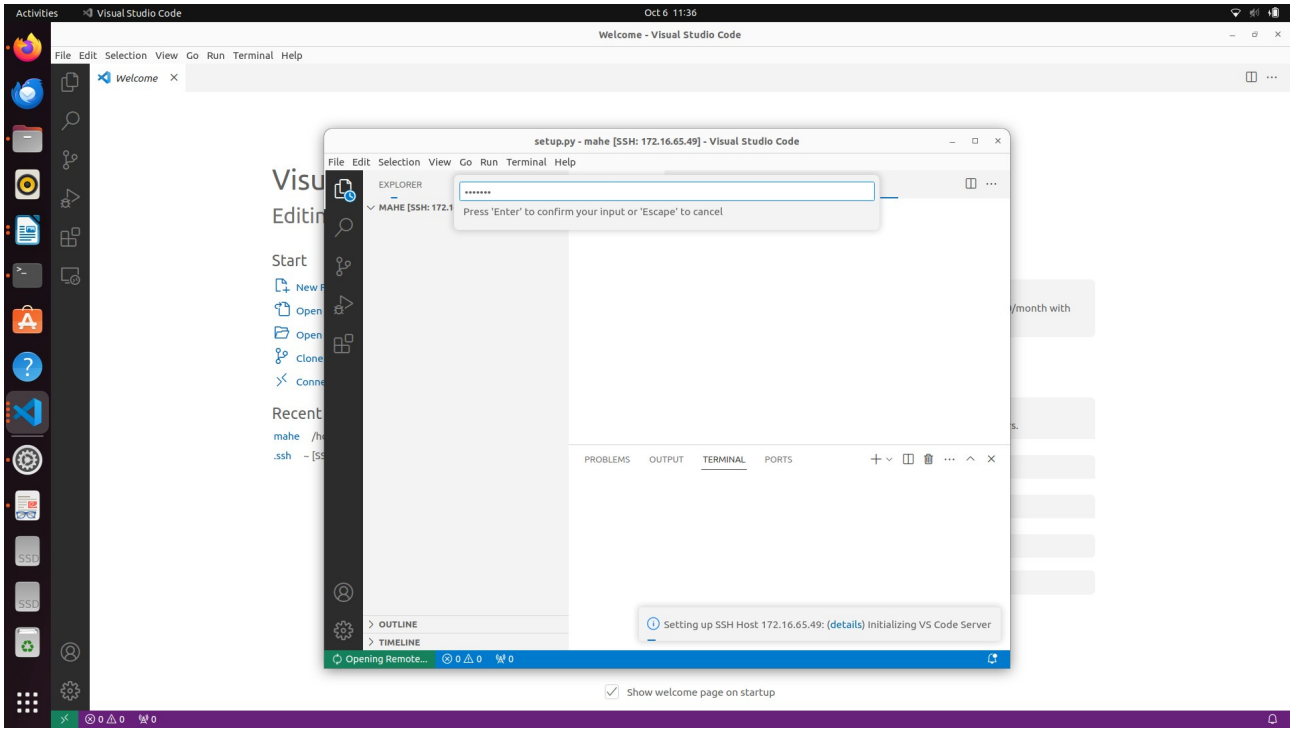
(mahe refers to name of the laptop connected too turtlebot)

(ip address is obtained as

type ifconfig

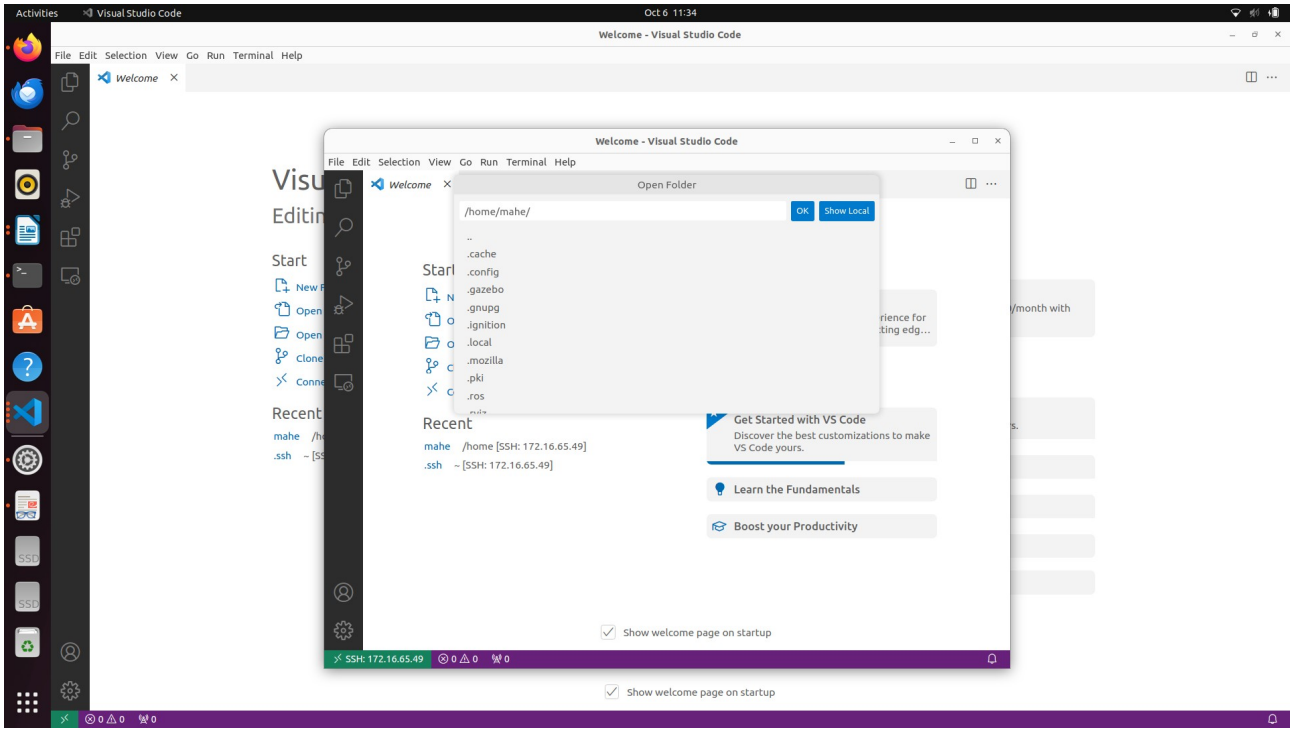
find the IP address

4. enter password (robolab)



File → Open new folder

select workspace



create workspace in the home folder

```
mkdir -p kobuki_ws/src
cd kobuki_ws/src
ros2 pkg create --build-type ament_python turtlebot_pkg --dependencies rclpy
cd ..
colcon build
```

open kobuki_ws/src/turtlebot_pkg folder in visual studio

create new file

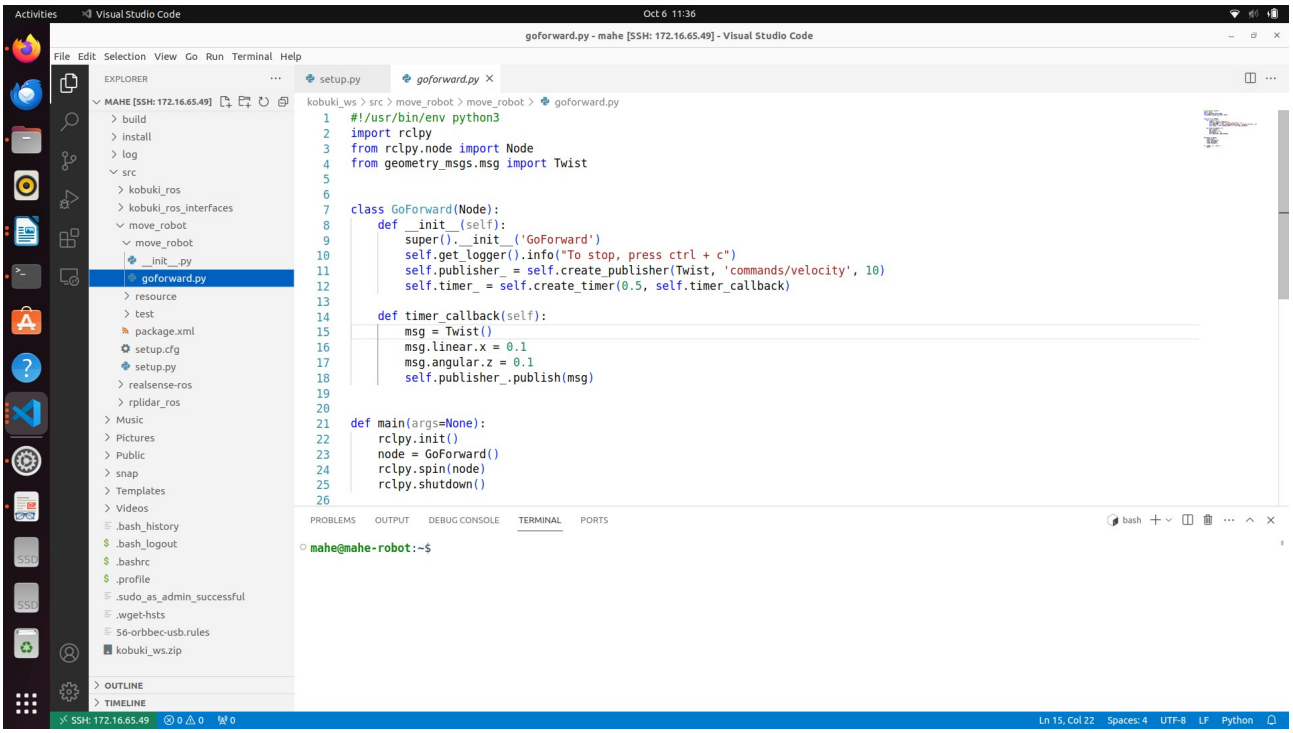
name it as goforward

type the following code

```
#!/usr/bin/env python3
import rclpy
from rclpy.node import Node
from geometry_msgs.msg import Twist


class GoForward(Node):
    def __init__(self):
        super().__init__('GoForward')
        self.get_logger().info("To stop, press ctrl + c")
        self.publisher_ = self.create_publisher(Twist, 'commands/velocity', 10)
        self.timer_ = self.create_timer(0.5, self.timer_callback)

    def timer_callback(self):
        msg = Twist()
        msg.linear.x = 0.1
        msg.angular.z = 0.0
        self.publisher_.publish(msg)


def main(args=None):
```

```
    rclpy.init()
    node = GoForward()
    rclpy.spin(node)
    rclpy.shutdown()

if __name__ == '__main__':
    main()
```

```
from setuptools import setup
package_name = 'turtlebot_pkg'

setup(
    name=package_name,
    version='0.0.0',
    packages=[package_name],
    data_files=[
        ('share/ament_index/resource_index/packages',
            ['resource/' + package_name]),
        ('share/' + package_name, ['package.xml']),
    ],
    install_requires=['setuptools'],
    zip_safe=True,
    maintainer='robolab',
    maintainer_email='robolab@todo.todo',
    description='TODO: Package description',
    license='TODO: License declaration',
    tests_require=['pytest'],
    entry_points={
        'console_scripts': [
            'goforward = turtlebot_pkg.goforward:main'
        ],
    },
)
```



cd ~/kobuki_ws

colcon build

Terminal 1

ros2 launch kobuki_node kobuki_node-launch.py

Terminal 2 (split the terminal)

ros2 run turtlebot_pkg goforward

Program 2:

Generate a square path using turtebot

#!/usr/bin/env python3

import rclpy

from rclpy.node import Node

from geometry_msgs.msg import Twist

import math

```
import time

class DrawSquare(Node):
    def __init__(self):
        super().__init__('draw_square')
        self.get_logger().info("Drawing Square")
        self.publisher_ = self.create_publisher(Twist, 'commands/velocity', 10)
        #self.timer_ = self.create_timer(0.5, self.timer_callback)
        move_vel = Twist()
        move_vel.linear.x = 0.2

        turn_vel = Twist()
        turn_vel.linear.x = 0.0
        turn_vel.angular.z = math.radians(45)
        count = 0
        while(True):
            self.get_logger().info("Going Straiggt")
            for x in range(0,10):
                self.publisher_.publish(move_vel)
                time.sleep(0.5)
            self.get_logger().info("Turning")
            for x in range(0,5):
                self.publisher_.publish(turn_vel)
                time.sleep(0.5)
            count = count+1
            if (count == 4):
                count = 0


def main(args=None):
    rclpy.init()
    node = DrawSquare()
    rclpy.spin(node)
    rclpy.shutdown()

if __name__ == '__main__':
```

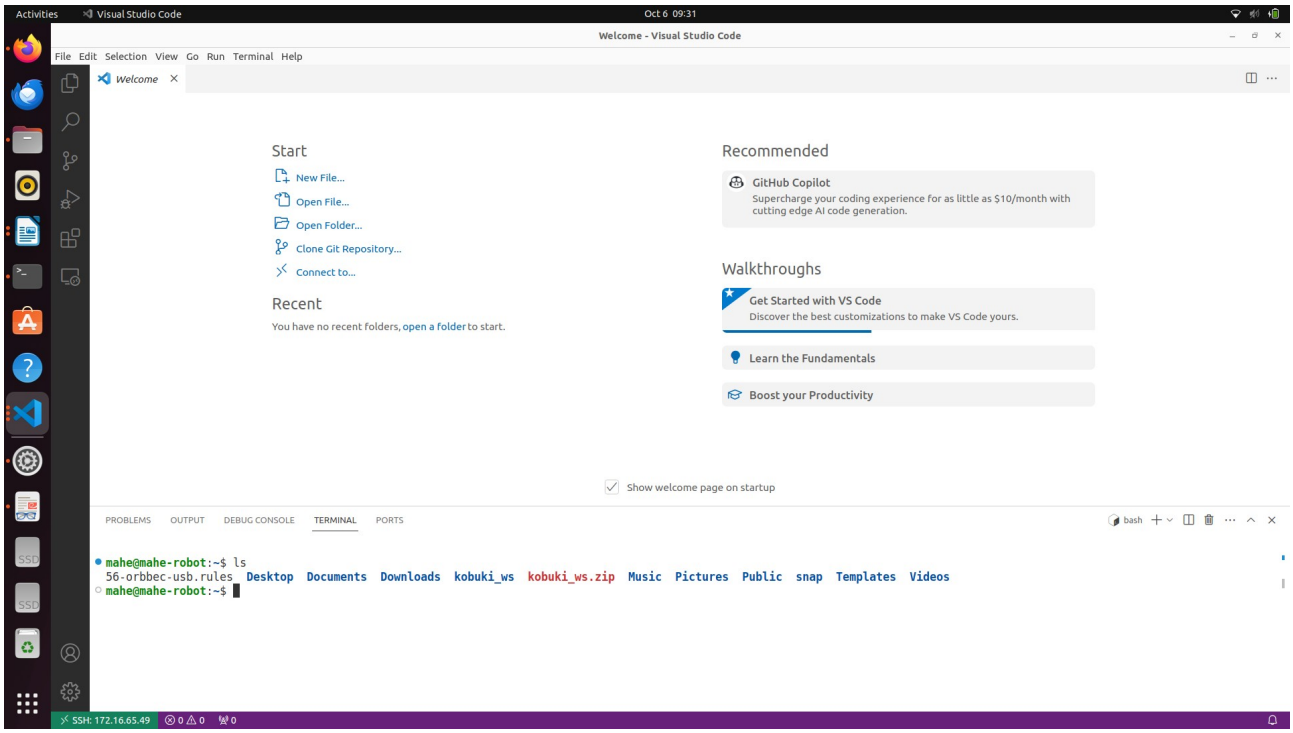
```
    main()


from setuptools import setup

package_name = 'turtlebot_pkg'

setup(
    name=package_name,
    version='0.0.0',
    packages=[package_name],
    data_files=[
        ('share/ament_index/resource_index/packages',
            ['resource/' + package_name]),
        ('share/' + package_name, ['package.xml']),
    ],
    install_requires=['setuptools'],
    zip_safe=True,
    maintainer='robolab',
    maintainer_email='robolab@todo.todo',
    description='TODO: Package description',
    license='TODO: License declaration',
    tests_require=['pytest'],
    entry_points={
        'console_scripts': [
            'goforward = turtlebot_pkg.goforward:main',
            'square = turtlebot_pkg.draw_square:main'
        ],
    },
)
```

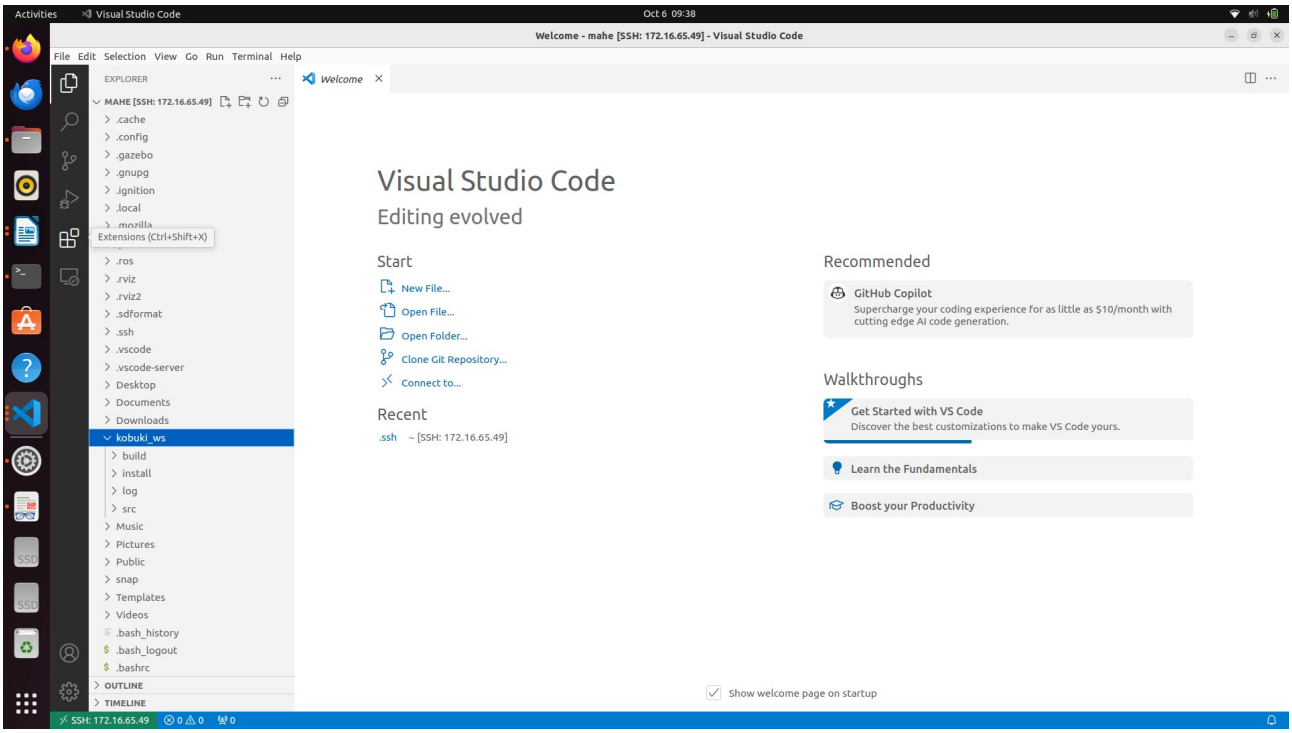
Check the battery status of the turtlebot

```
#!/usr/bin/env python3
```

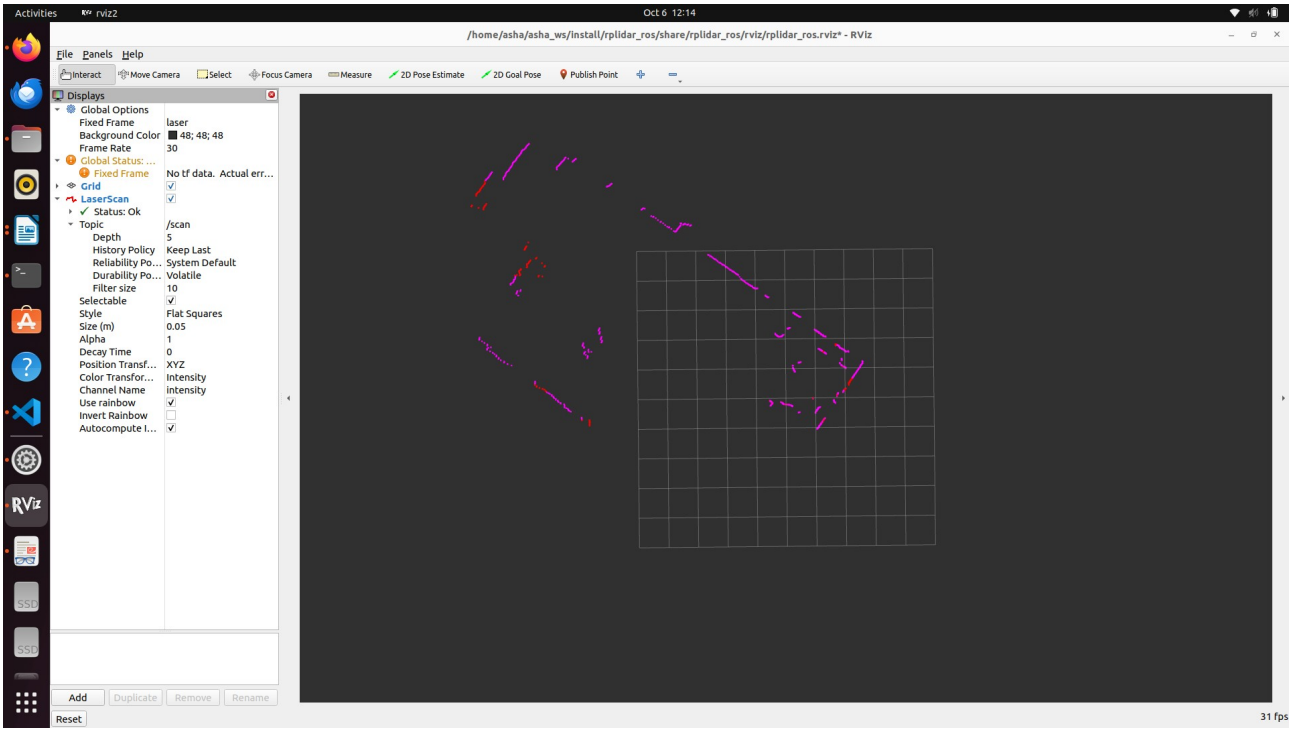
```
import rclpy
from sensor_msgs.msg import BatteryState
from rclpy.node import Node

class BatteryStatus(Node):
    def __init__(self):
        super().__init__('battery_status')
        self.subscriber_ =
self.create_subscription(BatteryState,'sensors/battery_state',self.status_callback, 10)

    def status_callback(self,msg):
        self.get_logger().info("Current Battery Status of the Turtlebot is " +
str(msg.percentage))



def main(args=None):
    rclpy.init()
    node = BatteryStatus()
    rclpy.spin(node)
    rclpy.shutdown()

if __name__ == '__main__':
    main()




from setuptools import setup

package_name = 'turtlebot_pkg'

setup(
    name=package_name,
    version='0.0.0',
    packages=[package_name],
    data_files=[
        ('share/ament_index/resource_index/packages',
            ['resource/' + package_name]),
```

```
        ('share/' + package_name, ['package.xml']),
    ],
    install_requires=['setuptools'],
    zip_safe=True,
    maintainer='robolab',
    maintainer_email='robolab@todo.todo',
    description='TODO: Package description',
    license='TODO: License declaration',
    tests_require=['pytest'],
    entry_points={
        'console_scripts': [
            'goforward = turtlebot_pkg.goforward:main',
            'square = turtlebot_pkg.draw_square:main',
            'battery = turtlebot_pkg.battery_status:main'
        ],
    },
)
```

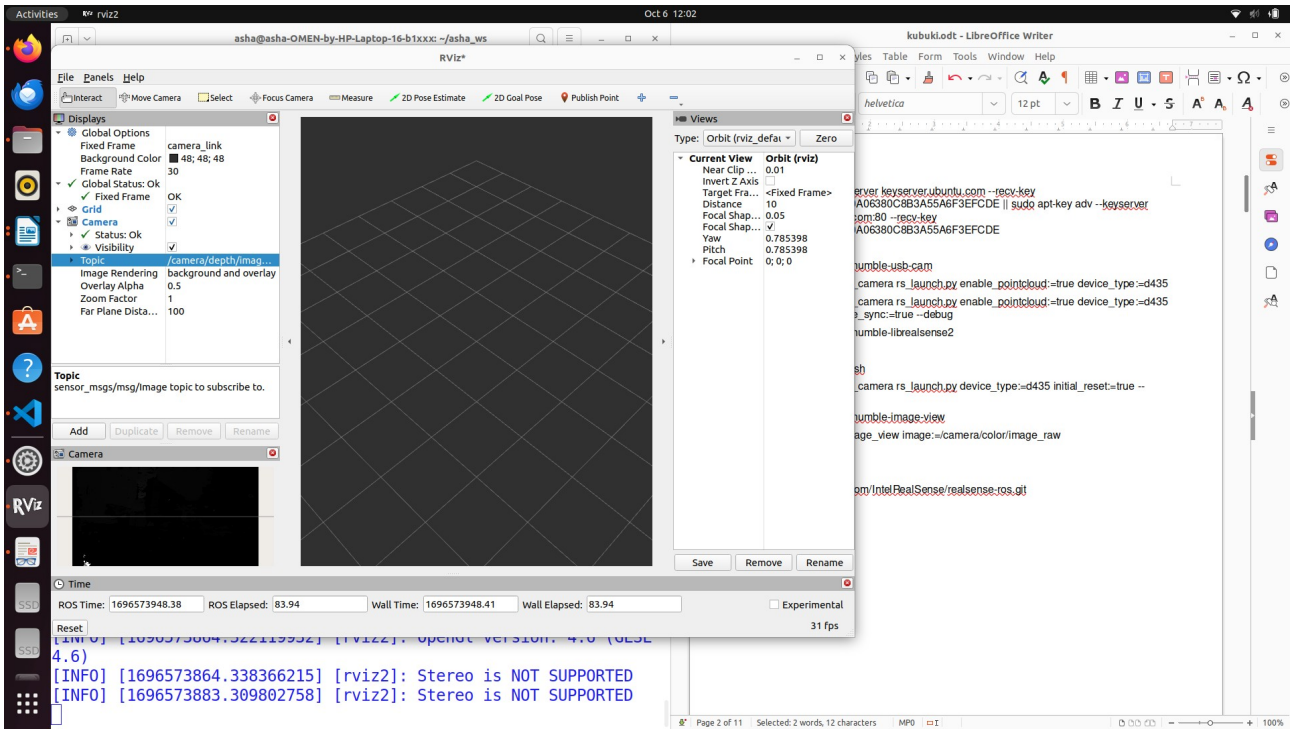

Activities
Visual Studio Code
Oct 6 09:31
Welcome - Visual Studio Code
File Edit Selection View Go Run Terminal Help
Welcome
Start
New File...
Open File...
Open Folder...
Clone Git Repository...
Connect to...
Recent
You have no recent folders, open a folder to start.
Recommended
GitHub Copilot
Supercharge your coding experience for as little as $10/month with cutting edge AI code generation.
Walkthroughs
Get Started with VS Code
Discover the best customizations to make VS Code yours.
Learn the Fundamentals
Boost your Productivity
Show welcome page on startup
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
bash
mahe@mahe-robot:~$ ls
56-orbbec-usb.rules Desktop Documents Downloads kobuki_ws kobuki_ws.zip Music Pictures Public snap Templates Videos
mahe@mahe-robot:~$
SSH: 172.16.65.49

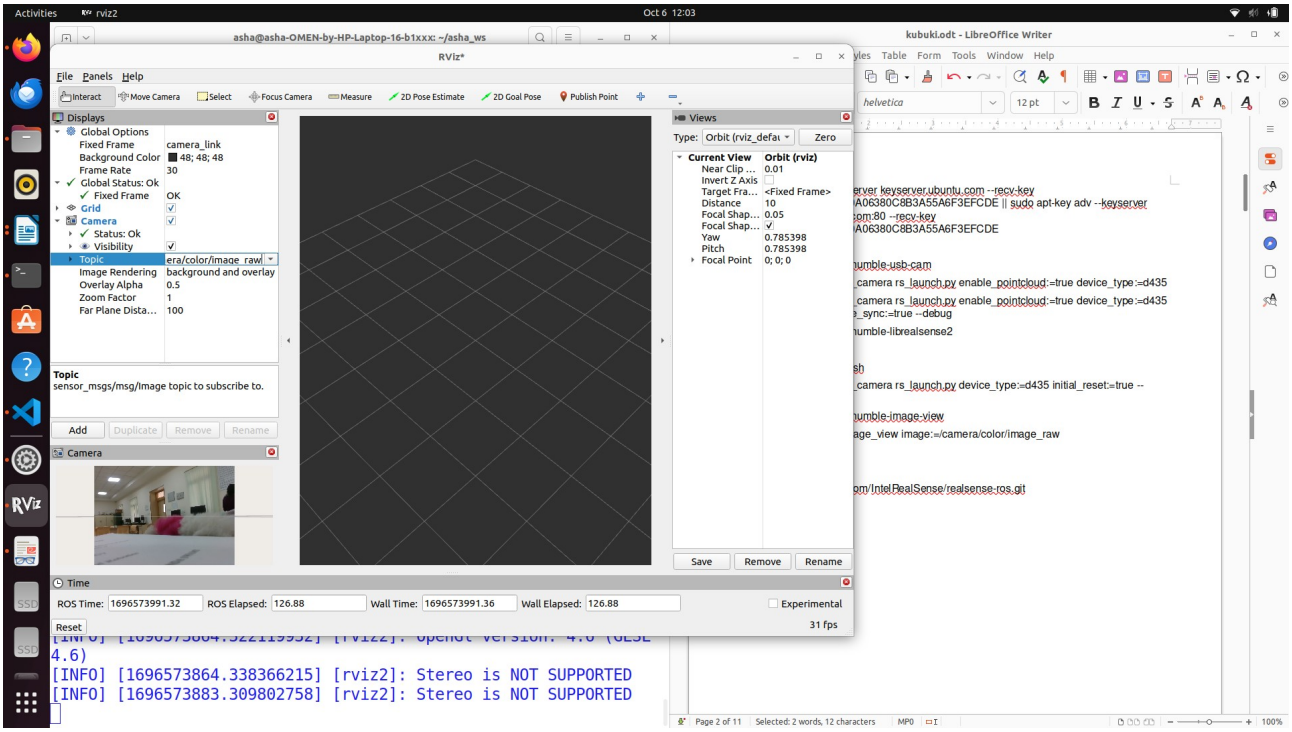

Activities
Visual Studio Code
Oct 6 09:38
Welcome - mahe [SSH: 172.16.65.49] - Visual Studio Code
File Edit Selection View Go Run Terminal Help
EXPLORER
MAHE [SSH: 172.16.65.49]
.cache
.config
.gazebo
.gnupg
.ignition
.local
.mozilla
Extensions (Ctrl+Shift+X)
.ros
.rviz
.rviz2
.sdformat
.ssh
.vscode
.vscode-server
Desktop
Documents
Downloads
kobuki_ws
build
install
log
src
Music
Pictures
Public
snap
Templates
Videos
.bash_history
.bash_logout
.bashrc
OUTLINE
TIMELINE
Welcome
Visual Studio Code
Editing evolved
Start
New File...
Open File...
Open Folder...
Clone Git Repository...
Connect to...
Recent
.ssh ~ [SSH: 172.16.65.49]
Recommended
GitHub Copilot
Supercharge your coding experience for as little as $10/month with cutting edge AI code generation.
Walkthroughs
Get Started with VS Code
Discover the best customizations to make VS Code yours.
Learn the Fundamentals
Boost your Productivity
Show welcome page on startup
SSH: 172.16.65.49

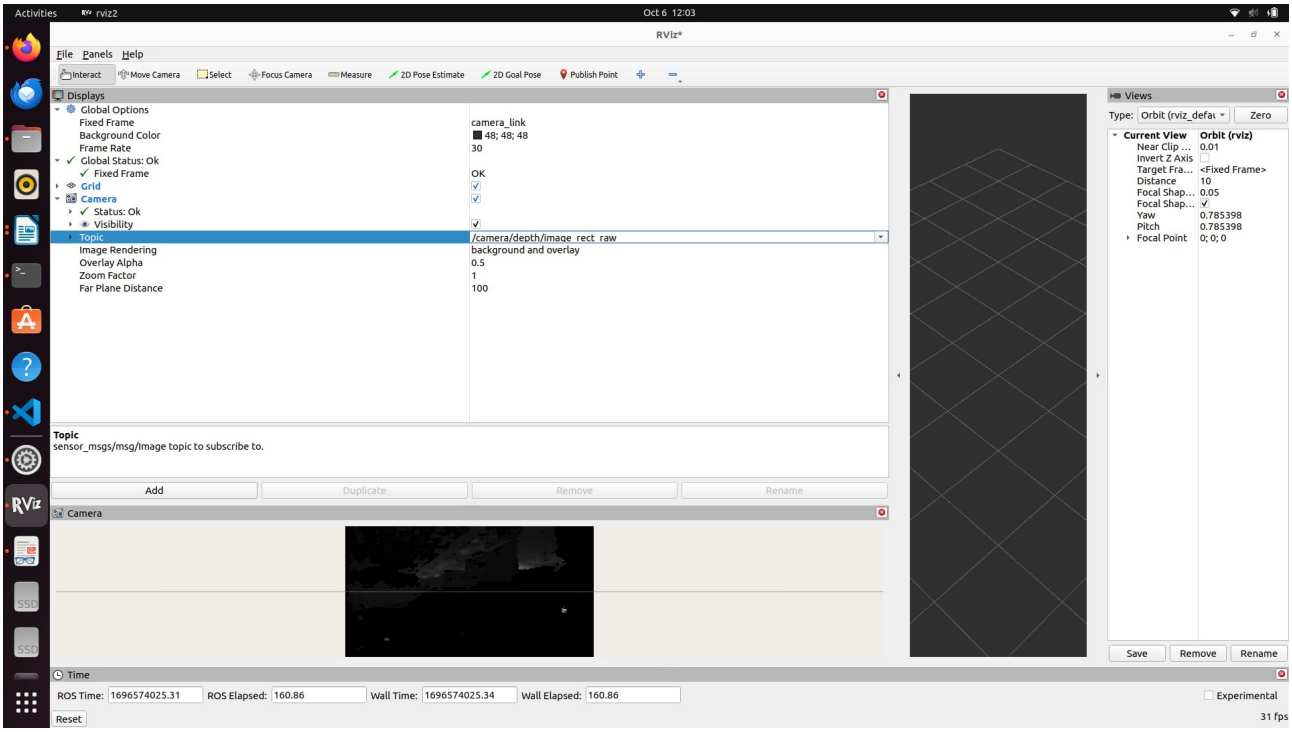
Lidar interfacing

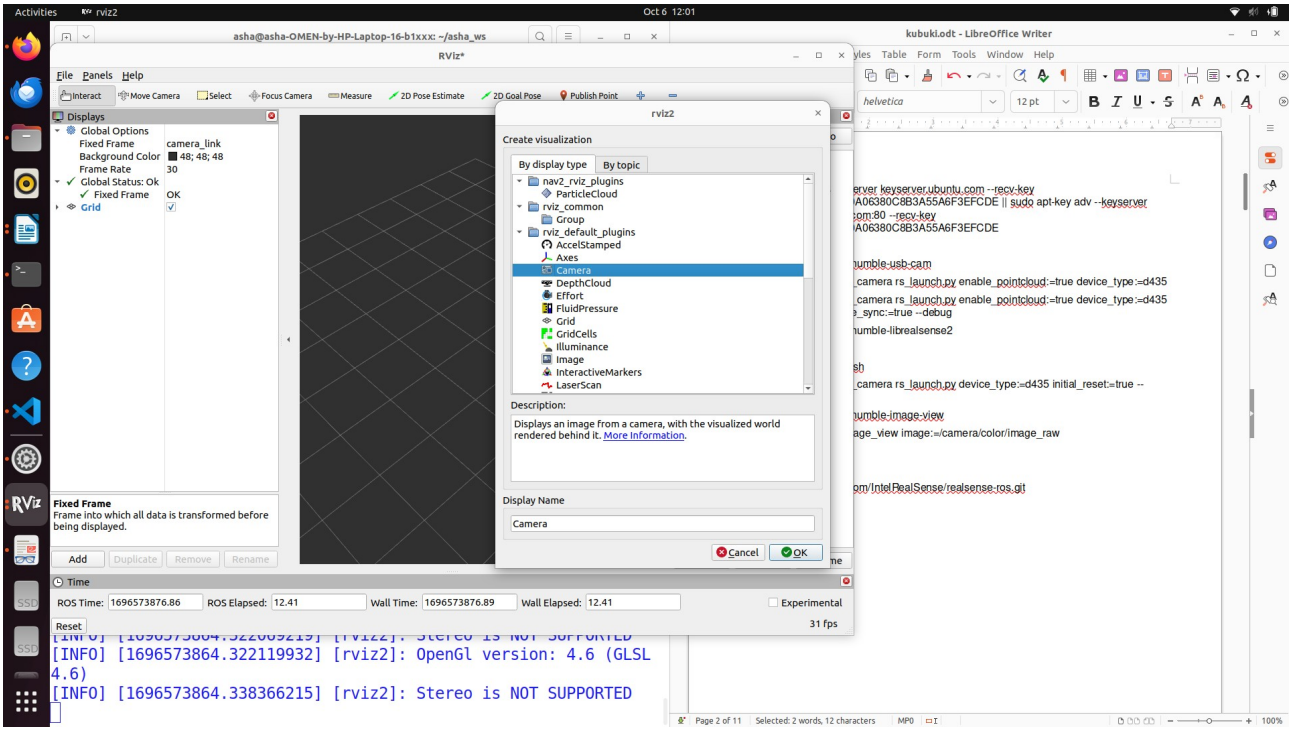


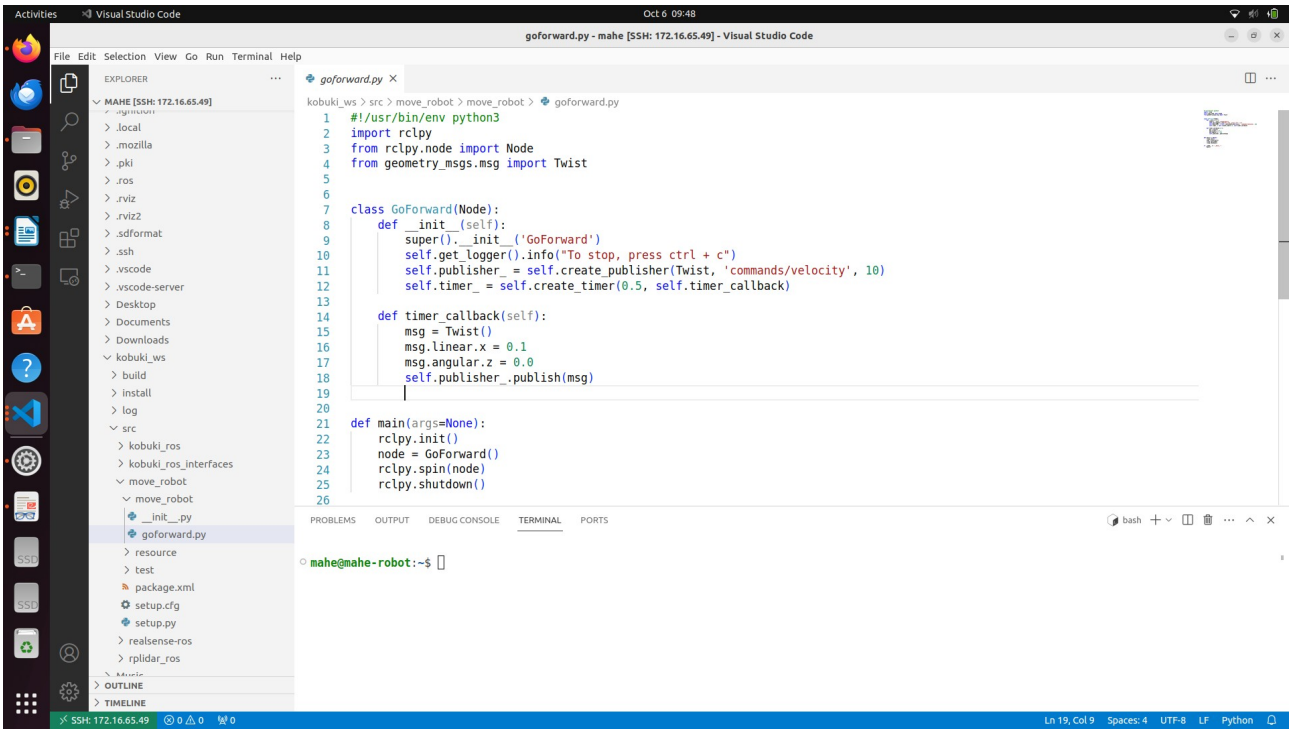
Depth camera interfacing




Activities
rviz2
Oct 6 12:03
asha@asha-OMEN-by-HP-Laptop-16-b1xxx: ~/asha_ws
RViz*
File Panels Help
Interact Move Camera Select Focus Camera Measure 2D Pose Estimate 2D Goal Pose Publish Point
Displays
Global Options
Fixed Frame camera_link
Background Color 48; 48; 48
Frame Rate 30
Global Status: Ok
Fixed Frame OK
Grid
Camera
Status: Ok
Visibility
Topic era/color/image_raw
Image Rendering background and overlay
Overlay Alpha 0.5
Zoom Factor 1
Far Plane Dista... 100
Topic
sensor_msgs/msg/Image topic to subscribe to.
Add Duplicate Remove Rename
Camera
Views
Type: Orbit (rviz_defa
Zero
Current View Orbit (rviz)
Near Clip ... 0.01
Invert Z Axis
Target Fra... <Fixed Frame>
Distance 10
Focal Shap... 0.05
Focal Shap...
Yaw 0.785398
Pitch 0.785398
Focal Point 0; 0; 0
Save Remove Rename
Time
ROS Time: 1696573991.32
ROS Elapsed: 126.88
Wall Time: 1696573991.36
Wall Elapsed: 126.88
Experimental
Reset
31 fps
4.6)
[INFO] [1696573864.338366215] [rviz2]: Stereo is NOT SUPPORTED
[INFO] [1696573883.309802758] [rviz2]: Stereo is NOT SUPPORTED
kubuki.odt - LibreOffice Writer
Edit Styles Table Form Tools Window Help
helvetica
12 pt
Page 2 of 11
Selected: 2 words, 12 characters
MPO
100%


Activities
rviz2
Oct 6 12:03
RViz*
File Panels Help
Interact Move Camera Select Focus Camera Measure 2D Pose Estimate 2D Goal Pose Publish Point
Displays
Global Options
Fixed Frame camera_link
Background Color 48; 48; 48
Frame Rate 30
Global Status: Ok
Fixed Frame OK
Grid
Camera
Status: Ok
Visibility
Topic /camera/depth/image_rect_raw
Image Rendering background and overlay
Overlay Alpha 0.5
Zoom Factor 1
Far Plane Distance 100
Topic
sensor_msgs/msg/Image topic to subscribe to.
Add Duplicate Remove Rename
Camera
Views
Type: Orbit (rviz_defa
Zero
Current View Orbit (rviz)
Near Clip ... 0.01
Invert Z Axis
Target Fra... <Fixed Frame>
Distance 10
Focal Shap... 0.05
Focal Shap...
Yaw 0.785398
Pitch 0.785398
Focal Point 0; 0; 0
Save Remove Rename
Time
ROS Time: 1696574025.31
ROS Elapsed: 160.86
Wall Time: 1696574025.34
Wall Elapsed: 160.86
Experimental
Reset
31 fps


Activities
rviz2
Oct 6 12:01
asha@asha-OMEN-by-HP-Laptop-16-b1xxx: ~/asha_ws
RViz*
File Panels Help
Interact Move Camera Select Focus Camera Measure 2D Pose Estimate 2D Goal Pose Publish Point
Displays
Global Options
Fixed Frame camera_link
Background Color 48; 48; 48
Frame Rate 30
Global Status: Ok
Fixed Frame OK
Grid
Fixed Frame
Frame into which all data is transformed before being displayed.
Add Duplicate Remove Rename
rviz2
Create visualization
By display type By topic
nav2_rviz_plugins
ParticleCloud
rviz_common
Group
rviz_default_plugins
AccelStamped
Axes
Camera
DepthCloud
Effort
FluidPressure
Grid
GridCells
Illuminance
Image
InteractiveMarkers
LaserScan
Description:
Displays an image from a camera, with the visualized world rendered behind it. More Information.
Display Name
Camera
Cancel OK
Time
ROS Time: 1696573876.86 ROS Elapsed: 12.41 Wall Time: 1696573876.89 Wall Elapsed: 12.41
Experimental
Reset
31 fps
[INFO] [1696573864.322119932] [rviz2]: OpenGl version: 4.6 (GLSL 4.6)
[INFO] [1696573864.338366215] [rviz2]: Stereo is NOT SUPPORTED
kubuki.odt - LibreOffice Writer
File Edit View Insert Format Styles Table Form Tools Window Help
helvetica 12 pt
Page 2 of 11 Selected: 2 words, 12 characters MP0 100%


Activities
Visual Studio Code
Oct 6 09:48
goforward.py - mahe [SSH: 172.16.65.49] - Visual Studio Code
File Edit Selection View Go Run Terminal Help
EXPLORER
MAHE [SSH: 172.16.65.49]
.local
.mozilla
.pki
.ros
.rviz
.rviz2
.sdformat
.ssh
.vscode
.vscode-server
Desktop
Documents
Downloads
kobuki_ws
build
install
log
src
kobuki_ros
kobuki_ros_interfaces
move_robot
move_robot
__init__.py
goforward.py
resource
test
package.xml
setup.cfg
setup.py
realsense-ros
rplidar_ros
OUTLINE
TIMELINE
goforward.py
kobuki_ws > src > move_robot > move_robot > goforward.py
#!/usr/bin/env python3
import rclpy
from rclpy.node import Node
from geometry_msgs.msg import Twist
class GoForward(Node):
def __init__(self):
super().__init__('GoForward')
self.get_logger().info("To stop, press ctrl + c")
self.publisher_ = self.create_publisher(Twist, 'commands/velocity', 10)
self.timer_ = self.create_timer(0.5, self.timer_callback)
def timer_callback(self):
msg = Twist()
msg.linear.x = 0.1
msg.angular.z = 0.0
self.publisher_.publish(msg)
def main(args=None):
rclpy.init()
node = GoForward()
rclpy.spin(node)
rclpy.shutdown()
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
bash
mahe@mahe-robot:~$
SSH: 172.16.65.49
Ln 19, Col 9 Spaces: 4 UTF-8 LF Python