ROS2 Object Detection and Tracking in field Autonomous Vehicles
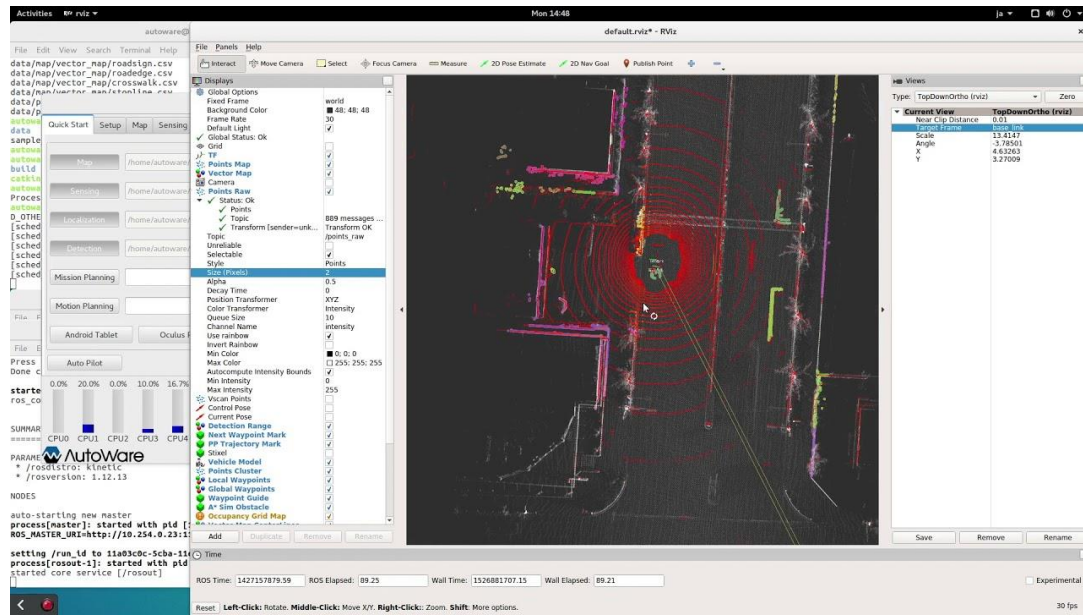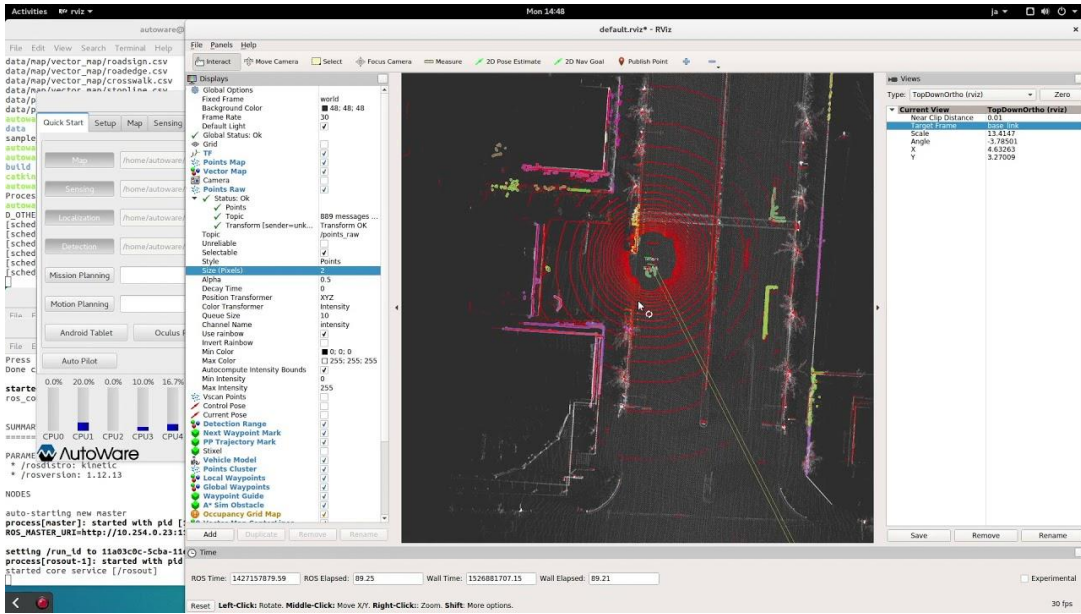
Scope will
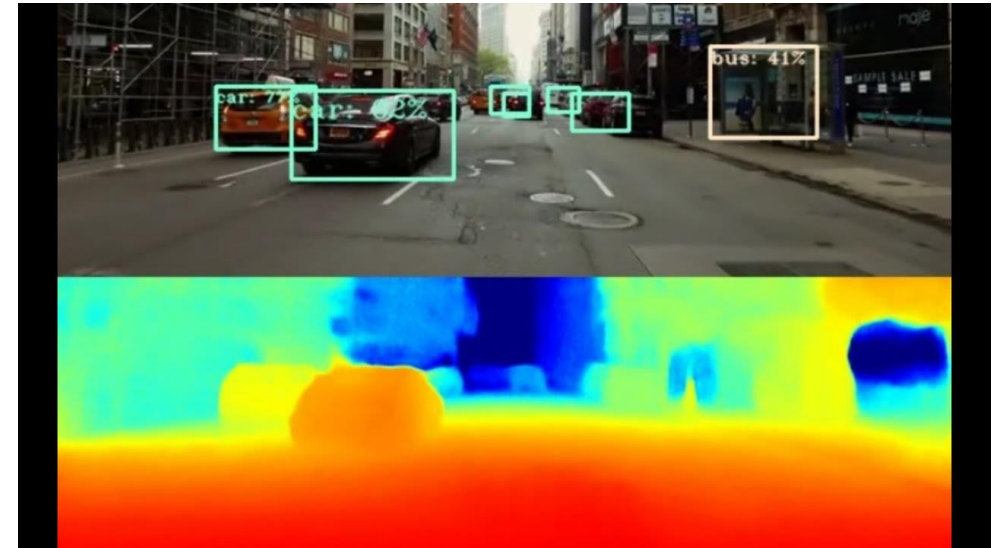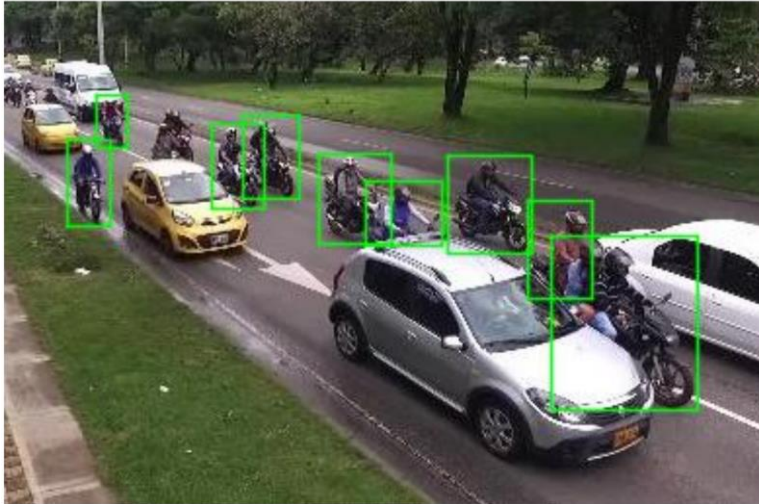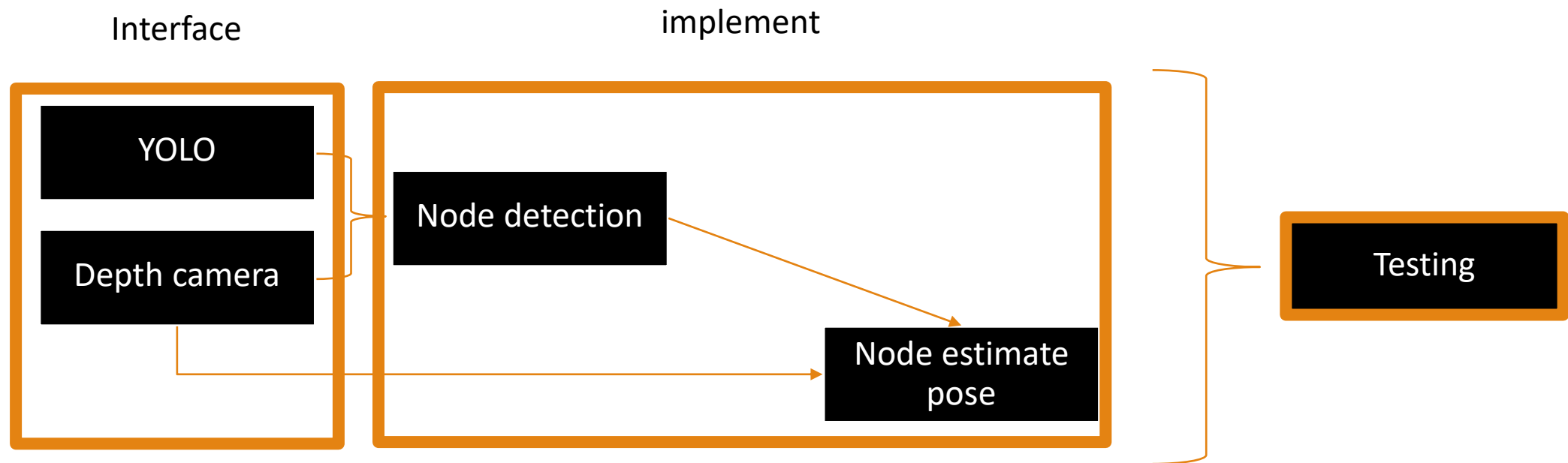
Scope will

Scope will

Scope will

Overview

Interface

implement

YOLO

Depth camera

Node detection

Node estimate pose

Testing

Select model
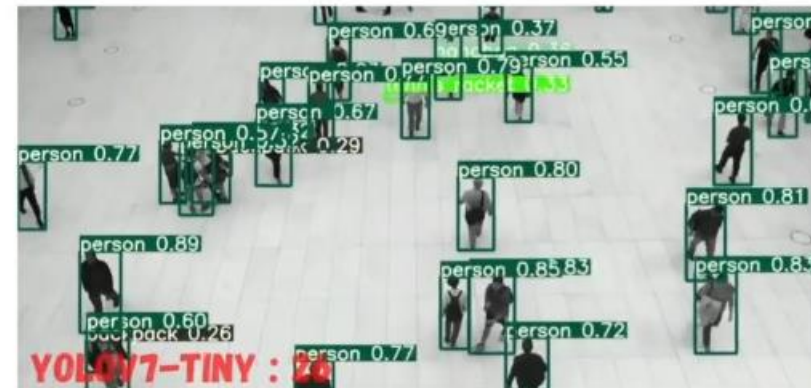
Select model

YOLOV5-NANO AND YOLOV7-TINY WITH TENSORRT ON JETSON NANO DEVELOPER KIT

YOLOV5-NANO : 33 FPS

YOLOV7-TINY : 26 FPS

Select camera

Intel realsense Depth camera D455

Problem

1280x720

QOS

rclpy

Navigation

Quick search

[   ] Go

Quality of Service

class `rclpy.qos.DurabilityPolicy`

Enum for QoS Durability settings.

This enum matches the one defined in rmw/types.h

`RMW_QOS_POLICY_DURABILITY_SYSTEM_DEFAULT` = *0*

`RMW_QOS_POLICY_DURABILITY_TRANSIENT_LOCAL` = *1*

`RMW_QOS_POLICY_DURABILITY_UNKNOWN` = *3*

`RMW_QOS_POLICY_DURABILITY_VOLATILE` = *2*

`SYSTEM_DEFAULT` = *0* ¶

`TRANSIENT_LOCAL` = *1*

`UNKNOWN` = *3*

`VOLATILE` = *2*

class `rclpy.qos.HistoryPolicy`

Enum for QoS History settings.

This enum matches the one defined in rmw/types.h
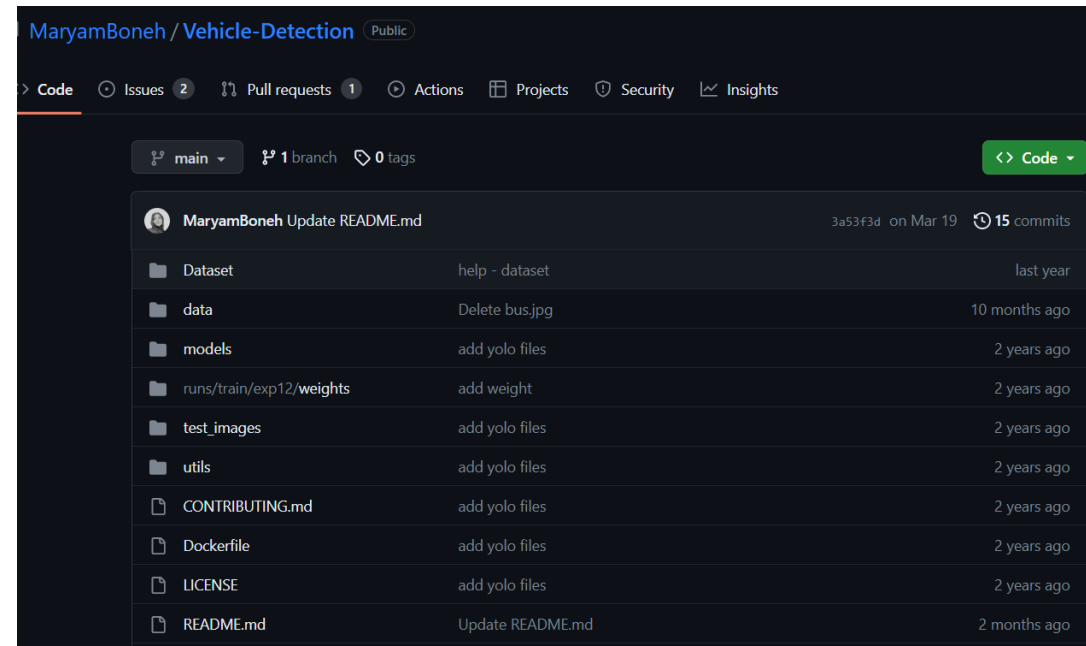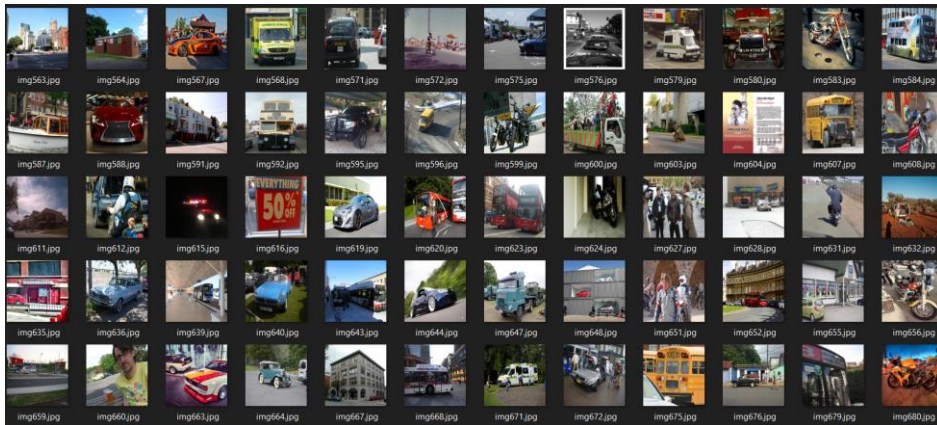
`KEEP_ALL` = *2*

`KEEP_LAST` = *1*

`RMW_QOS_POLICY_HISTORY_KEEP_ALL` = *2*

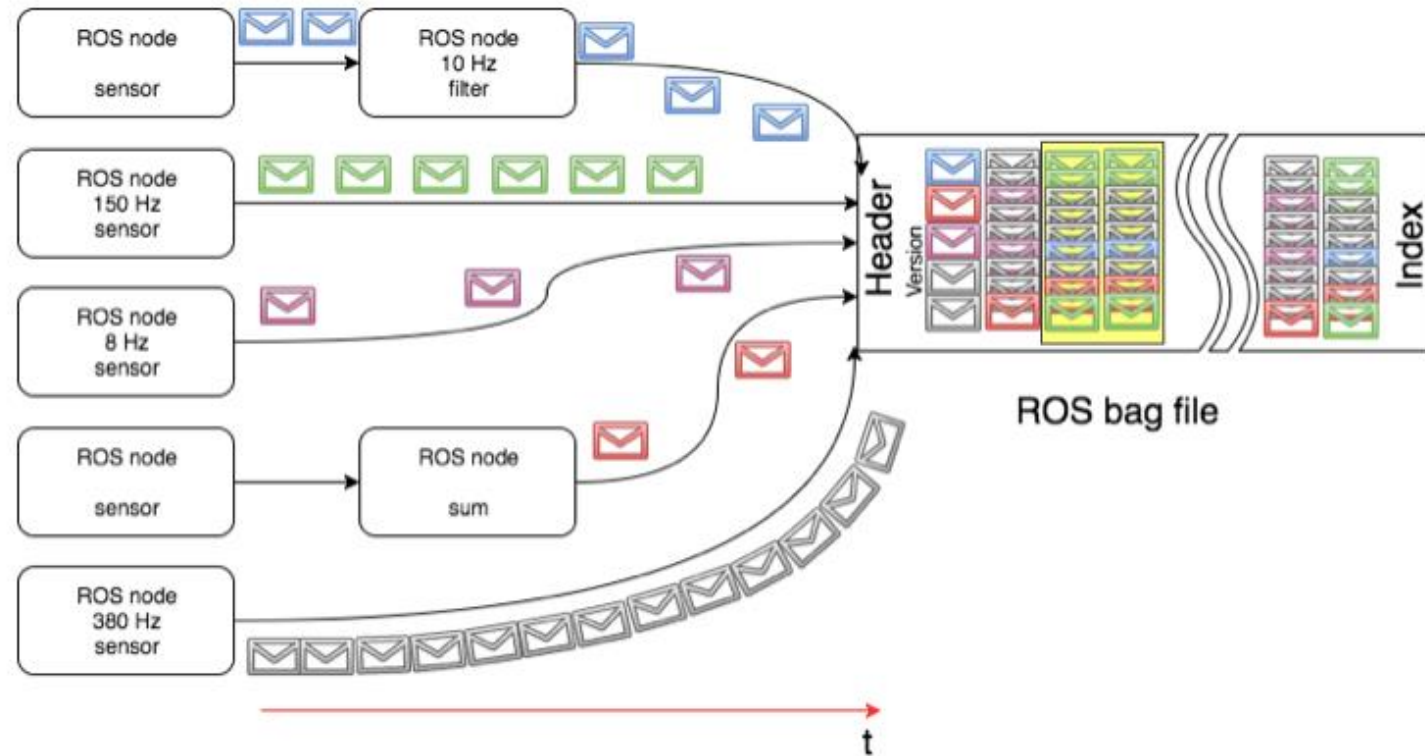`RMW_QOS_POLICY_HISTORY_KEEP_LAST` = *1*

`RMW_QOS_POLICY_HISTORY_SYSTEM_DEFAULT` = *0*

Dataset

Test model

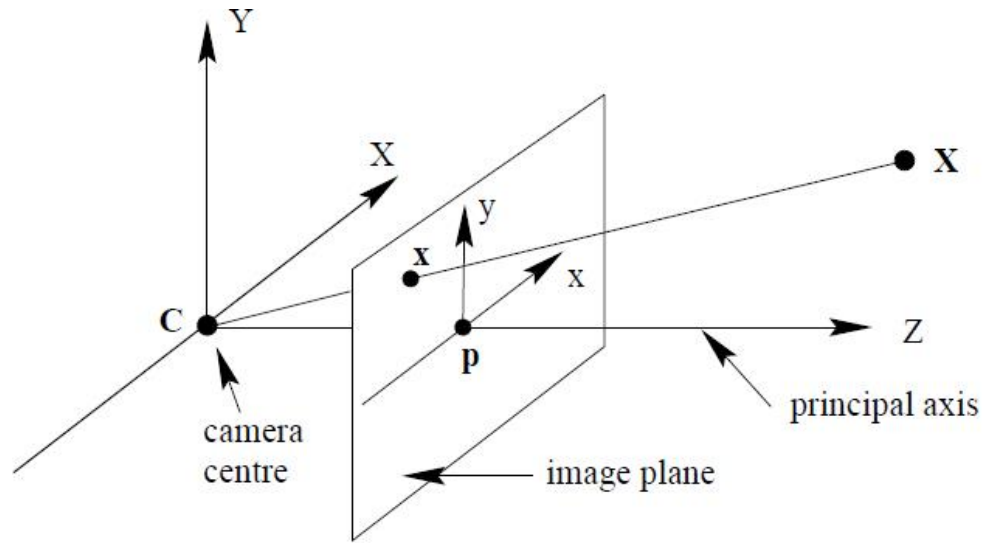| Confidence	Image size	Accuracy	average Runtime/image
0.8	original size	0.719457014	0.140
0.5	original size	0.9095	0.140
0.5	720x480	0.65158371	0.041
0.5	480x240	0.416289593	0.035

Ros bag

ROS bag file

Testing camera
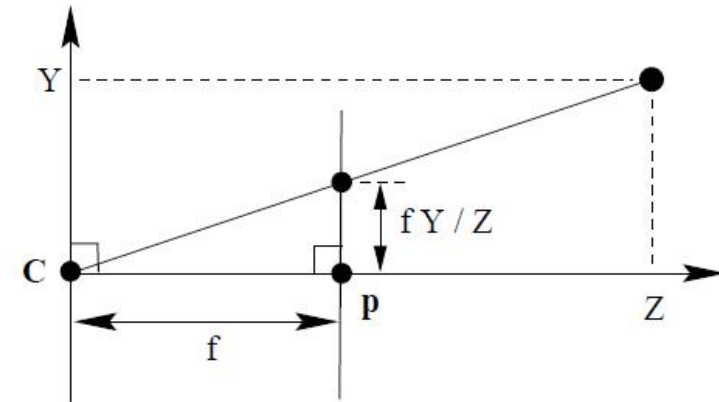
Testing camera

Testing camera
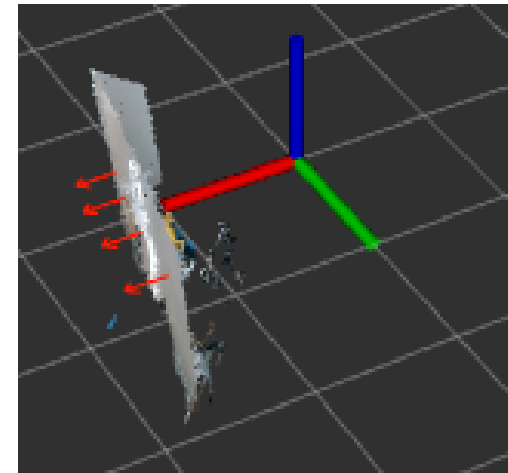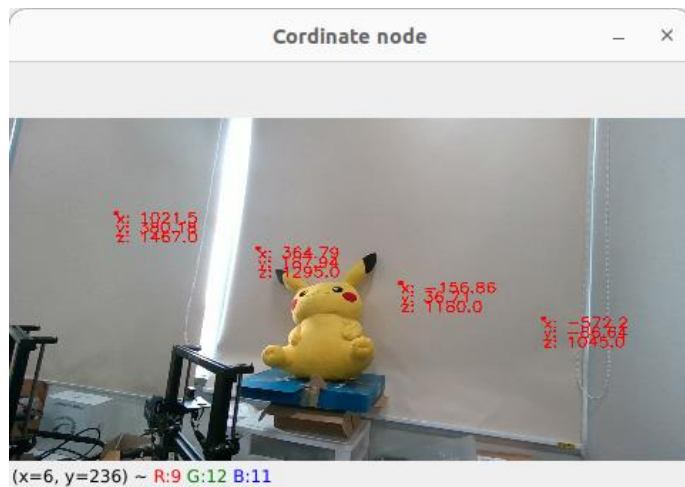
Testing node
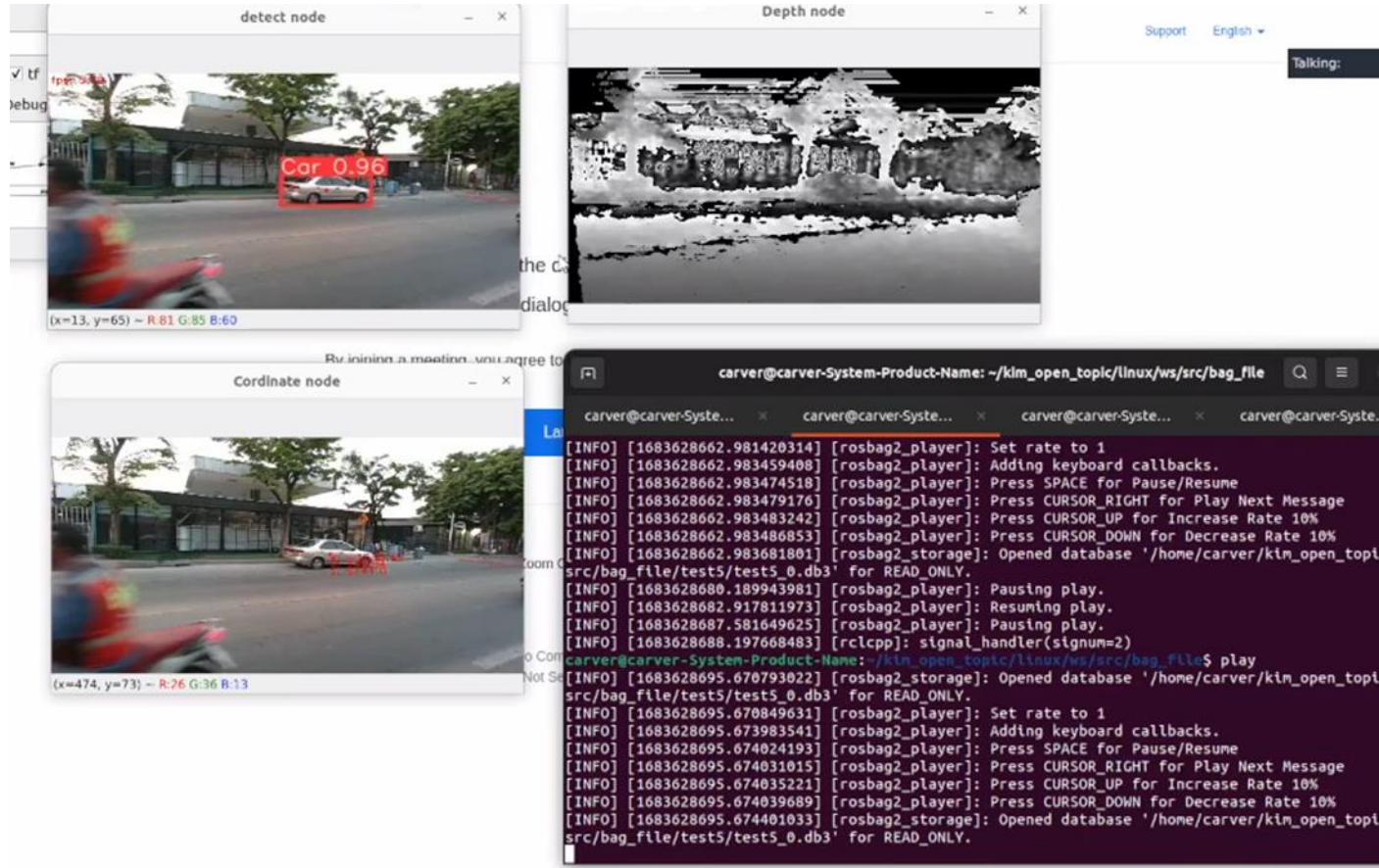
Problem test node

FEATURE	D455/D457
Depth Accuracy[2]	<2% at 4 m
Minimum Depth Distance (Min-Z) at Max Resolution:	~52 cm
Ideal Range:	.6 m to 6 m

operating temperature 0ºC and 35ºC.
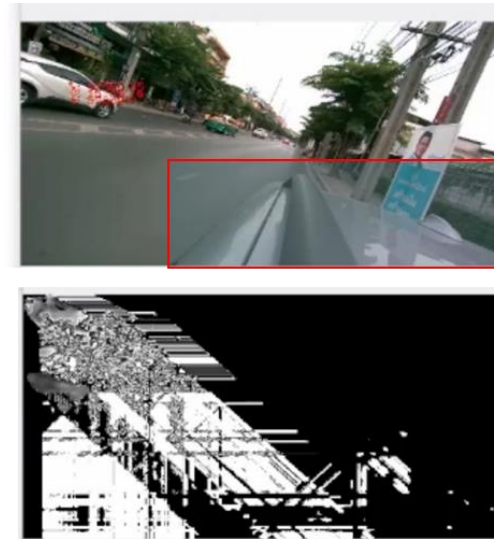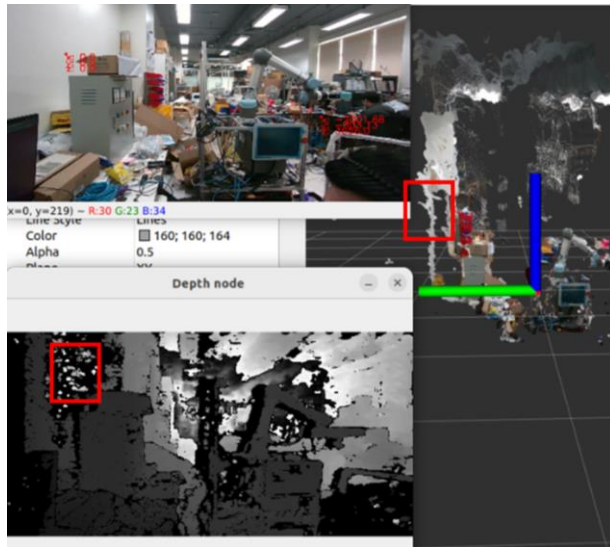
fps: 5.59

(x=465, y=200) ~ R:253 G:158 B:253

Problem test node

Optimize

Single tread

mutithread

Optimize
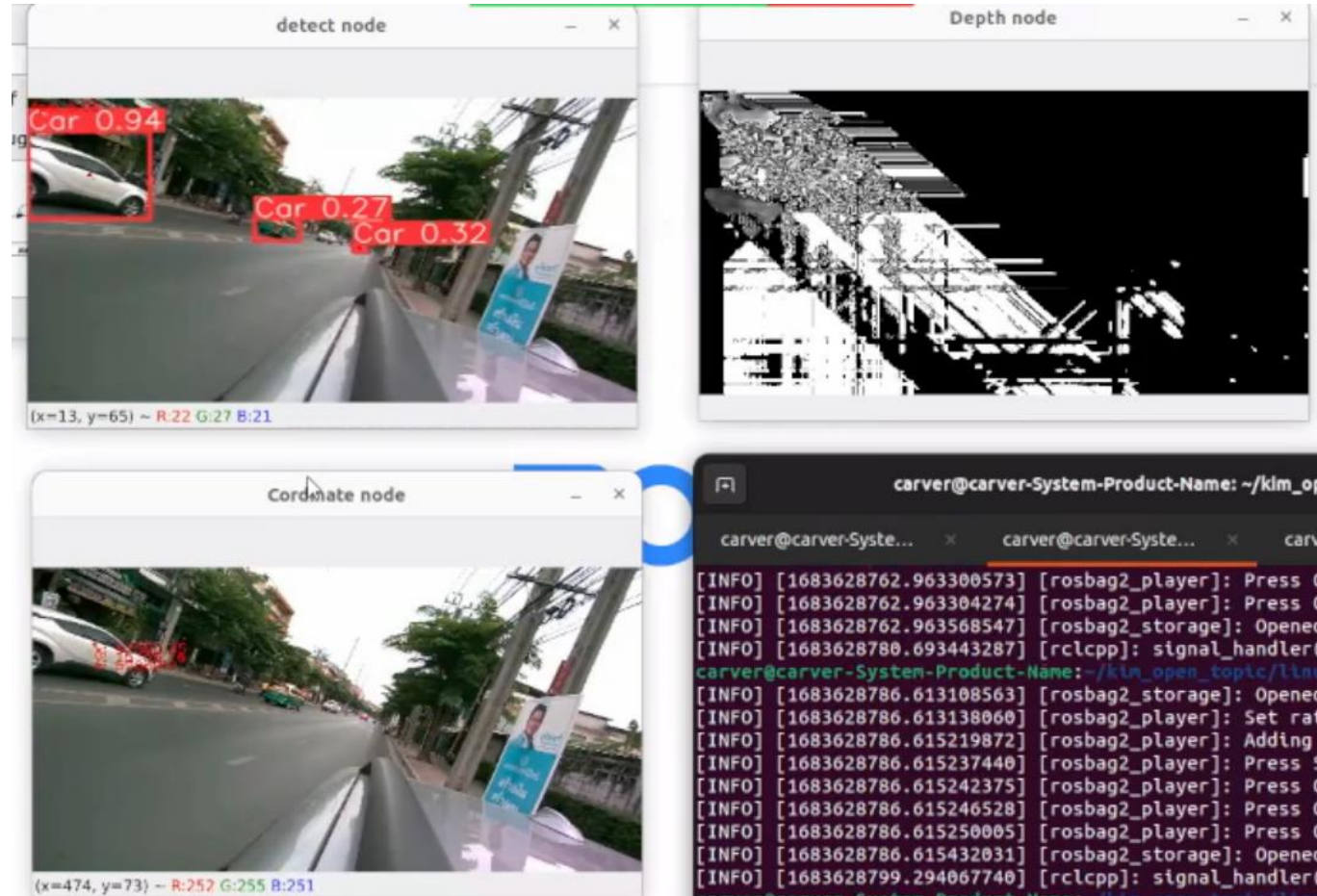
Lessons learned

o YoloV5

o Depth frame

o Pinhole camera

o Qos
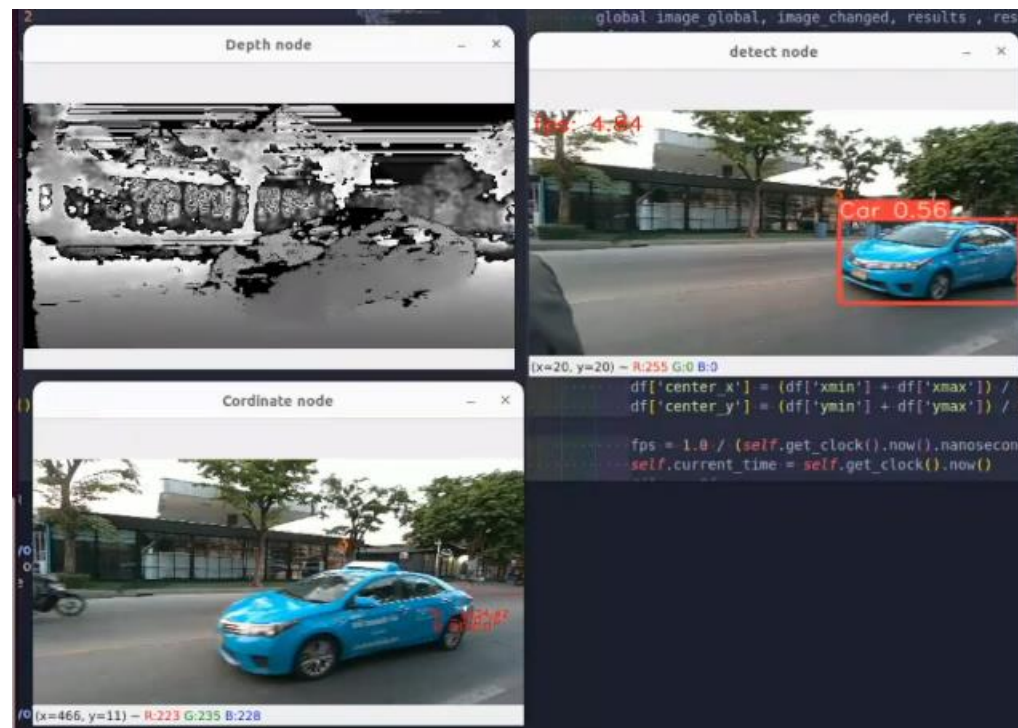
o Ros bag
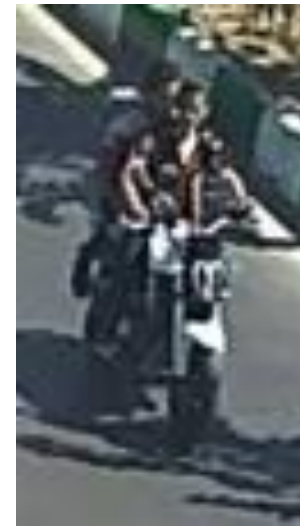
o time management

o work scurm update

Lessons miss

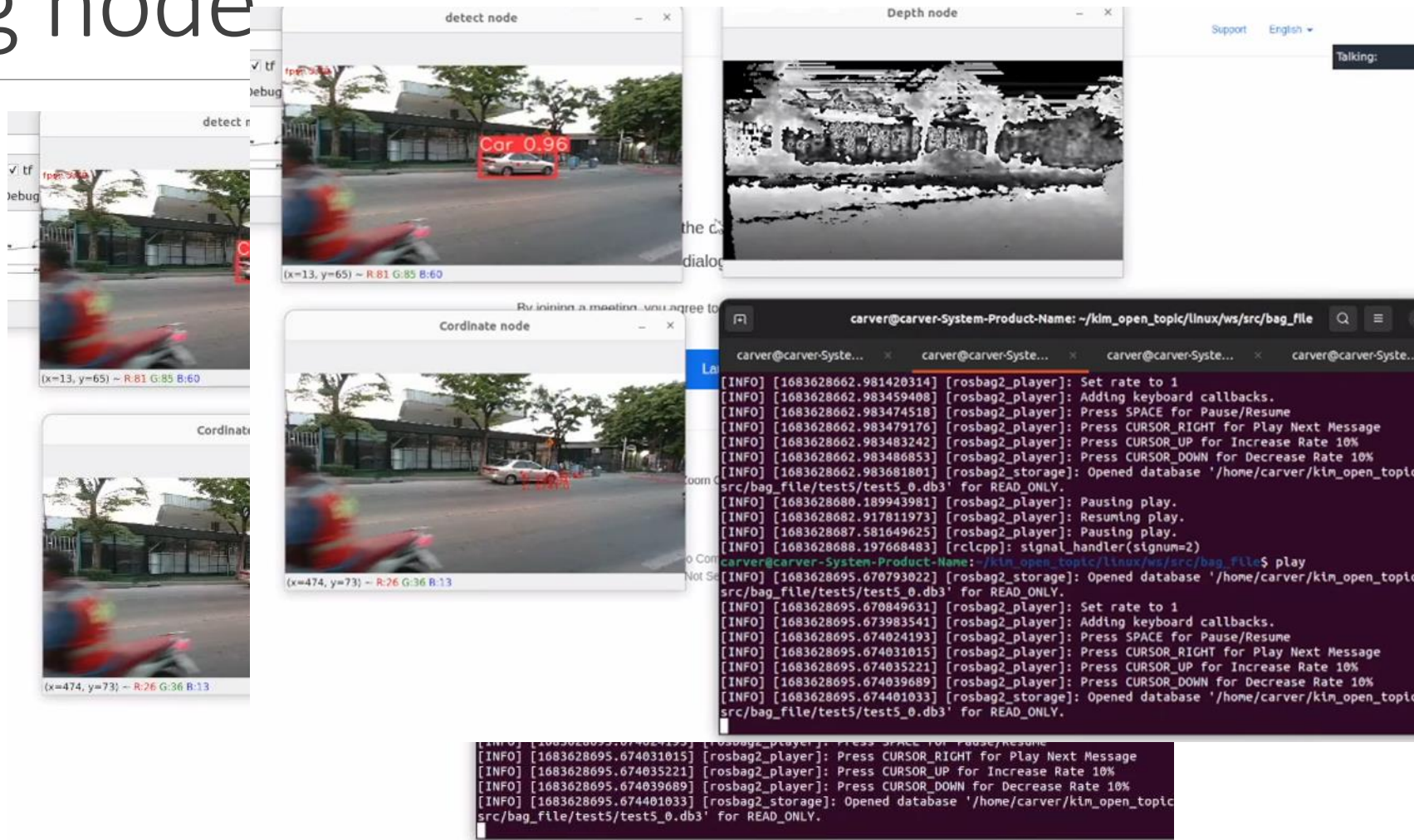o image recognition

o autoware

Thank you

Problem test node

Problem model

Testing node

Testing node overview