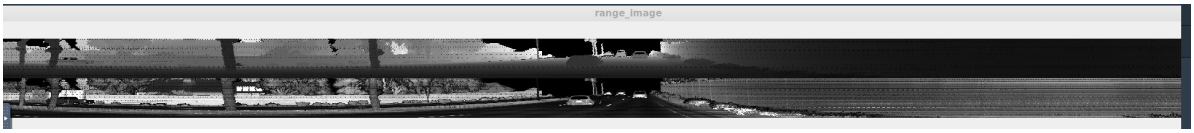
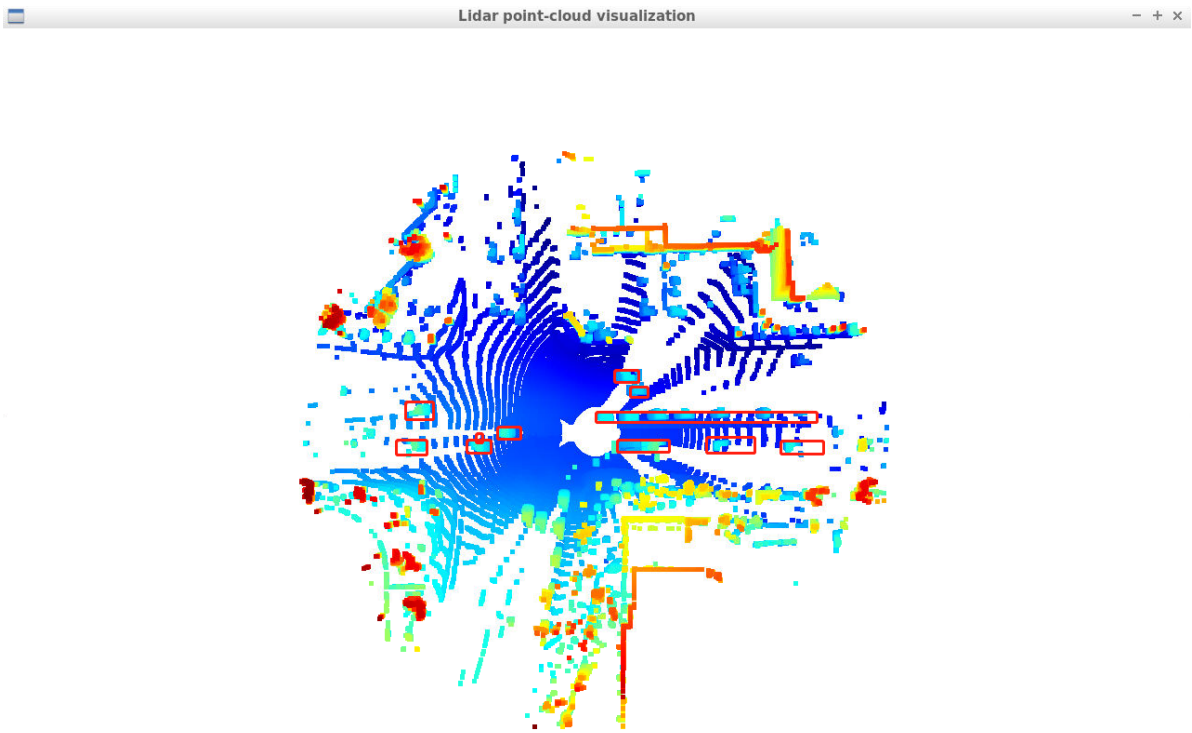
Step 1. Converting Range Images to Point Clouds

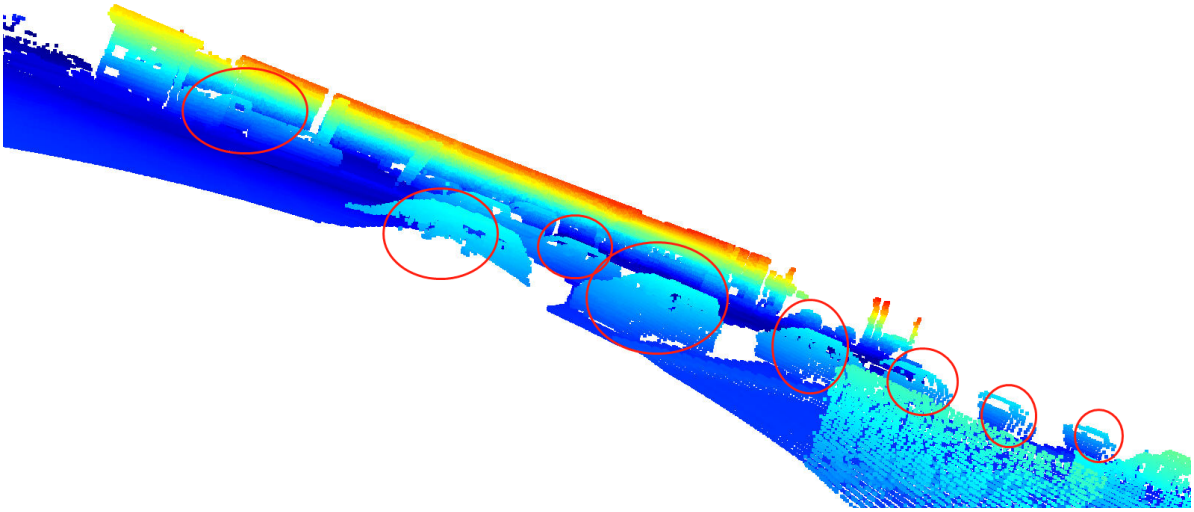
1. Visualizing Range Images(ID_S1_EX1)



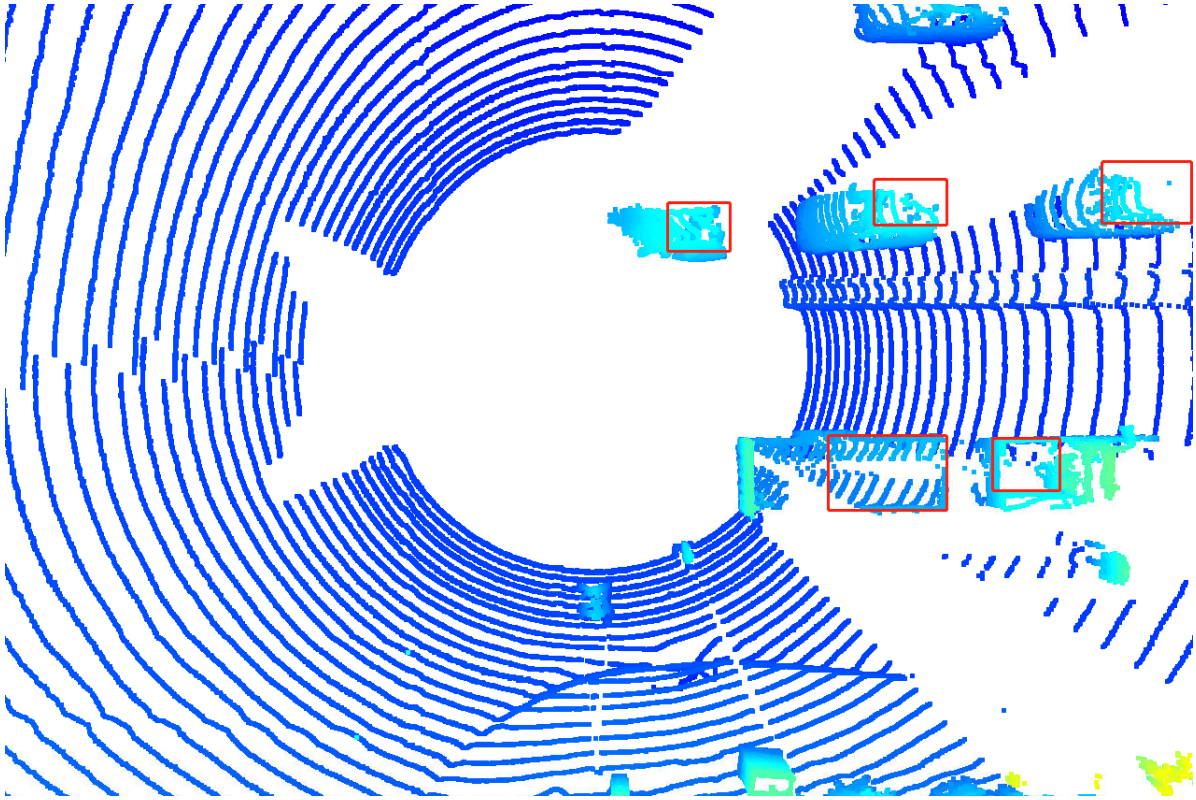
2. Converting Range Images to Point Clouds(ID_S1_EX2)



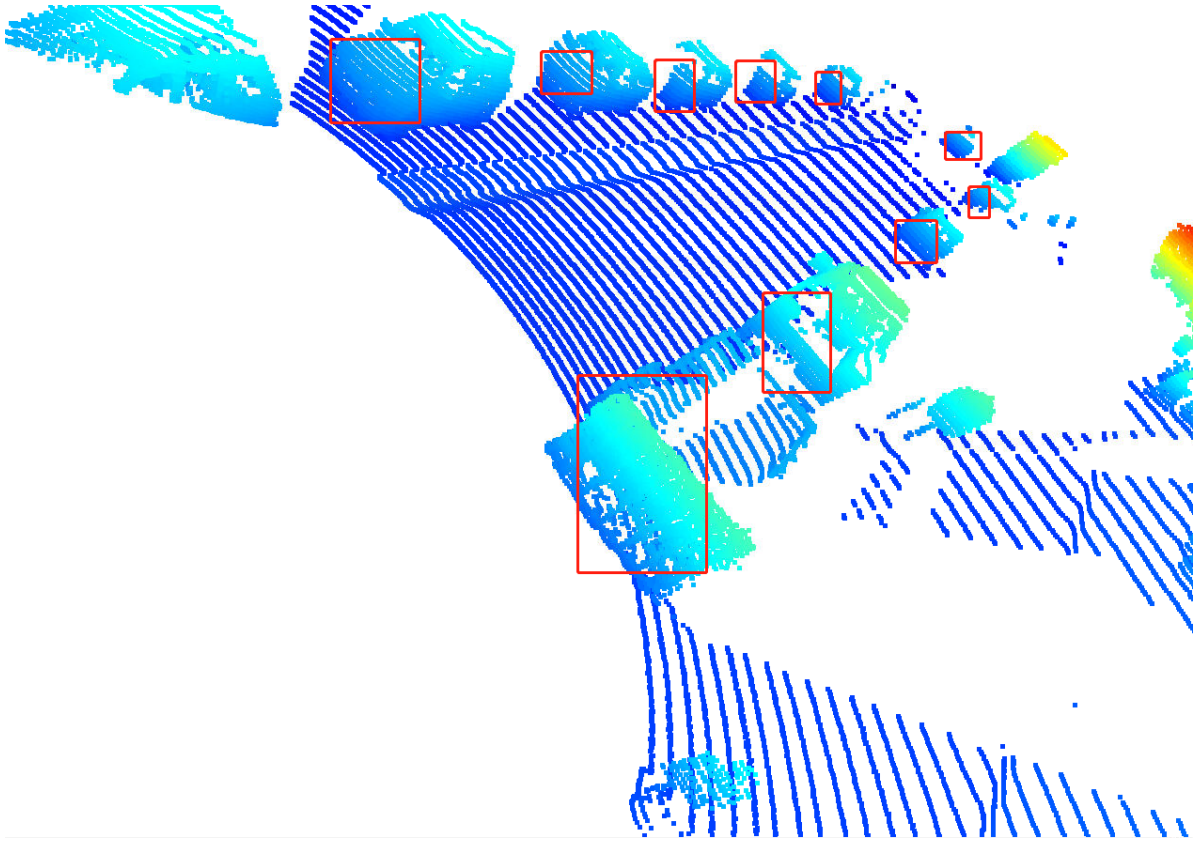
1、Vehicles from BEV lidar image



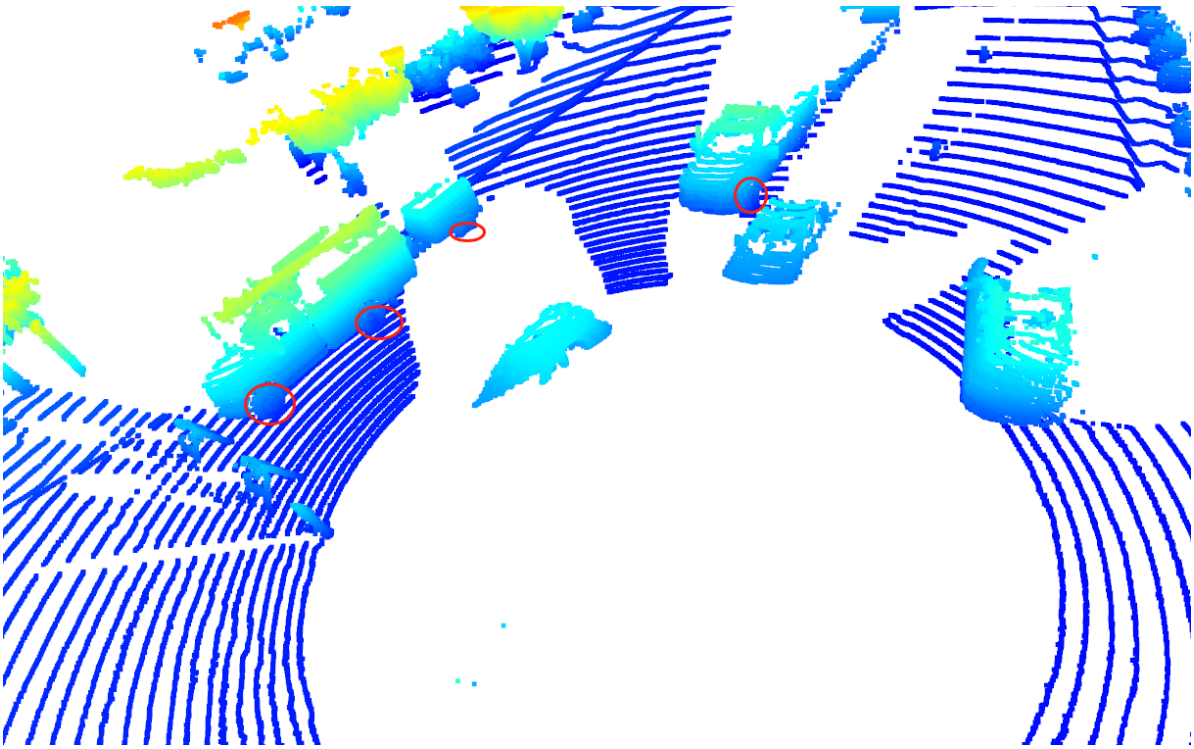
2、Vehicle Detection in similar shape



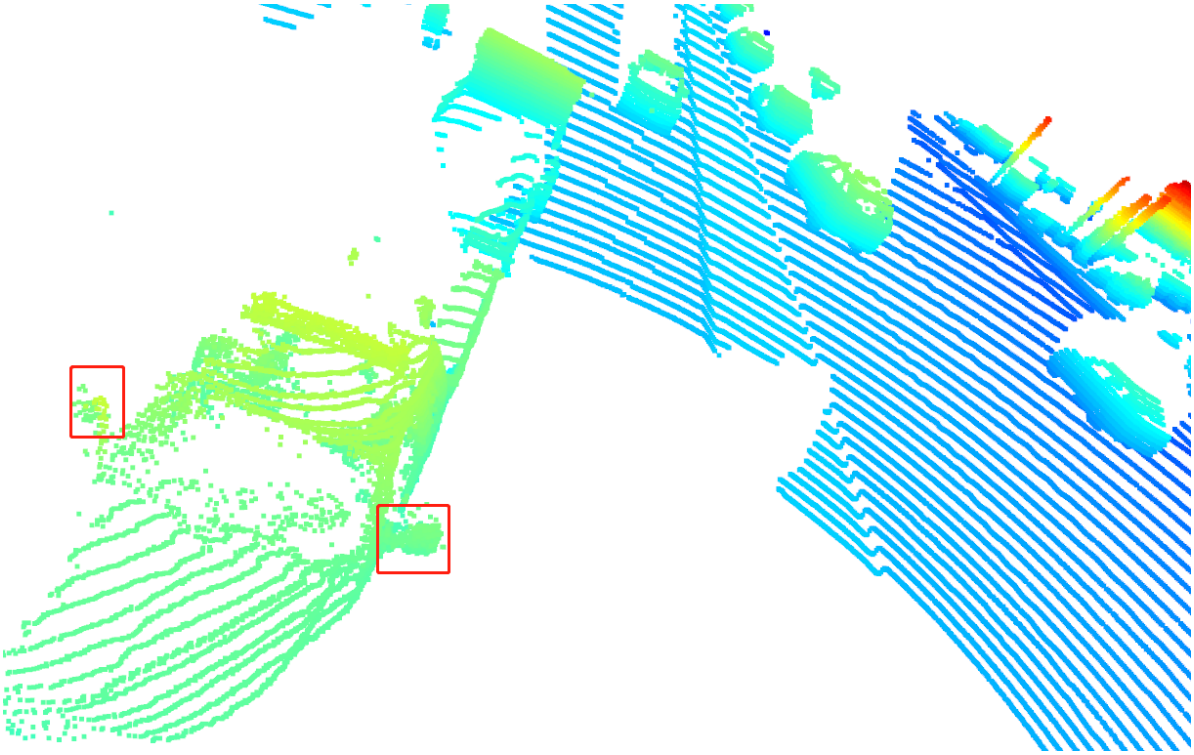
3、Similar Pattern from Top Bird Eye View



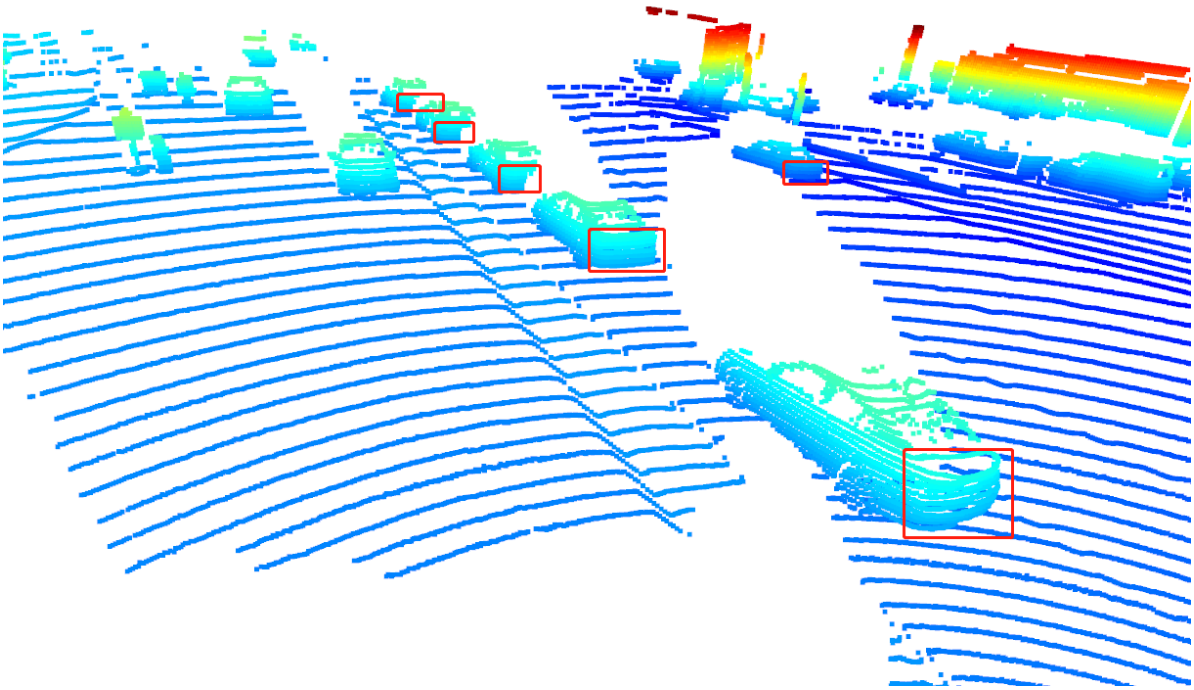
4、 Front Bumper



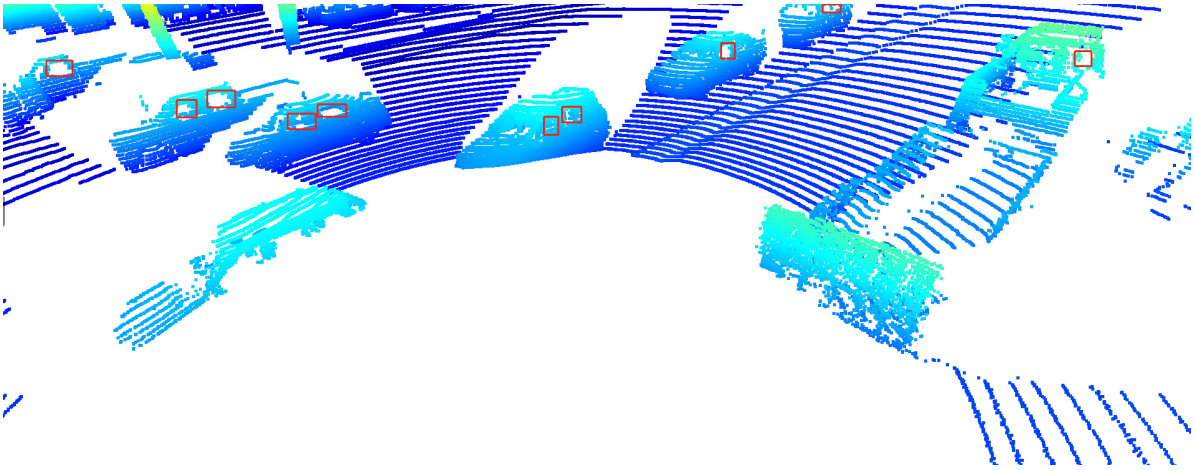
5、 Wheels



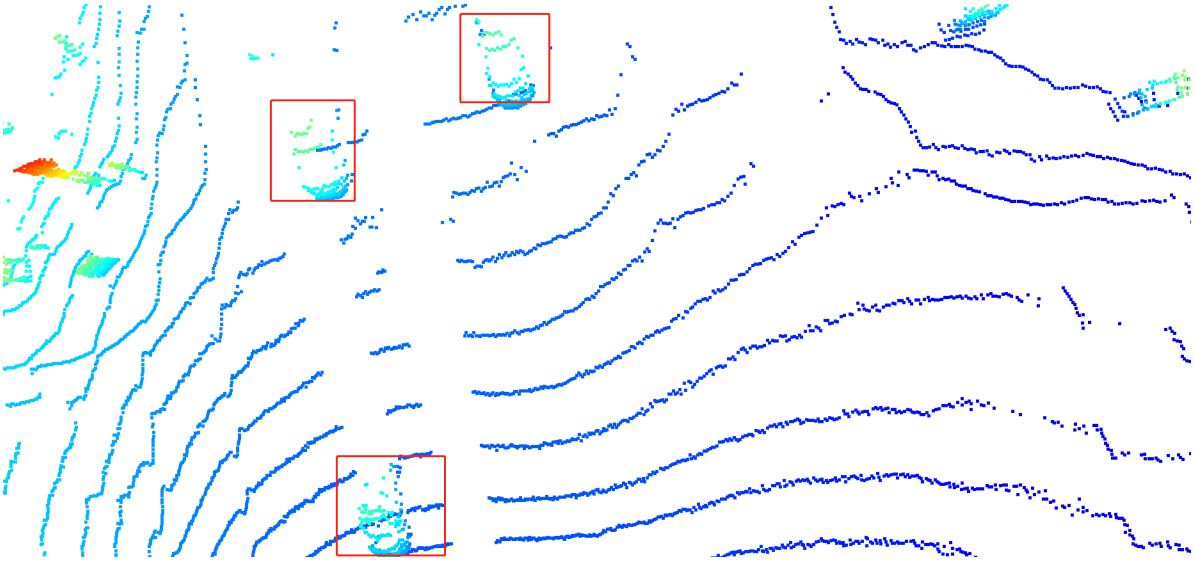
6、Rearview Mirrow



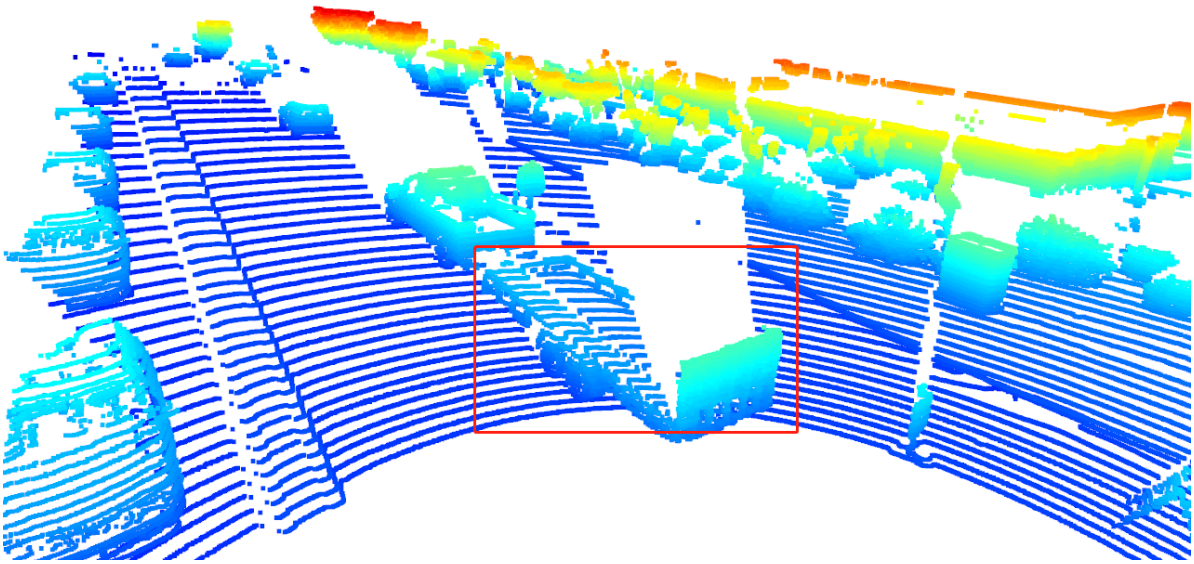
7、Rear Bumper



8、Side Window



9、Sparse Point for vehicle

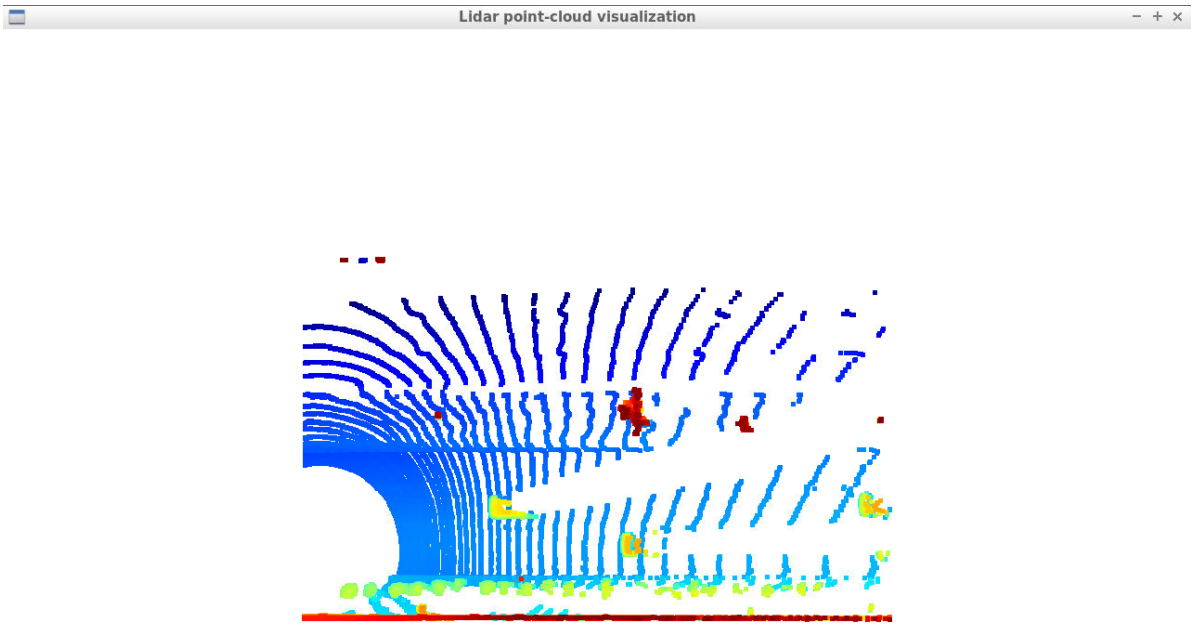


10、 Trailer

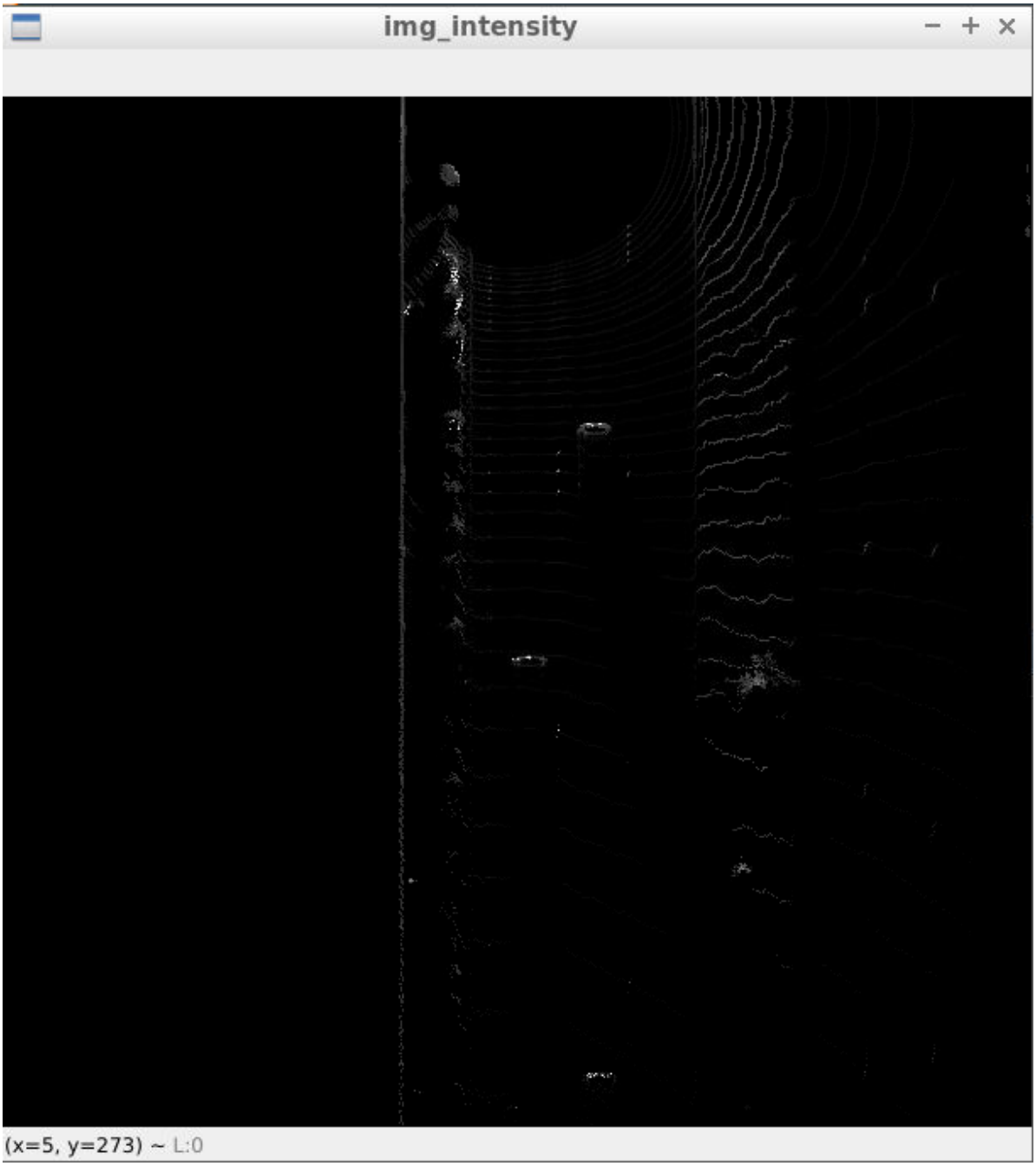
Step 2. Create Birds-Eye View (BEV) from Lidar PCL

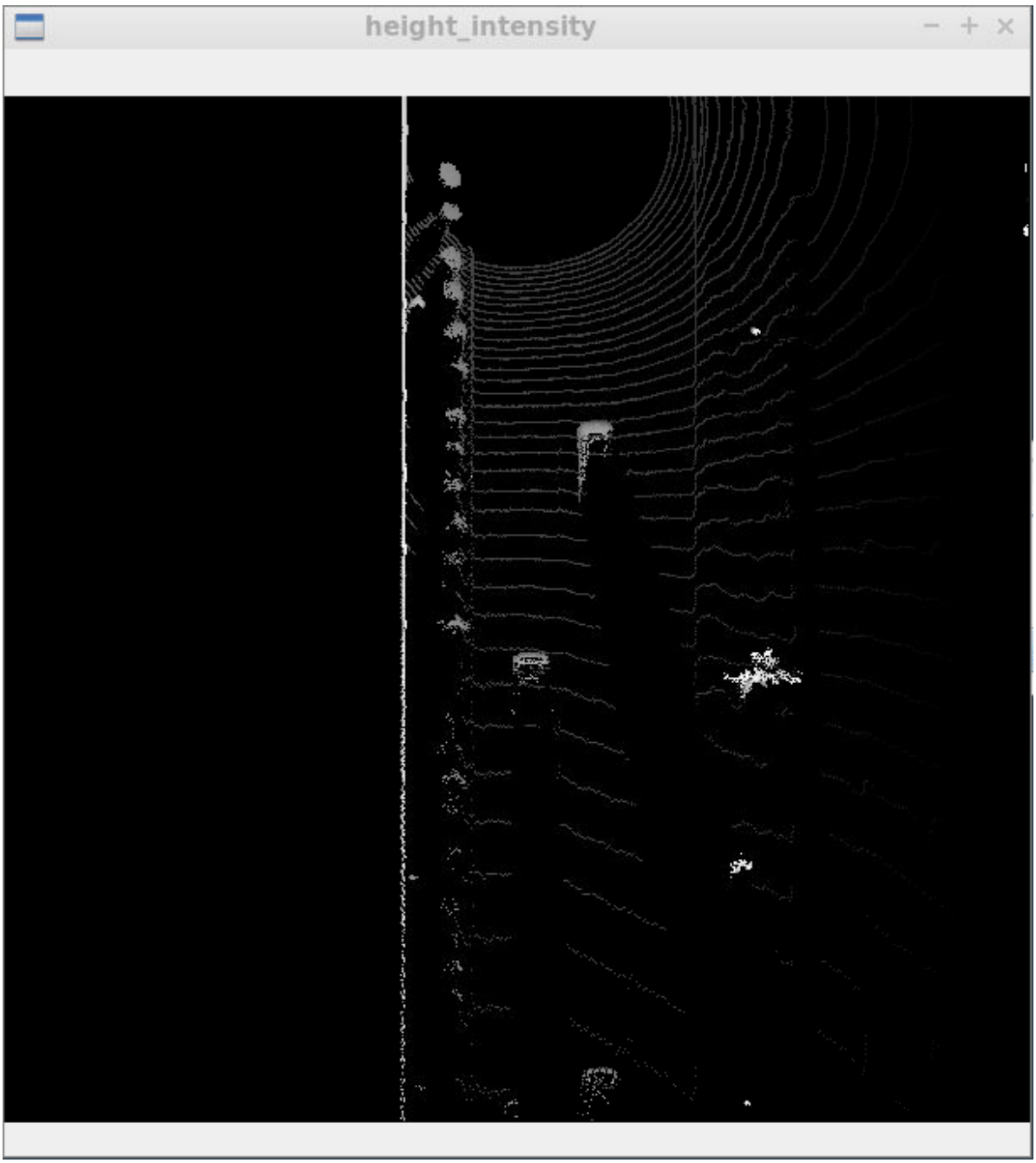

labels vs. detected objects

1. Convert sensor coordinate to BEV-map coordinates(ID_S2_EX2)



2. Compute intensity/hight/density layer of the BEV map(ID_S2_EX3)

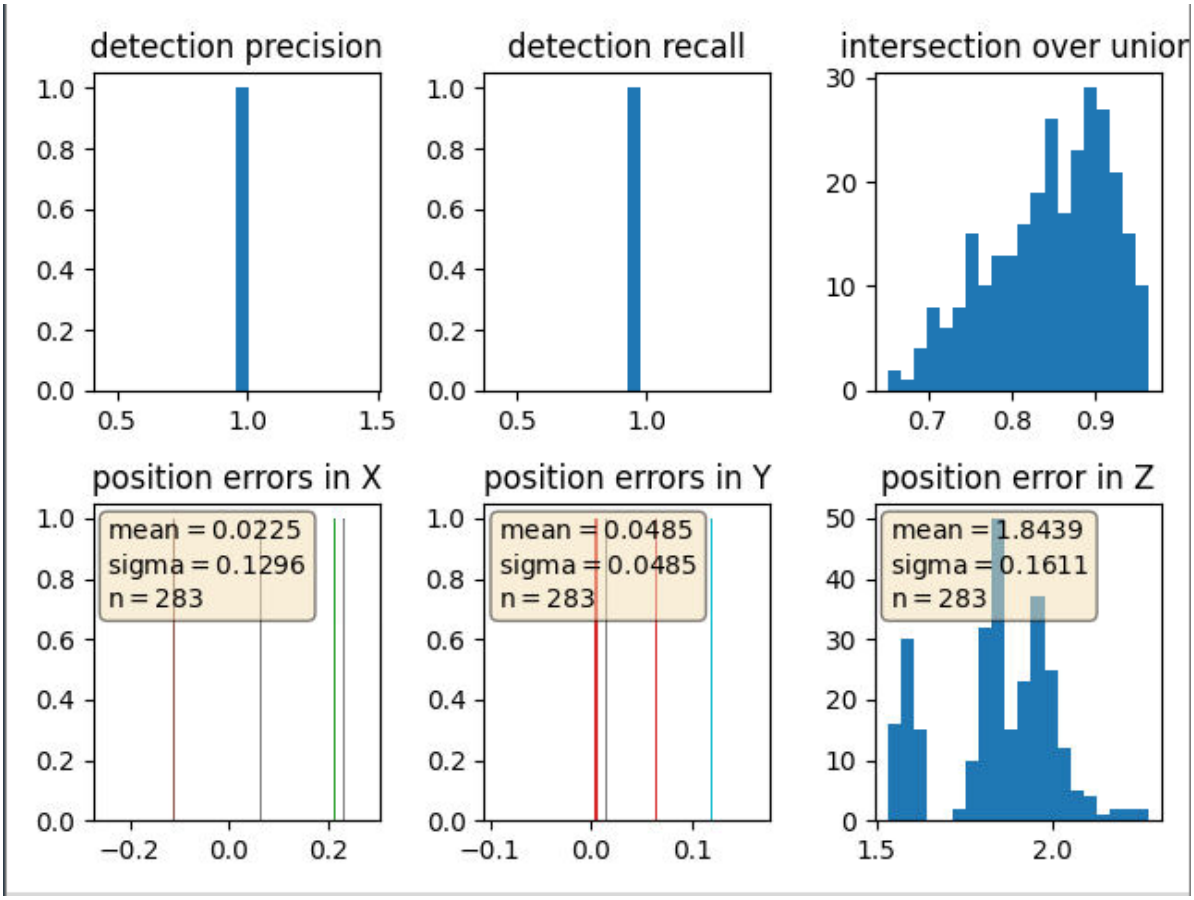

img_intensity
(x=5, y=273) ~ L:0



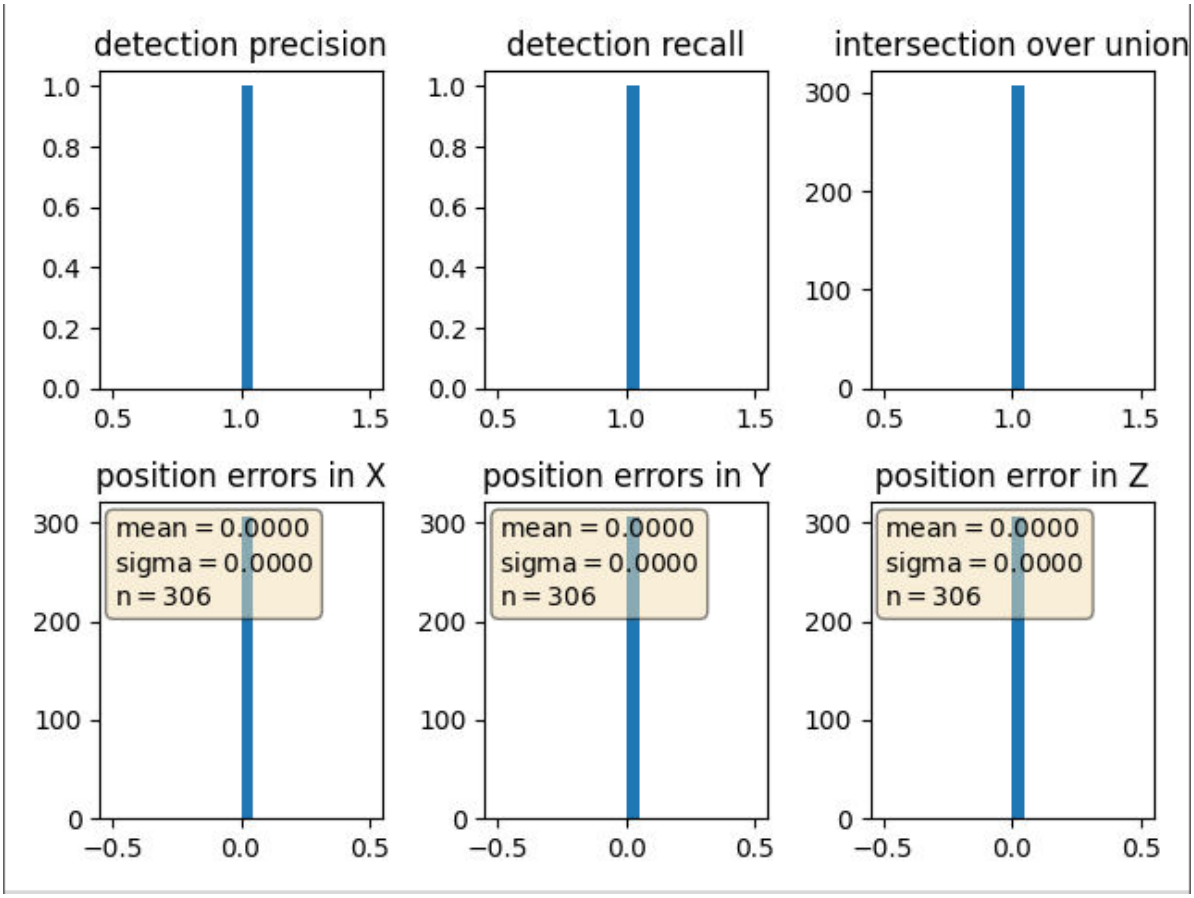
Step 3. Model-based Object Detection in BEV Image

Step 4. Performance Evaluation for Object Detection

DarkNet




```
computing birds-eye view from lidar pointcloud
student task ID_S2_EX1
student task ID_S2_EX2
student task ID_S2_EX3
detecting objects in lidar pointcloud
student task ID_S3_EX2
validating object labels
measuring detection performance
student task ID_S4_EX1
student task ID_S4_EX1
student task ID_S4_EX1
student task ID_S4_EX2
reached end of selected frames
student task ID_S4_EX3
precision = 0.9593220338983051, recall = 0.9248366013071896
```




```
computing birds-eye view from lida
student task ID_S2_EX1
student task ID_S2_EX2
student task ID_S2_EX3
using groundtruth labels as objec
validating object labels
measuring detection performance
student task ID_S4_EX1
student task ID_S4_EX1
student task ID_S4_EX1
student task ID_S4_EX2
reached end of selected frames
student task ID_S4_EX3
precision = 1.0, recall = 1.0
```