

# 3D OBJECT DETECTION HOMEWORK

**OPTION 2:** Perform Deep learning based 3D object detection or  
segmentation training

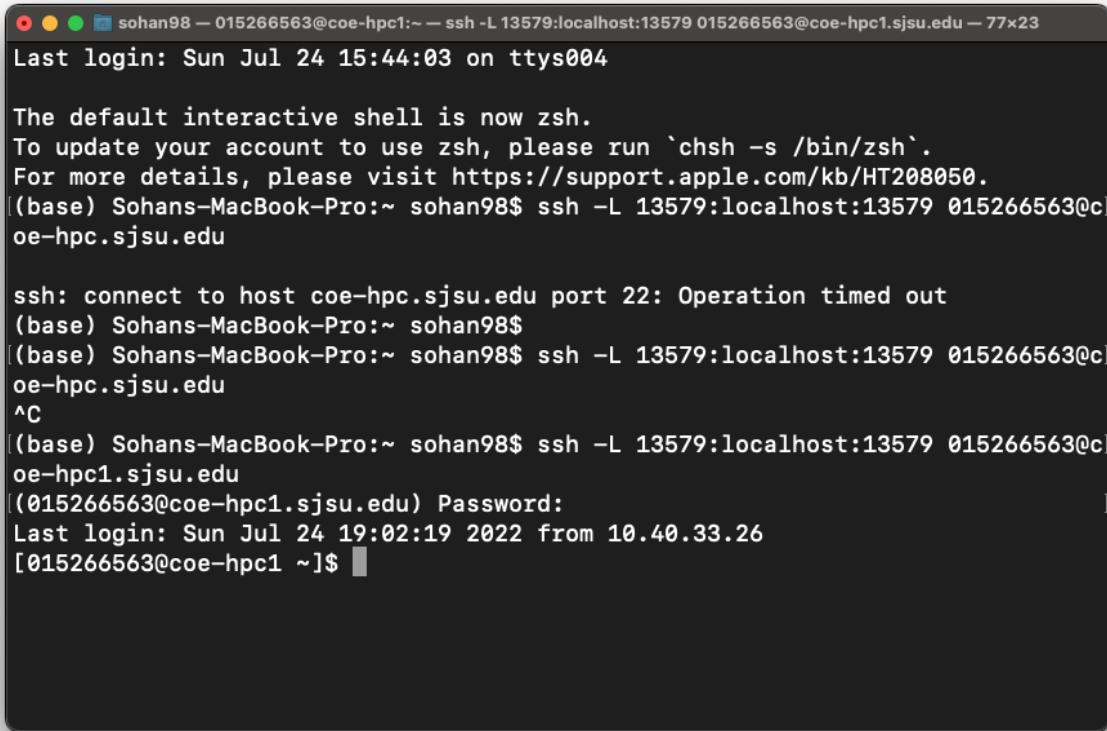
## **GitHub Link:**

[https://github.com/sohan1998/CMPE-249\\_MMDetection3D.git](https://github.com/sohan1998/CMPE-249_MMDetection3D.git)

## **SJSU CoE HPC Access:**

1. Download Cisco AnyConnect Secure Mobility Client
2. Request for Remote Access
3. Install TensorFlow2 Software based on Cuda 10.1
4. Enable Jupyter Lab via SSH tunnel
5. Install PyTorch 1.6
6. Use three terminals simultaneously to get access to HPC Node ID g1/g5 and connect it to the internet using Port ID 13579

## Starting a tunnel to HPC:



A screenshot of a terminal window titled "sohan98 - 015266563@coe-hpc1:~". The window shows the following text:

```
Last login: Sun Jul 24 15:44:03 on ttys004

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) Sohans-MacBook-Pro:~ sohan98$ ssh -L 13579:localhost:13579 015266563@co
oe-hpc.sjsu.edu

ssh: connect to host coe-hpc.sjsu.edu port 22: Operation timed out
(base) Sohans-MacBook-Pro:~ sohan98$
(base) Sohans-MacBook-Pro:~ sohan98$ ssh -L 13579:localhost:13579 015266563@co
oe-hpc.sjsu.edu
^C
(base) Sohans-MacBook-Pro:~ sohan98$ ssh -L 13579:localhost:13579 015266563@co
oe-hpc1.sjsu.edu
(015266563@coe-hpc1.sjsu.edu) Password:
Last login: Sun Jul 24 19:02:19 2022 from 10.40.33.26
[015266563@coe-hpc1 ~]$
```

## Training the model:

Epochs:

```
○ ○ ○  Users — 015266563@coe-hpc1:~/mmdetection3d — ssh 015266563@coe-hpc1.sjsu.edu — 89x23
after_val_iter:
(LOW      ) IterTimerHook
-----
after_val_epoch:
(VERY_LOW  ) TextLoggerHook
(VERY_LOW  ) TensorboardLoggerHook
-----
after_run:
(VERY_LOW  ) TextLoggerHook
(VERY_LOW  ) TensorboardLoggerHook
-----
2022-07-24 19:55:13,405 - mmdet - INFO - workflow: [('train', 1)], max: 5 epochs
2022-07-24 19:55:13,406 - mmdet - INFO - Checkpoints will be saved to /home/015266563/mmdetection3d/work_dirs/hv_pointpillars_secfpn_6x8_160e_kitti-3d-3class by HardDiskBackend.
2022-07-24 19:55:13.930820: I tensorflow/stream_executor/platform/default/dso_loader.cc:48] Successfully opened dynamic library libcudart.so.10.1
2022-07-24 19:56:11,256 - mmdet - INFO - Epoch [1][50/1995]    lr: 1.003e-03, eta: 3:02:51, time: 1.105, data_time: 0.386, memory: 5668, loss_cls: 0.7255, loss_bbox: 2.5672, loss_dir: 0.1412, loss: 3.4339, grad_norm: 9.6877
2022-07-24 19:56:45,653 - mmdet - INFO - Epoch [1][100/1995]   lr: 1.014e-03, eta: 2:27:34, time: 0.688, data_time: 0.010, memory: 5679, loss_cls: 0.5213, loss_bbox: 2.1189, loss_dir: 0.1390, loss: 2.7792, grad_norm: 7.6946
```

```
○ ○ ○  Users — 015266563@coe-hpc1:~/mmdetection3d — ssh 015266563@coe-hpc1.sjsu.edu — 89x23
s_dir: 0.1412, loss: 3.4339, grad_norm: 9.6877
2022-07-24 19:56:45,653 - mmdet - INFO - Epoch [1][100/1995]   lr: 1.014e-03, eta: 2:27:34, time: 0.688, data_time: 0.010, memory: 5679, loss_cls: 0.5213, loss_bbox: 2.1189, loss_dir: 0.1390, loss: 2.7792, grad_norm: 7.6946
2022-07-24 19:57:20,074 - mmdet - INFO - Epoch [1][150/1995]   lr: 1.031e-03, eta: 2:15:27, time: 0.688, data_time: 0.010, memory: 5725, loss_cls: 0.4562, loss_bbox: 1.9826, loss_dir: 0.1382, loss: 2.5770, grad_norm: 6.5566
2022-07-24 19:57:54,697 - mmdet - INFO - Epoch [1][200/1995]   lr: 1.055e-03, eta: 2:09:17, time: 0.692, data_time: 0.010, memory: 5725, loss_cls: 0.4352, loss_bbox: 1.9402, loss_dir: 0.1375, loss: 2.5129, grad_norm: 6.0942
2022-07-24 19:58:29,229 - mmdet - INFO - Epoch [1][250/1995]   lr: 1.086e-03, eta: 2:05:17, time: 0.691, data_time: 0.010, memory: 5725, loss_cls: 0.3993, loss_bbox: 1.8018, loss_dir: 0.1365, loss: 2.3377, grad_norm: 7.1542
2022-07-24 19:59:03,363 - mmdet - INFO - Epoch [1][300/1995]   lr: 1.124e-03, eta: 2:02:12, time: 0.683, data_time: 0.009, memory: 5725, loss_cls: 0.3980, loss_bbox: 1.8574, loss_dir: 0.1365, loss: 2.3919, grad_norm: 6.2607
2022-07-24 19:59:37,214 - mmdet - INFO - Epoch [1][350/1995]   lr: 1.169e-03, eta: 1:59:43, time: 0.677, data_time: 0.009, memory: 5725, loss_cls: 0.3881, loss_bbox: 1.7461, loss_dir: 0.1364, loss: 2.2706, grad_norm: 5.6648
2022-07-24 20:00:11,418 - mmdet - INFO - Epoch [1][400/1995]   lr: 1.220e-03, eta: 1:57:51, time: 0.684, data_time: 0.010, memory: 5725, loss_cls: 0.3821, loss_bbox: 1.6870, loss_dir: 0.1380, loss: 2.2071, grad_norm: 5.4771
```

```
Users — 015266563@coe-hpc1:~/mmdetection3d — ssh 015266563@coe-hpc1.sjsu.edu — 89x23
2022-07-24 20:14:32,171 - mmdet - INFO - Epoch [1][1650/1995]    lr: 4.289e-03, eta: 1:37:13, time: 0.690, data_time: 0.010, memory: 5725, loss_cls: 0.2946, loss_bbox: 1.3718, loss_dir: 0.1346, loss: 1.8010, grad_norm: 2.2064
2022-07-24 20:15:06,608 - mmdet - INFO - Epoch [1][1700/1995]    lr: 4.461e-03, eta: 1:36:35, time: 0.689, data_time: 0.010, memory: 5725, loss_cls: 0.2892, loss_bbox: 1.4003, loss_dir: 0.1346, loss: 1.8241, grad_norm: 2.1434
2022-07-24 20:15:41,720 - mmdet - INFO - Epoch [1][1750/1995]    lr: 4.634e-03, eta: 1:36:00, time: 0.702, data_time: 0.010, memory: 5733, loss_cls: 0.2955, loss_bbox: 1.3966, loss_dir: 0.1353, loss: 1.8274, grad_norm: 2.1421
2022-07-24 20:16:16,539 - mmdet - INFO - Epoch [1][1800/1995]    lr: 4.808e-03, eta: 1:35:24, time: 0.696, data_time: 0.010, memory: 5733, loss_cls: 0.2912, loss_bbox: 1.4005, loss_dir: 0.1352, loss: 1.8269, grad_norm: 2.0142
2022-07-24 20:16:51,043 - mmdet - INFO - Epoch [1][1850/1995]    lr: 4.984e-03, eta: 1:34:47, time: 0.690, data_time: 0.010, memory: 5733, loss_cls: 0.2838, loss_bbox: 1.4382, loss_dir: 0.1351, loss: 1.8572, grad_norm: 2.1149
2022-07-24 20:17:25,722 - mmdet - INFO - Epoch [1][1900/1995]    lr: 5.160e-03, eta: 1:34:11, time: 0.694, data_time: 0.010, memory: 5763, loss_cls: 0.2926, loss_bbox: 1.4170, loss_dir: 0.1353, loss: 1.8448, grad_norm: 1.8987
2022-07-24 20:18:00,489 - mmdet - INFO - Epoch [1][1950/1995]    lr: 5.337e-03, eta: 1:33:35, time: 0.695, data_time: 0.010, memory: 5763, loss_cls: 0.2921, loss_bbox: 1.3944, loss_dir: 0.1354, loss: 1.8219, grad_norm: 1.8413
2022-07-24 20:18:30,611 - mmdet - INFO - Saving checkpoint at 1 epochs
```

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s_dir: 0.1347, loss: 1.7148, grad_norm: 1.4078
2022-07-24 20:26:50,970 - mmdet - INFO - Epoch [2][700/1995]    lr: 7.854e-03, eta: 1:23:56, time: 0.688, data_time: 0.010, memory: 5764, loss_cls: 0.2686, loss_bbox: 1.2942, loss_dir: 0.1347, loss: 1.6975, grad_norm: 1.2750
2022-07-24 20:27:25,300 - mmdet - INFO - Epoch [2][750/1995]    lr: 8.003e-03, eta: 1:23:21, time: 0.687, data_time: 0.010, memory: 5764, loss_cls: 0.2684, loss_bbox: 1.3097, loss_dir: 0.1343, loss: 1.7124, grad_norm: 1.2612
2022-07-24 20:27:59,441 - mmdet - INFO - Epoch [2][800/1995]    lr: 8.148e-03, eta: 1:22:45, time: 0.683, data_time: 0.010, memory: 5764, loss_cls: 0.2674, loss_bbox: 1.2766, loss_dir: 0.1352, loss: 1.6792, grad_norm: 1.2365
2022-07-24 20:28:33,611 - mmdet - INFO - Epoch [2][850/1995]    lr: 8.289e-03, eta: 1:22:10, time: 0.683, data_time: 0.010, memory: 5764, loss_cls: 0.2726, loss_bbox: 1.3035, loss_dir: 0.1348, loss: 1.7110, grad_norm: 1.2392
2022-07-24 20:29:07,450 - mmdet - INFO - Epoch [2][900/1995]    lr: 8.426e-03, eta: 1:21:33, time: 0.677, data_time: 0.010, memory: 5764, loss_cls: 0.2675, loss_bbox: 1.3498, loss_dir: 0.1331, loss: 1.7505, grad_norm: 1.3529
2022-07-24 20:29:41,534 - mmdet - INFO - Epoch [2][950/1995]    lr: 8.558e-03, eta: 1:20:58, time: 0.682, data_time: 0.010, memory: 5764, loss_cls: 0.2744, loss_bbox: 1.2853, loss_dir: 0.1342, loss: 1.6939, grad_norm: 1.1822
2022-07-24 20:30:15,695 - mmdet - INFO - Epoch [2][1000/1995]    lr: 8.686e-03, eta: 1:20:22, time: 0.683, data_time: 0.010, memory: 5764, loss_cls: 0.2607, loss_bbox: 1.2714, loss_dir: 0.1344, loss: 1.6666, grad_norm: 1.1589
```

```
Users — 015266563@coe-hpc1:~/mmdetection3d — ssh 015266563@coe-hpc1.sjsu.edu — 89x23
2022-07-24 20:37:44,671 - mmdet - INFO - Epoch [2][1650/1995]    lr: 9.834e-03, eta: 1:12:53, time: 0.690, data_time: 0.010, memory: 5764, loss_cls: 0.2552, loss_bbox: 1.2280, loss_dir: 0.1327, loss: 1.6159, grad_norm: 1.0872
2022-07-24 20:38:19,218 - mmdet - INFO - Epoch [2][1700/1995]    lr: 9.878e-03, eta: 1:12:18, time: 0.691, data_time: 0.010, memory: 5764, loss_cls: 0.2567, loss_bbox: 1.2191, loss_dir: 0.1339, loss: 1.6097, grad_norm: 1.1046
2022-07-24 20:38:53,889 - mmdet - INFO - Epoch [2][1750/1995]    lr: 9.916e-03, eta: 1:11:44, time: 0.693, data_time: 0.010, memory: 5764, loss_cls: 0.2582, loss_bbox: 1.2242, loss_dir: 0.1345, loss: 1.6169, grad_norm: 1.0666
2022-07-24 20:39:28,419 - mmdet - INFO - Epoch [2][1800/1995]    lr: 9.947e-03, eta: 1:11:09, time: 0.691, data_time: 0.010, memory: 5764, loss_cls: 0.2545, loss_bbox: 1.2458, loss_dir: 0.1339, loss: 1.6342, grad_norm: 1.1237
2022-07-24 20:40:02,606 - mmdet - INFO - Epoch [2][1850/1995]    lr: 9.970e-03, eta: 1:10:34, time: 0.684, data_time: 0.010, memory: 5764, loss_cls: 0.2449, loss_bbox: 1.2554, loss_dir: 0.1338, loss: 1.6341, grad_norm: 1.0517
2022-07-24 20:40:36,855 - mmdet - INFO - Epoch [2][1900/1995]    lr: 9.987e-03, eta: 1:09:59, time: 0.685, data_time: 0.010, memory: 5764, loss_cls: 0.2492, loss_bbox: 1.2472, loss_dir: 0.1338, loss: 1.6301, grad_norm: 1.1379
2022-07-24 20:41:11,361 - mmdet - INFO - Epoch [2][1950/1995]    lr: 9.997e-03, eta: 1:09:25, time: 0.690, data_time: 0.010, memory: 5764, loss_cls: 0.2458, loss_bbox: 1.2117, loss_dir: 0.1340, loss: 1.5915, grad_norm: 0.9862
2022-07-24 20:41:41,674 - mmdet - INFO - Saving checkpoint at 2 epochs
[>>>>>>>>>>>>>>] 817/1497, 22.7 task/s, elapsed: 36s, ETA: 30s
```

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s_dir: 0.1288, loss: 1.4440, grad_norm: 1.0305
2022-07-24 20:57:52,775 - mmdet - INFO - Epoch [3][1250/1995]    lr: 8.963e-03, eta: 0:54:15, time: 0.685, data_time: 0.010, memory: 5764, loss_cls: 0.2269, loss_bbox: 1.1234, loss_dir: 0.1290, loss: 1.4793, grad_norm: 0.9778
2022-07-24 20:58:26,732 - mmdet - INFO - Epoch [3][1300/1995]    lr: 8.882e-03, eta: 0:53:40, time: 0.679, data_time: 0.010, memory: 5764, loss_cls: 0.2346, loss_bbox: 1.1511, loss_dir: 0.1296, loss: 1.5153, grad_norm: 1.1426
2022-07-24 20:59:00,474 - mmdet - INFO - Epoch [3][1350/1995]    lr: 8.798e-03, eta: 0:53:05, time: 0.675, data_time: 0.010, memory: 5764, loss_cls: 0.2317, loss_bbox: 1.1358, loss_dir: 0.1277, loss: 1.4952, grad_norm: 0.9965
2022-07-24 20:59:34,701 - mmdet - INFO - Epoch [3][1400/1995]    lr: 8.711e-03, eta: 0:52:31, time: 0.685, data_time: 0.010, memory: 5764, loss_cls: 0.2281, loss_bbox: 1.1361, loss_dir: 0.1285, loss: 1.4927, grad_norm: 0.9442
2022-07-24 21:00:08,805 - mmdet - INFO - Epoch [3][1450/1995]    lr: 8.622e-03, eta: 0:51:56, time: 0.682, data_time: 0.010, memory: 5764, loss_cls: 0.2241, loss_bbox: 1.1188, loss_dir: 0.1292, loss: 1.4720, grad_norm: 1.1276
2022-07-24 21:00:43,520 - mmdet - INFO - Epoch [3][1500/1995]    lr: 8.530e-03, eta: 0:51:22, time: 0.694, data_time: 0.010, memory: 5764, loss_cls: 0.2280, loss_bbox: 1.1487, loss_dir: 0.1280, loss: 1.5047, grad_norm: 0.9569
2022-07-24 21:01:17,864 - mmdet - INFO - Epoch [3][1550/1995]    lr: 8.436e-03, eta: 0:50:48, time: 0.687, data_time: 0.010, memory: 5764, loss_cls: 0.2213, loss_bbox: 1.0868, loss_dir: 0.1282, loss: 1.4364, grad_norm: 0.9277
```

```
Users — 015266563@coe-hpc1:~/mmdetection3d — ssh 015266563@coe-hpc1.sjsu.edu — 89x23
2022-07-24 21:04:09,434 - mmdet - INFO - Epoch [3][1800/1995]    lr: 7.932e-03, eta: 0:47:56, time: 0.686, data_time: 0.010, memory: 5764, loss_cls: 0.2181, loss_bbox: 1.0974, loss_dir: 0.1283, loss: 1.4439, grad_norm: 1.0225
2022-07-24 21:04:43,230 - mmdet - INFO - Epoch [3][1850/1995]    lr: 7.824e-03, eta: 0:47:21, time: 0.676, data_time: 0.010, memory: 5764, loss_cls: 0.2227, loss_bbox: 1.0876, loss_dir: 0.1283, loss: 1.4386, grad_norm: 0.9758
2022-07-24 21:05:17,746 - mmdet - INFO - Epoch [3][1900/1995]    lr: 7.715e-03, eta: 0:46:47, time: 0.690, data_time: 0.010, memory: 5764, loss_cls: 0.2251, loss_bbox: 1.0828, loss_dir: 0.1304, loss: 1.4384, grad_norm: 1.0630
2022-07-24 21:05:52,105 - mmdet - INFO - Epoch [3][1950/1995]    lr: 7.604e-03, eta: 0:46:12, time: 0.687, data_time: 0.010, memory: 5764, loss_cls: 0.2198, loss_bbox: 1.1005, loss_dir: 0.1278, loss: 1.4481, grad_norm: 0.8712
2022-07-24 21:06:22,544 - mmdet - INFO - Saving checkpoint at 3 epochs
2022-07-24 21:07:16,617 - mmdet - INFO - Epoch [4][50/1995]    lr: 7.388e-03, eta: 0:45:00, time: 1.077, data_time: 0.397, memory: 5764, loss_cls: 0.2304, loss_bbox: 1.1065, loss_dir: 0.1279, loss: 1.4648, grad_norm: 0.9245
2022-07-24 21:07:51,065 - mmdet - INFO - Epoch [4][100/1995]    lr: 7.272e-03, eta: 0:44:25, time: 0.689, data_time: 0.010, memory: 5764, loss_cls: 0.2251, loss_bbox: 1.0527, loss_dir: 0.1295, loss: 1.4073, grad_norm: 0.9849
2022-07-24 21:08:25,173 - mmdet - INFO - Epoch [4][150/1995]    lr: 7.154e-03, eta: 0:43:51, time: 0.682, data_time: 0.010, memory: 5764, loss_cls: 0.2165, loss_bbox: 1.0066, loss_dir: 0.1264, loss: 1.3495, grad_norm: 0.8596
```

```
s_dir: 0.1212, loss: 1.1908, grad_norm: 0.7663
2022-07-24 21:48:49,680 - mmdet - INFO - Epoch [5][1550/1995]    lr: 1.365e-04, eta: 0:05:04, time: 0.676, data_time: 0.010, memory: 5764, loss_cls: 0.1916, loss_bbox: 0.8606, loss_dir: 0.1194, loss: 1.1716, grad_norm: 0.7481
2022-07-24 21:49:24,068 - mmdet - INFO - Epoch [5][1600/1995]    lr: 1.077e-04, eta: 0:04:30, time: 0.688, data_time: 0.010, memory: 5764, loss_cls: 0.1941, loss_bbox: 0.8816, loss_dir: 0.1204, loss: 1.1961, grad_norm: 0.7697
2022-07-24 21:49:57,875 - mmdet - INFO - Epoch [5][1650/1995]    lr: 8.234e-05, eta: 0:03:55, time: 0.676, data_time: 0.010, memory: 5764, loss_cls: 0.1940, loss_bbox: 0.8731, loss_dir: 0.1195, loss: 1.1866, grad_norm: 0.8470
2022-07-24 21:50:32,025 - mmdet - INFO - Epoch [5][1700/1995]    lr: 6.033e-05, eta: 0:03:21, time: 0.683, data_time: 0.010, memory: 5764, loss_cls: 0.1969, loss_bbox: 0.8916, loss_dir: 0.1210, loss: 1.2095, grad_norm: 0.8174
2022-07-24 21:51:06,462 - mmdet - INFO - Epoch [5][1750/1995]    lr: 4.173e-05, eta: 0:02:47, time: 0.689, data_time: 0.010, memory: 5764, loss_cls: 0.1945, loss_bbox: 0.8581, loss_dir: 0.1199, loss: 1.1725, grad_norm: 0.7450
2022-07-24 21:51:41,024 - mmdet - INFO - Epoch [5][1800/1995]    lr: 2.654e-05, eta: 0:02:13, time: 0.691, data_time: 0.010, memory: 5764, loss_cls: 0.1884, loss_bbox: 0.8727, loss_dir: 0.1213, loss: 1.1824, grad_norm: 0.8779
2022-07-24 21:52:14,861 - mmdet - INFO - Epoch [5][1850/1995]    lr: 1.478e-05, eta: 0:01:39, time: 0.677, data_time: 0.010, memory: 5764, loss_cls: 0.1945, loss_bbox: 0.8920, loss_dir: 0.1206, loss: 1.2070, grad_norm: 0.8214
```

## Save checkpoint after training the model:

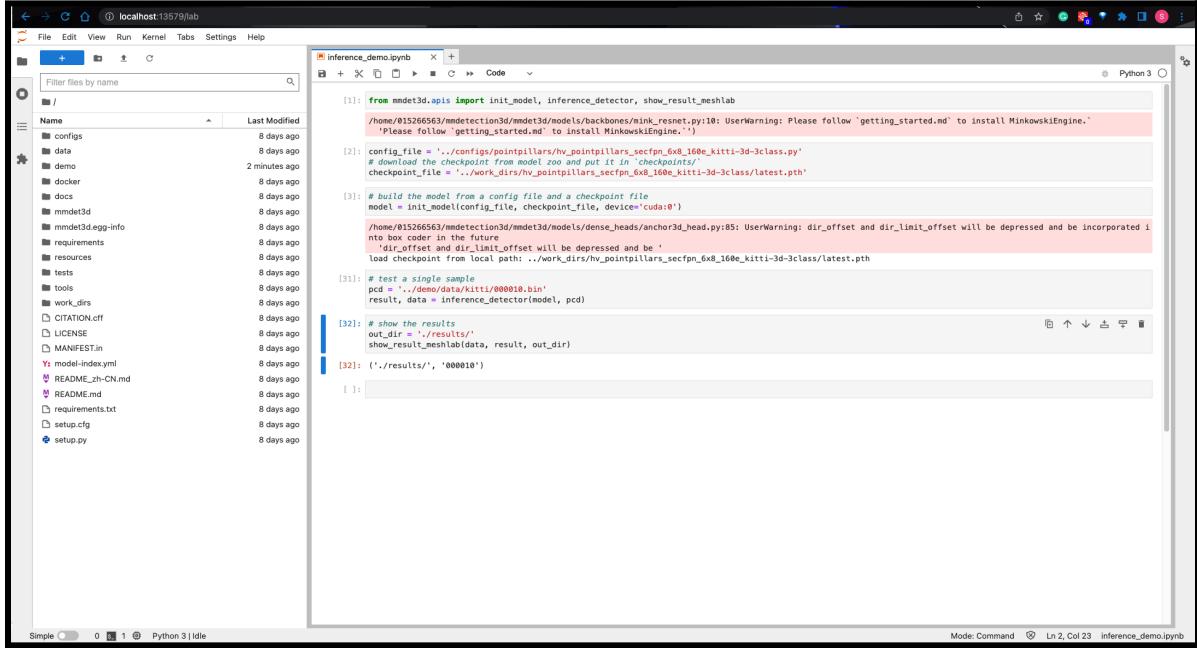
```
Users - 015266563@coe-hpc1:~/mmdetection3d - ssh 015266563@coe-hpc1.sjsu.edu - 89x23
2022-07-24 21:49:57,875 - mmdet - INFO - Epoch [5][1650/1995] lr: 8.234e-05, eta: 0:03:55, time: 0.676, data_time: 0.010, memory: 5764, loss_cls: 0.1940, loss_bbox: 0.8731, los
s_dir: 0.1195, loss: 1.1866, grad_norm: 0.8470
2022-07-24 21:50:32,025 - mmdet - INFO - Epoch [5][1700/1995] lr: 6.033e-05, eta: 0:03:21, time: 0.683, data_time: 0.010, memory: 5764, loss_cls: 0.1969, loss_bbox: 0.8916, los
s_dir: 0.1210, loss: 1.2095, grad_norm: 0.8174
2022-07-24 21:51:06,462 - mmdet - INFO - Epoch [5][1750/1995] lr: 4.173e-05, eta: 0:02:47, time: 0.689, data_time: 0.010, memory: 5764, loss_cls: 0.1945, loss_bbox: 0.8581, los
s_dir: 0.1199, loss: 1.1725, grad_norm: 0.7450
2022-07-24 21:51:41,024 - mmdet - INFO - Epoch [5][1800/1995] lr: 2.654e-05, eta: 0:02:13, time: 0.691, data_time: 0.010, memory: 5764, loss_cls: 0.1884, loss_bbox: 0.8727, los
s_dir: 0.1213, loss: 1.1824, grad_norm: 0.8779
2022-07-24 21:52:14,861 - mmdet - INFO - Epoch [5][1850/1995] lr: 1.478e-05, eta: 0:01:39, time: 0.677, data_time: 0.010, memory: 5764, loss_cls: 0.1945, loss_bbox: 0.8920, los
s_dir: 0.1206, loss: 1.2070, grad_norm: 0.8214
2022-07-24 21:52:49,066 - mmdet - INFO - Epoch [5][1900/1995] lr: 6.447e-06, eta: 0:01:04, time: 0.684, data_time: 0.010, memory: 5764, loss_cls: 0.1900, loss_bbox: 0.8470, los
s_dir: 0.1187, loss: 1.1557, grad_norm: 0.7704
2022-07-24 21:53:23,476 - mmdet - INFO - Epoch [5][1950/1995] lr: 1.557e-06, eta: 0:00:30, time: 0.688, data_time: 0.010, memory: 5764, loss_cls: 0.1912, loss_bbox: 0.8778, los
s_dir: 0.1205, loss: 1.1895, grad_norm: 0.7953
2022-07-24 21:53:53,341 - mmdet - INFO - Saving checkpoint at 5 epochs
(venvpy37cu10) [015266563@g1 mmdetection3d]$
```

```
Users - 015266563@coe-hpc1:~/mmdetection3d - ssh 015266563@coe-hpc1.sjsu.edu - 89x23
load checkpoint from local path: work_dirs/hv_pointpillars_secfpn_6x8_160e_kitti-3d-3clas
s/latest.pth
[>>>>>>>>>>>>>>>>>>>>>] 1497/1497, 22.3 task/s, elapsed: 67s, ETA:      0s
Converting prediction to KITTI format
[>>>>>>>>>>>>>>>>>>>>>] 1497/1497, 383.3 task/s, elapsed: 4s, ETA:      0s
Result is saved to /tmp/tmp1f9r0lzm/results.pkl.

----- AP11 Results -----
Pedestrian AP11@0.50, 0.50, 0.50:
bbox AP11:56.5736, 50.9067, 46.9553
bev AP11:52.6472, 47.4917, 42.7714
3d AP11:47.6695, 43.1687, 39.1281
aos AP11:30.79, 27.64, 25.36
Pedestrian AP11@0.50, 0.25, 0.25:
bbox AP11:56.5736, 50.9067, 46.9553
bev AP11:61.5559, 56.5449, 51.0776
3d AP11:61.5559, 56.5444, 51.0776
aos AP11:30.79, 27.64, 25.36
Cyclist AP11@0.50, 0.50, 0.50:
bbox AP11:75.6774, 68.5502, 64.7656
bev AP11:71.2869, 59.5474, 56.4866
```

## Results:

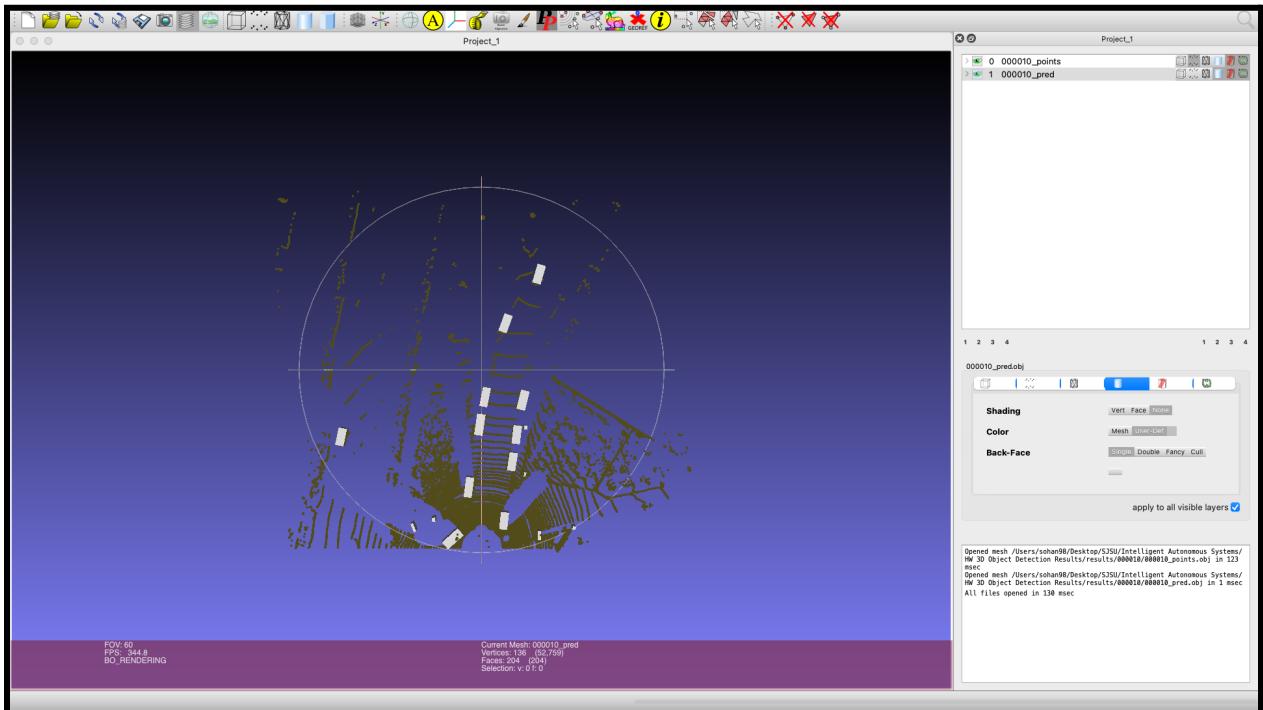
### Inference Pipeline (using MeshLab application):

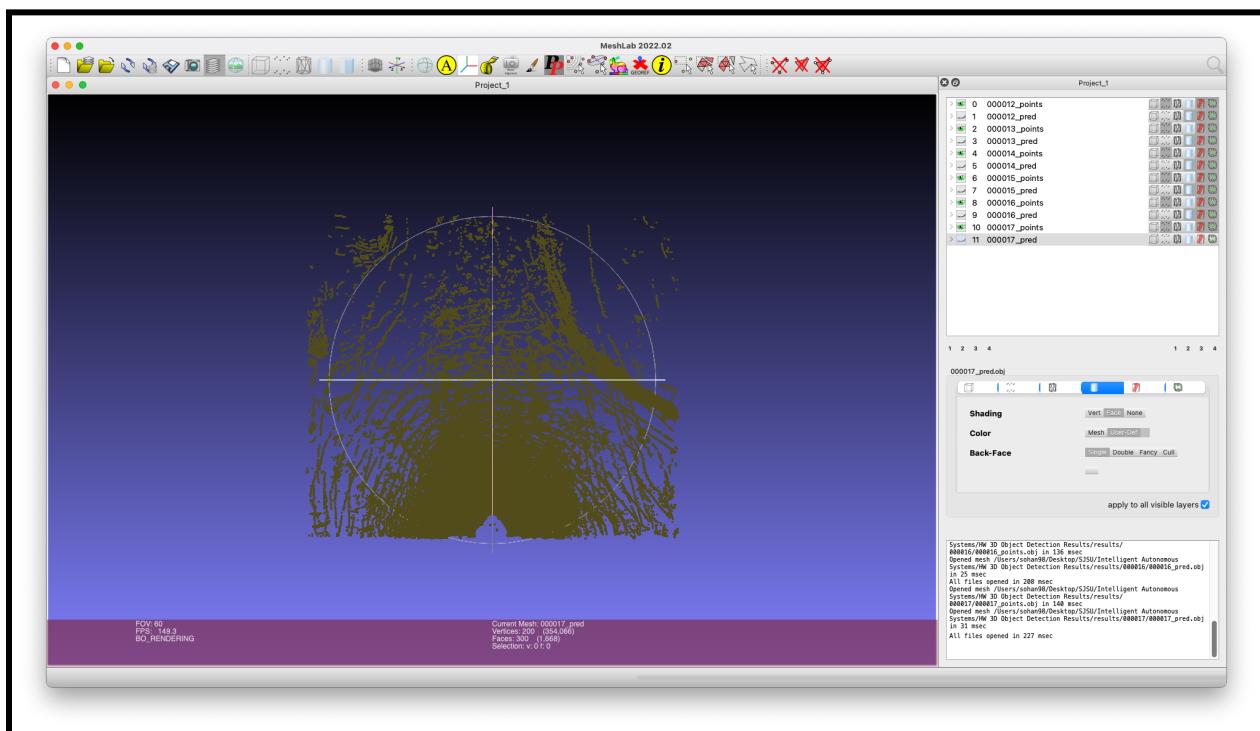
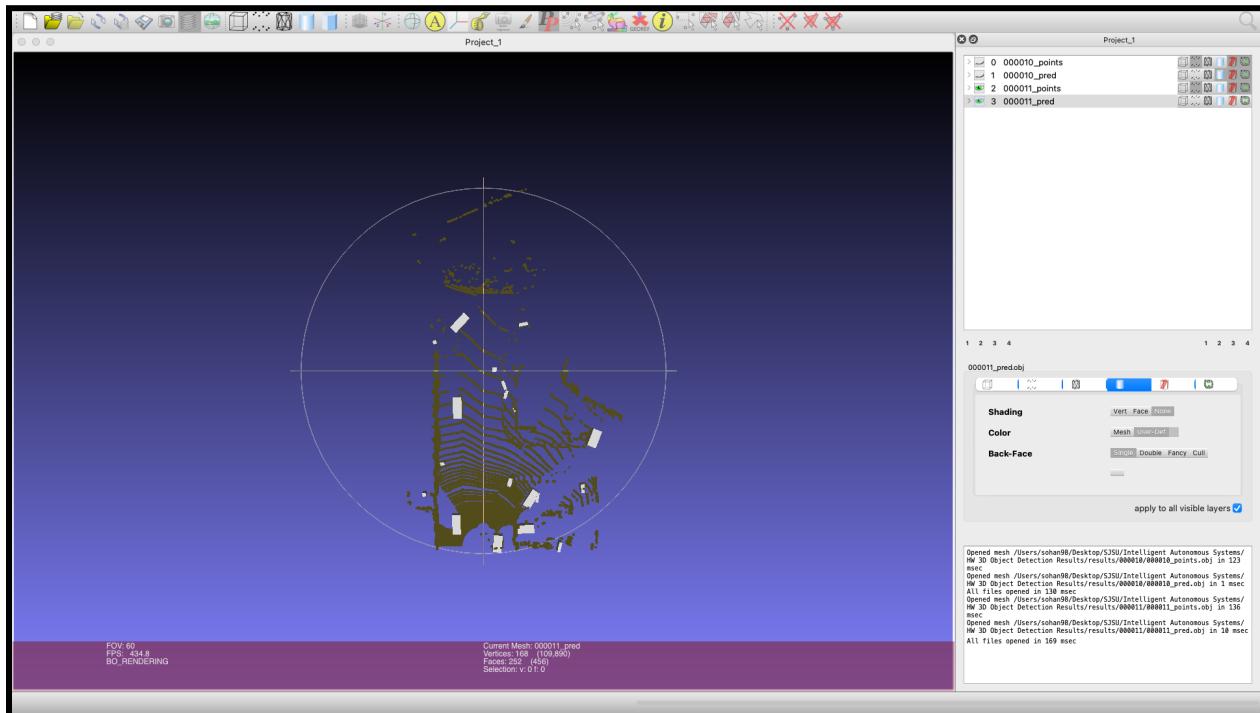


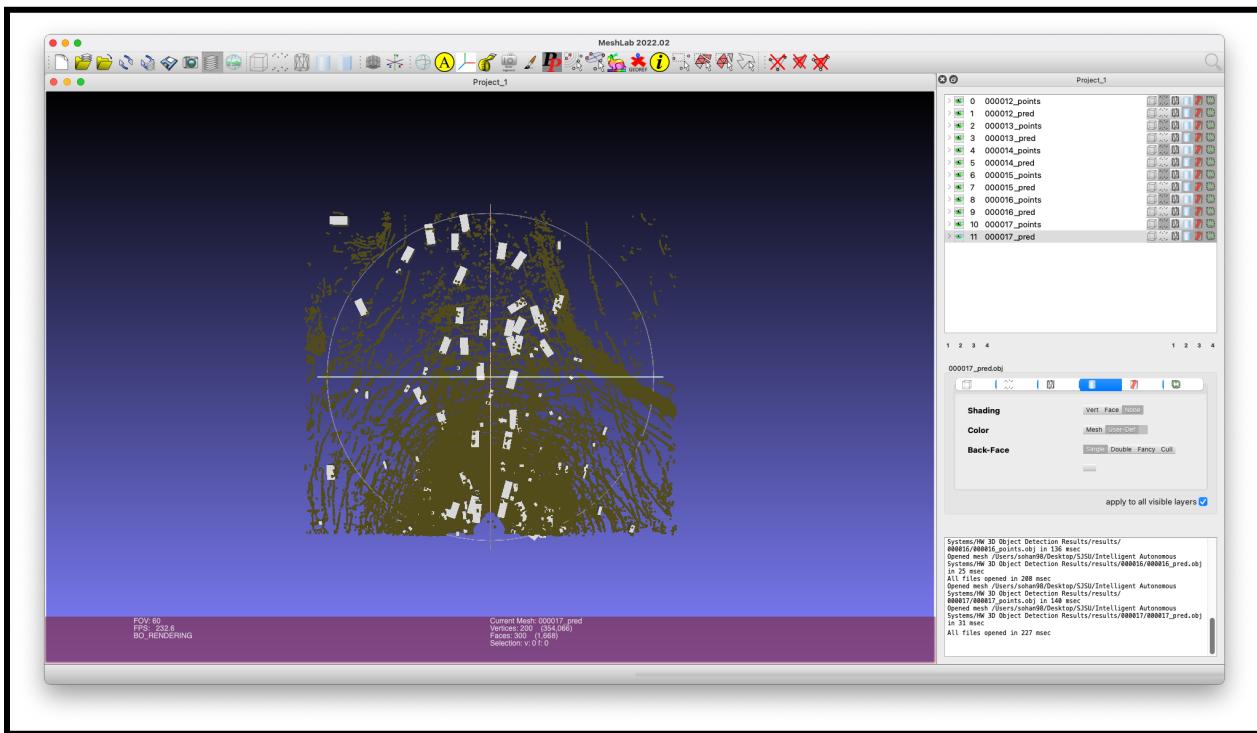
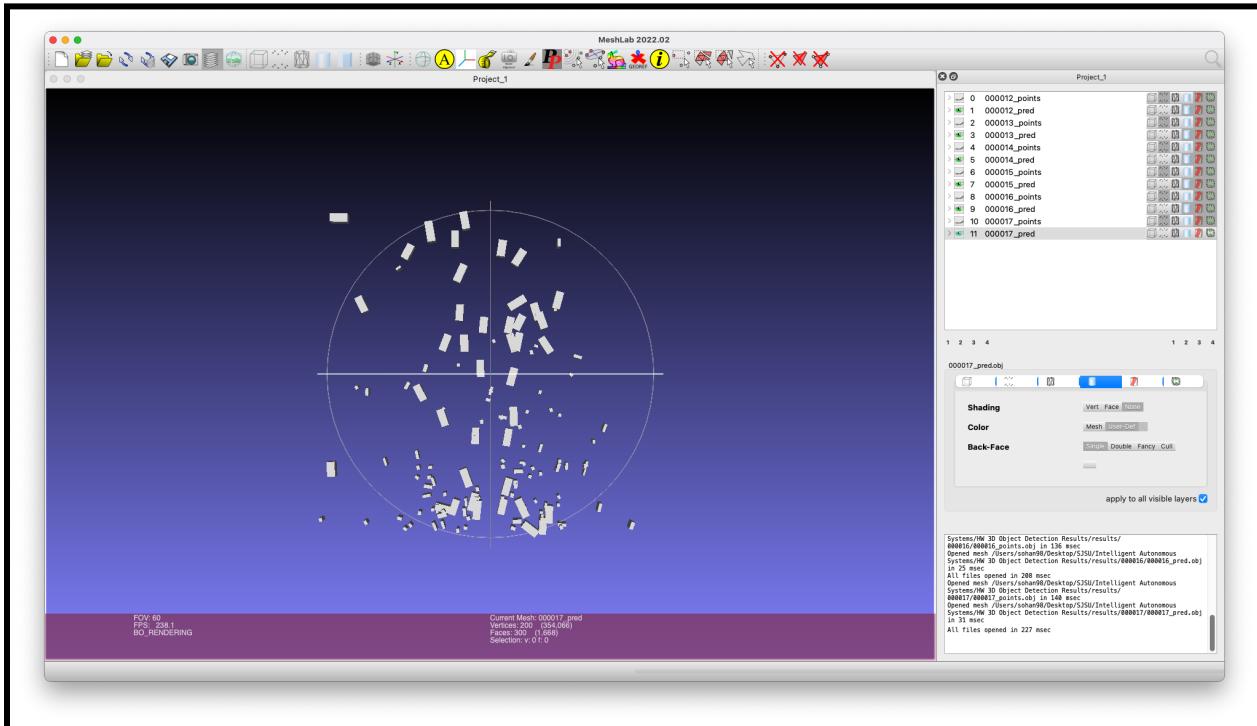
The screenshot shows a Jupyter Notebook interface with a file tree on the left and a code editor on the right. The code editor contains Python 3 code for an inference pipeline:

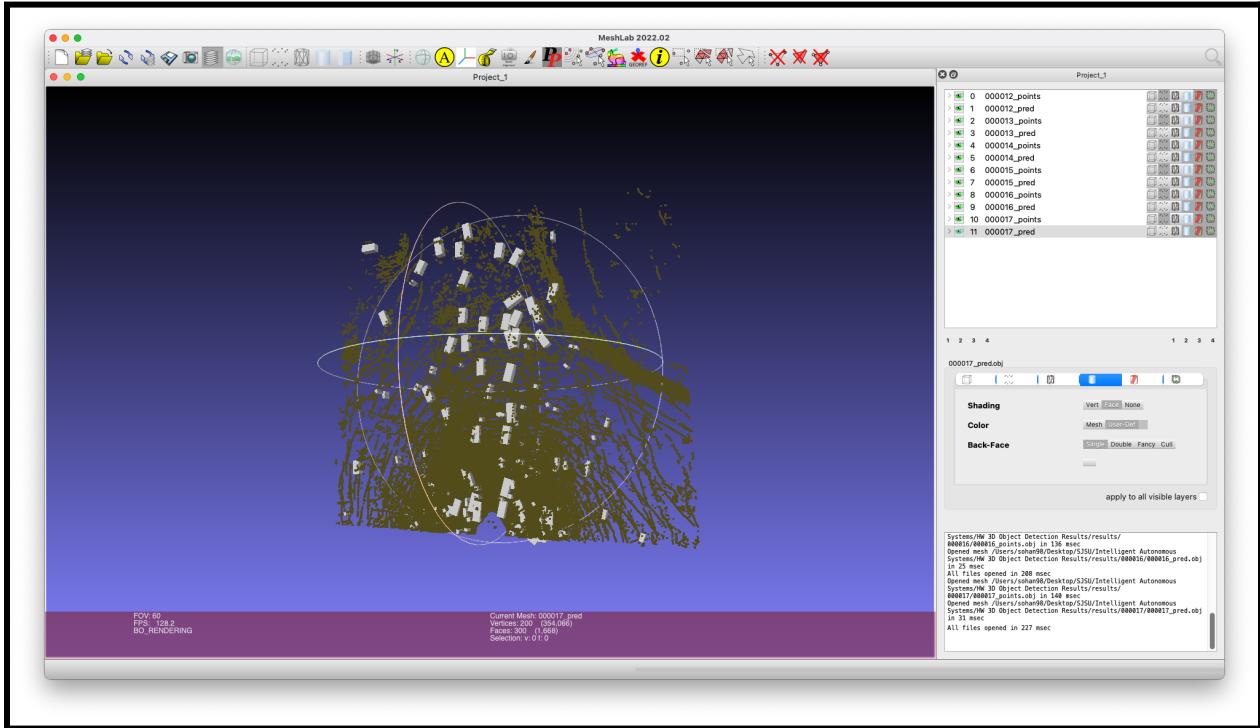
```
from mmdet3d.apis import init_model, inference_detector, show_result_meshlab
# Please follow `getting_started.md` to install MinkowskiEngine.
config_file = './config/pointrpillars/hv_pointpillars_secfpn_6x8_160e_kitti-3d-3class.py'
checkpoint_file = './work_dirs/hv_pointpillars_secfpn_6x8_160e_kitti-3d-3class/latest.pth'
# build the model from a config file and a checkpoint file
model = init_model(config_file, checkpoint_file, device='cuda:0')
# test a single sample
pcd = './demo/data/kitti/000010.bin'
result, data = inference_detector(model, pcd)
# show the results
out_dir = './results'
show_result_meshlab(data, result, out_dir)
```

### MESHLAB RESULTS:









## References:

[https://mmdetection3d.readthedocs.io/en/latest/2\\_new\\_data\\_model.html](https://mmdetection3d.readthedocs.io/en/latest/2_new_data_model.html)

<http://coe-hpc-web.sjsu.edu/>

<https://github.com/lkk688/mymmdetection3d>