Coding Exercise 3

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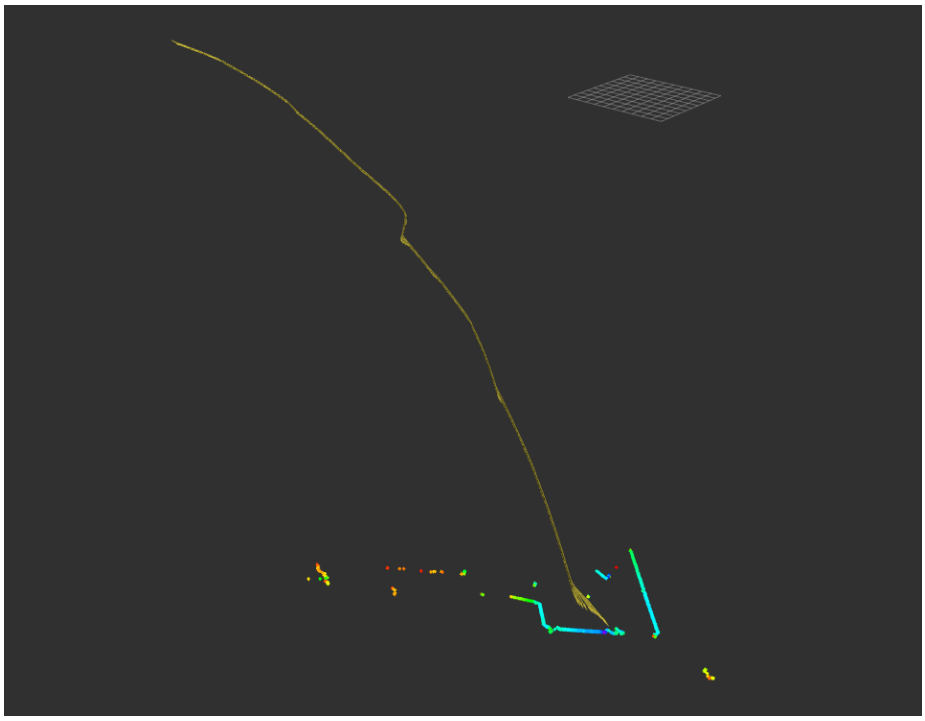
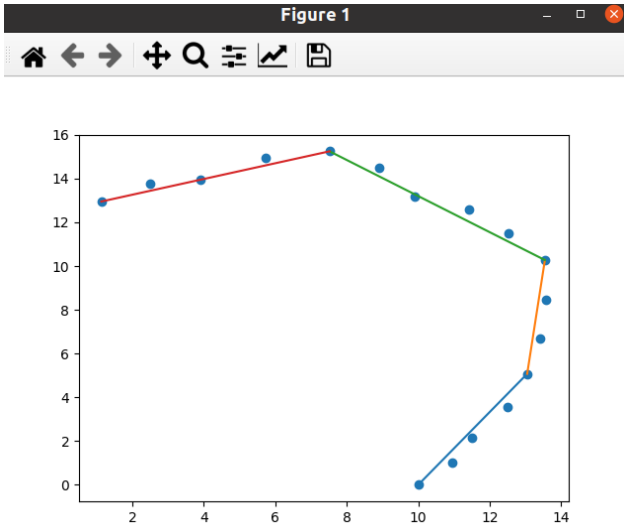
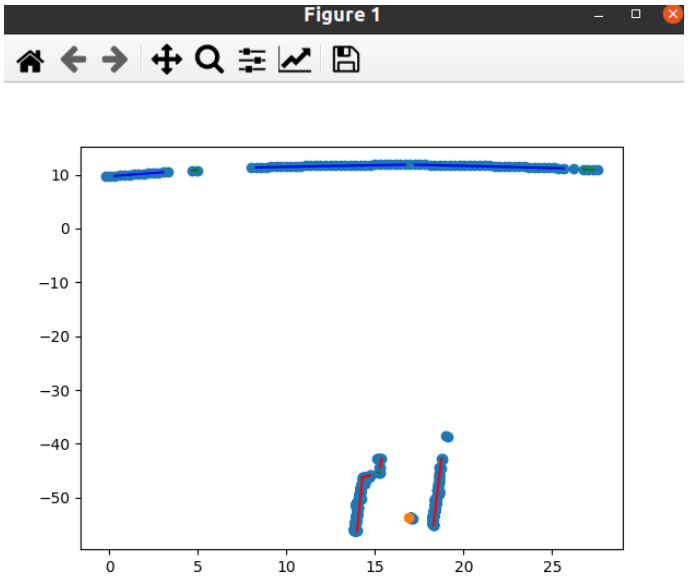
1.



2. For line fitting, I use the split and merge method, with some threshold to remove outliers.

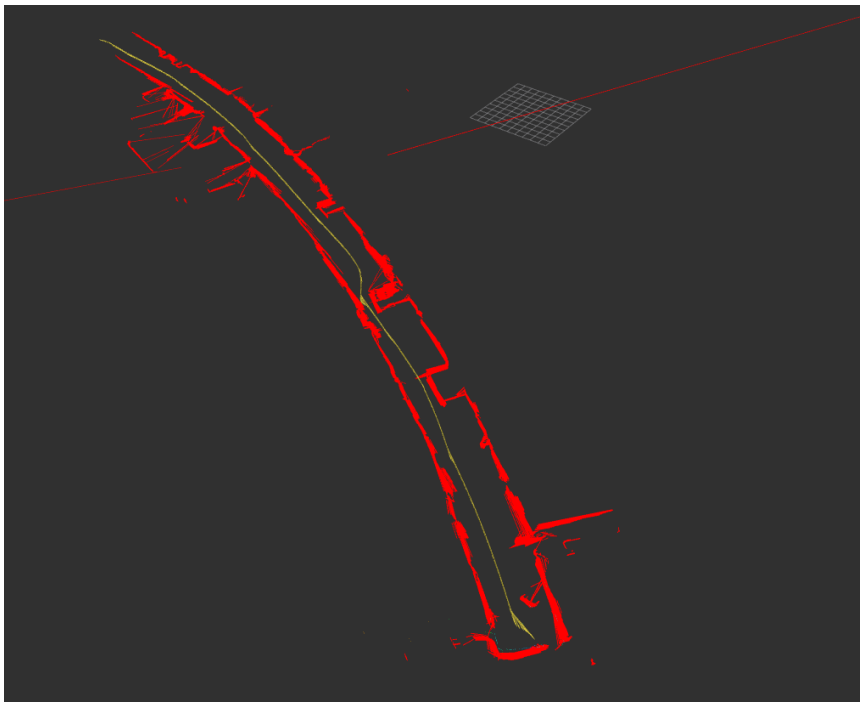


3. I record a frame of lidar data and try to fit it. We can see some outliers and invalid measurements. Set a threshold of range to remove those.

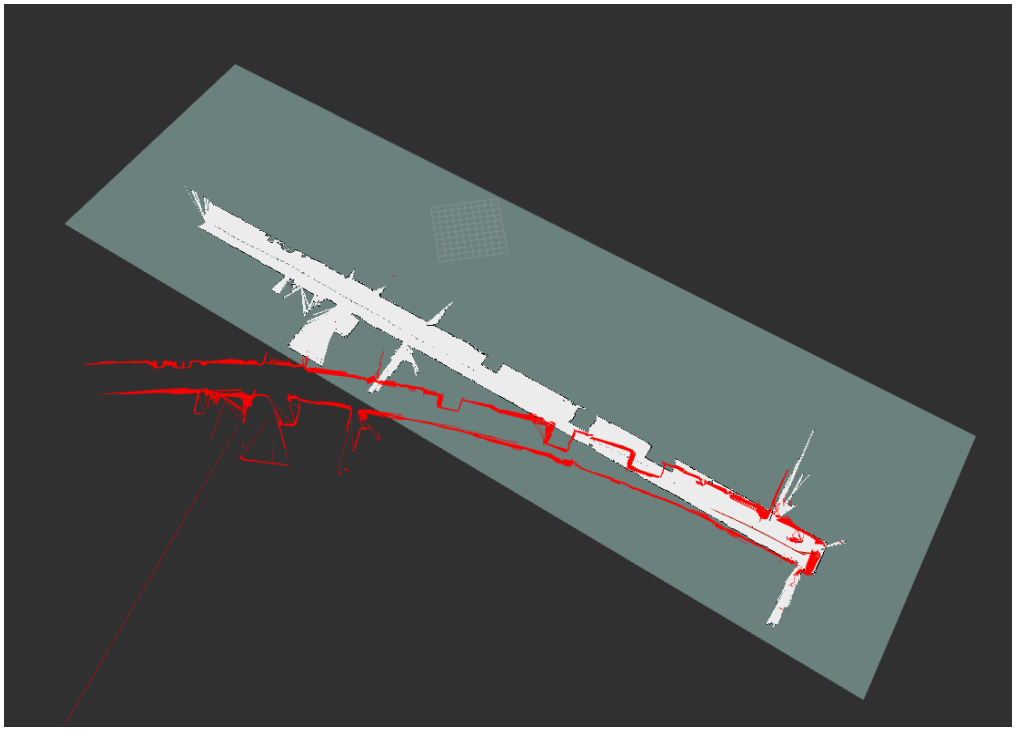


Orange point: robot position
Blue line: outliers
Red line: my line fitting

4. The whole lidar mapping



5. Compare with gmapping



Apparently the map we got is significantly affected by the odometry that ekf tells us. The gmapping, however, is not using the ekf to do localization. It's completely based on the laser input. To estimate the robot motion from laser input, I'm not too sure how they achieve this, but icp is a common way to do the localization. And for the mapping, simply register the laser scan measurements.