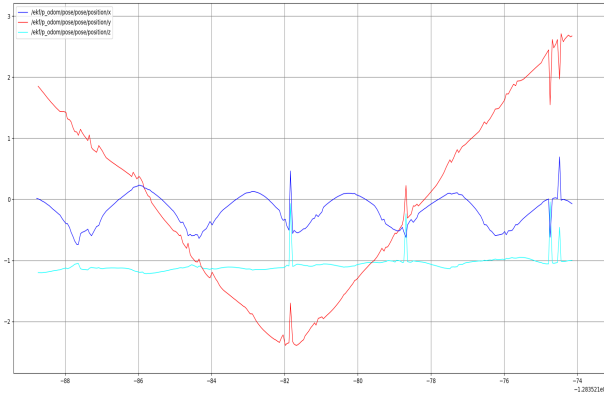


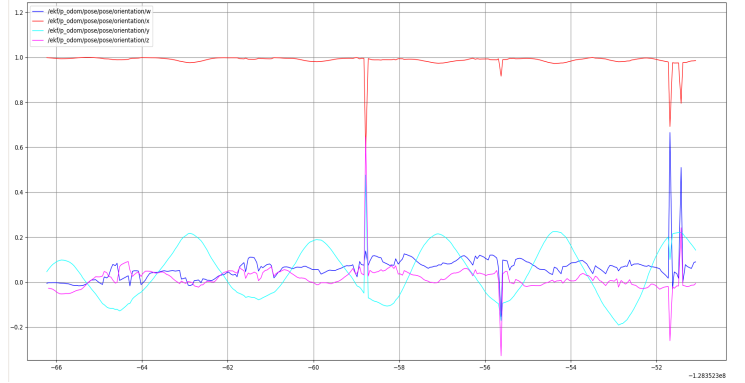
Project 3 Phase 1 Report

FENG Chen

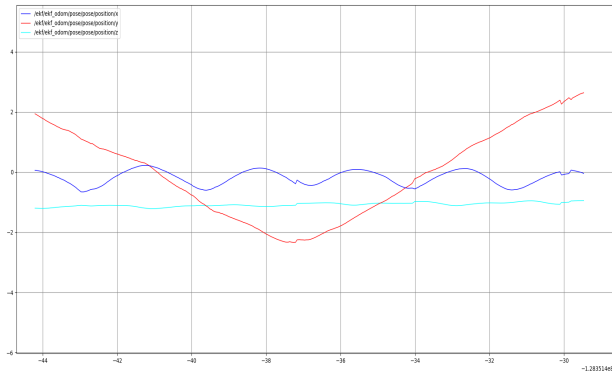
1. Figures



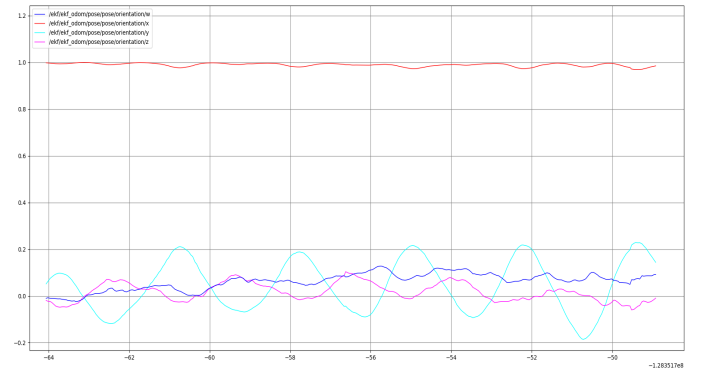
position from tag_detector



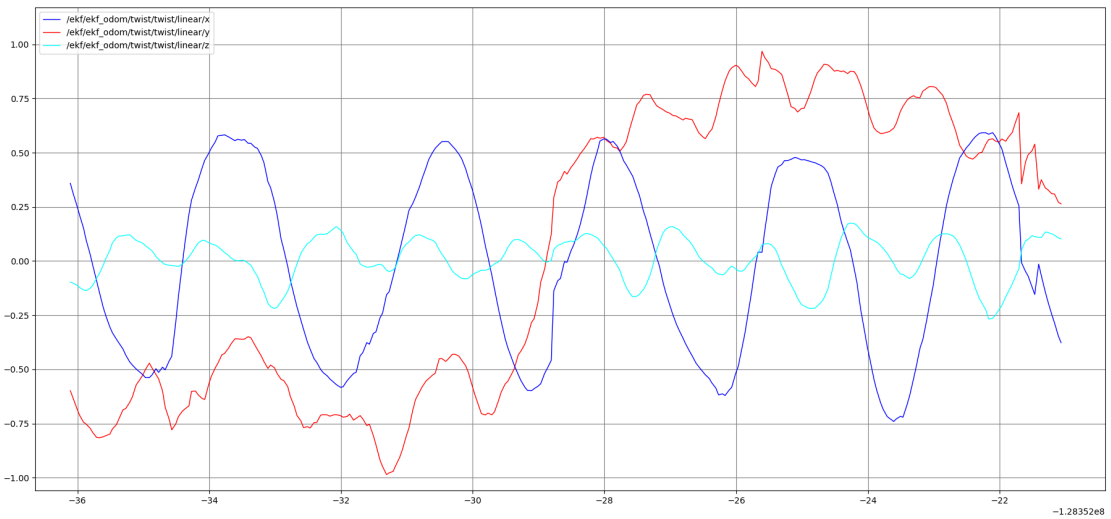
orientation from tag_detector



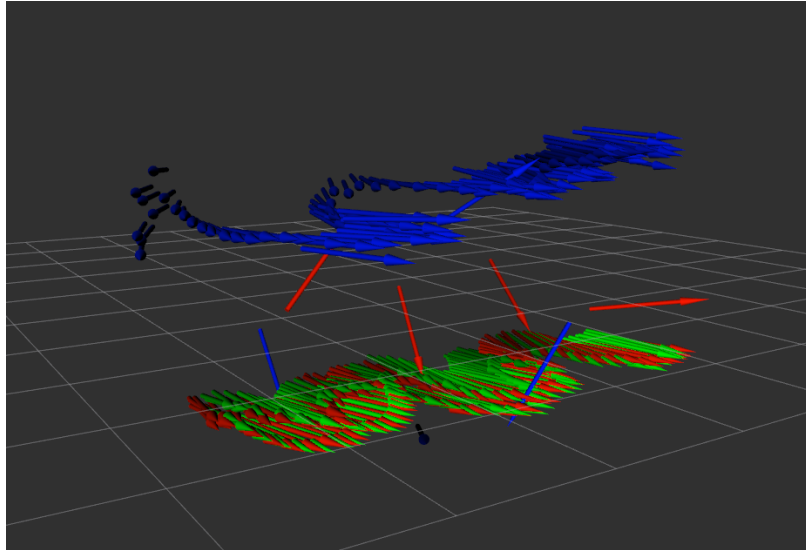
position from ekf filter



orientation from ekf filter



linear velocity from ekf filter



visualization of poses (blue: tag_detector in camera frame, red: tag_detector in world frame, green: ekf results in world frame)

2. Implementation

In this project, I finished the EKF filter for a VIO, propagation and update 2 stages.

In propagation stage, I define 15-dim state vector, which is position, orientation, linear velocity, gyro bias, acc bias. Then I use the propagation formula in lecture notes of EKF, only using IMU data as prior. After that, I use VO poses as measurement to update IMU prior so that I obtain the filtered poses based on EKF. For convenience, I transferred the VO poses from camera frame to world frame for visualizing the difference between observation ones and filtered ones.

From figures above, we can see the filter plots more smooth and rejecting the outliers.

3. Something should be aware

You should change line 6 in A3.launch, which is 'odom_yourwork' to 'odom_ref'. Then you can just run "roslaunch ekf A3.launch" in your terminal under you workspace. Then you will see the all visual results in RVIZ.

I push this assignment to my github repo in detail:

https://github.com/AlbertFeng-0405/ELEC5660/tree/main/project_3_phase_1_FENG_Chen/vio_ws/src/ekf