Project 3 Phase 2 Report

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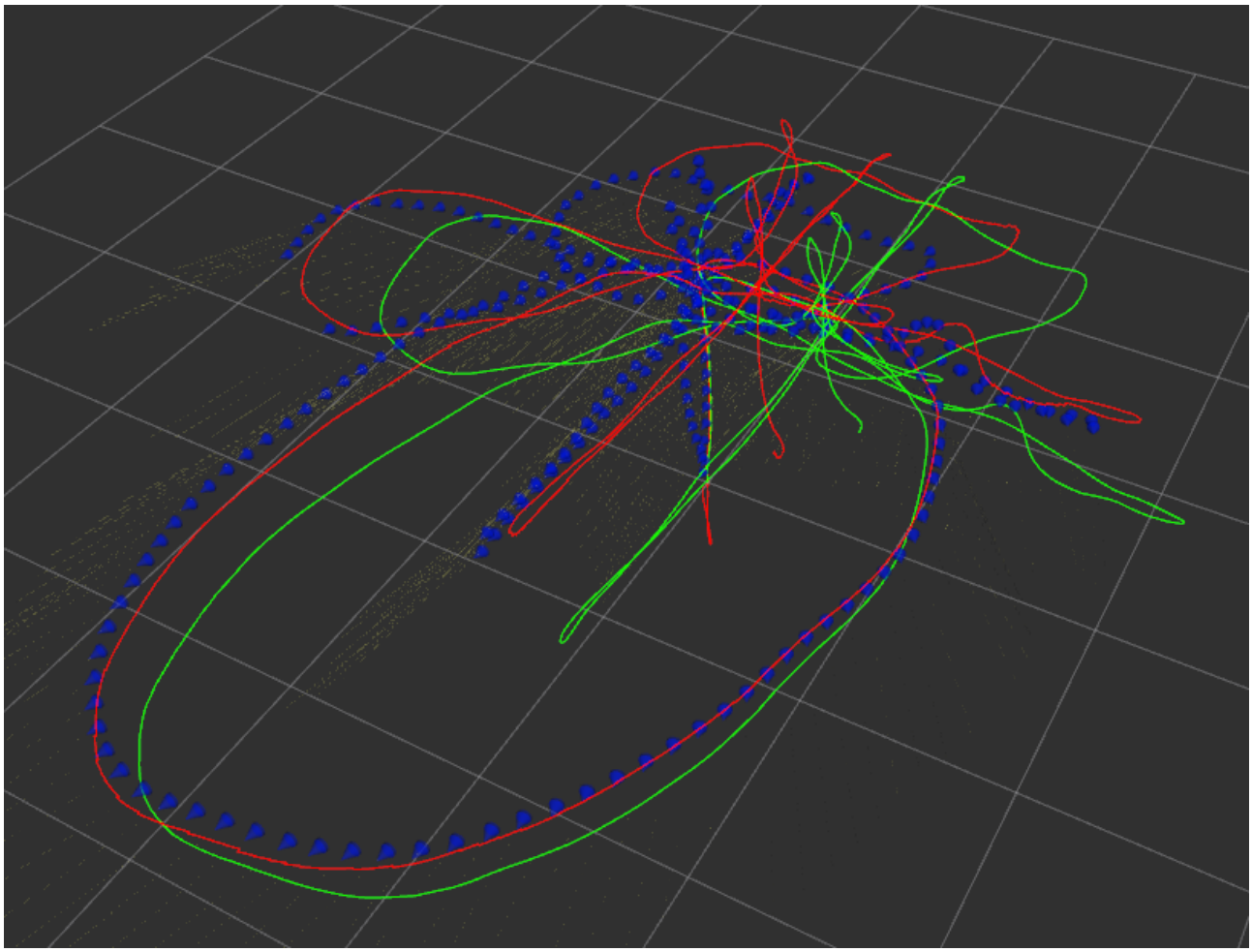
1. Figures (Blue: Vicon GT, Red: aug_ekf, Green: VO)



visualization of a recording bag

2. Implementation

In this project, I implemented aug_ekf in a VIO system, where IMU and VO is a loosely coupled relationship.

In initialization stage, 2 aug_states matrices will be reset according to slides formula then IMU and VO call_back function will be called to determine states in sliding window (or deque).

In later stage, I will judge the type of new state to determine which function will be called then I will insert this frame into deque according timestamp. After that, I will repropagate those frames in deque that are after new state frame.

1) If this frame is IMU, I will call predictIMU function to repropagate the propagation stage in aug_ekf.

2) If this frame is VO, I will call updateVO function to reupdate the update stage in aug_ekf.

3) If this frame is keyframe, I will call updateVO function to reupdate the update stage in aug_ekf and then I will change augmented states in state vector by calling changeAugmentedState function.

After repropagation, I will remove old states in deque and publish newest odometry state in deque.

3. Something should be aware

You should use the bag with GT collected by us in augekf.launch.
The link is
https://hkustconnect-my.sharepoint.com/:u:/g/personal/cfengag_connect_ust_hk/Ebq6Tku7j8pPtilE_aKlidcBtGiTRjGALYpsBkAJGKHBng?e=Hpi5D0

I push this assignment to my github repo in detail:
https://github.com/AlbertFeng-0405/ELEC5660/tree/main/project_3_phase_2_FENG_Chen