Meeting Materials for QDrone Project Regular Internal Meeting

Regular Internal Meeting for QDrone Project

Jan 7 2019 4PM at PSE 312

Jungwon Kang, Zahra Arjmandi, Kunwoo Park Gunho Sohn

Prerequisites for Pursuing Project

- Software
 - Matlab
 - C++
 - Ubuntu
 - ROS
- ☐ Theory (for backend: state estimation from sensor measurement)
 - EKF
 - MSCKF
 - Smoothing
- □ Sensor
 - GPS
 - IMU
 - Camera
 - LiDAR

Tasks

- ☐ Task 0: Building Systems
- ☐ Task 1: Localization
- ☐ Task 2: SLAM
- ☐ Task 3: Navigation

Task 0: Building Systems

☐ Building Complete Systems

Building Systems

Done!

DJI M100 (basic setup)

Done!

DJI M100 (payload integration)

DJI M600 + Gimbal (basic setup)

DJI M600 + Gimbal (payload integration)

Simulator

Localization & Mapping

Localization (range-based)

SLAM

Navigation

Navigation (by just predefined via-point following)

Task 1: Localization

☐ Following Predefined Via-Points

Building Systems

DJI M100 (basic setup)

DJI M100 (payload integration)

DJI M600 + Gimbal (basic setup)

DJI M600 + Gimbal (payload integration)

Simulator

Localization & Mapping

Localization (range-based)

In-progress

SLAM

Navigation

Navigation (by just predefined via-point following)

Task 2: SLAM

■ Building a Map

Building Systems

DJI M100 (basic setup)

DJI M100 (payload integration)

DJI M600 + Gimbal (basic setup)

DJI M600 + Gimbal (payload integration)

Simulator

Localization & Mapping

Localization (range-based)

SLAM

Navigation

Navigation (by just predefined via-point following)

Task 3: Navigation

☐ Building a Map by Next-Best-View Point Selection

Building Systems

DJI M100 (basic setup)

DJI M100 (payload integration)

DJI M600 + Gimbal (basic setup)

DJI M600 + Gimbal (payload integration)

Simulator

Localization & Mapping

Localization (range-based)

SLAM

Navigation

Navigation (by just predefined via-point following)

Meeting Results: What to do

- ☐ Common
 - Basic setup for 'DJI M600 + Gimbal' (primarily by Zahra & Kunwoo)
- □ Zahra
 - Understanding Kunwoo's EKF-based UWB localization code (including EKF)
- □ Kunwoo
 - Sending thesis and experiment plan to prof. Sohn
 - Writing a paper for ISPRS Geospatial Week 2019
- ☐ Jungwon
 - Writing a paper for IROS 2019

Future Plan

☐ Jungwon's Rough Suggestion for Future Plan

Zahra (primarily semantic SLAM)

Kunwoo (primarily UAV localization)

UWB-Inertial Odometry (UIO)

- EKF-based UIO and/or DOP
- MSCKF-based UIO and/or DOP

Localization with UIO + GPS switching

Conventional SLAM

- Using vision and/or LiDAR
- ORB2

Semantic SLAM

Fusion with deep

Jungwon: supports Kunwoo & Zahra mainly in technical issues.