Open Project Plan

1. Team name and team members (up to 4 persons/team)

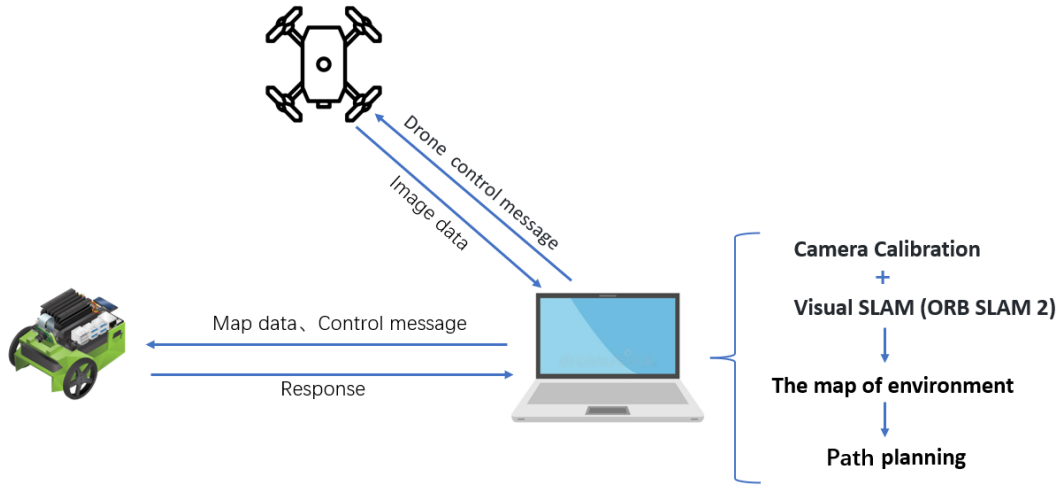
Group_2
Sier Ha, Yuxi Liu, Zhilin Lin, Yunfeng Zhu

2. Application / Use-case

Our target is to use the Tello to sense and map the surrounding environment and make a path for the Jetbot to follow without the need to detect obstacles on the ground. In the process, the Tello will interact with the Jetbot by sending the information it has obtained. We chose this application because we thought it could be useful for the application of some scenes of non-human navigation and autonomous applications.

3. The system

- One Tello drone、One Jetbot
- Sensor：Camera for Tello and Jetbot
- Communication：Through WIFI and ZeroTier
- Algorithm ：Visual SLAM （ORB-SLAM2）、Path planing algorithm (like AMCL) 、Camera Calibration algorithm
- Data flow: as shown below



4. GitHub repo link

https://github.com/lyximjk/RAS-Jetbot-PrePath

5. Background

We have some knowledge about using the ROS system. We have ideas of how to control the Tello and the Jetbot and how to make interactions between them. We are more confident about the algorithm part where we will need to using the Tello to explore the unknown environment and make a map and path for the Jetbot. However, this part is also the most riskiest part because we don't know much about the cameras the Tello uses, so the sensing process can be challenging and we can predict that we will adjust many times in this part.

6. Expected challenges and wishes to learn

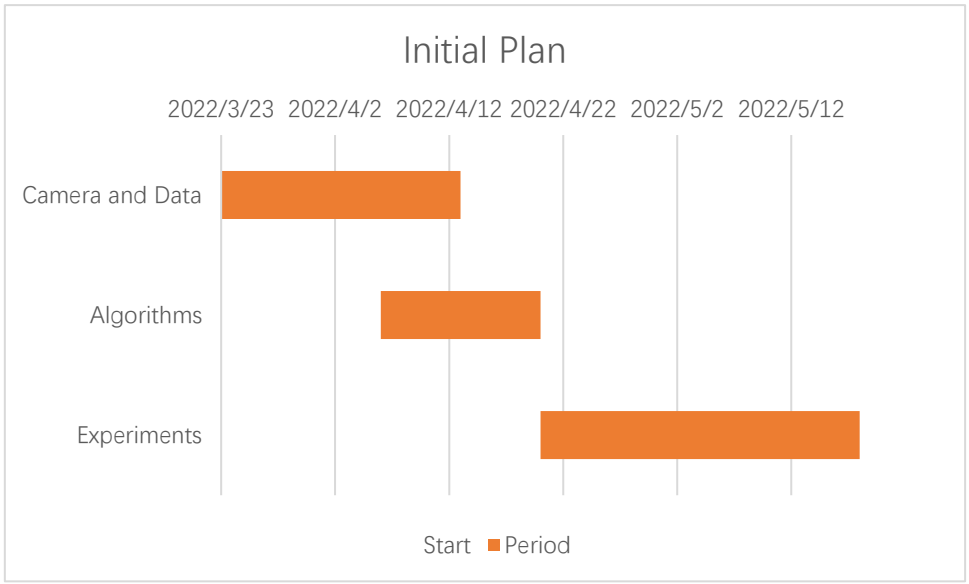
We need to learn more about the feedback from the camera and the algorithms of mapping the surrounding environments. Our main challenges are the interactions, the mapping, the path deciding and so on.
First of all, we must strengthen the knowledge of ROS2, and also learn the knowledge of camera calibration and visual Slam (ORB-SLAM2) related content; we also need to do research on the algorithm of path planning to find the algorithm that suits us;

7. Team roles

Environment sensing and path defining: Sier Ha, Yuxi Liu
Interaction and Jetbot following: Zhilin Lin, Yunfeng Zhu

8. Work packages (how is the work going to be divided among team members and in time), with tentative project schedule.

2022.03-2022.04: Tello camera testing and data acquisition. (Sier Ha, Yuxi Liu)
2022.04: Research for the algorithms about mapping(Sier Ha, Yuxi Liu) and interactions(Zhilin Lin, Yunfeng Zhu).
2022.04-2022.05: Interactions realization and Jetbot path-following. (Zhilin Lin, Yunfeng Zhu)



9. Description of final experiment or demonstration.

We plan to use the Tello to map a surrounding indoor environment and define a path for the Jetbot. Then the Jetbot will follow the path autonomously.