Final Project Proposal

Year: \_2019\_ Semester: \_Spring\_ Team: \_\_17\_\_ Project : \_Face Tracking Drone\_\_\_\_\_\_

Creation Date: \_\_\_Jan 09, 2019\_\_\_\_\_\_\_\_ Last Modified: Jan 09, 2019

Team Members (#1 is Team Leader):

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Member 2: Xingchen Wang\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Email: wang2930@purdue.edu\_\_\_\_\_\_\_\_\_

Member 3: Yi Qiao\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Email: qiao22@purdue.edu\_\_\_\_\_\_\_\_\_\_\_\_

Member 4: Haobo Chen\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Email: chen1887@purdue.edu\_\_\_\_\_\_\_\_\_\_

1.0 Project Description:

Face tracking drone is a drone that is designed specifically for amateur musicians allowing them to record their performance by themselves. The drone has a camera that will transfer real time video data to a local computer through a dedicated video transfer chip. After receiving the processed data from the local computer, the drone will be able to perform the desired action sent from the local computer. In addition, the drone will feature manual control mode in which the motion will be controlled manually by a RF controller.

2.0 Roles and Responsibilities:

Xufei Gao is the team leader and software engineer. He will maintain communication among team members and keep updating the project information. He is mainly responsible for application design in the host client and algorithms. He has rich experience building frontend applications and utilizing APIs. He will also help with coding on the microcontroller and designing interfaces.

Xingchen Wang has participated in several mini-projects and has good understanding in theory of operation. He has rich experience in designing block diagram and making decision on component selection. Therefore, he is suitable to be the system engineer in this team. He will take care of the high-level functional overview of the system.

Yi Qiao was mainly focused on software throughout his college life. While being able to understand the hardware part, he is able to integrate the software with them perfectly. Since he has a lot of experience writing low-level codes, coding on embedded system would be a nice match with his skill set. He will take care of the embedded software development and help with microcontroller interfacing.

Haobo Chen has been working on the hardware design during 362 projects, he has designed filters for audio signal capturing, soldered the circuit and performed test on the design. He has enough experience to work on the hardware side in this face tracking drone project to ensure his teammates’ code would work on the integrated hardware.

2.1 Homework Assignment Responsibilities

Below are the assigned homework responsibilities (Figure 1).

|  |  |  |  |
| --- | --- | --- | --- |
| *Design Component Homework* | | *Professional Component Homework* | |
| 3-Software Overview | Y.Q. | 9-Legal Analysis | X.W. |
| 5-Electrical Overview | H.C. | 10-Reliability and Safety Analysis | Y.Q. |
| 7-Mechanical Overview | X.W. | 11-Ethical/Environmental Analysis | H.C. |
| 8-Software Formalization | X.G. | 12-User Manual | X.G. |

X.G.: Xufei Gao X.W.: Xingchen Wang Y.Q.: Yi Qiao H.C.: Haobo Chen

*Figure 1: Assigned Homework Responsibilities*

3.0 Estimated Budget

An estimated budget for Face Tracking Drone is provided in figure 2, below:

|  |  |
| --- | --- |
| **Mechanical** | **Estimated Cost** |
| Drone skeleton | $60 |
| Packaging Materials | $50 |
| **Electrical** |  |
| LIPO battery \* 2 | $50 |
| PCB | $50 |
| Video transmitter/receiver | $50 |
| Camera | $50 |
| RF transmitter/receiver | $20 |
| Radio controller | $50 |
| Micro Controller | $40 |
| **Other** |  |
| Shipping | $50 |
| **Total** | $470 |

***Figure 2. Estimated Budget***

This budget analysis is only estimation since some components may be provided by team members or may be found in the lab. Overall, it costs the amount of around $120 towards this project per team member which will mainly be covered by Purdue. The amount that exceeds the reimbursement will be separated evenly between team members.

4.0 Project Specific Success Criteria

Below are the criteria necessary to the success of our project.

1. An ability to communicate with flight control to perform desired movement such as moving in a specified direction for a certain distance.
2. An ability to communicate over RF/WiFi with the local host to receive commands so that the drone would perform the corresponding action/movement based on the commands.
3. An ability to control the gimbal on the quadcopter to point to a specific human face.
4. An ability to track face in the video and reach a reasonable framerate(above 30 fps).
5. An ability to detect one face precisely in a any given image frame.