sdmay19-35: Implementing a Web Portal System for Drone Simulation and Control

Biweekly Report 5

April 2nd - April 16th

Client: Ali Jannesari

Faculty Advisor: Ali Jannesari

Team Members

Bansho — *Test Engineer. Sensors Hardware Developer.*

Ian — *Scrum Master. Full Stack Developer.*

Li — *Test Engineer. Back-end Developer.*

Jawad — *Meeting Manager. Embedded Systems Developer.*

Mehul — *Project Lead. Computer Vision Developer.*

Sammy — *Report Manager. Lead Front-end Developer.*

Summary of Progress this Report

- Integrated ArduPilot into our Gazebo container
    - Added new drone model and ArduPilot gazebo plugin to our world file.
    - Wrapped the CLI in websocketd program to communicate the I/O over a web-socket
    - Added a terminal to the simulate web-page that displays the output of the ArduPilot web-socket and allows the user to enter commands
    - Tested commands for taking off, landing, and moving up, down, left, right, forward, and backward.
        - Takeoff <distance>
        - Land
        - Velocity <X> <Y> <Z>
    - Documented ArduPilot installation process and flight commands
- Prepared to integrate computer vision module with the frontend
    - Wrote Python scripts for routing commands through our Django API
    - Created a form on the Flight page for triggering the computer vision module via HTTP POST request
- Computer Vision: Blender/Python
    - Blender python imports .obj file and gives developer access to image characteristics and its manipulation.
    - The python script aligns, textures and converts .obj into .dae which is a file format that can be used inside Gazebo world.

- Created the drone's own wifi network

    - Connected the drone, APM planner and the Raspberry PI used to livestream and geo-tag images under the same network

- Started to control and calibrate the drone using APM planner
    - Can set various modes and arm the drone using APM planner
    - Calibrated the drone using APM planner

Pending Issues

- “Circle” flight mode doesn’t work in the integrated simulator
- Have to get better in controlling the drone using APM
- PID tuning, Basic tuning, and other parameter values are hard to adjust

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Bansho	Build the geo-tagging system to the drone machine.	22	164
Ian	Documented ArduPilot simulator flight controls. Modified Django API to allow integration of CV component.	22	165
Jawad	Created the drone’s own wifi network and used APM to control and calibrate the drone	23	170
Li	Fix and adjust the PID tuning and basic tuning in APM, and Additional Parameter Settings	21	163
Mehul	Automated image stitching from ODM to GzWeb using Bender/Python. Added real-world phenomenon to the virtual-world.	25	168
Sammy	Integrated ArduPilot into our Gazebo/GzWeb container. Started integrating CV component into API/Gazebo	20	175

Plans for Upcoming Reporting Period

- Finish integrating computer vision component
- Perform full system tests; plan and prepare demo

- Keeping adjust the values in the PID tuning and basic tuning, and prepare demo