EE / CprE / SE 491 – sdmay20-47
Real-time volumetric analysis
Third be-weekly report
Feb 13 - Feb 23, 2020
Client: Prof. Ali Jannesari
Faculty Adviser: Prof. Ali Jannesari

Team members

Kenneth Lange – Team Lead
Alain Njipwo – Chief Hardware Developer
Luke Bell – Chief Interface Developer
Daniil Olshanskyi – Chief Software Developer
Max Medberry – Chief Backend Developer

Past weeks accomplishments

- Drone firmware properly flashed and set up
- Battery arrived, set up, connected and tested
- Airframe configured, motors properly connected and configured
- RC bound to the drone
- Three-way connection between the pixhawk controller, the RC, and the Jetson set up and tested
- Further progress in understanding ROS and simulation environments

Pending issues

- Test flight still not scheduled
- ROS node still can't appropriately control drone in AirSim simulation environment

Individual contributions

Team member	Contribution	Bi-weekly hours	Total hours
Kenneth Lange	These past two week has been working on lidar. The lidar sensor communicates with the drone to tell the drone how far off the ground it is. Been spending the week researching how everything functions and testing the results on the simulated environment. Made enough progress to code basic functionality within the flight simulation and will be continuing to work into the next few weeks working with an actual sensor and hooking it up to the drone to return the same results	13	41
Daniil Olshanskyi	These past two weeks was mainly working with drone hardware to make it fly. Once again reflashed and recalibrated the firmware, with the help of grad student bounded the RC and placed a GPS/Compass on the drone alongside with recalibrating the airframe. With Alain figured out how to charge and connect the battery, then worked tweaking the PWM to the rotors to make them non-spinning at arming but that resulted in one of them not getting enough power so brought it back(currently at 1000 us as the standard suggests). After that worked on reconnecting the motors so their numbering was corresponding with the airframe. To test all this tried controlling the drone with the RC/with the software/with both/with software via SSH. After figured out the boot sequence (power the controller, connect to Jetson, turn on the RC, launch the software, press the safety switch) did some tests without propellers attached to verify everything is connected and functions properly. At this point waiting to get a flight lab access to do a test flight.	18	50
Luke Bell	Has been working on getting us set up to develop ROS code that utilizes the ZED camera data. First, installed all of the necessary	14	42

	software and tools to develop with the ZED camera Python API, then realized that the computer installed it on would need a dedicated GPU to run anything. Reinstalled everything onto our GPU-equipped Titan PC and confirmed that the ZED camera was working as expected. Then installed ROS Melodic on the Titan PC and created a Catkin workspace for our ROS development. Initially, the plan was to write a ROS node using the ZED Python API, but it appeared that there is already a ZED wrapper node for ROS, so downloaded that and began investigating.		
Max Medberry	Working on translating Ros Twist messages to Airsim movement commands through using the motor simulation, but that didn't seem to be working. A grad student working in conjunction with us suggested using pose and changing the drone position directly, letting the simulation handle motor/drivetrain control. So now we're working on scripts to listen to published pose messages from the Ros environment to push them to Airsim and change the drone position. An issue we still face is that the publisher he suggested using is part of hector_quadrotor, so we are having to run the Gazebo simulator simultaneously to Airsim. In the future we'll need to work to copy the package publishing pose messages to a clean package so it can work without the simulation, or use Airsim simulation instead of Gazebo.	12	42
Alain Njipwo	This past week, I am working on setting up a ROS node for ZEDM. I basically did the exam thing as Luke, excepted I imaged a partition of my laptop installed Ubuntu, created a catkin_WorkSpace, downloaded the Wrapper ZEDM package and I'll try and come into lab to see to connect and trouble shoot the output. I am also starting to look at different nodes to look to subscribe to the ZEDM's topic and how that will all work	15	43

Plans for the upcoming week:

- Test the flight setup in the flight lab, adjust drone controller settings
- Be able to fully control Airsim simulation from ROS
- Be able to get images from ZEDM camera via the Python library calls
- Finish familiarizing with ROS, start integrating the Machine Learning algorithm into ROS and onto the drone via the AirSim