Simulation and Control of Multiple Quadrotor Robots

by Eric Tatman

Crazyflie 2.0 drone used in simulations.

Purpose

To create a test bed simulator for multiple quadrotor drones to fly autonomously in geometric patterns without colliding into each other or surrounding objects.

Challenges

My greatest challenge was acclimating myself to the Ubuntu 18.04 interface, % familiarizing myself with Robotic Operating System (ROS), and learning how to set up simulations so the drones would move in geometric formations. %

Explanation

This project requires Ubuntu 18.04 to run the Melodie version of ROS. Once you have a a catkin workspace you install Eigen, Armadillo and GNU Science Library dependencies. Now, you can Git-clone the necessary packages to run the simulator. It starts as with a base simulation, but you build codes to make the drones fly in certain patterns. The rqt graph below shows how the program runs the simulation. %
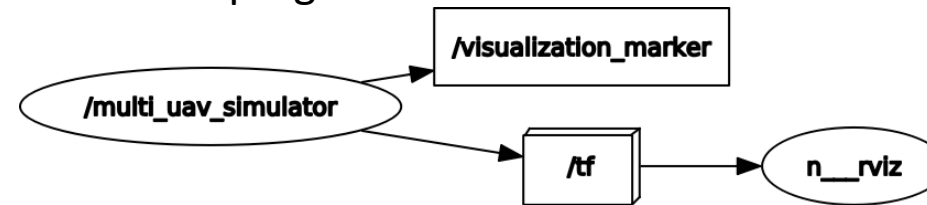
In the rqt graph, it shows that the /multi_uav_simulator is controlling the program, it gives data to the /visualization_marker to set up the simulation, and data to the background programs /tf and n_rviz that help the simulation run.

Conclusion

This project was a great experience. I learned a great deal about the intricacies of drone control and movement. It was also interesting to research the possible application of the technology that I worked one and hope that this contribution can be applied in the real world.