Hover Hand Glove

Flight at Your Fingertips

Austin Dorotheo | Colin Garrett | Miclos Lobins | Steven Fields | Zachary Meyer

Background

The goal of this project is to create an alternative and more intuitive way to control a quadcopter. The Hover Hand Glove allows a user to pilot a quadcopter using the hand instead of a controller. The glove uses sensors placed on the fingers and back of the hand to read hand movements. These gestures are converted by the processor into flight commands for the quadcopter.

Overview

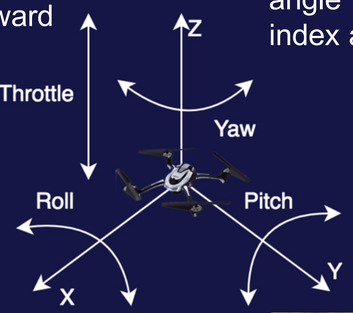
There are four inputs to a quadcopter: yaw, pitch, roll, and throttle. Throttle controls the speed of the propellers. Yaw, pitch, and roll are rotation about the z, y, and x axes, respectively, as shown below.

Pitch

Pitch is controlled by tilting the hand forward or backward

Throttle

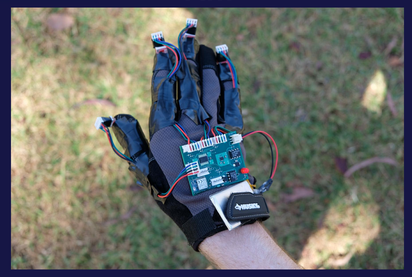
Throttle is controlled by the angle difference between the index and middle fingers



Roll

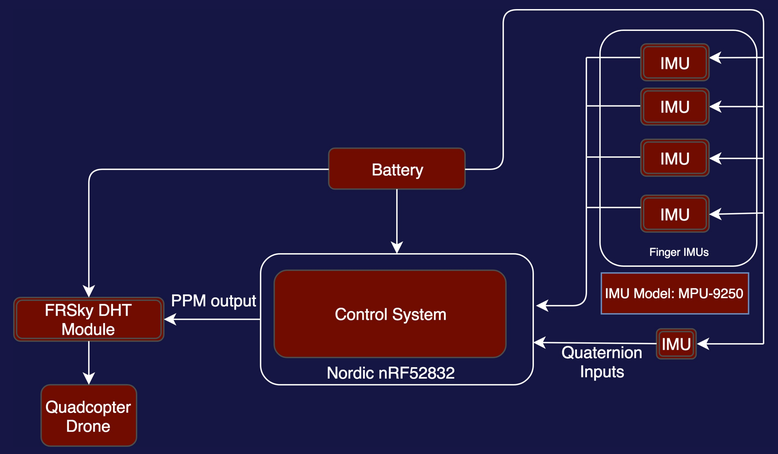
Pitch is controlled by tilting the hand forward or backward

Yaw

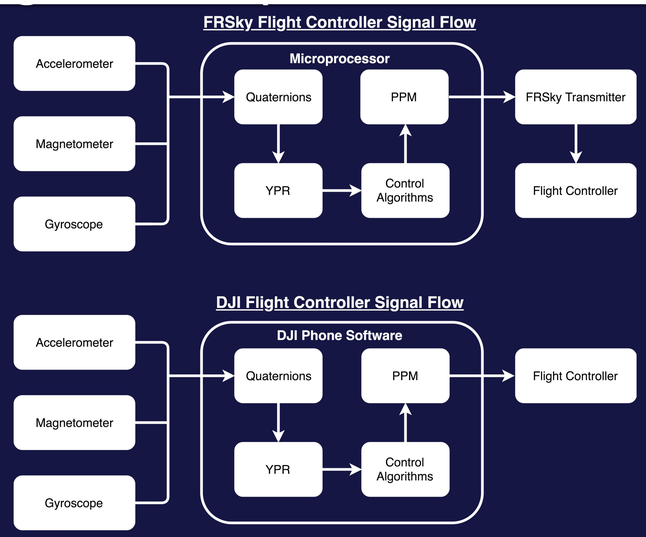


Yaw is controlled by rotating the hand along the z-axis

System Block Diagram



Signal Flow (Software Overview)



*Sensor data is forwarded from microprocessor to phone via Bluetooth

Hardware / Key Components

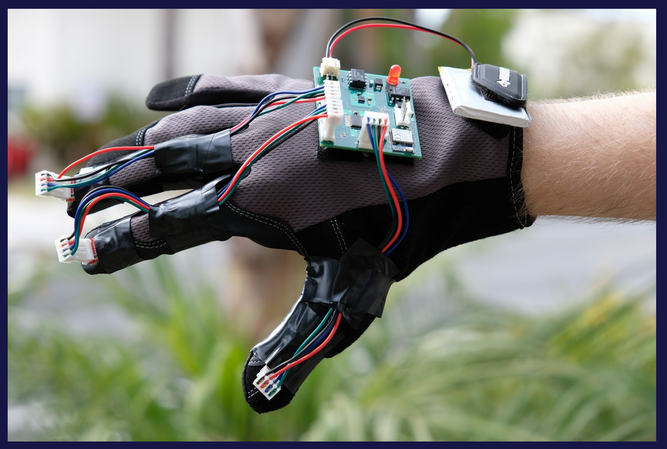
MPU-9250

This sensor records the movement of the hand.

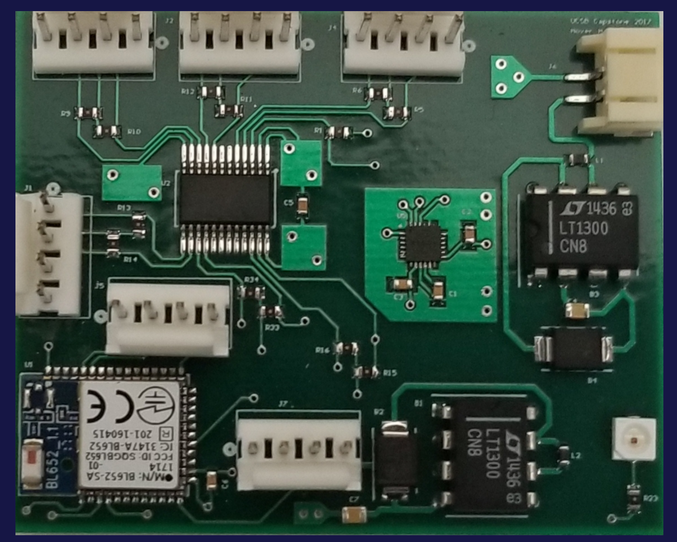
Nordic nRF52832

This microcontroller interfaces between the sensors and the quadcopter.

The Hover Hand Glove



The Main PCB



The Glove in Action

Acknowledgements:
Thank you to our mentors at UCSB: Yogananda Isukapalli, Celeste Bean, & Caio Motta, as well as our sponsor, Arveng Technologies

ARVENG TECHNOLOGIES

UC SANTA BARBARA engineering