Google Glass Remote Monitoring

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Introduction & Motivation

Technology is changing every day. As future computer engineers, we must be able to adapt any and all new forms of technology as the years advance.

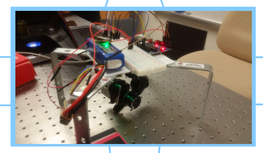
This project looks into remote monitoring using the new Google Glass and a GoPro module, which will be mounted onto a quadcopter as part of a larger project. The project has applications for military, police and firefighters, implementing a fast and easy method to view hard-to-reach areas.

This project covers many computer engineering topics, including: hardware, software, client-server wireless connections, and user interface.

Project Description

Using sensors in the Google Glass hardware, changes in head position are to be transmitted to an Arduino, which will move motors on a Gimbal. Streaming video will be transmitted through WiFi to give the pilot a first person view of the quadcopter, emphasizing ease on user interface (UI).

Using the gyroscope in conjunction with other motion detecting hardware, we have been able to get usable data from the hardware. We have also successfully created a client-server connection to an Arduino module and have been able to send and receive data from the Glass to the Arduino.



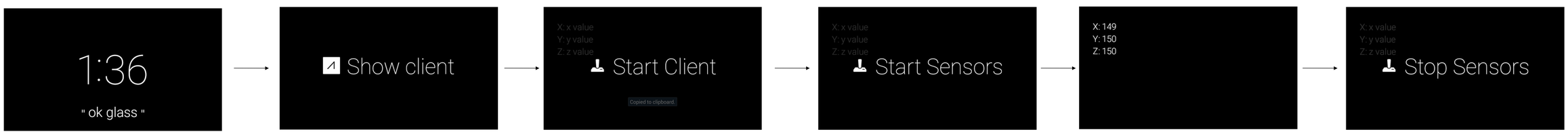
Materials

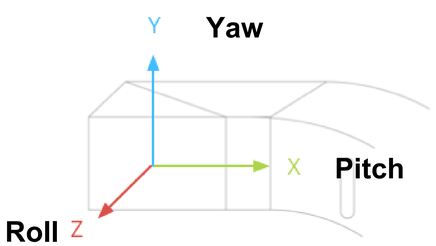
Google Glass: Under the Android Operating System (OS), video receiver, controller
GoPro: Capturing video and streaming video data
Gimbal: Motors for angling GoPro
Arduino: Operating Gimbal via wireless connection
WiFly: Establishing TCP/IP server-client connection

Methods

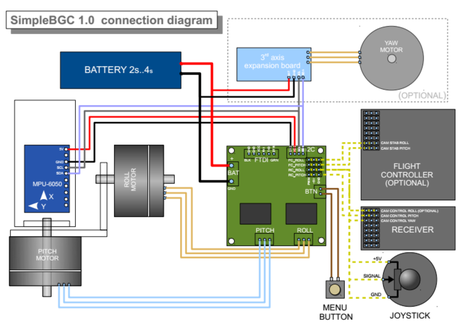
1) Create effective user interface
2) Establish a client-server socket relationship between the Google Glass and Arduino
3) Control Gimbal via Google Glass using Android's built in sensor libraries
4) Stream from GoPro to Google Glass over WiFi
5) Unable to establish a concurrent connection with both Glass-Arduino and Glass-GoPro

Results & Analysis





Trigonometry applied to convert x-y-z values from gyroscope into angles, to send to Arduino and Gimbal.



Wiring diagram for Gimbal

Conclusion

Head tracking via wireless connection is a success.
Video to Glass while head tracking is unsuccessful. However, using Android GoPro app, able to view video on phone while head tracking simultaneously.