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# Wearable Computing with Google Glass

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# Wearable Computing with Google Glass

By Aaron Countryman, Nathan Hale, & Ian McQuaid

March 11, 2015

# Project Overview

Wearable  
Computing with  
Google Glass

By Aaron  
Countryman,  
Nathan Hale, &  
Ian McQuaid

Project Overview

Project Details

Glass Capabilities  
& Limitations

Android  
Development for  
Mobile & Glass

Demo

Conclusions and  
Questions

## Senior Design Format

- Year-long project
- Team Format
- Real-world clients and problems
- Competition between teams

## Purpose

*The application serves as a link between a subject matter expert and an unskilled individual who needs to be assisted to accomplish a specific task suited to the expert's skills.*

## Customer

*The Air Force Research Labs (AFRL)*

# Project Overview (Cont.)

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## Technologies

- Android Software Development Kit (SDK)
- Glass Development Kit (GDK)
- Android Phone & Tablet
- Google Glass

## Team Responsibilities

- **Ian McQuaid:** Team leader & Mobile Development Lead
- **Aaron Countryman:** PC Development Lead
- **Nathan Hale:** Video and Audio Streaming Lead

## Experience

- 3-4 years in the CS program developing in C++ and Java primarily.
- No experience with Android or Glass development

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## Worker Role

- Possesses Mobile Device
- Streams video to expert in real-time
- Able to send and receive images to/from the expert
- Able to send and receive annotations (i.e drawings) on those images
- Able to talk to the expert via a two-way audio channel

## Expert Role

- Typically uses a PC with more resources available
- Able to view the video stream from the Worker
- Able to view and send annotations
- Able to talk to the worker via a 2-way audio channel

# Glass Capabilities & Limitations

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## Capabilities

- Android Application Programming Interface (API)
- Camera
- Touch-pad
- Voice commands
- Phone pairing
- Wireless and Bluetooth communication

## Limitations

- Battery life
- Overheating
- Touch inputs
- Phone screen-casting limitations

# Android Development for Mobile & Glass

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## Environment

- Eclipse with Android Tools (DDMS, SDK, ADB)
- Android Studio
- Java
- Emulators

## Challenges

- Networking & Multi-threading (Mobile)
- New description style (XML) and API for user interface (Mobile)
- New interaction style for application (Mobile)
- Cross-platform debugging (Mobile)
- Inputs (Glass)
- Battery life and charging (Glass)

# Demo

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**Demo**

Conclusions and  
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*Time for a Demonstration*



# Conclusions and Questions

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## Conclusions

- Wearable devices are convenient; however, the input limitations are an obstacle which requires creative design for developing practical applications.
- The battery life is insufficient to support a continuously-running application; therefore, application designers need to consider ways to extend the battery life by techniques such as allowing an application to automatically sleep and awake, as needed.
- Leveraging the Android SDK makes development relatively simple.

## Questions