Wearable Computing with Google Glass

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Wearable Computing with Google Glass

By Aaron Countryman, Nathan Hale, & Ian McQuaid

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Project Overview

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.)

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
Project Details

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

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

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

Time for a Demonstration
Conclusions and Questions

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