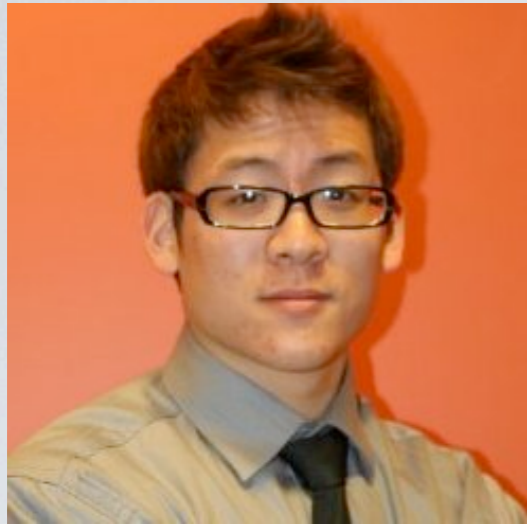


PRELIMINARY DESIGN REVIEW

Team SafeLet

October 2013

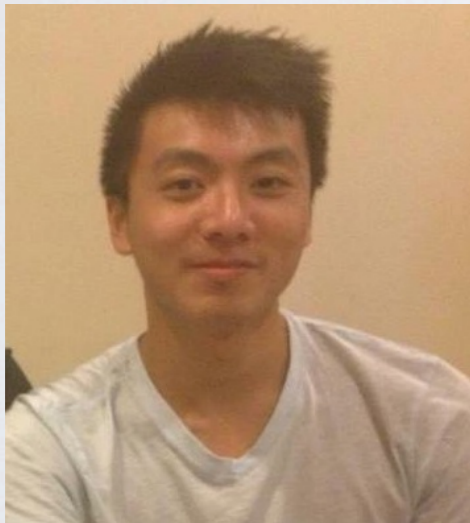


Marco Chiang
CSE



Chris Garry
CSE

The Team



Steven Tso
CSE



Aaron Tye
EE



OVERVIEW

- Motivation
- Specifications
- Design Alternatives
- MDR Deliverables

MOTIVATION

- Create awareness about the people you care about
- Real-time feedback of notable, everyday activities
- Taking action in protecting loved ones
- Autonomous emergency detection



CONCEPT

- Unobtrusive and lightweight wrist band
- Simple mobile application
- Creating awareness



IMPACT

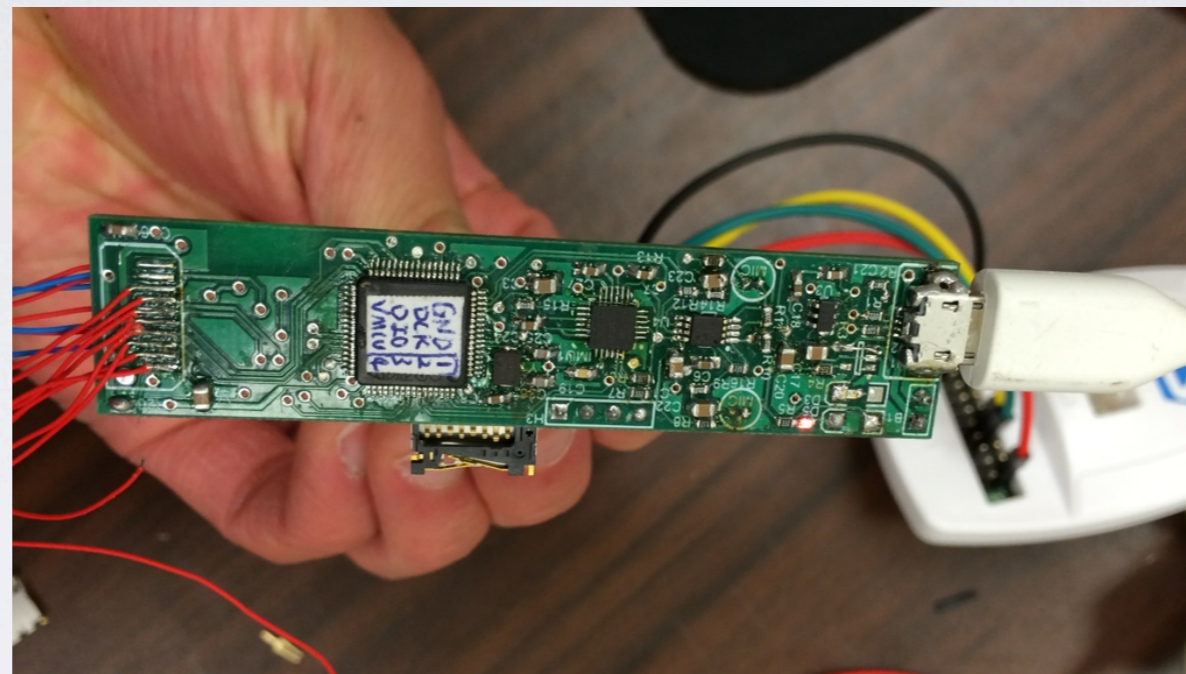
- Falls in elderly people are the main cause of admission and extended period of stay in a hospital
- Every 40 seconds in the United States, a child becomes missing or is abducted

IMPACT

- Ease of mind for individuals
- Empowers the community to take action
- Become protectors of your loved ones

SENSORS LAB

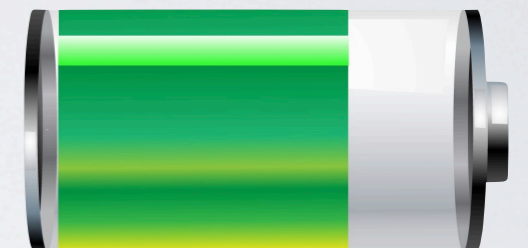
CS Department



- Vast resources in sensor technology
- Currently building computational eye glasses
- Providing us a development platform

SPECIFICATIONS

- Small form factor
- Bluetooth 4.0 BLE
- Lithium ion battery



INPUTS & OUTPUTS



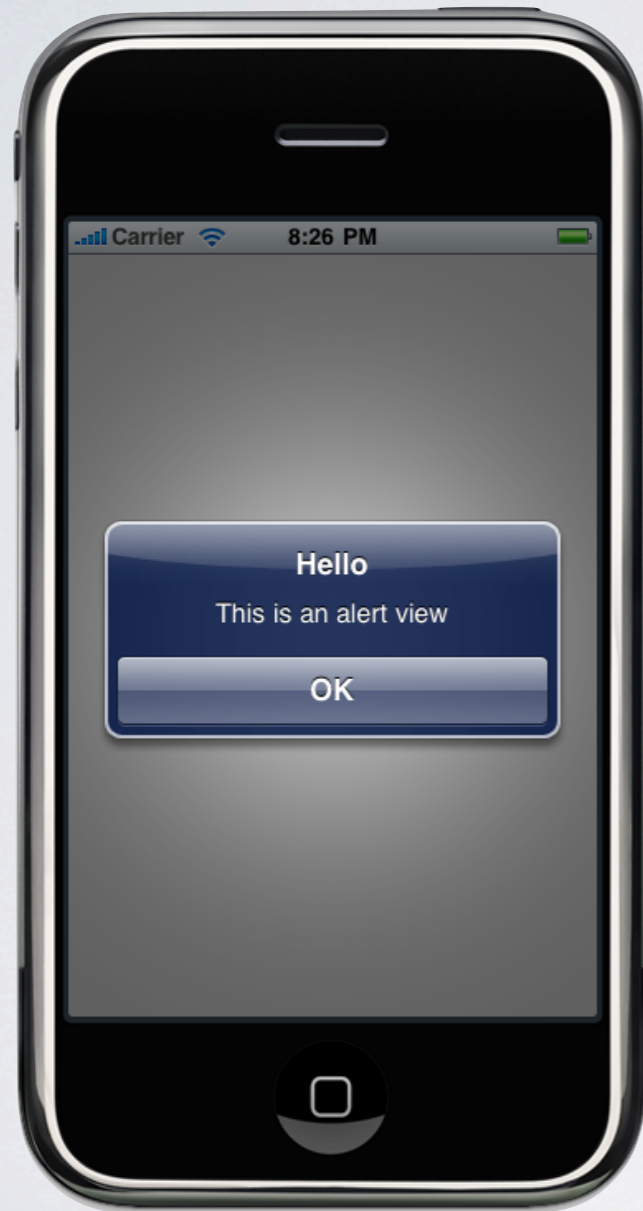
Input

- Accelerometer (X, Y, Z) data
- Temperature data

Output

- Real-time notifications of significant events

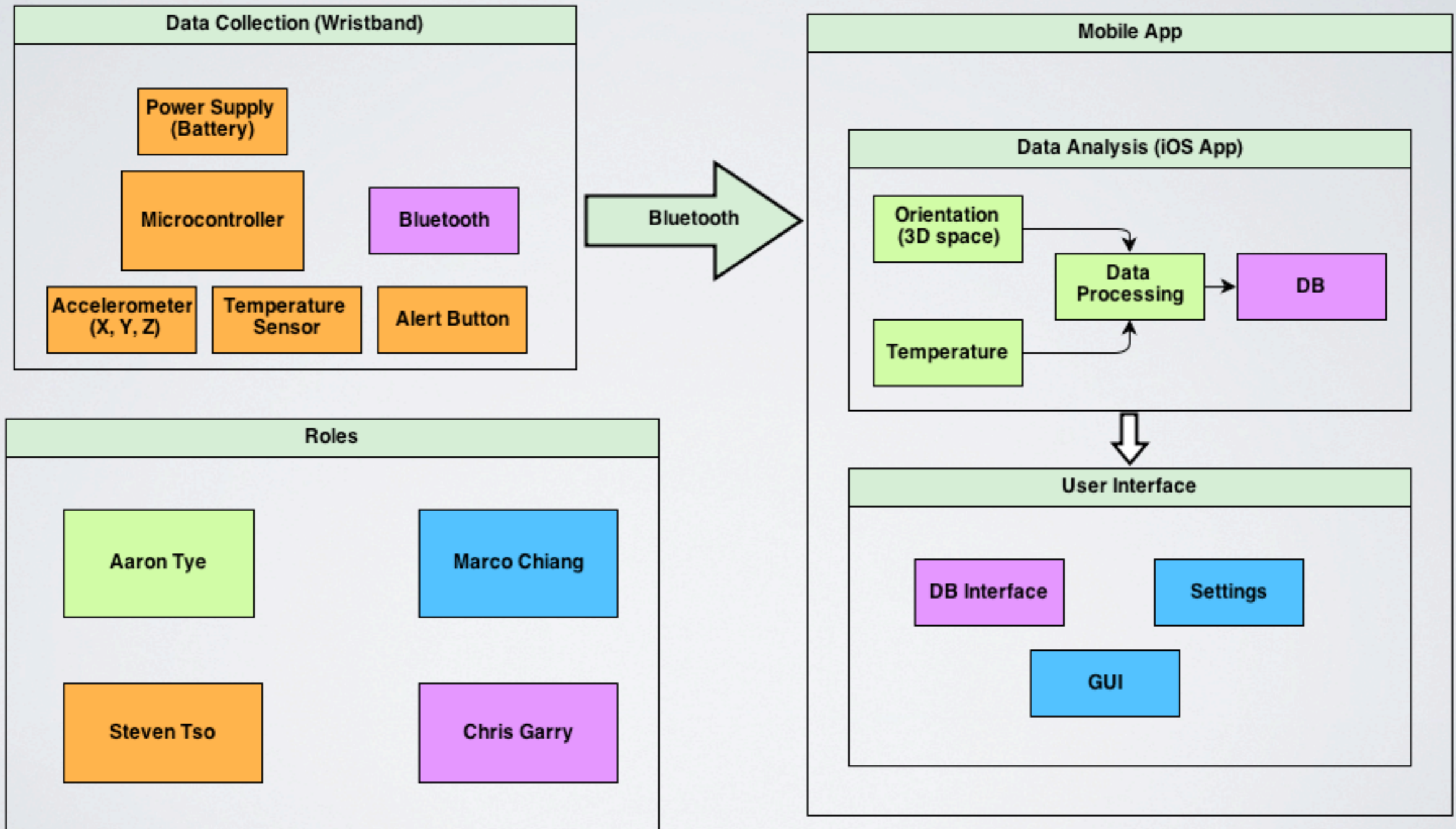
USER INTERFACE



iPhone App

- Activity
 - sitting & standing
 - lying up & down
 - walking & running
 - upstairs & downstairs
- GPS Coordinates from mobile phone
- Elevated temperatures
- Communicates alerts via text and phone calls

BLOCK DIAGRAM



Overview

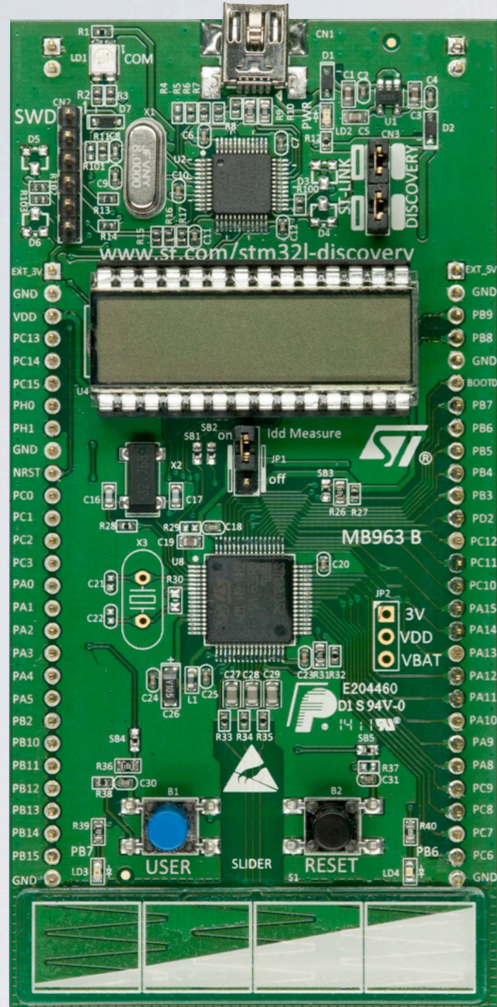
- STMicroelectronics
- Ultra low-power ARM Cortex-M3
- Designed specifically for low powered devices

Specs

- 32 MHz CPU
- 32 KB RAM
- 256 Kbytes Flash

IDE

- IAR Embedded Workbench
- CooCox



STM32 Discovery
(Development Board)

PCB FABRICATION



In collaboration with Sensors Lab

- Altium software for PCB design
- Fabrication and mounting

DESIGN ALTERNATIVES

Additional Sensors

- Audio transmitter
- Galvanic skin response sensor
- Heart rate monitor

Alternative Development Board

- EZ430-Chronos



DESIGN ALTERNATIVES

Design device for children

- Safety measure for kidnappings
- Bracelet paired with guardian's phone
- Wireless communication via bluetooth

Shoe device (alternative to size constraints)

- Track walking patterns, gait
- Help correct posture
- Wireless communication to phone

MARKET ALTERNATIVES

Life Alert

- Pendant-shaped device worn on necklace or wristband
- Requires button press to activate automatic dialer to a call center
- Emergency dispatcher alerts authorities



FitBit

- Wrist device to track steps, distance, calories burned, sleep quality
- Wireless syncing to PC, Mac, or phone via bluetooth



MDR DELIVERABLES

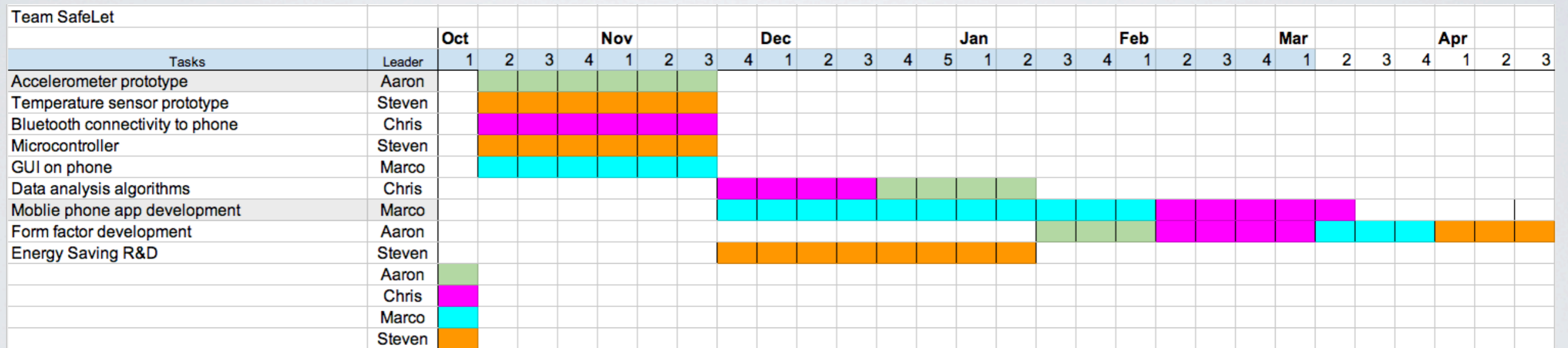
Prototype of hardware working on breadboard

- Accelerometer
- Temperature Sensor
- Bluetooth

Demonstration of bluetooth connectivity with mobile phone

- GUI interface and notification that bluetooth connection is successful

GANTT CHART



Q&A

ADDENDUM

SECURITY

Design for

- Bluetooth 128-bit AES
- Transport Layer Security/Secure Socket Layer for mobile application
- Secure databases

PROJECT BUDGET

- Board \$12 (back up for chips)
- Fabrication costs (tbd)

Estimated final budget:

	Final	
1	Microcontroller	12.5
1	Bluetooth	25
	Temperature	
2	Sensor	5
1	Accelerometer	15
1	Button	0.5
1	Li-ion Battery	20
1	Power Regulator	5
1	Misc components	35
		118
1	PCB Fabrication	50-100