Senior Design Team 312

Wearable Anti-Sexual Assault Device

Sponsored by Power Angel
Advised by Babak Noroozi, Ph.D.

Team Introductions

Kathleen Kelly

Team Leader

Kevin Martinez

Head CPE

Scottie Jacobs

Head Developer

Andrew McGlone

Head Integration

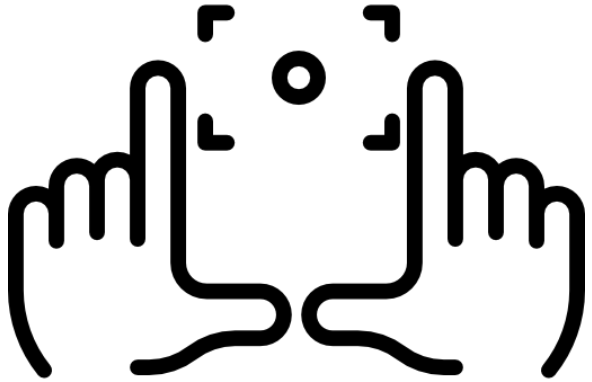
Charles Johansen

Head EE

Outline

- Project Scope
- Design Concept
- Current Works
- Future Works
- Questions

Project Scope



Project Description:
Wearable device to prevent sexual assault and support the user should they be a victim to a crime.

Key Goals:

- Prevent attacker from pursuing victim
- Build a case for legal action
- Be comfortable and sleek
- Not easily tampered with

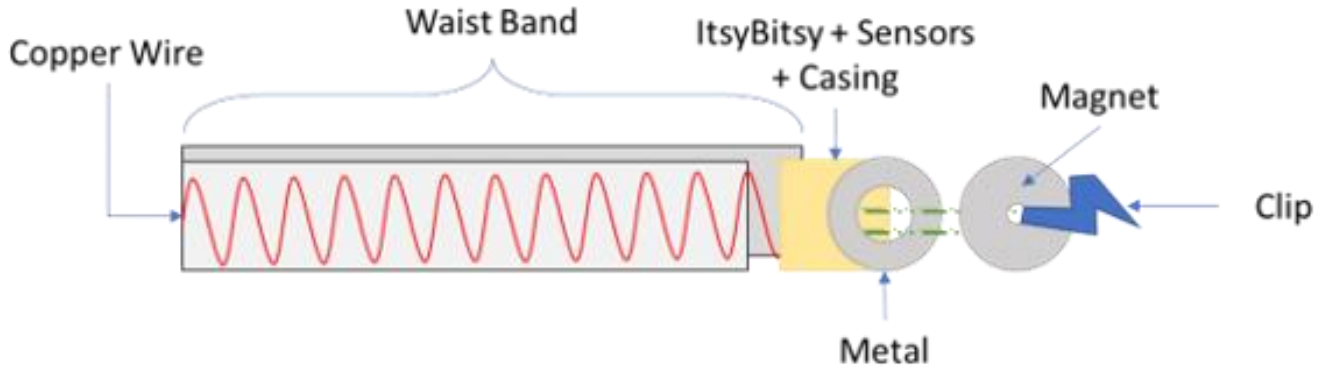
Markets:
Primary markets: Primary demographic is women ages 12 or older
Secondary markets: Anyone can be sexually assaulted; this device is for everyone.

Assumptions:

- User will wear this device under clothes.
- Phone will be near user for location precision.

Design - Overall

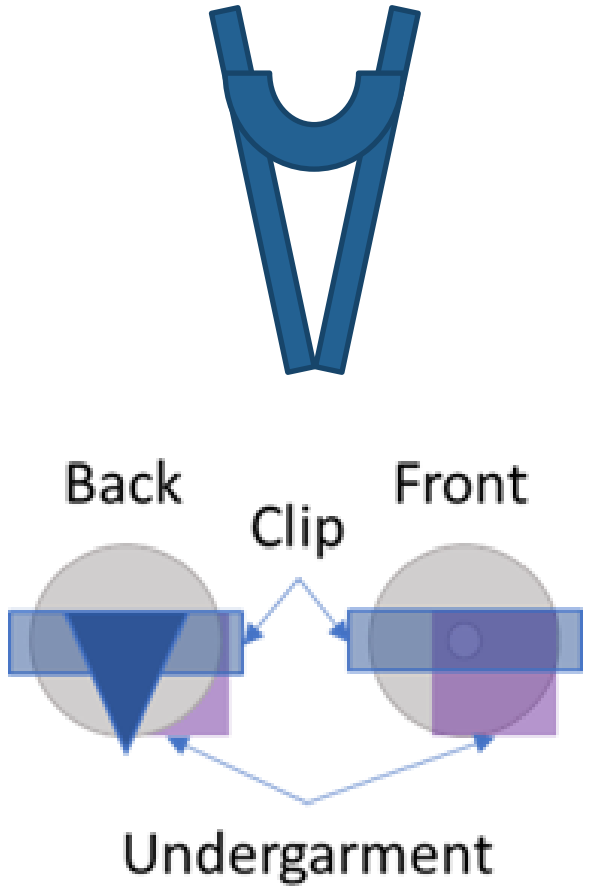
- Features:
  - Magnet-Sheet Metal Trigger System
  - Wire-Waistband Trigger System
    - Made with Elastic w Copper Wire inside
  - Itsy Bitsy
    - Bluetooth Module
    - Hall Effect Sensor
    - SD Card Reader/Writer
    - Microphone & *Buzzer
  - 3D Printed Clip & Casing



*New Design Change

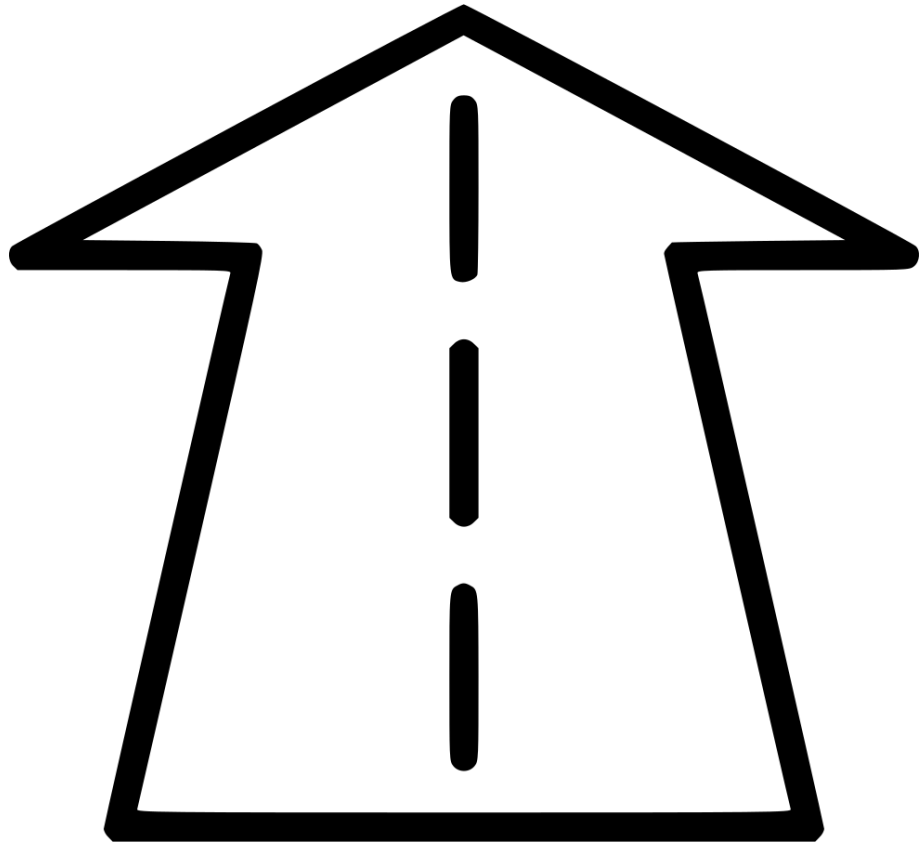
Design - Clip

- The back will clip onto the bottoms of the user.
- The front will face the undergarment magnetized by the washer.
- The clip will be built via 3D Printing.



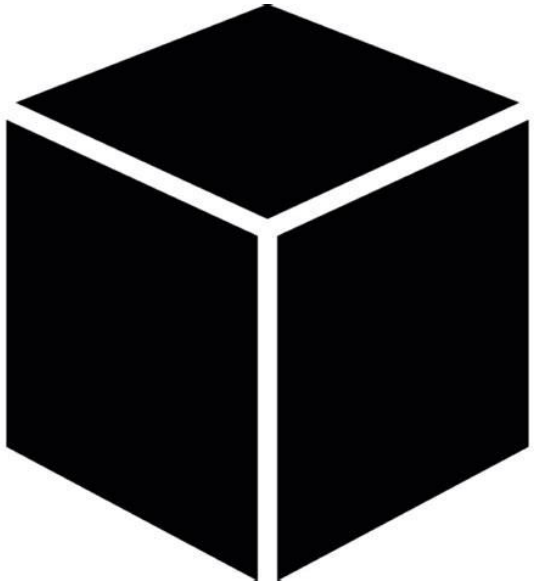
Current Works -> Future Works

- Hardware (Bluetooth and Code)
- PCB footprint
- Schematic
- Battery Design
- App Development



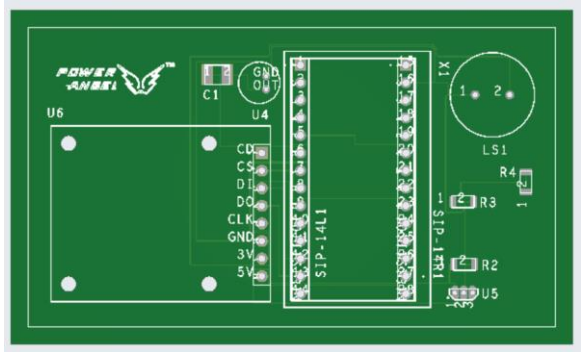
3D Casing

- Current
- Future

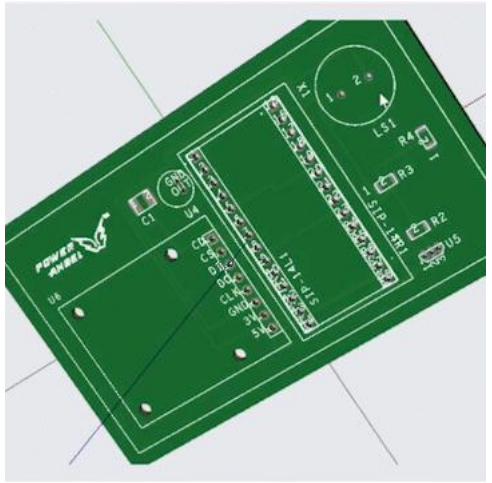


Schematic & PCB

- Schematic - OrCAD Capture CIS
- Footprint - PCB Editor
- Parts ordered using DigiKey
  - Arrival: 02/12/2022
- PCB Fabrication ordered using Seeed
  - Arrival: 02/15/2022
- Next Step – Assembly
  - Kevin Martines and Kathleen Kelly

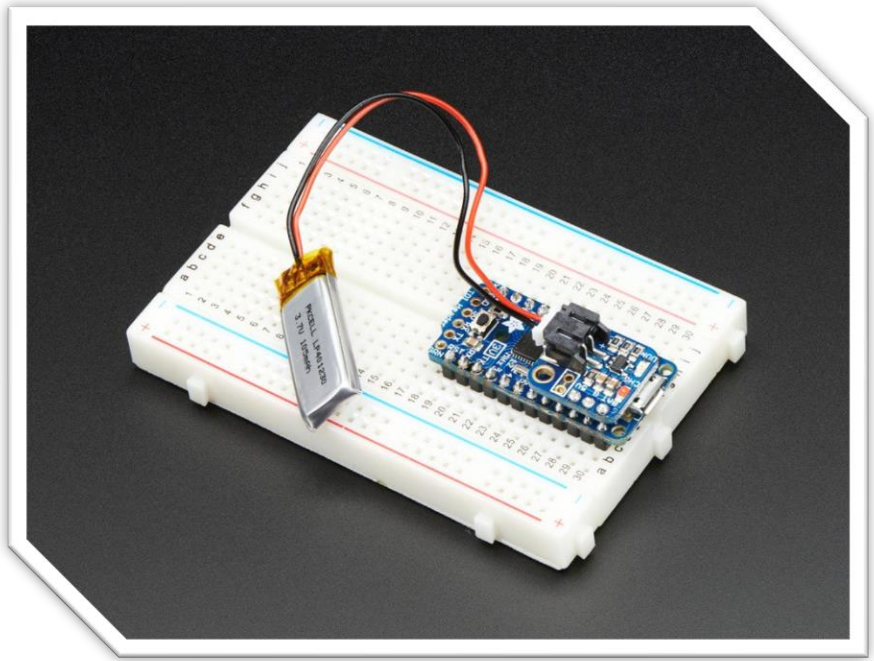


cadence



Battery

- Wireless charging
- Analyzing Physical Circuit
- LiIon/LiPoly Backpack Add-On
- Little Parts with Little Power
- Lithium Battery, further research



App Development

- Current:
  - Finish Bluetooth
  - Texting/Notifications to Contacts
- Future
  - User Accounts
  - Geolocation
  - Settings/Customization
  - Final Design Modifications

Bluetooth

- Current:
  - The microcontroller on the device advertises itself and connects to the companion app.
  - Messages can be sent over UART
- Future:
  - Choose UART messages to represent events such as "arm", "disarm", and "triggered".
  - Echo received messages to confirm reception.

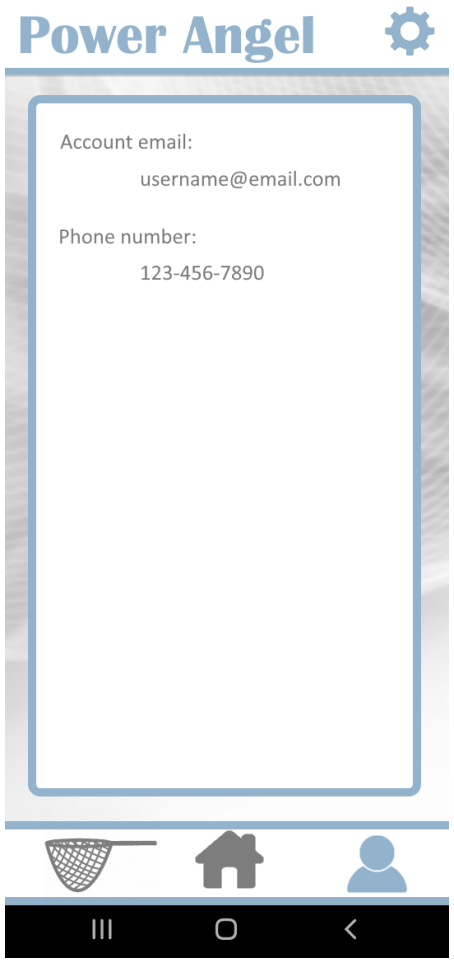
```
Waiting to connect
Connected
b''
b''
b''
```

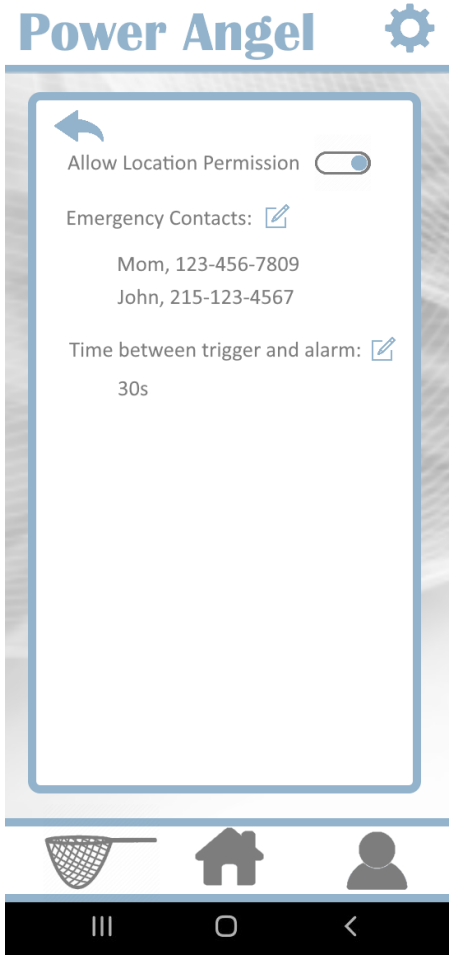
Future App Development

- The launcher icon is designed for contrast.
- The home page is organized into scrollable cards.
- The top card arms/disarms the device.
- The second card gives the user active options to protect themselves.
- The third promotes Power Angel.

Future App Development

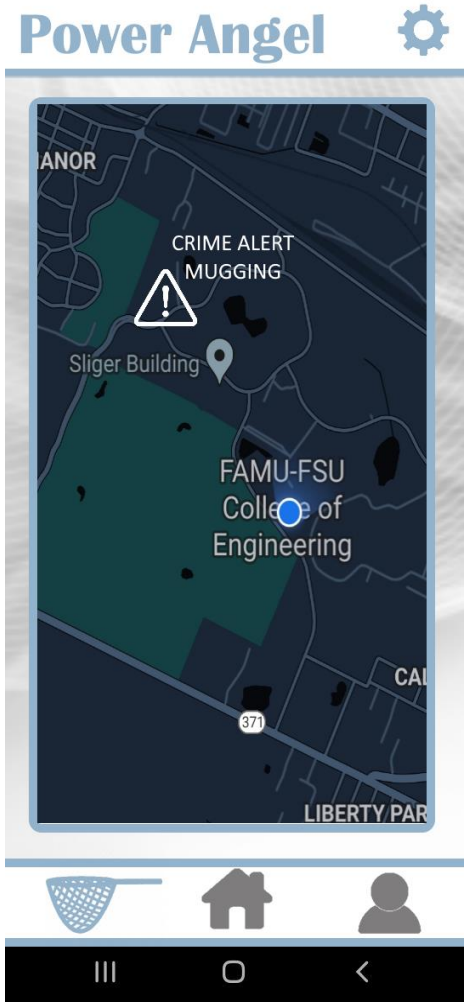
- The profile and settings tabs provide users options such as:
  - Email
  - Phone number
  - Location permission
  - Emergency contact info
  - Delay timer





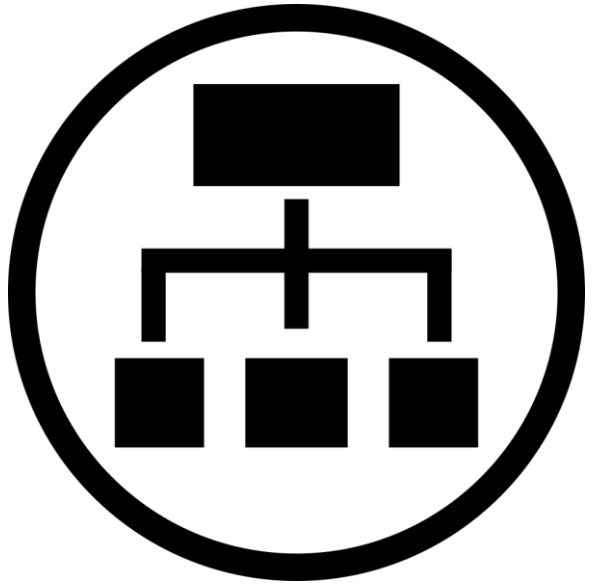
Future App Development

- The final tab is the Safety Net, a network to provide users with historical and live crime in their vicinity.



Hardware - Code

- Current
  - Pushed all current code to GitHub for individual circuits
- Future
  - Combine code to one main file. Improving code to make microphone files upload to SD card and make those files readable MP3.



Questions