Population Path

Expanding Your Safety Toolbox
The Team

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We’re Motivated to Keep you Safe

“UC Berkeley has the highest robbery rate of all California universities.” - CBS SF Bay Area; August 6, 2016

“Berkeley police warn community about robbery spree” - Berkeleyside; November 10, 2016

“UC Berkeley experienced the most of any of the 49 California public schools reporting to the FBI”  
 - Daily Cal; November 23, 2015
A Look at the Numbers

In 2014:

- Total Students: 37,565 (undergrad and grad)
- Total Reported Criminal Offenses: 241
- Total Reported Sexual Assaults: 48
- Total Reported Hate Crimes: 12

*Statistics and graphic are from a 2014 study done by Start Class
Our Motivation

The Problem
- Sentiment of students feeling unsafe on campus at night
- Dynamic campus

Current Options
- Campus light map
- Bear Walk
- Car sharing services
- Wildfire

Our Take
- Increase information flow
- Provide live stream of campus activity
- Benefit campus safety
Proposed Solution
Our Prototype
The Hardware

Light Sensor

Sound Sensor

Motion Sensor
Calculating the Safety Factor

\[ SN_{N_i} = 0.4L_i + 0.3S_i + 0.3M_i \]
\[ SF_{N_i} = 100 - SN_{N_i} \]
\[ SF_{P_{ij}} = \frac{SF_{N_i} + SF_{N_j}}{2} \times \frac{D_{ij}}{100} \]

**SN** - Safety Number from Arduino Safety Rating
(high number is safest)

**SF** - Safety Factor from Python Safety Rating
(low number is safest)

**L**_i_ – Luminosity rating at node i

**S**_i_ - Sound rating at node i

**M**_i_ - Motion rating at node i

**P**_ij_ - Path from node i to j

**D**_ij_ - Distance from node i to j

Dijkstra’s Algorithm
- Shortest path algorithm
- Progressively steps from node to node by looking for the neighboring node with the highest “safety factor”
Cyber Layer
User Interface

Demo!
Scaling Up
On the Berkeley Campus

- Campus-wide implementation
- Permanent sensors with 24/7 live stream of data
- Internet connectivity
And Beyond!

Prototype Zone

Entire Berkeley Campus

City Wide Implementation

- Modular design allows for infinite scalability
- Connection with local police authorities and city safety infrastructure
- Affordable public service