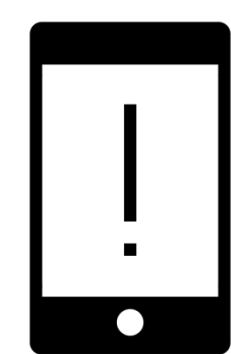


The Need



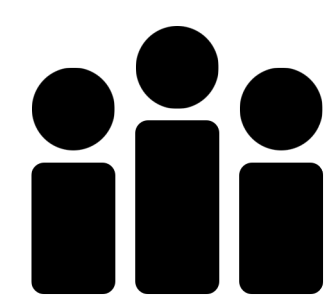
Many different products provide temperature monitoring and home security, but none package those features into one system.

The Problems



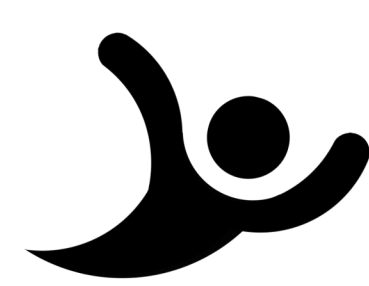
Extreme Temperatures

A frozen pipe or an untended fire may pose life-threatening hazards.



People Counting

Unexpected guests or tracking the number of people who entered.



Fall Detection

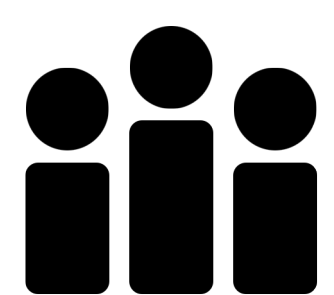
A serious hazard for the elderly and disabled if neglected.

Our Solutions



Radiometry

Measuring electromagnetic radiation to convert raw thermal data into real temperature values.



Vector Detection

Using direction vectors to track how many people entered and exited a frame from each direction.



Background Subtraction

Calculating the difference in foreground to track objects and determining their angles of tilt.

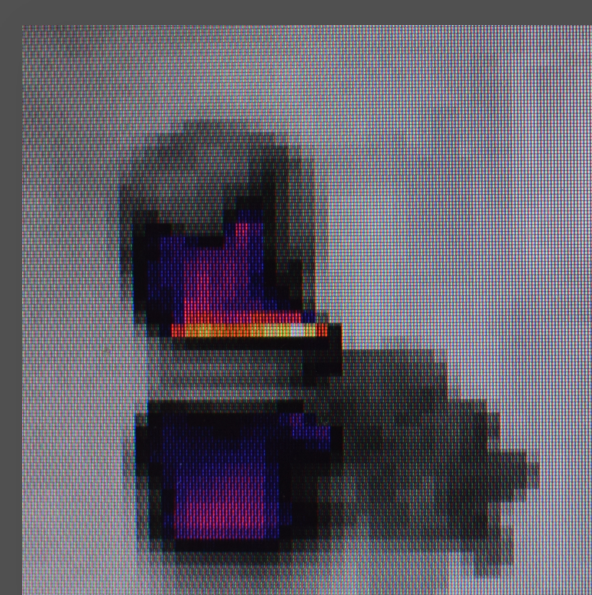
Special Thanks:

Renato Untalan
Chandra Krintz
Tim Sherwood

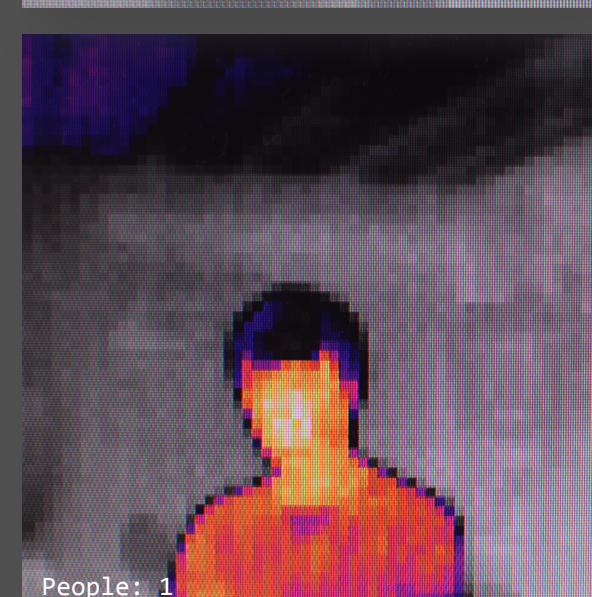
Kyle Jorgensen
Janet Kayfetz

smartvision

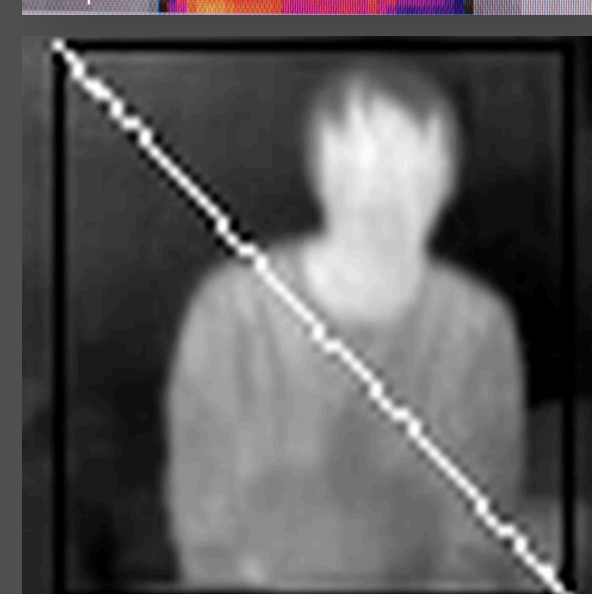
Home Security Through Thermal Imaging



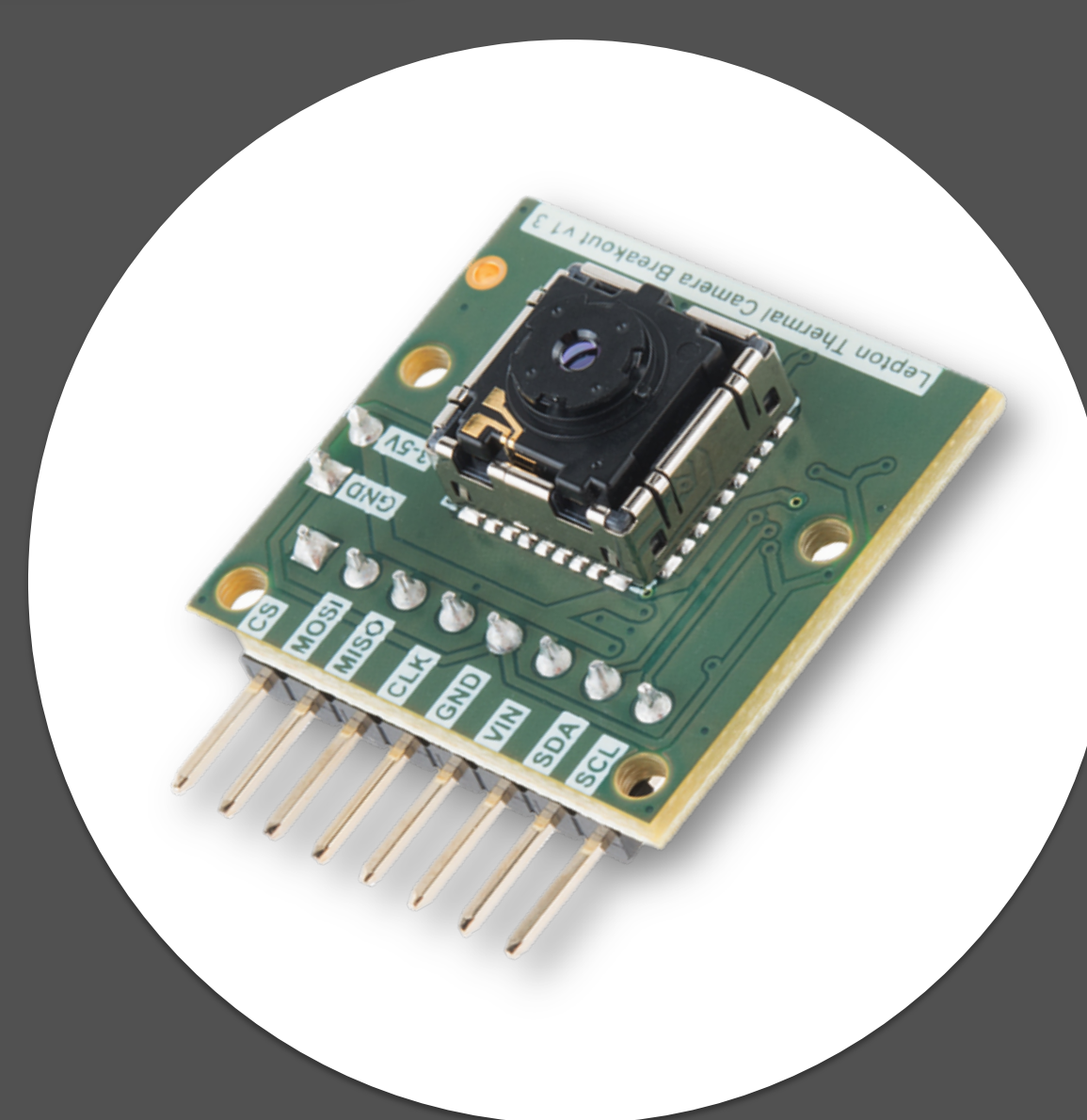
1a. Analysis of the radiometric values in the FLIR Lepton can return the true temperature value for each pixel. User-determined values are scanned for in each frame.



1b. Inspecting the leftmost and rightmost columns of the image tracks a person entering through the right and exiting through the left of the frame allows for counting people in the house.



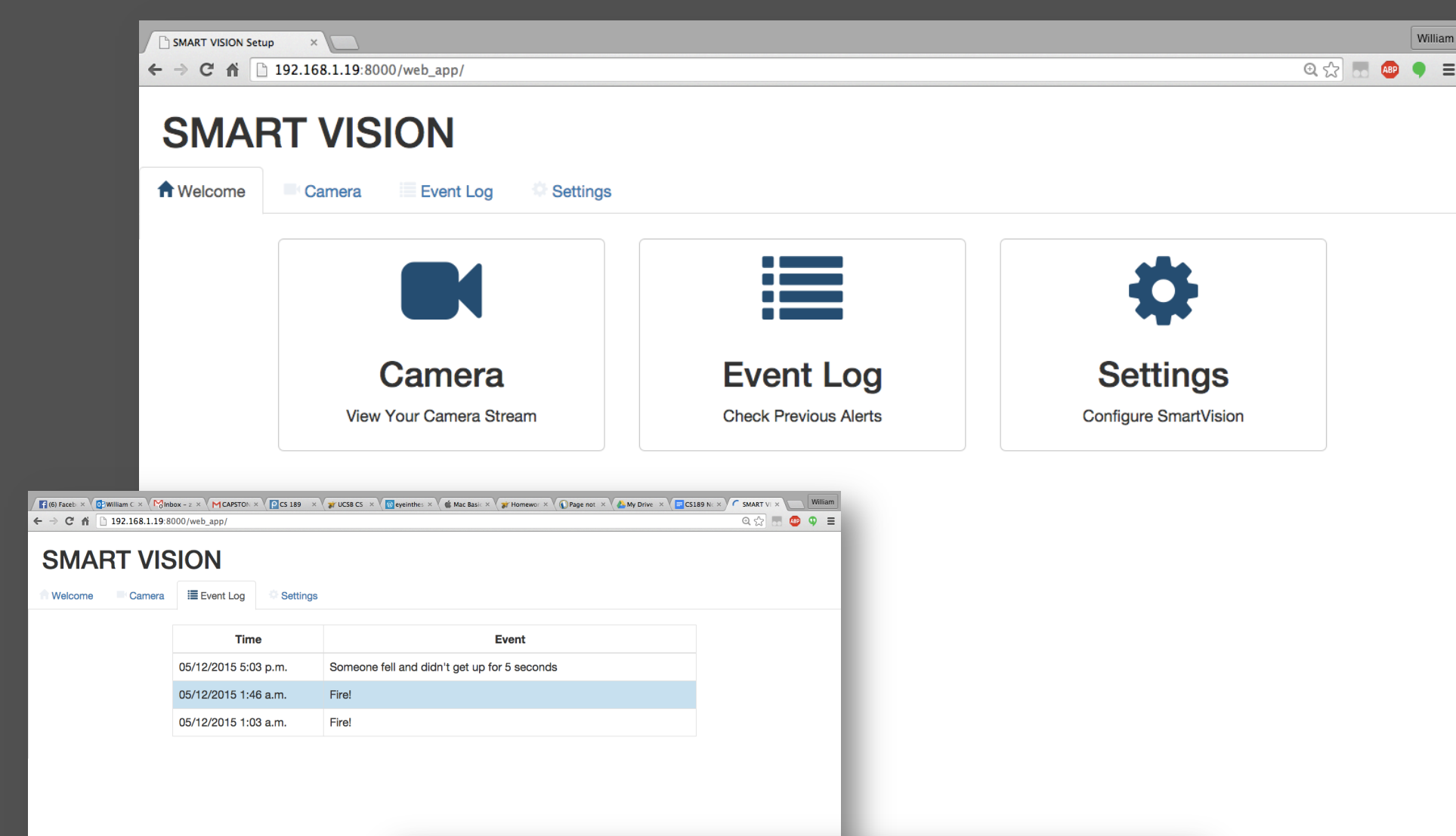
1c. Contours are found based on the movement of the objects in the frame. A line is drawn through the top-left and bottom-right points and the change in angle is monitored for drastic fluctuations.



1d. The image from the Lepton is read in as a byte array and converted to an OpenCV matrix. Both are used to check for events.



2. The web server hosted on the Raspberry Pi reads from the database and checks if an action is required. The logging is handled by Ajax while the configuration is handled by Django and SQLite3.



3. Written in HTML, CSS, and JavaScript, the web app interacts with the user. While built on Django, it uses Bootstrap and jQuery UI as either aesthetic aids or user interactivity solutions.

William Chen
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Jonathan Simozar

Brian Wan
Chris Kim

How It Works

1. The thermal camera constantly monitors the frame for events.
2. When an event is detected, it is logged in the database behind the web app.
3. The web app reacts accordingly by sending an alert by text or email.

Sample Alerts

