Project Overview
Smart Vision is about making a “smart home” using FLIR’s mobile thermal sensor, the Lepton. It follows the rising trend of “The Internet of Things,” where aspects of a person’s life can be automated using the internet. The Lepton will be used to monitor a room in the house, and report significant changes, such as people entering or exiting, frost on a window, or when someone has fallen and requires assistance. When an event triggers, the product will perform an action, such as inform the owner, or potentially, through integration with SmartThings or IFTTT, automatically fix the problem. The interface will be controlled by an external web application.

Smart Vision will target the problems of convenience, security, and personal safety. Convenience has quickly become a major commodity, with “smart” objects such as refrigerators, thermostats, televisions, and other common items gaining popularity. People need their homes to be secure, sometimes even against their own family. Smart Vision will be able to have an objective view of how many people are in the house, regardless of welcome. Also, if an older citizen happens to fall and is unable to recover, Smart Vision system will be able to detect it, and act accordingly.

This problem is solved today through many different products, but not one single system. There are no current products that automate the home as Smart Vision does, but many are certain to follow. Home security systems are expensive and require an expensive monthly
subscription, and though they monitor more than home intrusions, Smart Vision can accomplish a similar task at a fraction of the cost. There are systems for the elderly to call for help when they fall, but that also requires a monthly subscription. Smart Vision will be an all-in-one system that can serve multiple purposes in many applications.

Outcome

At the end of the project, we will have a working prototype home detector using the Lepton camera. It will be controllable and configurable through a web application. It will be able to do the things specified in the project milestones listed below.

General Implementation Details

Throughout the project, we’ll be using Trello as our issue tracking software and GitHub to maintain our code. For the webapp, we will be using Django as the framework, along with Javascript. Python will be used with OpenCV for processing the data obtained from the Lepton camera. To store save states, we will use MySQL as our database.

Process Model

We will be using agile software development to allow adaptability within the overall goal of the project. We will have daily scrums either in person or via Google Hangout/Doc to ensure everyone is on track and making progress. The Google Doc will be updated as we work throughout the rest of the academic year.

Project Milestones

1. Complete project specifications
   a. Implement fall detection and “If this then that” home automation
   b. If possible, implement a people counter
   c. confirm Raspberry Pi meets software requirements
2. Implement web app for user interface
   a. use a MySQL database for generic storage requirements
3. Use OpenCV for the image processing of the Lepton image data
4. Complete bridge between web app and Lepton
   a. implement a method of discovering Lepton over the network
5. Work with MEs at FLIR to develop a project enclosure for the Lepton and Raspberry Pi
6. Set up a full working system