We finally decided upon the use of the image processing technique of image subtraction to handle the motion detection challenge of this project. Image subtraction takes subsequent images and compares the pixels within those images to detect a change. It is a popular solution to motion detection, as a difference in pixels may suggest that an object or intruder has moved into frame[10].

We are using OpenCV, a popular open sourced computer vision library, and running a python program that monitors the room and sends an alert when motion is detected. Because it is very likely that two frames are different, even when a mid sized object is not present (possibly due to shadows or cars moving outside), the process of Gaussian Blurring is used to average alpha values of the pixels and essentially set a threshold so that minor movements do not set the system off.

One of the major objectives of this project is to develop a system that can not only detect an intruder, but detect where that intruder is to be able to accurately dispatch a drone to their location. One of the solutions that we have researched uses image processing to calculate a relative location using the pixels in an image.

The position of light sources give a geometrical constraint between them. By measuring and calculating these distances and determining camera orientation, the angles can be used with the laws of triangles to determine approximate positions of objects[11]. We will expand upon this technique to locate an intruder in a room of 100ft X 100ft.