Pi Security System

**Use case and idea of project**

My project works by running a python script that listens for events on multiple sensors. Whenever an event is triggered on one of the sensors, it takes a picture and sends an email notification describing what sensor was triggered and the date/time of the event. The email also contains the picture that was captured as an attachment. A log is also put into a MySQL database with the event number, the path of the picture, the sensor that was triggered, and a date/time stamp.

**How it meets the initial criteria**

My project uses 3 devices to capture motion:

-A break beam sensor to detect when an object passes through the two sensors. These can be placed on both sides of a doorframe to detect when someone walks through.

-A hall effect sensor that can detect a magnetic field. This can be used to detect a door opening by placing a magnet on a door and the sensor on a doorframe.

-A PIR motion sensor. This can be used to detect any motion of an object that moves within 7 meters of it.

There is also the Pi camera that is used to take a picture whenever an event is triggered on any of the sensors.

My project also lights up a green light whenever it is operating normally, and turns on a red light whenever an exception is thrown to indicate an error state. There is also a log put into a database every time an event is triggered on one of the sensors with information such as the date/time and

**How this project could evolve in the future**

The device could be evolved by using more devices to capture information about a possible intruder. A video recorder could be used instead of a camera, and a microphone could be used to capture audio. More sensors could also be used such as a decibel meter or a light sensor to detect other events.

The software could be evolved by making it more modular. Right now there is a separate callback function for each sensor event, and each function has code to take a picture, display information to the screen, log a database entry, and send an email notification. Each one of these functionalities could be put into its own function and called by the callback functions with specific arguments, as opposed to having similar code in each callback function.

**Interesting experiences/things I learned**

Problems: database commit (), connect in try except, mmal error when button pressed oo fast, fixed by putting lock, smtp errors fixed by putting lock around email too.