This project uses a Raspberry Pi Camera to stream video. Before running the code, make sure to configure the Raspberry Pi camera on your device.

Open the terminal and run

sudo raspi-config

Select Interface Options , then Pi Camera and toggle on. Press Finish and exit.

You can verify that the camera works by running

raspistill -o image.jpg

which will save a image from the camera in your current directory.

You can open up the file inspector and view the image.

This project uses openCV to detect objects in the video feed. You can install openCV by using the following [tutorial.](http://www.pyimagesearch.com/2016/04/18/install-guide-raspberry-pi-3-raspbian-jessie-opencv-3/) I used the Python 2.7 version of the tutorial.

The installation took almost 8 hours (!!) on my Raspberry Pi Zero.

The tutorial will prompt you to create a virtual environment. Make sure you are using the virtual environment by typing the following commands

source ~/.profile

workon cv

Next, navigate to the repository directory

cd Smart-Security-Camera

and install the dependencies for the project

pip install -r requirements.txt

To get emails when objects are detected, you'll need to make a couple modifications to the mail.py file.

Open mail.py with vim vim mail.py , then press i to edit. Scroll down to the following section

# Email you want to send the update from (only works with gmail)

fromEmail = 'myemail@gmail.com'

fromEmailPassword = 'password1234'

# Email you want to send the update to

toEmail = 'anotheremail@gmail.com'

and replace with your own email/credentials. The mail.py file logs into a gmail SMTP server and sends an email with an image of the object detected by the security camera.

Press esc then ZZ to save and exit.

You can also modify the main.py file to change some other properties.

email\_update\_interval = 600 # sends an email only once in this time interval

video\_camera = VideoCamera(flip=True) # creates a camera object, flip vertically

object\_classifier = cv2.CascadeClassifier("models/fullbody\_recognition\_model.xml")

# an opencv classifier

Notably, you can use a different object detector by changing the path "models/fullbody\_recognition\_model.xml" in object\_classifier =cv2.CascadeClassifier("models/fullbody\_recognition\_model.xml")

to a new model in the models directory.

facial\_recognition\_model.xml

fullbody\_recognition\_model.xml

upperbody\_recognition\_model.xml

Run the program

python main.py

You can view a live stream by visiting the ip address of your pi in a browser on the same network. You can find the ip address of your Raspberry Pi by typing ifconfig in the terminal and looking for the inet address.

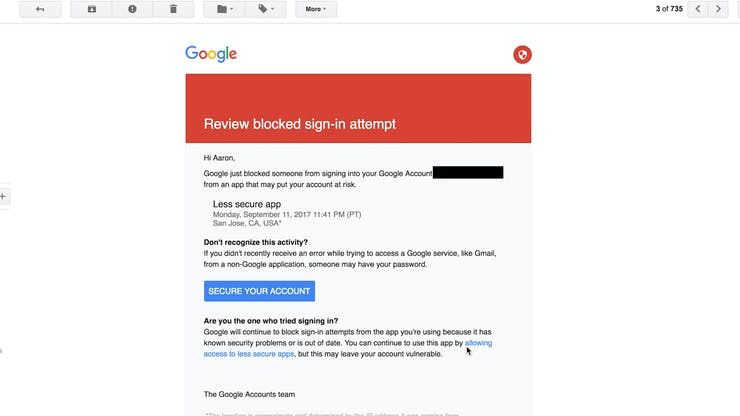
Visit <raspberrypi\_ip>:5000 in your browser to view the stream.

Note: To view the live stream on a different network than your Raspberry Pi, you can use [ngrok](https://ngrok.com/)to expose a local tunnel. Once downloaded, run ngrok with ./ngrok http 5000 and visit one of the generated links in your browser.

Note: The video stream will not start automatically on startup. To start the video stream automatically, you will need to run the program from your /etc/rc.local file see this [video](https://youtu.be/51dg2MsYHns?t=7m4s)for more information about how to configure that.

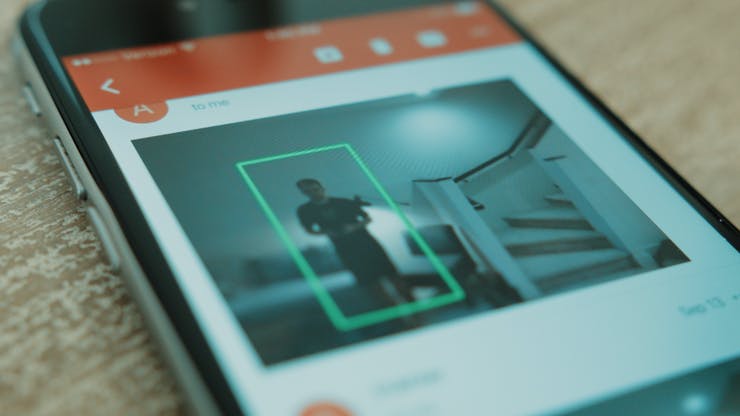
**Receiving Emails**

When receiving an email for the first time, you might get the following notification from Google:



1 / 2

By default, Google blocks apps from using SMTP without permissions. We can solve this by clicking on the allow "less secure apps" link and toggle the feature on. The next object detected will send an email.



**Mounting the Camera**

The security camera Secan be easily positioned on a shelf or counter inside if you want to monitor your home while out of town. We set it on a shelf in our living room and it worked relatively well with normal lighting. Flipping the metal bracket 180 degrees will help level the camera.

Security camera on a shelf, bracket flipped 180 degrees

You can also mount the camera outside your house or by your front door with some 3M outdoor mounting tape.

1 / 2

We stuck a large piece on the top of the metal bracket and mounted it on an overhang beside our front door. The tape should be strong enough to support the weight of the camera. You can plug the camera in outside with an extension cord or route the power wire through the hinge in your front door. We used the wing nut to tilt the camera down toward where a person would stand by the front door.



1 / 2

**Note: the object detection works better if the camera is positioned at a lower angle (e.g. at the same level as the person it is detecting)**