

Creating a Motion Sensor Camera using a Raspberry Pi

In this document, you will find code that will create a Raspberry Pi motion sensor camera. It will have a login for each user and will send you notifications and video or photo evidence, when motion is sensed. As a security measure you will be asked to enter your email password when logging into the Pi. Your email password is not stored anywhere on the Pi so you do not need to worry that someone will get access to it.

You will need:

- Raspberry Pi
- PIR Motion Sensor
- Pi Camera
- 3 Female to Female jumper cables

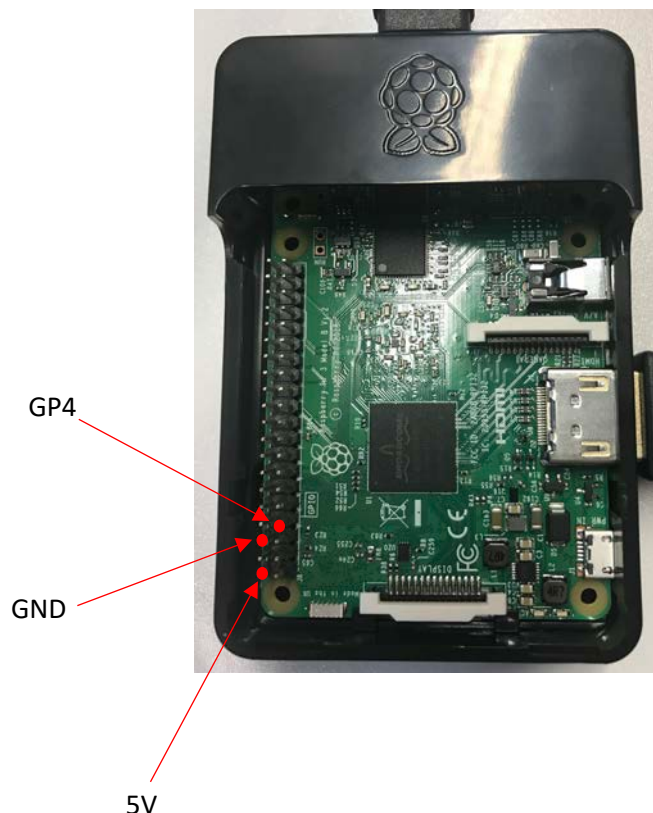
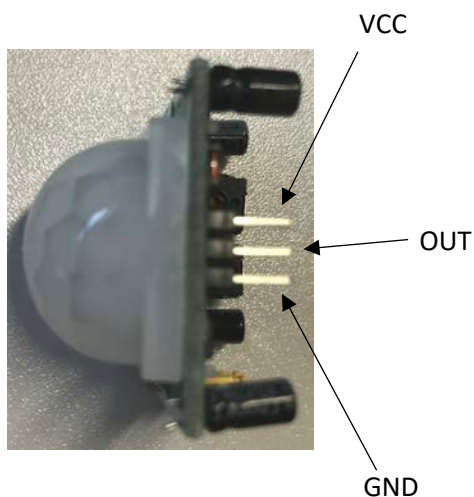
Note: When connecting both the motion sensor and the Pi camera, make sure that the Raspberry Pi is turned off.

Connecting the Motion Sensor

To connect the motion sensor to the raspberry pi you will need 3 female to female jumper cables.

To find out which pin is which on the motion sensor you can pop off the plastic dome. You will then see that each pin is labelled.

- The **VCC** pin is connected to the **5V** pin on the Raspberry Pi.
- The **GND** pin is connected to the **GND** pin on the Raspberry Pi.
- The **OUT** pin is connected to the **GP4** pin on the Raspberry Pi.



Connecting the Pi Camera



First, you must locate the camera port, this is next to the HDMI port on the Raspberry Pi.

To connect the camera you must lift the plastic above the camera port. This should raise slightly allowing you to place the camera in.

The images on the left show the way that the camera should be facing when in the camera port.

Once you have put the camera into the port you must push down on the plastic that you previously lifted. This will lock the camera into place.



Enable Camera Software

To check that the camera software is enabled you need to:

- Start the Raspberry Pi
- Open Raspberry Pi Configuration Tool in the GUI (**Menu -> Preferences -> Raspberry Pi Configuration**)
- Click **Interfaces**
- Switch **Camera** to **Enabled**
- Reboot the Pi

Setup

Update and Upgrade your Pi

First you need to ensure your Pi is up to date. To do this you must type into the terminal:

```
sudo apt-get update
```

```
sudo apt-get upgrade
```

Install and Create

You need to install pycurl. To do this open terminal on your Raspberry Pi and type:

```
sudo apt-get install python-pycurl
```

Next, you need to create users.pickle. This is so that you can have different logins for different users.

In terminal type:

```
nano users.pickle
```

Once this opens type:

```
(dp0
```

```
S'admin'
```

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p1

S'password'

s.

This sets the user as admin and the password as password (you can change this to any username and password that you want). Make sure that you save this.

Add more than one user

You can add more than one user. To do this you just add to the code shown above.

Example:

(dp0

S'admin'

p1

S'password'

p2

ss'user'

p3

S'football'

s.

As you can see, I have now added another user called 'user'. You can do this for as many users as you require. You can also add a new user when running the program. You will be asked if you are a new user and can follow the steps to create an account for yourself.

Push notifications when movement is sensed

To set up the push notifications you first need to create an account.

- Go to <http://instapush.im>
- Click **get started for free**, and enter your details
- Click **Apps**
- Click **Add Application**
- Name it whatever you want and click **create**
- Click **basic info**

You will see an application ID and application Secret. These need to be added into the code. You add these under *Push notification setup*. **Application ID** is to be added next to **appID = "... "** and **Application Secret** is to be added next to **appSecret = "..."**

Note: the code must be opened on the Pi as it is a python file.

Now you need to add an event on instapush.

- Click Add Event
- Write the title as 'MotionDetected'
- Write ' message ' in Trackers and click tab

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- Write the message as '{message}'

Once you have set all this up you can download the **insta push** app on your phone and login. This will then allow you to get notifications straight through to your phone when motion is sensed.

Email photo or video when taken

This code automatically sends an email with the photo or video taken when motion is sensed. This photo/video will not be shown with the push notification, it will only be sent to your email. The code that is written allows you to send the email from a Gmail account to any other account you have. You need to enter your emails into the code to get this to work.

- In the code go to the 'Email code starts' section.
- Where it says fromaddr = "..." Enter your Gmail email address.
- Where it says toaddr = "..." Enter the email address that you want to receive the emails.
- Then scroll down to where it says 'Login details and server'.
- Enter your Gmail email where it says 'server.login("..." , password)').
- Save the code.

You have now added your email meaning that you will receive an email every time motion is sensed and a photo or video is taken.

Close the program

To log out of the program you click Ctrl C, then you must click Ctrl Q to close the program.

Note

You may need to change your Gmail settings to allow login through the Pi. The first time that you run the script it may crash and you will then get an email saying that a sign-in attempt has been blocked. To fix this issue click on that email and click '*allowing access to less secure apps*'. You then need to turn this on as otherwise you will be blocked from sending any emails.

Save

Within the email code, you need to specify the file path that you want to save the photo and video. You type this where it says '**attachment = open("Enter file path...")**'. This will be saved directly onto the Pi so the file path has to be within the Pi. We created a folder on the desktop and saved the images directly into this folder.

You also need to specify the file path under both the take picture code and take video code.

Known Bugs

The login details are saved in plain text so anyone can read them. We have tried to fix this issue but have been unable to at the moment.

When an email is sent, it is sent to both the sender and the receiver. We only want to send the email to the receiver.

The script crashes when the Pi is not connected to the internet.

Only one Image is saved on the Raspberry Pi as it is overwritten every time a new image is taken. This is to save space on the Pi, as you will be emailed the pictures once they are taken so you do not need to store all of them on the Pi.

If anyone has any ideas on how to fix any of these issues, please comment/get in touch.