

How to Program a Hallway / Bedroom / Living Room Light with Tapo Motion Sensor and Hallway Light Bulb and Tapo Hub.

The process is you buy the devices, which range between: approx £10 for the light's, £12 - £15 for the motion sensor, and £15-£20 for the hub. I've used a £114 Motorola g34 and a £95 second hand Lenovo tablet to house the app, which programs, these devices. It's imperative that you set a switch off time/time out/countdown/max on time for the plug, if your going to attach it to any heating or temp control device, so that it doesn't heat the room forever or to increasingly hot or dangerous temps due to bad code.

Motion Controlled Sunset to Sunrise Light

Operation

When someone comes into the room the light is switched on because the motion sensor will detect movement. If the light is in the hallway it can be programmed to stay on for 5 minutes every time it detects motion if the light is in the front room it can be programmed to stay on for up to 1 HR 20 minutes or more when it detects motions. So that when they go to bed or leave the flat the light switches off but not when they're watching TV. I figure within 1 HR 20 mins they're likely to go the toilet and standing up and moving will trigger the sensor meaning the lights won't go off on them. Next paragraphs include the parts list.

Tapo H100 hub

<https://www.amazon.co.uk/Tapo-H100-Whole-Home-Ringtones-Energy-Efficient/dp/B0BC6KN2DK>

This hub allows the sensors to work with other tapo devices that perform an action. You can have up to 64 devices connected to the Hub. This is a H100 hub it won't allow you to connect some cameras. This hub will not work with certain models of camera and one doorbell chime model.

Other hubs can be found on this link, check compatibility of the device..

<https://www.tapo.com/uk/product/smart-hub/>

Tapo Motion Sensor Tapo T100

<https://www.tapo.com/uk/product/smart-sensor/tapo-t100/>

When a motion is detected the tapo T100 motion sensor can be used to perform an action, like switch a light on or switch a plug on or off. This device can only be used when connected to the a Tapo Hub in my case I chose the cheapest hub which is the H100.

Tapo Multicolor T530E Light Bulb

I used a Tapo T530E lightbulbs and had to buy an E to B adapter because I had a B fitting (Bayonet) light socket which is the one with pointy things and the not the round T530E.

<https://www.tapo.com/uk/product/smart-light-bulb/tapo-l530b/>

Tapo Extra Bright T535E

75 Watt Equivalent Brightness at 8.7 Watts.

<https://www.tp-link.com/uk/home-networking/smart-bulb/tapo-l535e>

A shopping list for this would read tapo H100 tapo T535B for a bayonet fitting light switch, tapo T100 for the motion sensor. I bought all this from Amazon and Argos.

The App

This is called "TP-Link Tapo" I installed it from Google Play as I have an Android Phone. The app is programmable using a simple and part graphical programming language to do powerful things with devices. I took it one stage further and used a programming language called python to program the app.

Operation and Additional Parts List for the Energy Saving Heater

Operation of Energy Saving Heater and Some Caveats

This is the same as above apart from you dont need the bulb. But will also include a Contact sensor which you will attach to the door of your room so that when the door is open for a certain amount of time, like over 30 seconds the heater will be turned off. You also need a Plug that monitors energy like the Tapo P110 and what i would call a dumb heater. The heater needs to be powerful enough to heat the room to 18.5 to 19.00 degrees but not so powerful that it results in more energy use than a Central Heating system or the heating system its going to replace. The power i chose was between 1.4 and 1.5 kW. What i mean by dumb heater is one which is not controlled by a remote or app but simply a dial which can switch it between various on power and rotation settings and a power source. I used a fan £15 to £25 fan assisted and rotating halogen space heaters, i go for ones with a rating of 4.5 or more on amazon. One thing i noticed some of the heaters that are advertised as 1.5kW were really 1.8kw and some which were advertised as rotating didnt rotate. You also have to be careful to test the rotation for a few days at least before the return date as in one case the rotation did break down for no good reasons after 2 days.

Plug P110

<https://www.tapo.com/uk/product/smart-plug/tapo-p110/>

For a general Blurb on Plugs look at this: <https://www.tapo.com/uk/product/smart-plug/>
This gives information on smart plugs and what you can do with them. Things you can do with them include giving it a name and turning them on and off with Alexa, Google Home Assistant Etc. The latest appliance is P110M is Matter compliant. Matter is the standard for connecting connecting smart devices so they can talk to each other regardless of manufacturer.

Tapo T110 Contact Sensor

<https://www.tapo.com/uk/product/smart-sensor/tapo-t110/>

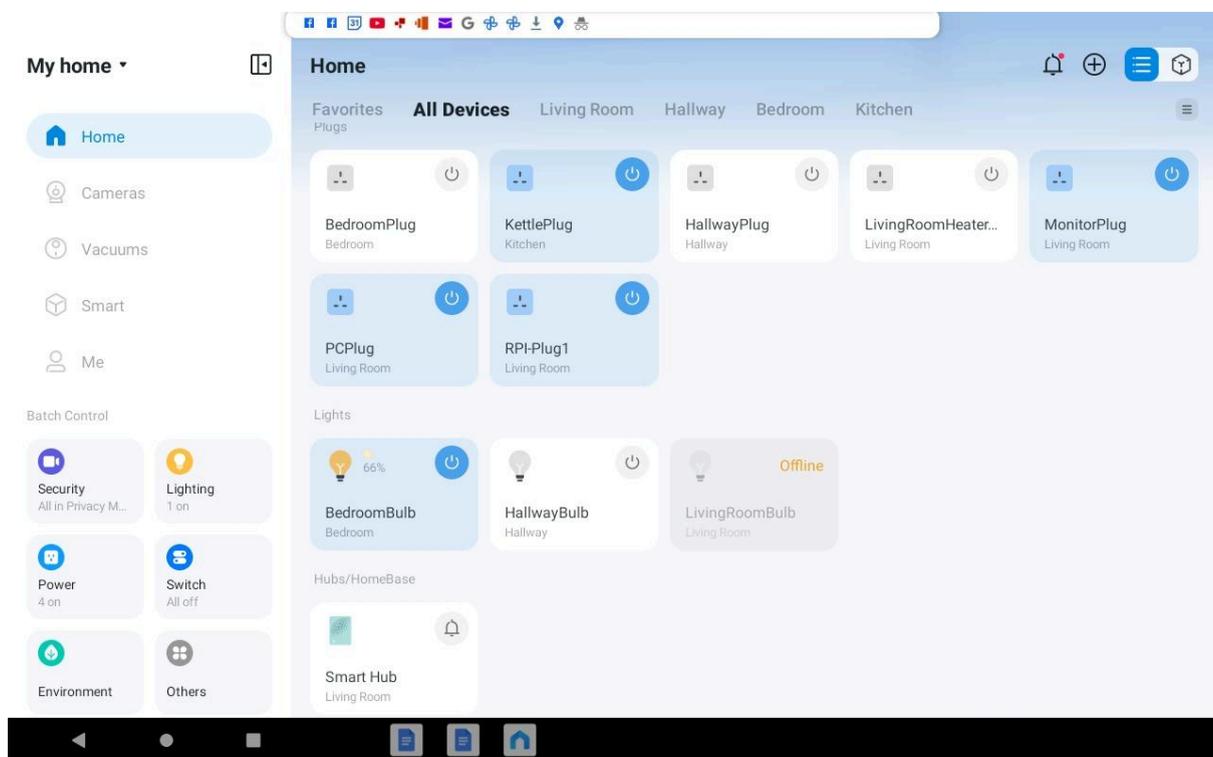
The above is a contact sensor: its attached to doors or windows to tell if the door has been opened. I used it to control a heater so that if the door was left open for a period of time it would switch the plug connected to the heater off. If the door is closed and room is below a certain temp it would switch the plug on switching the heater on.

Tapo T310 Temp and Humidity Sensor

<https://www.tapo.com/uk/product/smart-sensor/tapo-t310/>

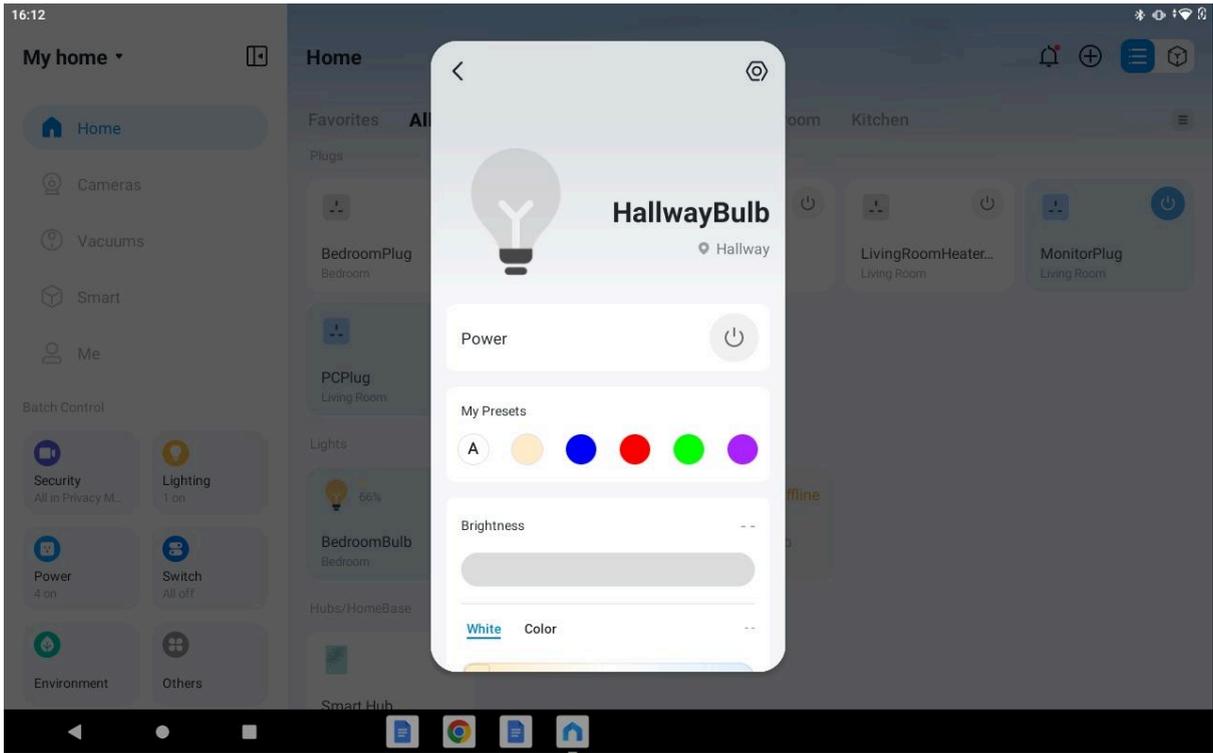
This sends temp readings which can be read, by hub that can be used to control the plug by the phone app, in the way described above.

Programming The Tapo App

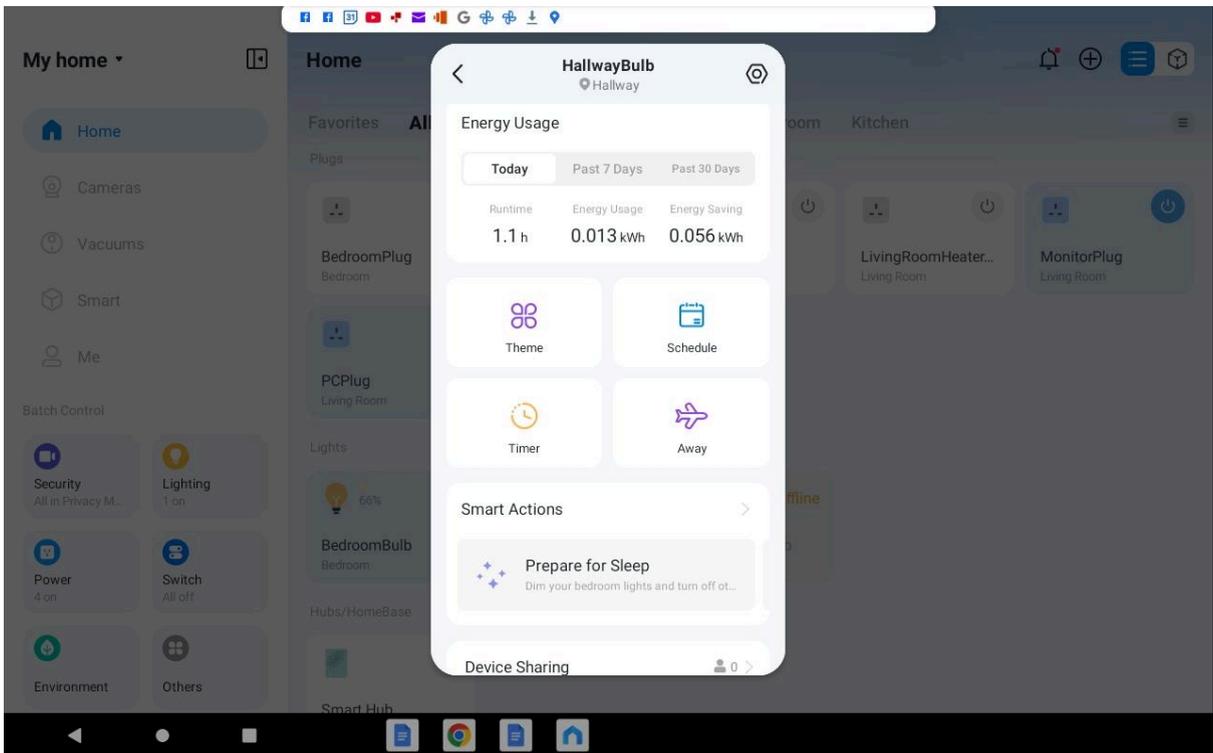


Here's what my devices on the Tapo app look like. The Plugs and lights etc with a light blue background are on. The ones with a light grey/ white background are off but can be switched on the others are offline as it says. Currently the Hallway Bulb the bedroom light is on for no good reason. The living Room bulb is offline because I pressed the light switch instead of turning it off on the app or waiting for the light to turn off on its own.

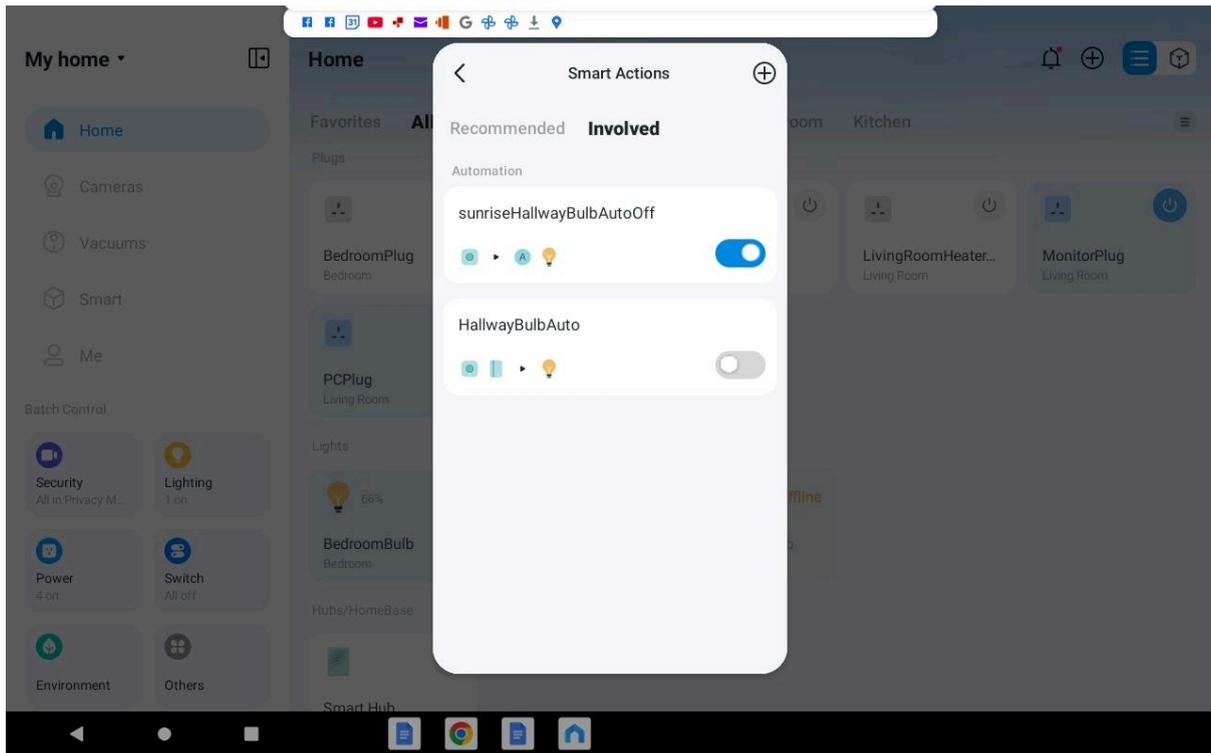
In order to program a device click on it then go to smart actions. In my example I've clicked on HallwayBulb



Then found smart actions:



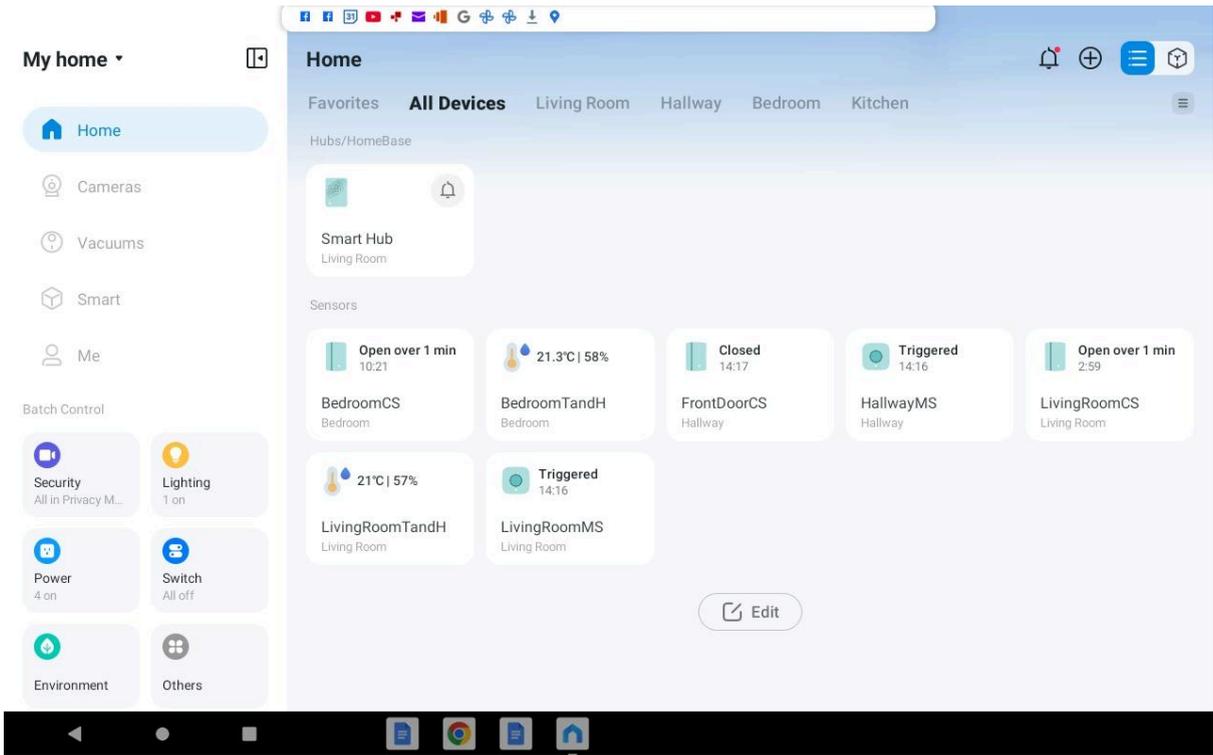
Clicked on smart actions and found two I've created earlier



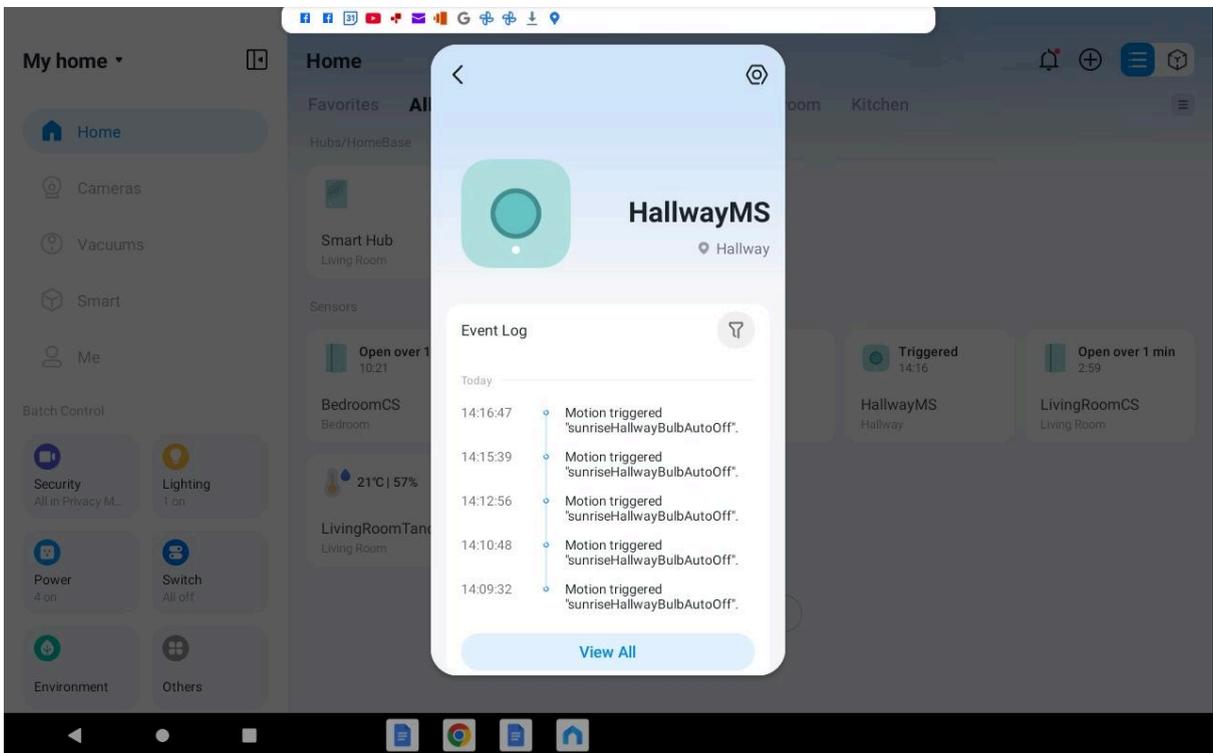
These are Automations (Powerful Mini program) one called sunriseHallwayBulbAutoOff to switch the program off that causes the bulb to switch on and off at any motion detected at sunrise. The other: called HallwayBubAuto which is the automation that controls the the bulb and is switched on and off by the automation just mentioned.

This illustrates a very important point which is if you want create an automation, the automation will not necessarily remain on the device you created them on, but will be on the device to which they belong. For example going a bit lower down the Tapo app and clicking on the smart actions of the hallwayMS (Hallway Motion Sensor) is shown in the following example. It will reveal all the automations that are affected by motion detected by this device. On the lightbulb there may be one or two automations affected by the motion sensor that turn the light on, but not all. This includes an automation for switching the program build automation on at sunset and an automation for switching the bulb automation off at sunrise.

The following steps show this:

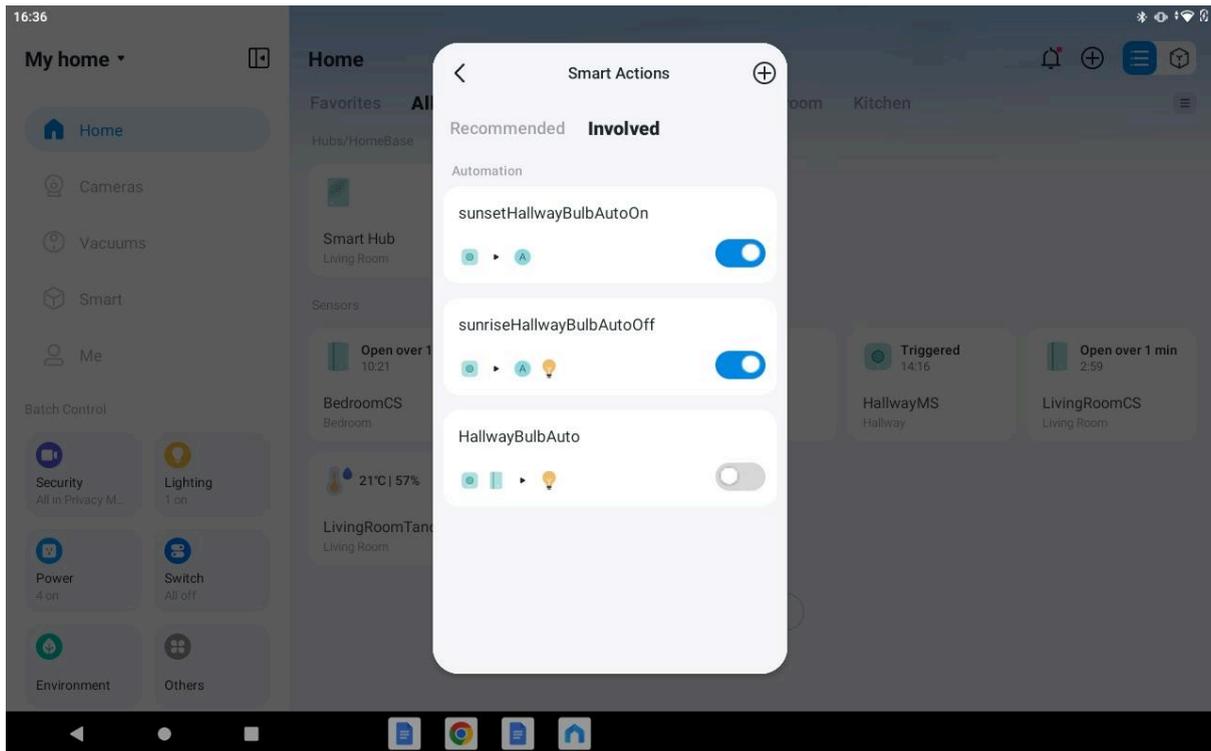


Click on the graphic for HallwayMS. And I can see the times it was triggered, this is also a way of telling if someone has been in your room.



These are the names of the automations:

- sunsetHallwayBulbAutoOn which I programmed to turn on the lightbulb in the Hallway; provided the time is between 20 minutes before sunset and 20 minutes after sunrise. And the
- sunriseBulbAutoOff which I programmed to switch of the light bulbs ability to detect motion. I took this screenshot in the afternoon sometime after sunrise+20 mins as the HallwayBulbAuto is off. The next section talks about how to program such automations.
- HallwayBulbAuto switches the bulb on for 5 minutes when triggered by the motion sensor.



Programming Automations

If you've been can program and configure things that are not complex, then this type of programming should provide some enjoyable practise.

There are 4 stages to every automation/program; these are setting:

- **Effective Time:**
This is an interval of time in which the automation will be active, it will either be always or within an time interval the app can use sunrise or sunset as start or end time or fixed periods between or after as well as fixed times like 9:00am to 5pm.
- **When:**
trigger events this is one or more individual events in time. Like if the time changes from less than and equal to 9:00am to Greater than 9:00am. Or if the door changes state from closed to open or if the temp changes from less than or equal to 17.1 degrees to greater than to 17.1 degrees. Its that change of state that it reacts to or causes things to occur at.
- **If:**
one or more conditions are met simultaneously or individually carry out the action performed in then.
- **Then:**
Perform an action, this can be: switching on a light bulb over 10 seconds and switching it off after 5 mins; switch on a plug, sound an alarm, take video images and send an alert to a phone if motion is detected or a door is open.

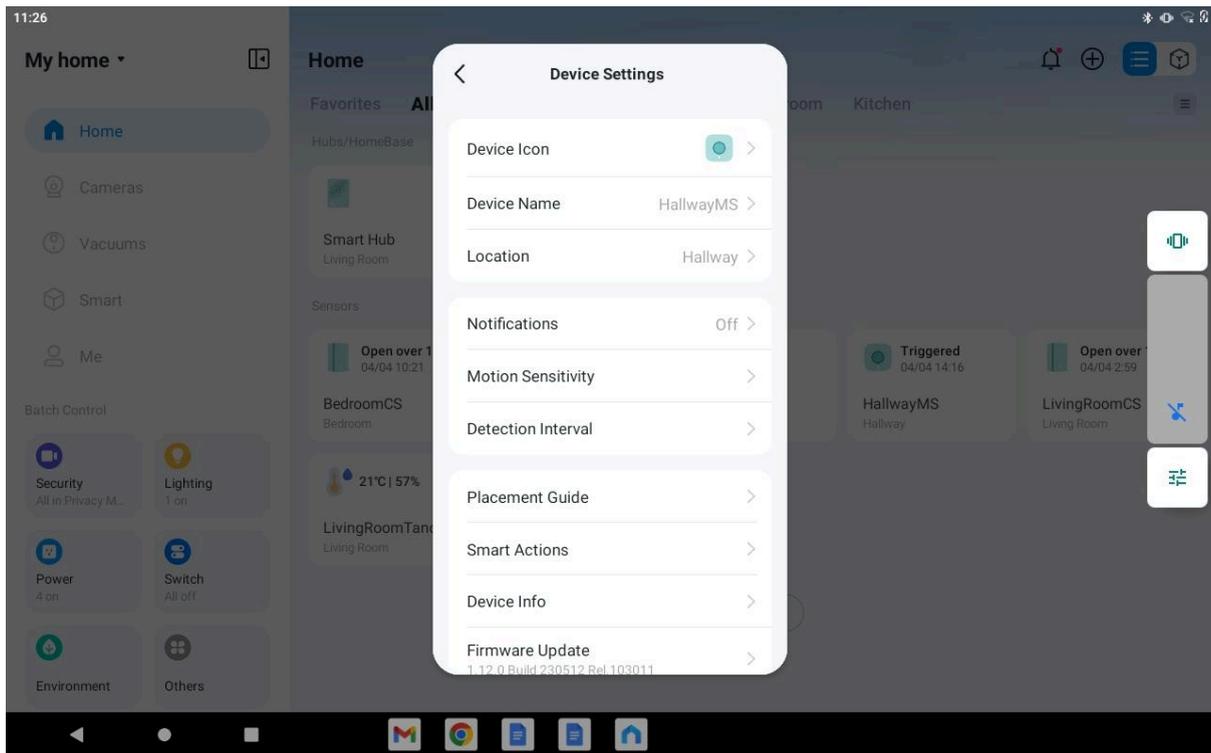
Or switch on or off a program that causes: a light to be switched of when motion is deteted; or a heater to be switched on when the temperature is above a certain level.

For a full list of action see this link: <https://www.tapo.com/uk/faq/80/> . You wont need to memorise all these action. You can refer to them if you get really stuck, however all these actions can be learned by starting to program with a basic understanding like level 3 coding or less and then clicking and choosing the options.

Automation to Turn a Light On When Motion is Detected.

First of all you have to connect the motion sensor to the hub, then name the motion sensor something sensible and the light something sensible. You can find the device name after clicking on the top right hand hexagon with a circle on it when you first click on the motion sensor. You simply click on "device name" and rename. In the top right hand hexagon, there are also a variety of settings like including smart actions which is the section under which you program the device.

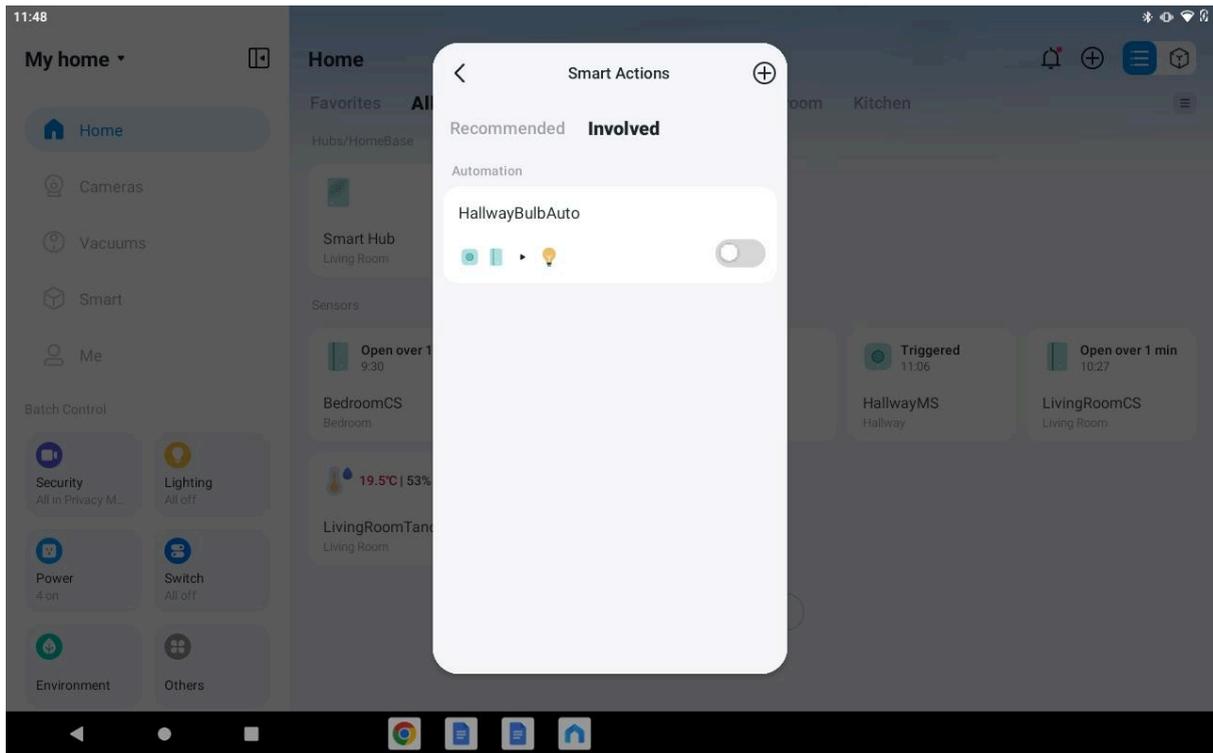
So here is what clicking on the hexagon looks like:



The location is useful for grouping devices but not for programming, detection interval is also important. See how large you can make this and still get the device to function as you want as if the device is checking for motion a lot of times in a minute it runs the battery down.

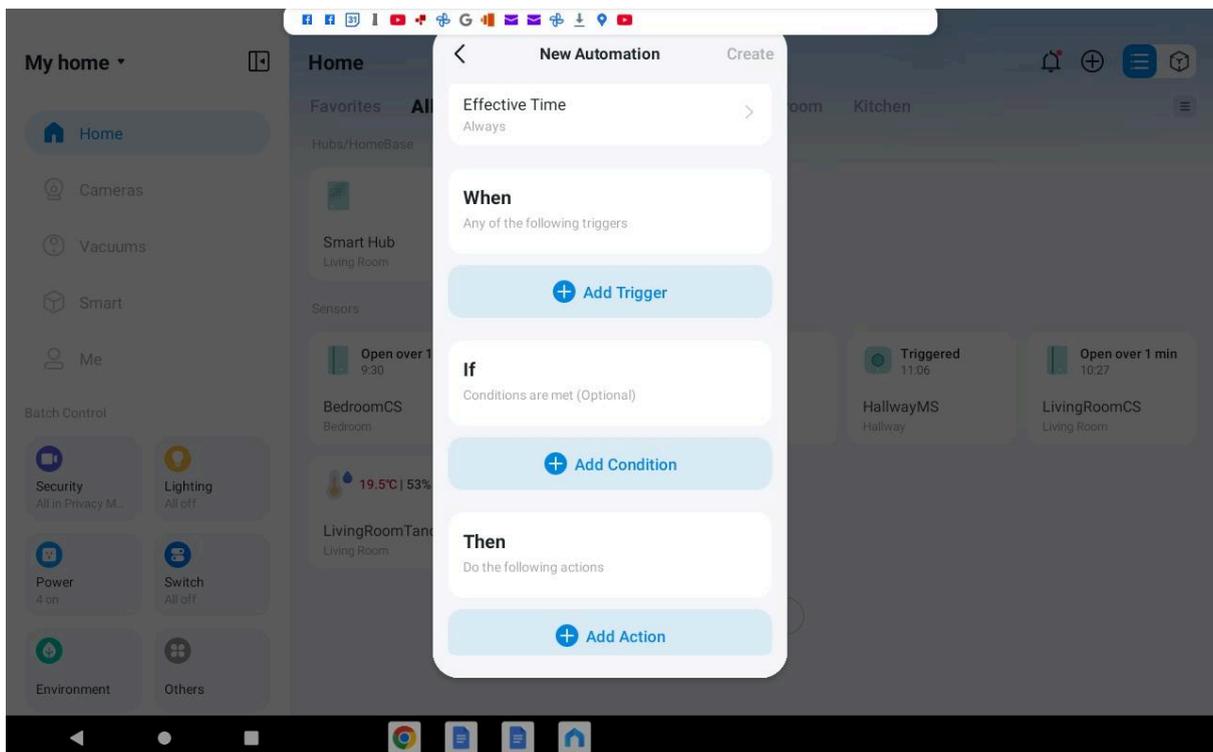
Under device info you have the Mac address or in the case of standalone devices like plugs and lightbulbs in which don't need a hub, you have the Mac and IP Address. There are other settings to experiment with but these are the most important I've used.

You can click on smart action from the hexagon options and you'll see a screen that looks like this:



Apart from you wont see any automations like on the above.

You press the + button on the top right to create an automation and you get a screen that gives you the option to choose between shortcuts and automations. I never use shortcuts a shortcut is simply a single button press that does multiple things. If you click on automations you get a screen like this:



These are the programming options I've mentioned before.

I learned a lot about programming these devices simply by clicking on the options in the various boxes.

The code to turn the light on and off using the Tapo app is within 3 automations, these are called:

```
sunsetHallwayBulbAutoOn
EffectiveTime
    Custom time
    sunset-20 mins to sunrise next day

When
    HallwayMS
        Motion Detected

Then
    Perform an automation
        HallBulbAuto
```

The automation called HallwayBulbAuto turns the light on for five minutes

Sunset to Sunrise operates between Sunset and sunrise and turns the hallway Light on for 5 mins every time motion is detected by hallwayMS.

Here is the algorithm for HallwayBulbAuto,

```
Effective Time
    Always

When
    HallwayMS (Hallway Motion Sensor)
        Motion detected or
    Or
    frontDoorCS (front door contact sensor)
        Open (moment the front door is opened)

Then
    Turn on for 5 mins set Brightness to 50%
```

sunriseHallwayBulbAutoOff

Effective Time

Sunrise + 1 min - sunset - 21mins

When

HallwayMS

Motion detected

Then

Turn Off Automation

HallwayBulbAuto

HallwayBulb

TurnOff