Introduction to IoT with Raspberry Pi

COMCAST

Student Handout

Introduction

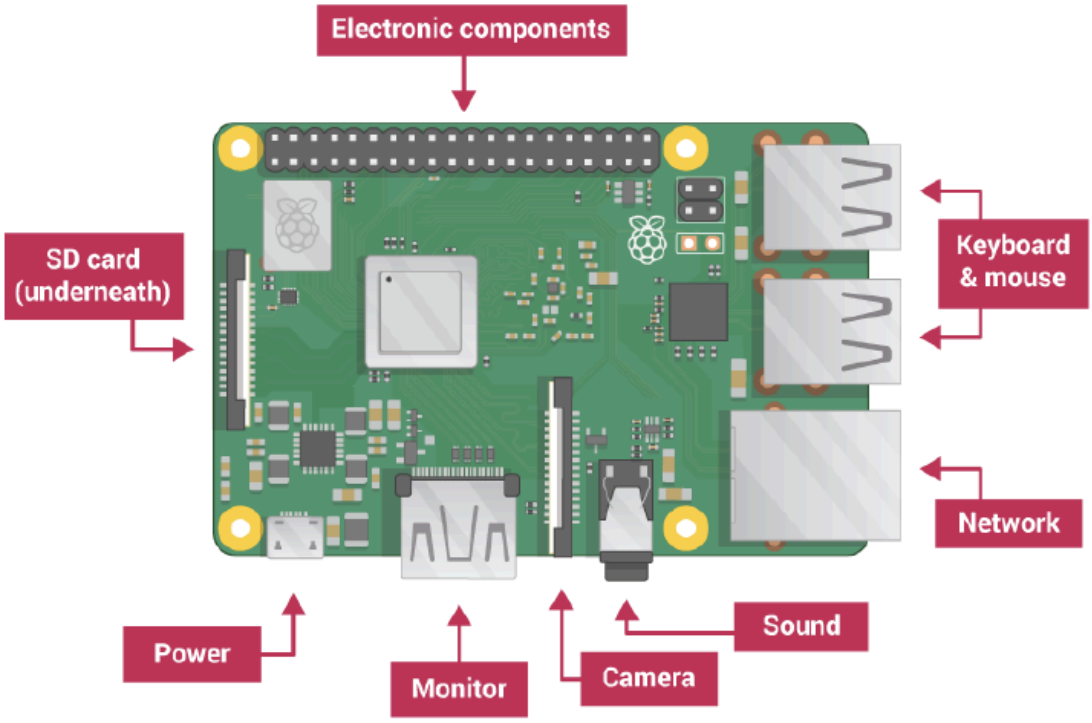
Today we will be setting up our own computer and using it to create a motion detection system!

Here are some of the things you will learn about:

Raspberry Pi

A Raspberry Pi is a really small computer! Really! It may look tiny and a little weird, but you can do a lot with a Raspberry Pi. You can connect a keyboard and monitor to it and use it to make all sorts of projects.

Take a look at this picture of a Raspberry Pi and check out all the things you can connect to it!



Steps: IoT Project

Get the starter code

We are going to write a little bit of code in Python. Some of the code has already been written for you and we have to load that file from a USB key.

1. Plug the USB stick into one of the USB ports on the Raspberry Pi
2. Open the terminal
3. Copy the file that is in the USB key by typing this in the terminal:

```
sh ../../media/pi/{tab}/{tab}
```

The file containing the project will be on the desktop! Open it!

You will see the following code has already been typed out for you:

```
from gpiozero import MotionSensor
import pygame.mixer
from pygame.mixer import Sound
from time import sleep
import random

# This enables the sounds to be played
pygame.init()
pygame.mixer.init()

# This will load your sound files so they can be used through the speaker. The allowed
file extensions are .wav and .ogg.
# You can choose a couple sounds to play when motion is detected.
# Example sounds:
# /usr/share/scratch/Media/Sounds/Human/Scream-male1.wav
# /usr/share/scratch/Media/Sounds/Human/Scream-female.wav
# /usr/share/scratch/Media/Sounds/Human/Laugh-male1.wav
# /usr/share/scratch/Media/Sounds/Human/Laugh-female.wav
# /usr/share/scratch/Media/Sounds/Effects/Rattle.wav
# /usr/share/scratch/Media/Sounds/Effects/MotorcyclePassing.wav
# NOTE: You can find more sounds to play by running the following command: sudo find / -
name *.wav

sounds = [
    pygame.mixer.Sound("/usr/share/scratch/Media/Sounds/Human/Scream-male1.wav"),
    pygame.mixer.Sound("/usr/share/scratch/Media/Sounds/Human/Scream-female.wav"),
    pygame.mixer.Sound("/usr/share/scratch/Media/Sounds/Human/Laugh-male1.wav"),
    pygame.mixer.Sound("/usr/share/scratch/Media/Sounds/Human/Laugh-female.wav"),
    ]

# 4 is the GPIO pin that the motion sensor is connected to
motionSensor = MotionSensor(4)
```

Get the motion sensor working

Now that you have the file with python code open, add the following lines of code after the last line:

```
# This is a continuous loop that will detect motion
while True:
    if motionSensor.motion_detected:
        print("Motion Detected")
    else:
         print("No motion detected")
```

Save your code and look at the terminal to see what happens when the sensor detects motion!

Getting sound when motion is detected

You are now going to add more code. Take a close look and add the following new code to what you just wrote. The new code is in bold so it is easier to spot.

```
# This is a continuous loop that will detect motion
# and choose a random sound to play based on the sounds above
while True:
    if motionSensor.motion_detected:
        print("Motion Detected")
        # Choose a random sound from the list of sounds above
        playSounds = random.choice(sounds)
        playSounds.play()
        # Play the full sound clip before resuming motion detection
        sleep(playSounds.get_length())
        playSounds.stop()
    else:
         print("No motion detected")
```