Getting started with Pi camera

For course EE592P, IoT Lab.

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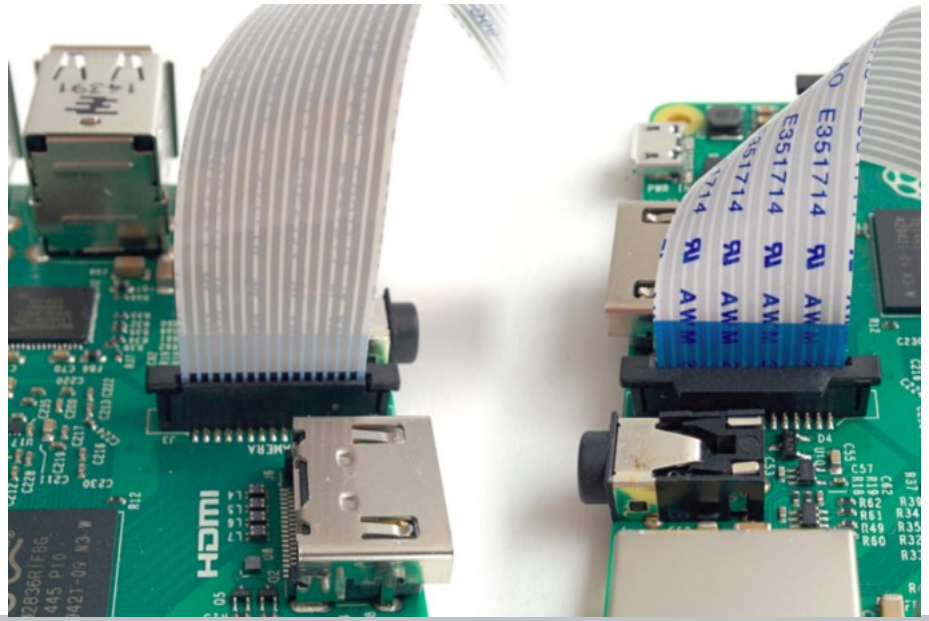
Source- https://projects.raspberrypi.org/en/projects/getting-started-with-picamera

What you will learn

- **Raspberry Pi Camera Module, using Python and picamera. pictures, record video, and apply image effects.**
- **What you will learn**
  - How to connect the Camera Module to the Raspberry Pi
  - How to use Python to control the Camera Module
  - How to use start_preview() and stop_preview() to control the camera preview
  - How to take still pictures with capture()
  - How to record video with start_recording() and stop_recording()
  - How to play back video with omxplayer
  - How to alter the brightness and contrast
  - How to apply image effects and exposure modes

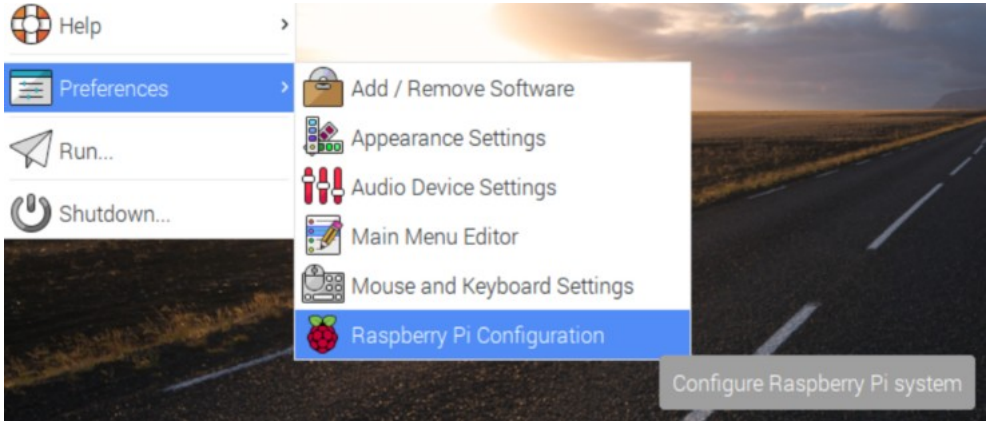
Connect the Camera Module

- **Hardware – Raspberry Pi Camera Module**
- **Can take Pictures and Record video in full HD.**
- **How to connect the Camera Module**
  - Switch off Pi
  - Connect camera to Pi's camera port, locate the camera port and connect the camera:

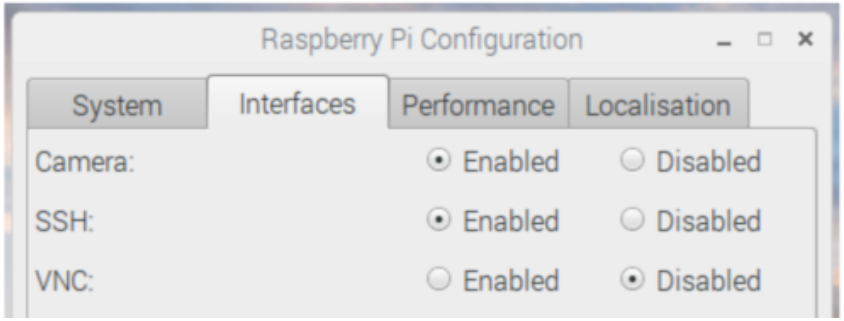


Software Configuration

- **Start up the Pi**
  - Open the Raspberry Pi Configuration Tool from the Main menu:



  - Ensure the camera software is enabled:



  - Reboot the Pi

Camera Preview

→Open Python 3 from the main menu:

```
from picamera import PiCamera
from time import sleep

camera = PiCamera()

camera.start_preview()
sleep(10)
camera.stop_preview()
```

→Note that the camera preview only works when a monitor is connected to the Pi, so remote access (such as SSH and VNC) will not allow you to see the camera preview

Rotate Image

- If your preview was upside-down, you can rotate it with the following code:

```
camera.rotation = 180
camera.start_preview()
sleep(10)
camera.stop_preview()
```

- You can rotate the image by 90, 180, or 270 degrees, or you can set it to 0 to reset.

- You can alter the transparency of the camera preview by setting an alpha level:
  - alpha can be any value between 0 and 255.

```
from picamera import PiCamera
from time import sleep

camera = PiCamera()

camera.start_preview(alpha=200)
sleep(10)
camera.stop_preview()
```

Still pictures

- Amend your code to reduce the sleep and add a camera.capture() line:

```
camera.start_preview()
sleep(5)
camera.capture('/home/pi/Desktop/image.jpg')
camera.stop_preview()
```

- It's important to sleep for at least 2 seconds before capturing, to give the sensor time to set its light levels.

- Now try adding a loop to take five pictures in a row:

```
camera.start_preview()
for i in range(5):
    sleep(5)
    camera.capture('/home/pi/Desktop/image%s.jpg' % i)
camera.stop_preview()
```

Recording video

- Amend your code to replace capture() with start_recording() and stop_recording():

```
camera.start_preview()
camera.start_recording('/home/pi/video.h264')
sleep(10)
camera.stop_recording()
camera.stop_preview()
```

- To play the video, you'll need to open a terminal window by clicking the black monitor icon in the taskbar:

```
omxplayer video.h264
```

- Type the following command and press Enter to play the video:
  - The video should play. It may actually play at a faster speed than what has been recorded, due to omxplayer's fast frame rate.