Raspberry Pi Tutorial

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Software and Hardware Requirement

- Win32DiskImager
- Visual Studio Code with Remote-SSH Extension (Optional)
- VNC Viewer (Optional)

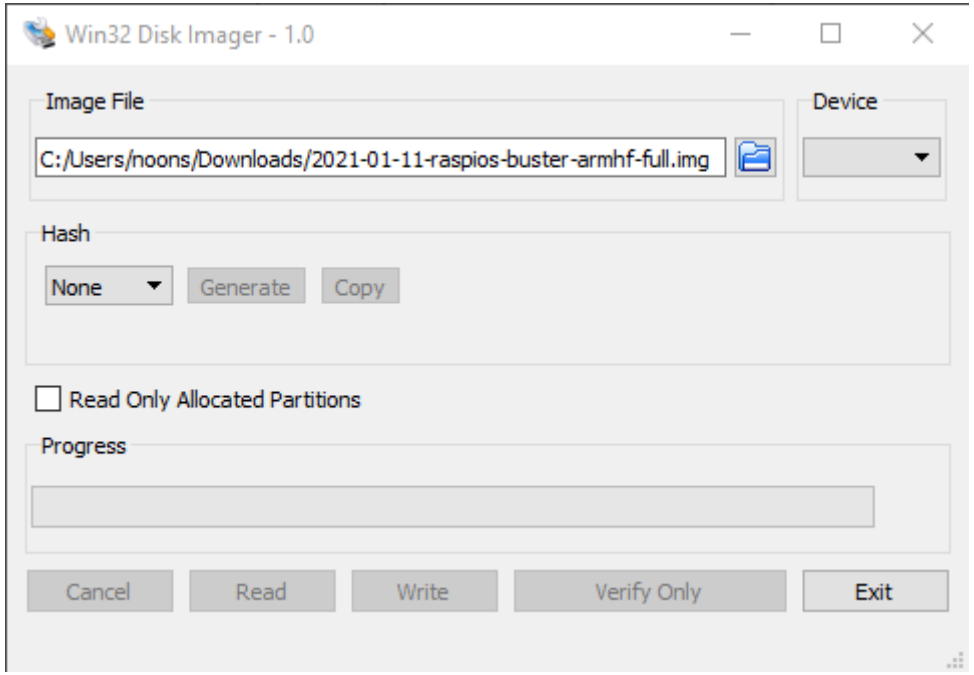
- SD card
- Keyboard
- Mouse
- HDMI monitor

Workflow

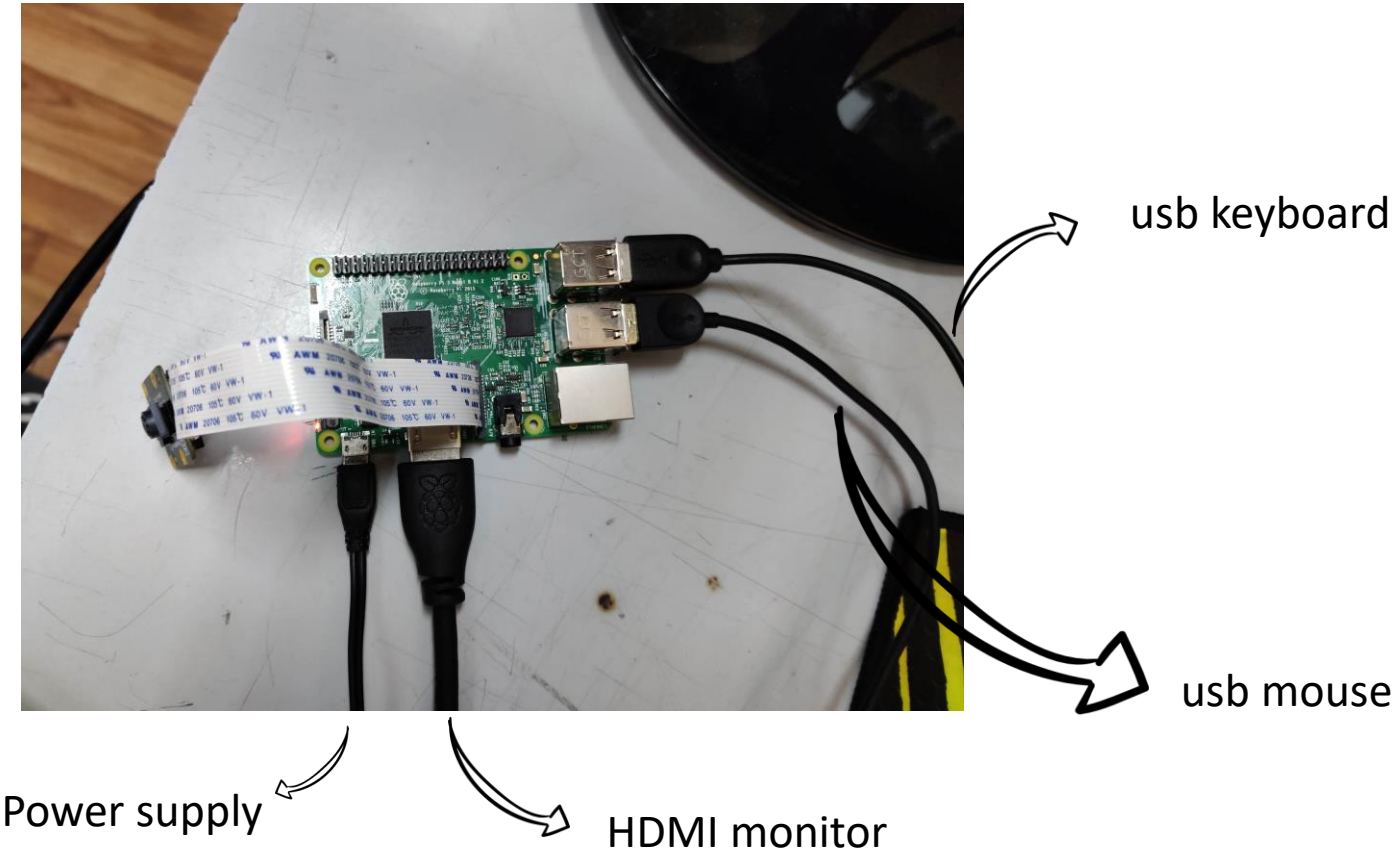
- Install Raspbian OS into SD card
- Setup system
  - Enable camera
  - Enable ssh (Optional)
  - Enable VNC (Optional)
- Install OpenCV
- Test camera and OpenCV
- Implement laplacian and canny edge detection

Install Raspbian OS

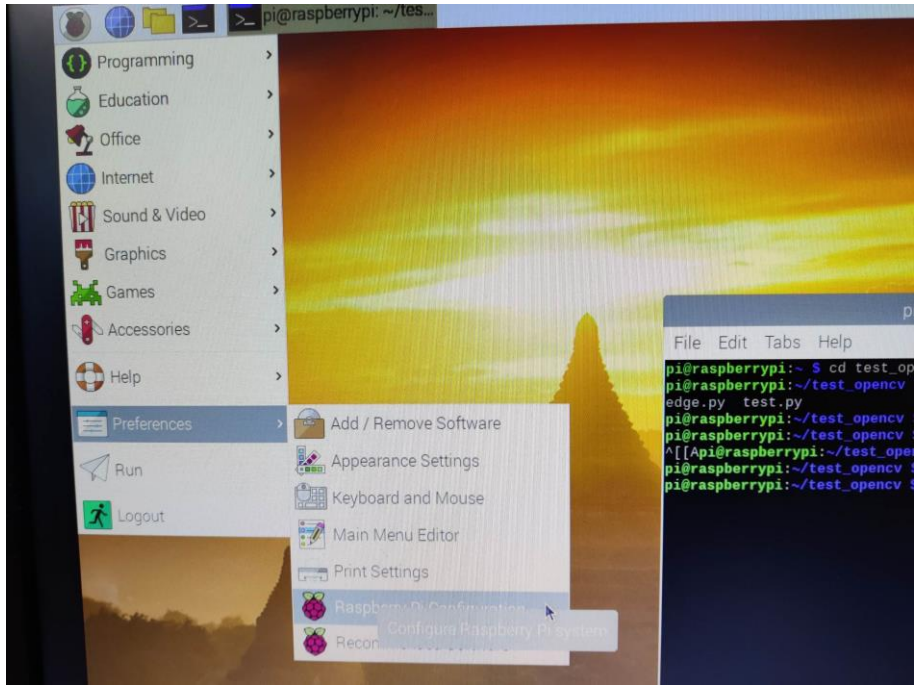
- Download Raspbian image from https://www.raspberrypi.org/software/operating-systems/#raspberry-pi-os-32-bit
- Install by Win32DiskImager

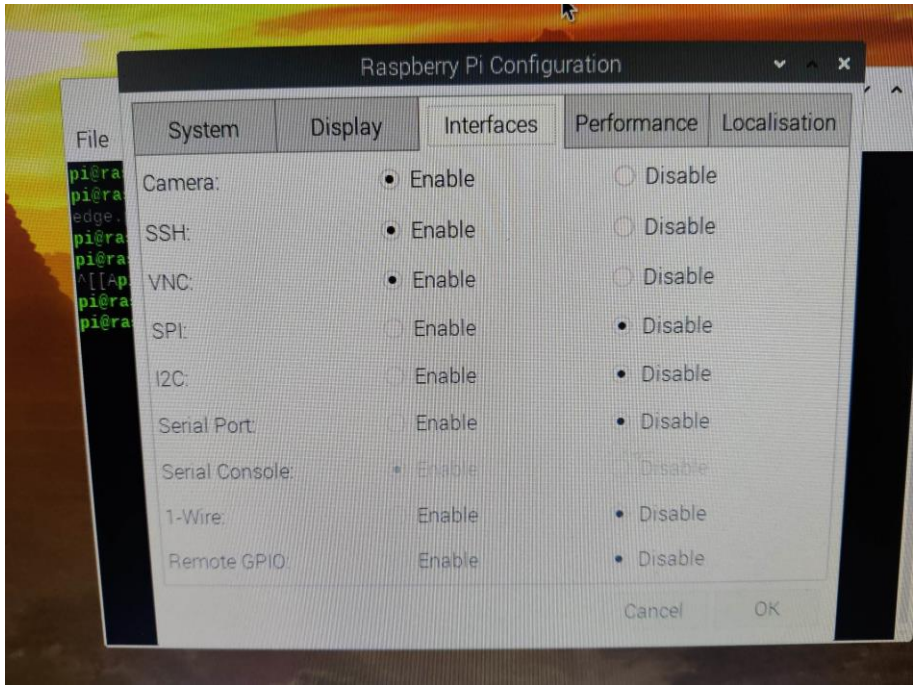


Hardware setup



System setup



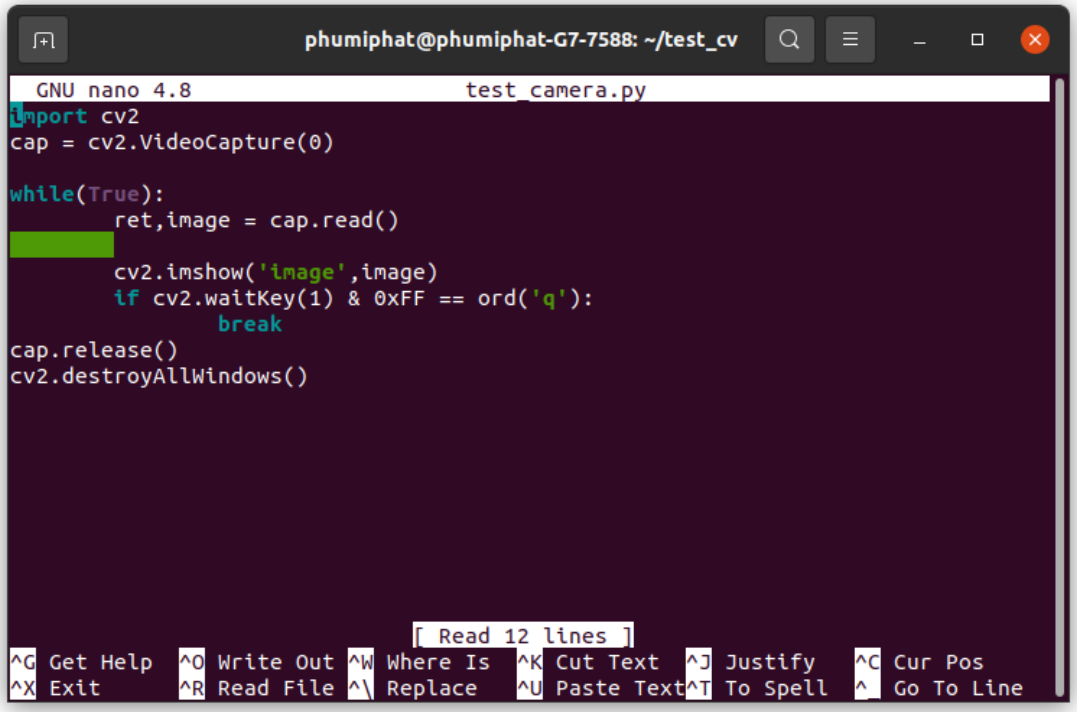


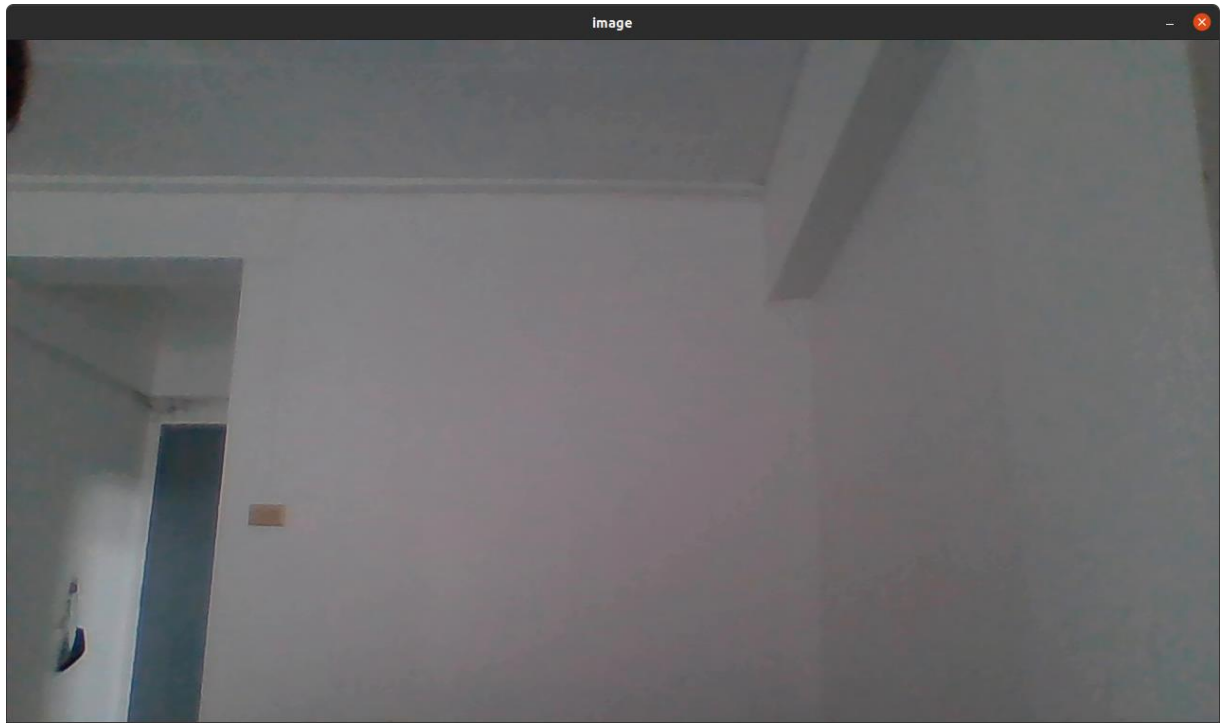
Install OpenCV

- System update
  - sudo apt-get update
  - Sudo apt-get upgrade
  - Sudo rpi-update
- Install dependencies image and video io
  - sudo apt-get install libjpeg-dev libtiff5-dev libjasper-dev libpng12-dev –y
  - sudo apt-get install libavcodec-dev libavformat-dev libswscale-dev libv4l-dev –y
  - sudo apt-get install libxvidcore-dev libx264-dev
- Install HiGUI
  - Sudo apt-get install libgtk2.0-dev libgtk-3-dev –y
  - Sudo apt-get install libatlaas-base-dev gfortran –y
- Install OpenCV
  - Sudo apt-get install python3-opencv

Experiment (1)

- Test picamera and OpenCV





Experiment (2)

- Implement laplacian and canny edge on raspberry pi

phumiphat@phumiphat-G7-7588: ~/test_cv

```
  GNU nano 4.8                    test_edge.py                    Modified
import cv2
import numpy as np
from matplotlib import pyplot as plt
cap = cv2.VideoCapture(0)

while(True):
    ret , image = cap.read()
    gray = cv2.cvtColor(image,cv2.COLOR_BGR2GRAY)
    canny = cv2.Canny(gray,100,200)
    laplacian = cv2.Laplacian(gray,cv2.CV_64F)
    #sobelx = cv2.Sobel(gray,cv2.CV_64F,1,0,ksize=5)
    #sobely = cv2.Sobel(gray,cv2.CV_64F,0,1,ksize=5)
    #gradient_mag = sobelx  + sobely
    #cv2.imshow("grayscale",gray)
    cv2.imshow("laplacian",laplacian)
    #cv2.imshow("gradient magnitude",gradient_mag)
    cv2.imshow("Canny Edge Detection",canny)
    if cv2.waitKey(1) & 0xFF == ord('q'):
        break
cap.release()

^G Get Help  ^O Write Out ^W Where Is  ^K Cut Text  ^J Justify   ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Paste Text^T To Spell  ^_ Go To Line
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Demo video : https://www.youtube.com/watch?v=3j-d8IbfJ8I