Setup Raspy with OpenCV

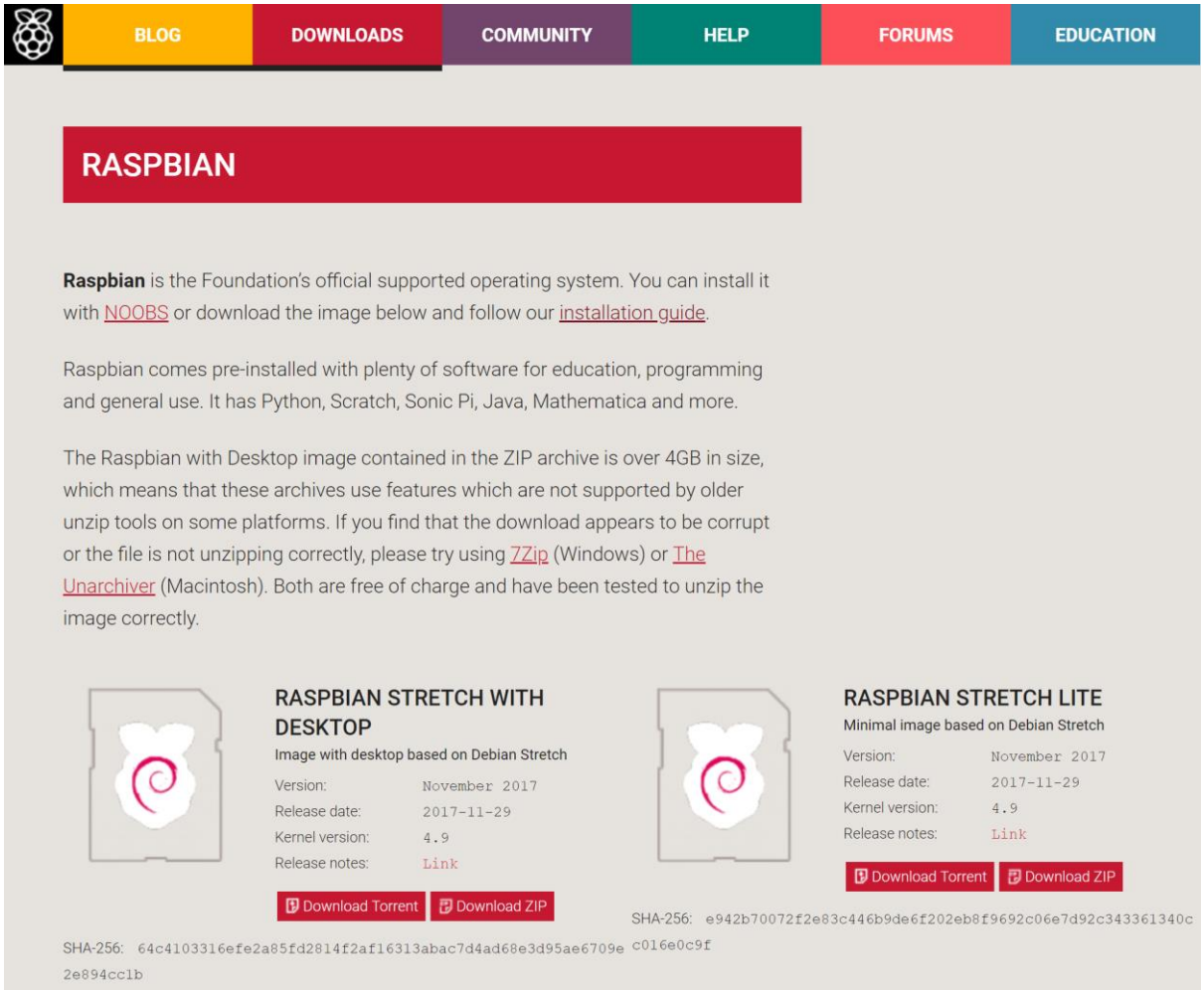
From a Dummy for other Dummies

Install Raspbian

Download the latest image from raspberrypi.org. I took the lite version without desktop gui.

To check the hashcode on Windows you can use the following command:

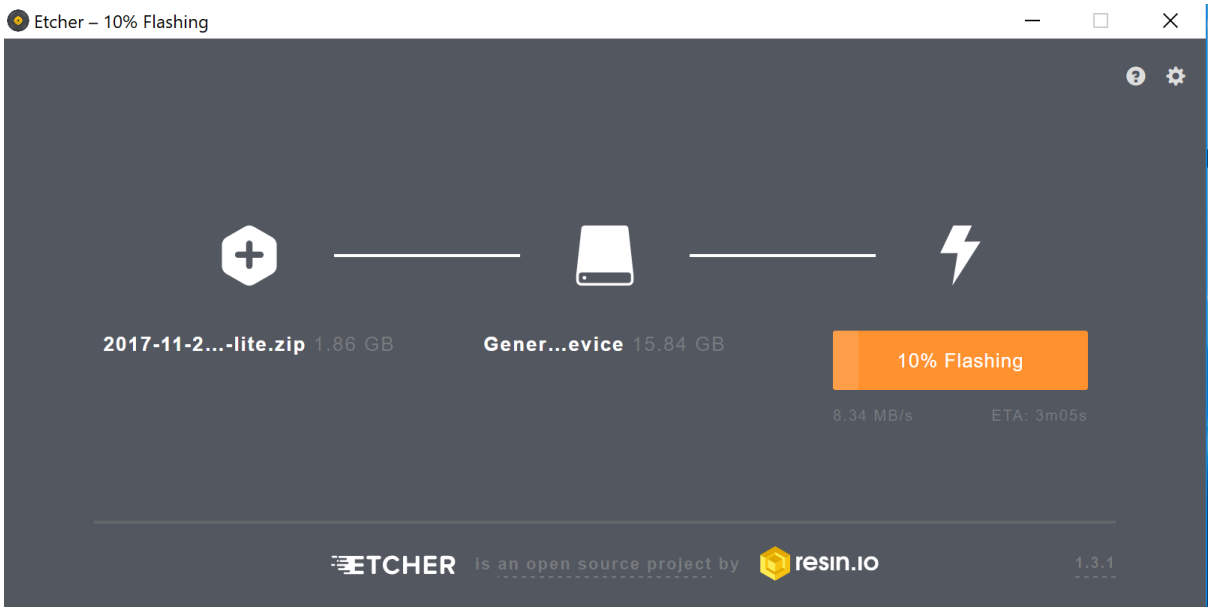
```
certutil -hashfile C:\Users\...raspbian-stretch-lite.zip sha256
```



Link: https://www.raspberrypi.org/downloads/raspbian/

Write the image to the SD card either manually or with a client like Etcher. I used Etcher.

Select the previously downloaded image (.zip File), then select the SD Card and click the flash button in Etcher.



Etcher Link: https://etcher.io/

Installation Guide Link: https://www.raspberrypi.org/documentation/installation/installing-images/README.md

Setup wireless connection

You could work on your Raspy with a HDMI Monitor and a USB Keyboard locally. I want to work via ssh over the wlan hotspot of my smartphone. To make the Raspy connect to the network we have to configure the ssid and the password in `/etc/wpa_supplicant/wpa_supplicant.conf` as follows:

```
country=GB
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1

network={
        ssid="<your ssid>"
        psk="<your password>"
}
```

After configuring this, we have to restart the wlan client:

```
wpa_cli -i wlan0 reconfigure
```

Basic configuration

Now the raspy should connect to the network. The next point is to expand the root filesystem and to start the ssh server. Raspbian brings a shell client for these options:

```
sudo raspi-config
```

Download OpenCV and setup python environment

wget -O opencv.zip https://github.com/Itseez/opencv/archive/3.3.0.zip

unzip opencv.zip

wget -O opencv_contrib.zip https://github.com/Itseez/opencv_contrib/archive/3.3.0.zip

unzip opencv_contrib.zip

wget https://bootstrap.pypa.io/get-pip.py

python3 get-pip.py

pip install virtualenv virtualenvwrapper

mkvirtualenv cv -p python3

workon cv

pip install numpy

Compile OpenCV

cmake -D CMAKE_BUILD_TYPE=RELEASE -D CMAKE_INSTALL_PREFIX=/usr/local -D INSTALL_PYTHON_EXAMPLES=ON -D OPENCV_EXTRA_MODULES_PATH=~/opencv_contrib-3.3.0/modules -D BUILD_EXAMPLES=ON ..

-- Python 3:

-- Interpreter: /home/pi/.virtualenvs/cv/bin/python3 (ver 3.5.3)

-- Libraries: /usr/lib/arm-linux-gnueabihf/libpython3.5m.so (ver 3.5.3)

-- numpy: /home/pi/.virtualenvs/cv/lib/python3.5/site-packages/numpy/core/include (ver 1.14.1)

-- packages path: lib/python3.5/site-packages

python -m site

sys.path = [

'/home/pi/opencv-3.3.0/build',

'/home/pi/.virtualenvs/cv/lib/python35.zip',

'/home/pi/.virtualenvs/cv/lib/python3.5',

'/home/pi/.virtualenvs/cv/lib/python3.5/plat-arm-linux-gnueabihf',

```
    '/home/pi/.virtualenvs/cv/lib/python3.5/lib-dynload',
    '/usr/lib/python3.5',
    '/usr/lib/python3.5/plat-arm-linux-gnueabihf',
    '/home/pi/.virtualenvs/cv/lib/python3.5/site-packages',
]
USER_BASE: '/home/pi/.local' (doesn't exist)
USER_SITE: '/home/pi/.local/lib/python3.5/site-packages' (doesn't exist)
ENABLE_USER_SITE: False
```

Change swapfile to 1024

```
sudo /etc/init.d/dphys-swapfile stop
sudo /etc/init.d/dphys-swapfile start

make -j4
sudo make install
sudo ldconfig
```

Change swapfile back to 100

https://www.pyimagesearch.com/2017/09/04/raspbian-stretch-install-opencv-3-python-on-your-raspberry-pi/

Setup git

```
sudo apt-get install git
git config --global user.name "Raspberry Pi"
git config --global core.editor vi

ssh-keygen -t rsa -C pi@raspy
VIELLEICHT: sudo /etc/init.d/ssh restart
git clone git@github.com:haubschueh/loufchatz.git loufchatz

sudo mkdir /opt/loufchatz
sudo chown pi /opt/loufchatz/
```

git clone git@github.com:haubschueh/loufchatz.git loufchatz

cd loufchatz/

git pull

Serial interface

VIELLEICHT: Check if serial interface is used by the operating system

```
dmesg | grep tty
```

Disable the serial interface over the the console gui:

```
sudo raspi-config
```

Install the package pyserial with pip. It's important to install pyserial and not serial, otherwise it might not be possible to open ports.

```
pip install pyserial
```

python3

>> import serial

>> port = serial.Serial()

Disable Bluetooth modem that blocks GPIO ports

Add to the end of the file /boot/config.txt

dtoverlay=pi3-disable-bt

We also need to run to stop BT modem trying to use UART

sudo systemctl disable hciuart

dtc -I fs /proc/device-tree

```
uart1_pins {
      brcm,pins;
      phandle = <0x11>;
      brcm,pull;
      brcm,function;
};
```

```
[…]
uart0_pins {
      brcm,pins = <0x20 0x21>;
      phandle = <0x8>;
      brcm,pull = <0x0 0x2>;
      brcm,function = <0x7>;
};
```