Deep Micro Systems

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CONFIGURATION STEPS FOR RASPBIAN STRETCH LITE FOR ARTIFICIAL VISION

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1. Installation Instructions

1.1. Raspbian Image

For this tutorial we are using a Raspberry Pi 3 and Raspbian Stretch Lite OS:

- Minimal image based on Debian Stretch
- Version: November 2017
- Release date: 2017-11-29
- Kernel version: 4.9

We will be using a 32 Gb Samsung SD Card with Read speed of 80 MB/s and write speed of 20 MB/s.

For the burning of the image to the SD card we advice to use Windows OS:

1. Download the Lite version image
2. Extract it using 7 zip
3. Burn the image using Win 32 Image Creator
4. Extract the sd card and plug to the Raspberry Pi 3

1.2. Pre configuration

1.2.1. Wi-Fi configuration

To stablish connection to a visible Wi-Fi Network we just add the following lines to the file: **/etc/network/interfaces**:

```
auto lo

iface lo inet loopback
iface eth0 inet dhcp

allow-hotplug wlan0
auto wlan0

iface wlan0 inet dhcp
      wpa-ssid "SSID"
      wpa-psk "PASSWORD"
```

1.2.2. Enable SSH and auto login on startup

In order to control the pi remotelly without the need of a keyboard and screen monitor we allow SSH:

1. Tipe **raspi-config** to get into configuration
2. In the preferences menu enter the Interfaces menu
3. Enable SSH
4. Back to the main menu enter the Boot Options
5. Activate Autologin

Then to get the local IP for your raspberry pi just tipe: ifconfig in the terminal.
This is highly recommended that you change the Pi password to a secure one, this can also be achieved from the raspi-config menu.

1.3. Python 3 setup

```
$ sudo apt-get update && sudo apt-get upgrade
$ sudo apt-get install build-essential cmake pkg-config
$ sudo apt-get install libhdf5-dev
$ sudo apt-get install libjpeg-dev libtiff5-dev libjasper-dev libpng12-dev
$ sudo apt-get install libavcodec-dev libavformat-dev libswscale-dev libv4l-dev
$ sudo apt-get install libxvidcore-dev libx264-dev
$ sudo apt-get install libgtk2.0-dev libgtk-3-dev
$ sudo apt-get install libcanberra-gtk*
$ sudo apt-get install libatlas-base-dev gfortran
$ sudo apt-get install python2.7-dev python3-dev
```

Or we can try the joint commands:

```
$ sudo apt-get update && sudo apt-get upgrade -y && sudo apt-get install
    build-essential cmake pkg-config -y && sudo apt-get install libhdf5-dev -y
    && 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 -y &&
    libx264-devsudo apt-get install libgtk2.0-dev libgtk-3-dev -y && sudo
    apt-get install libcanberra-gtk* -y && sudo apt-get install
    libatlas-base-dev gfortran -y && sudo apt-get install python2.7-dev
    python3-dev -y
```

1.4. Install OpenCV

First we need to remove any default installation of OpenCV.

```
$ sudo apt-get remove libopencv*
$ sudo apt-get autoremove
```

And now we download all necesary resources and unzip them:

```
$ cd ~
$ 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

$ cd ~/opencv-3.3.0/
$ mkdir build
$ cd build
```

Now we compile:

```
$ cmake -D CMAKE_BUILD_TYPE=RELEASE \
    -D CMAKE_INSTALL_PREFIX=/usr/local \
    -D OPENCV_EXTRA_MODULES_PATH=~/opencv_contrib-3.3.0/modules \
    -D ENABLE_NEON=ON \
    -D ENABLE_VFPV3=ON \
    -D BUILD_TESTS=OFF \
    -D INSTALL_PYTHON_EXAMPLES=OFF \
    -D WITH_EIGEN=ON  \
    -D BUILD_EXAMPLES=OFF ..
```

Now we shall increase the swap size to 1024 to compile using several cores, this can be done modifiying the file: **sudo nano /etc/dphys-swapfile**

```
# CONF_SWAPSIZE=100 # Old
CONF_SWAPSIZE=1024
```

Now we restart the swap service:

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

Now we are ready to compile and make our opencv:

```
$ make -j4
$ sudo make install
```

In the -j4 we can select the number of cores used for the compilation of OpenCV. Now we must go back to the normal swap size and restart again

1.4.1. Install Background substraction

To install Background substraction we first need to install swig and git:

```
$ sudo apt-get install swig && sudo apt-get install git
```

Now we can get and build Background substraction:

```
$ git clone https://github.com/sagi-z/BackgroundSubtractorCNT.git
   --single-branch
$ cd BackgroundSubtractorCNT
$ mkdir build
$ cd build
$ cmake -DPYTHON_EXTENSION=ON -DPYTHON=/usr/bin/python3.5 ..
$ make
$ sudo make install
```

2. Otras configuraciones

2.1. Remot3 configuration

Referencias

[1] Adafruit's Raspberry Pi Lesson 3. Network Setup.

[2] Remote Manage Networked Devices Anywhere, Remot3