1. Format SD card using below:

https://www.sdcard.org/downloads/formatter/sd-memory-card-formatter-for-windows-download/

2. Download raspberry PI imager:

https://www.raspberrypi.com/software/

3. On Imager tool select “Raspbian buster lite”, write to SD card

https://www.tomshardware.com/reviews/raspberry-pi-headless-setup-how-to,6028.html

4. Write an empty text file named "ssh" (no file extension) to the root of the directory of the card. (boot drive)

5. Create file “**wpa\_supplicant.conf**” to the root of the directory of the card, with content as below:

country=IN

ctrl\_interface=DIR=/var/run/wpa\_supplicant GROUP=netdev

update\_config=1

network={

scan\_ssid=1

ssid="PsySage"

psk="\*\*\*\*\*"

}

6. Open the file config.txt in the root directory of the micro SD card, and add the line dtoverlay=dwc2 to the very bottom of the file and save.

7. Open cmdline.txt and add the text modules-load=dwc2,g\_ether after the word rootwait, and save the file. There are no linebreaks in this file.

8. Connect the micro USB cable to the port labeled "USB" on the Pi Zero. This will not work if you connect to the port labeled "PWR."

9. Connecting via SSH. Use Putty or any other tool.

Address: raspberrypi.local or raspberrypi

10. Once connected, opened in terminal, command

ifconfig

to get IP address of Raspberry Pi

11. sudo apt-get update –allow-releaseinfo-change

13. for Xwindows

sudo apt-get install xserver-xorg-video-fbdev

sudo apt-get install xserver-xorg

sudo apt-get install xinit

sudo apt-get install x11-xserver-utils

14. OpenCV installation

Open a Terminal and download the desired version of OpenCV:

wget https://github.com/sol-prog/raspberry-pi-opencv/releases/download/opencv4rpi2.1/opencv-4.1.0-armhf.tar.bz2

Next, extract the archive:

tar xvf opencv-4.1.0-armhf.tar.bz2

Once the archive was extracted, move the resulting opencv-4.1.0 folder to /opt:

sudo mv opencv-4.1.0 /opt

Optionally, you can remove the archive:

rm opencv-4.1.0-armhf.tar.bz2

Next, we are going to install a couple of libraries required by OpenCV:

sudo apt install libtiff-dev zlib1g-dev

sudo apt install libjpeg-dev libpng-dev

sudo apt install libavcodec-dev libavformat-dev libswscale-dev libv4l-dev

sudo apt-get install libxvidcore-dev libx264-dev

The next two libraries are only required if you are using the GUI version of OpenCV, you can safely ignore these if you are using the headless version:

sudo apt install libgtk-3-dev libcanberra-gtk3-dev

Next, we’ll add OpenCV to the system library path, you’ll need to run these commands from your home folder:

cd ~

echo 'export LD\_LIBRARY\_PATH=/opt/opencv-4.1.0/lib:$LD\_LIBRARY\_PATH' >> .bashrc

. .bashrc

Restart your Terminal or log in and log out if you are connected to your RPi through SSH.

Install git if necessary:

sudo apt install git

We’ll clone a simple config file useful if you want to be able to use OpenCV from C++:

git clone https://gist.github.com/sol-prog/ed383474872958081985de733eaf352d opencv\_cpp\_compile\_settings

cd opencv\_cpp\_compile\_settings/

sudo cp opencv.pc /usr/lib/arm-linux-gnueabihf/pkgconfig

cd ~

rm -rf opencv\_cpp\_compile\_settings/

create library config file

*sudo nano /etc/ld.so.conf.d/opencv.conf*

*Write content as below:*

*/opt*/opencv-4.1.0/lib

save and exit

*command:*

sudo ldconfig -v

15. Copy Mathable unzipped folder to home directory

16. cd Mathable\_1.1/v\_1.1

17 make (Makefile to be edited to replace opencv4.pc with opencv.pc)

18. sudo nano /etc/X11/xinit/xinitrc

Content as below:

# /etc/X11/xinit/xinitrc

#

# global xinitrc file, used by all X sessions started by xinit (startx)

cd /Mathable\_1.1/v\_1.1

sudo chmod +x mathable

./mathable

# invoke global X session script

. /etc/X11/Xsession

19.create rc.local file for start up

sudo nano /etc/rc.local

Add “sudo startx -- -nocursor” just before exit 0