Institución Universitaria
Reacreditada en Alta Calidad

RaspBerry Pi and Edge Impulse

Aprendizaje Automático Embebido

Somos Innovación Tecnológica con Sentido Humano

Alcaldía de Medellín

Raspberry Pi

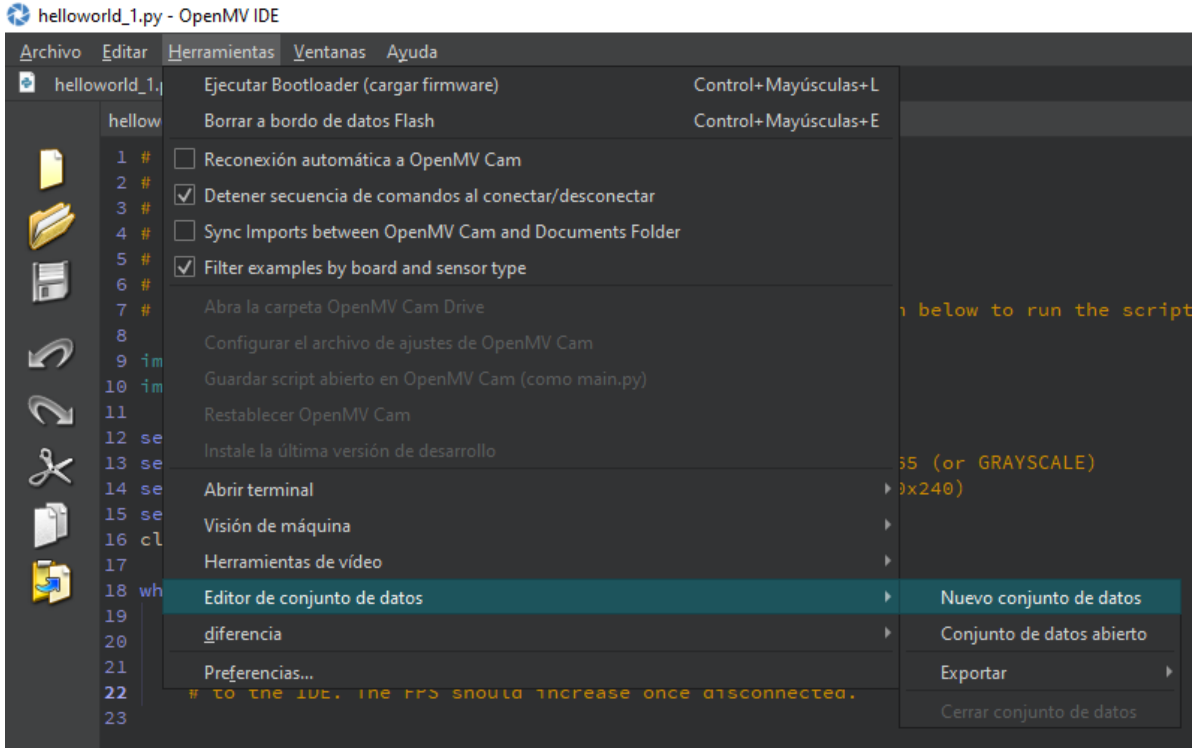
1. Data Acquisition (Images)
2. Install Raspberry Pi
2. Ways to access the Raspberry Pi
3. Connect Raspberry Pi to Edge Impulse
4. Model Deployment in Raspberry Pi

Image Acquisition

There are different ways to build/generate the dataset for image classification

1. Upload images from a local o cloud folder (OpenMV IDE).
2. Take images from Smartphone connected to Edge Impulse.
3. Take images from camera/raspberry pi to Edge Impulse.

Upload Dataset using OpenMV IDE



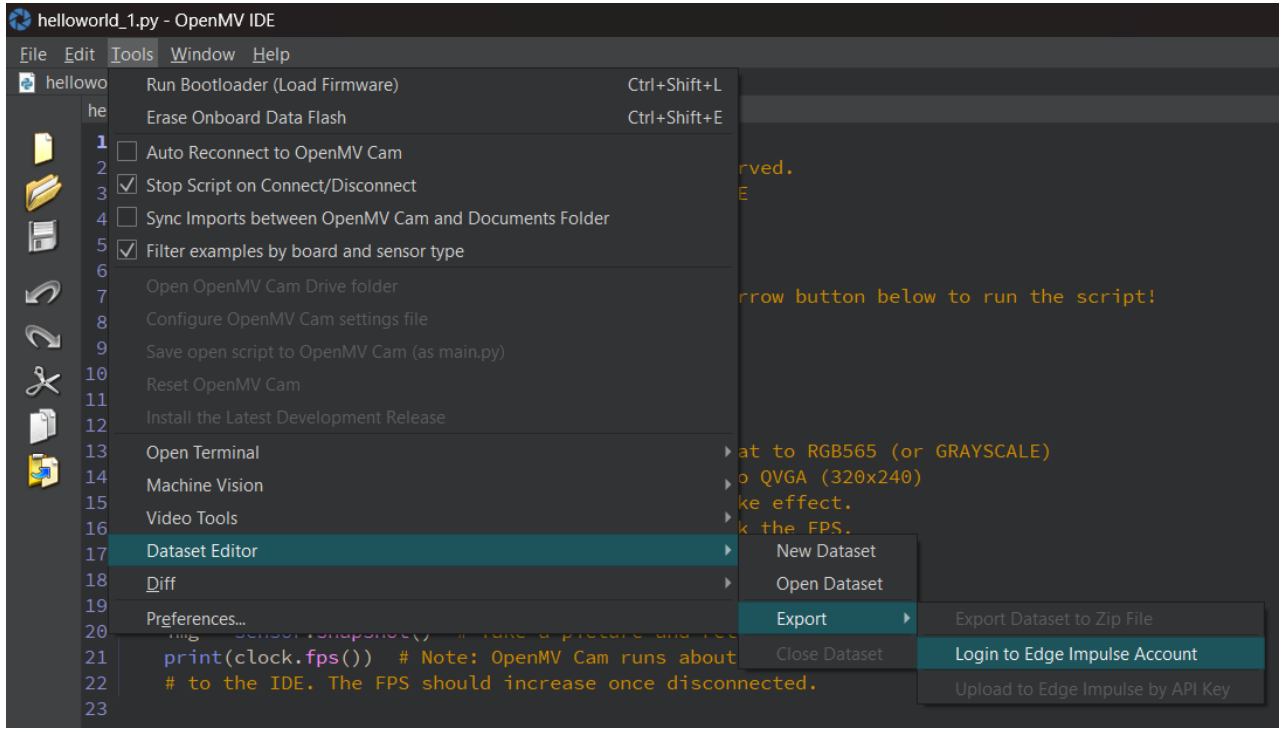
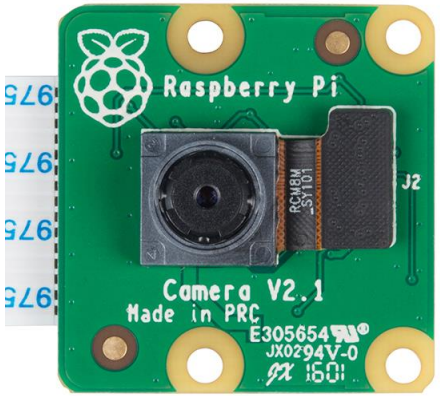


Image Acquisition

>64MP

Edge Impulse

512x512



3280 x 2464 = 8MP

Edge Impulse

640x480

640 x 480 =300kP

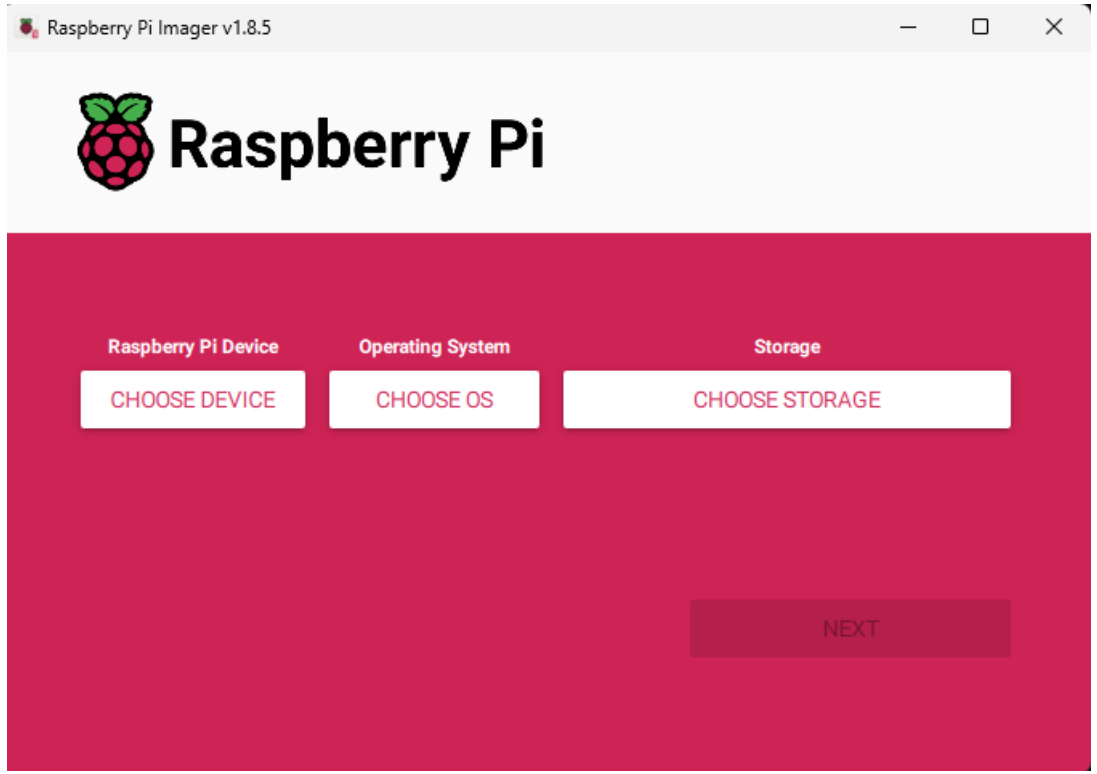
Edge Impulse

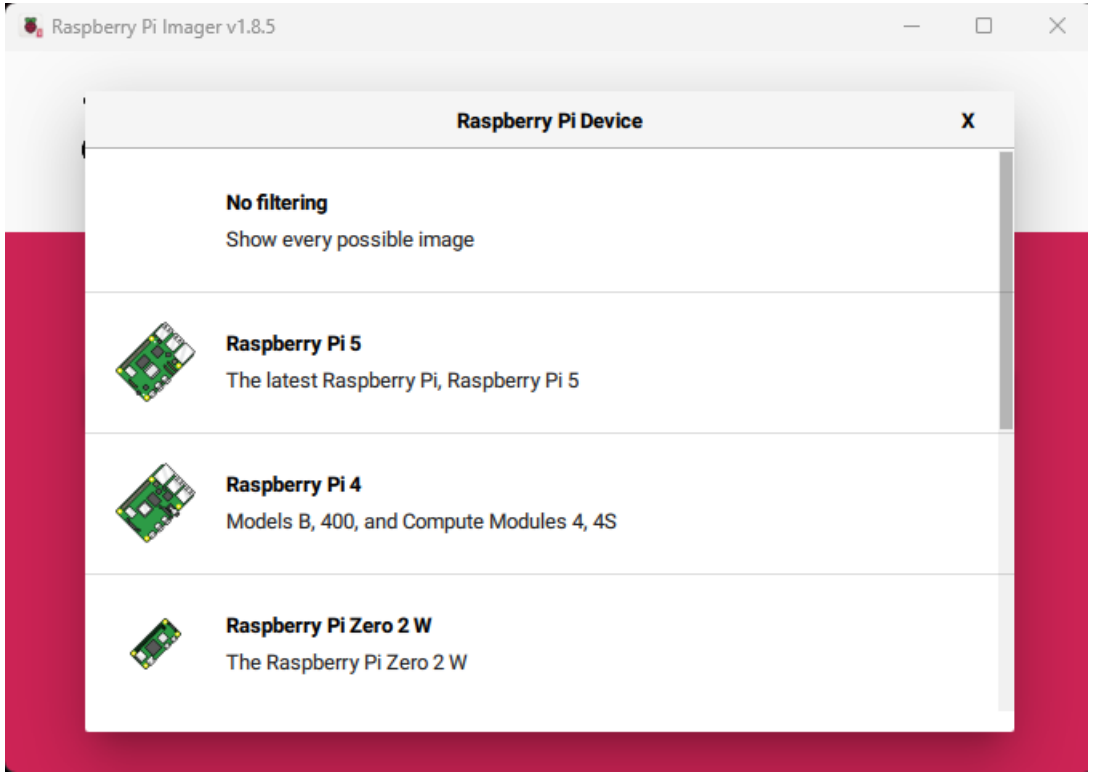
640x480

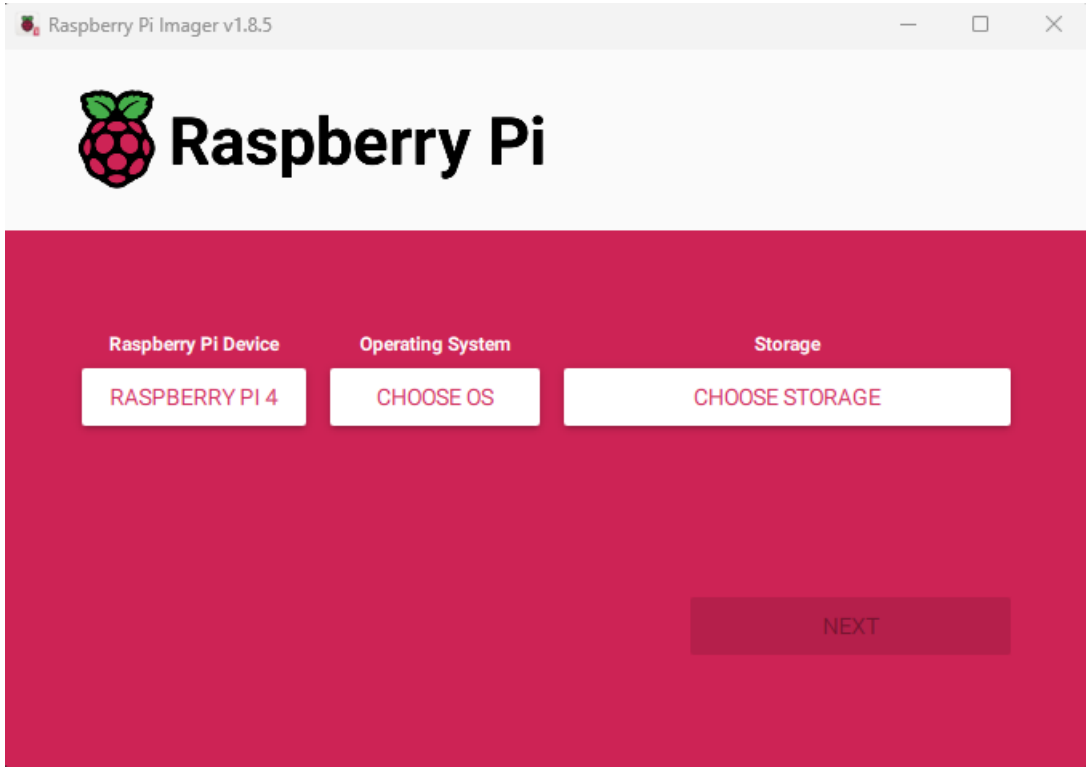
https://edge-impulse.gitbook.io/docs/tutorials/end-to-end-tutorials/image-classification/image-classification-mobile-phone

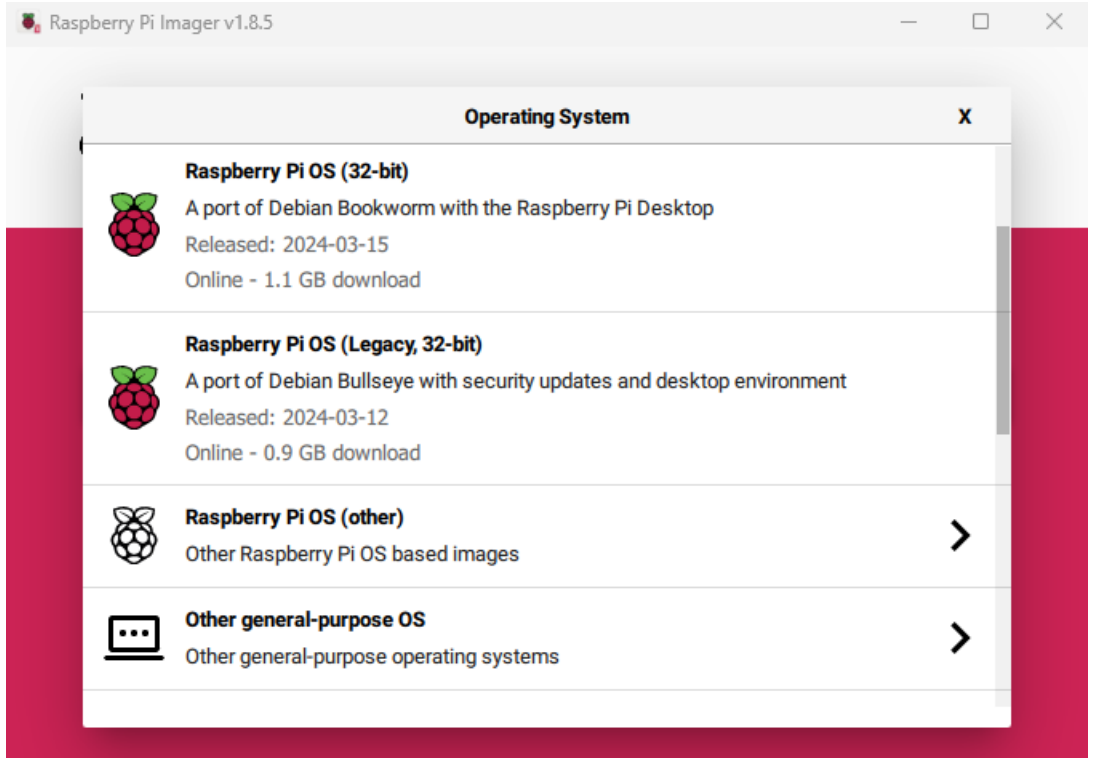
Raspberry Pi

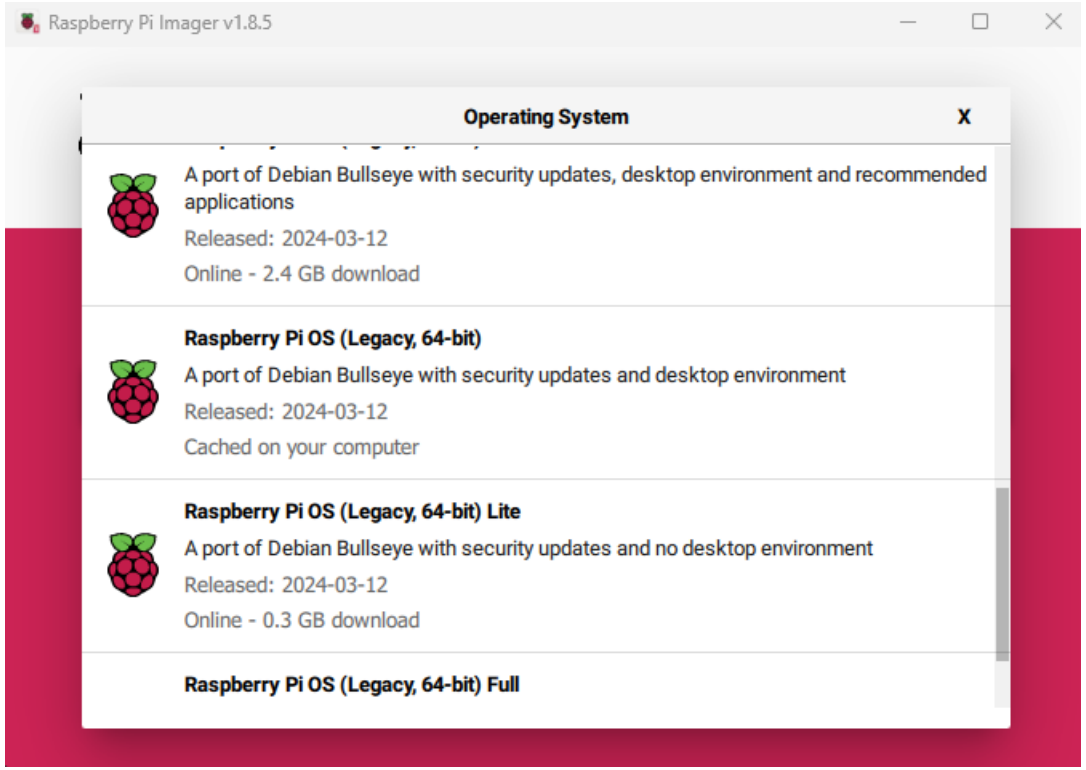
1. Data Acquisition (Images)
2. Install Raspberry Pi (SD reader)
2. Ways to access the Raspberry Pi
3. Connect Raspberry Pi to Edge Impulse
4. Model Deployment in Raspberry Pi

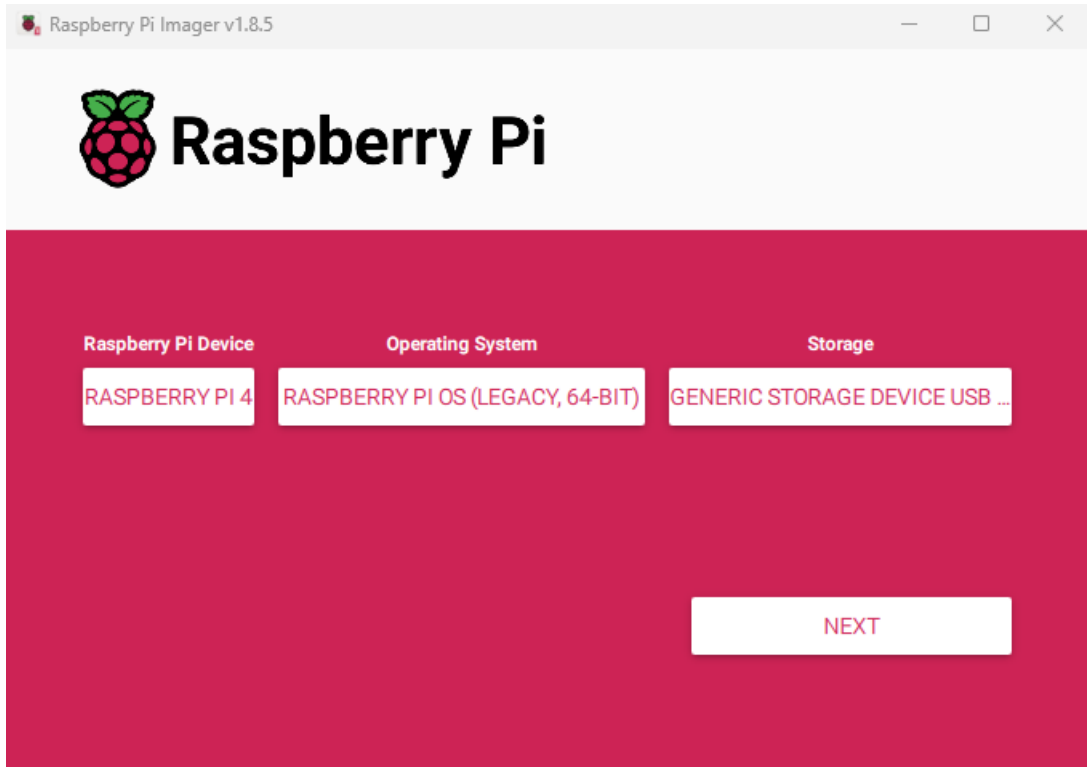


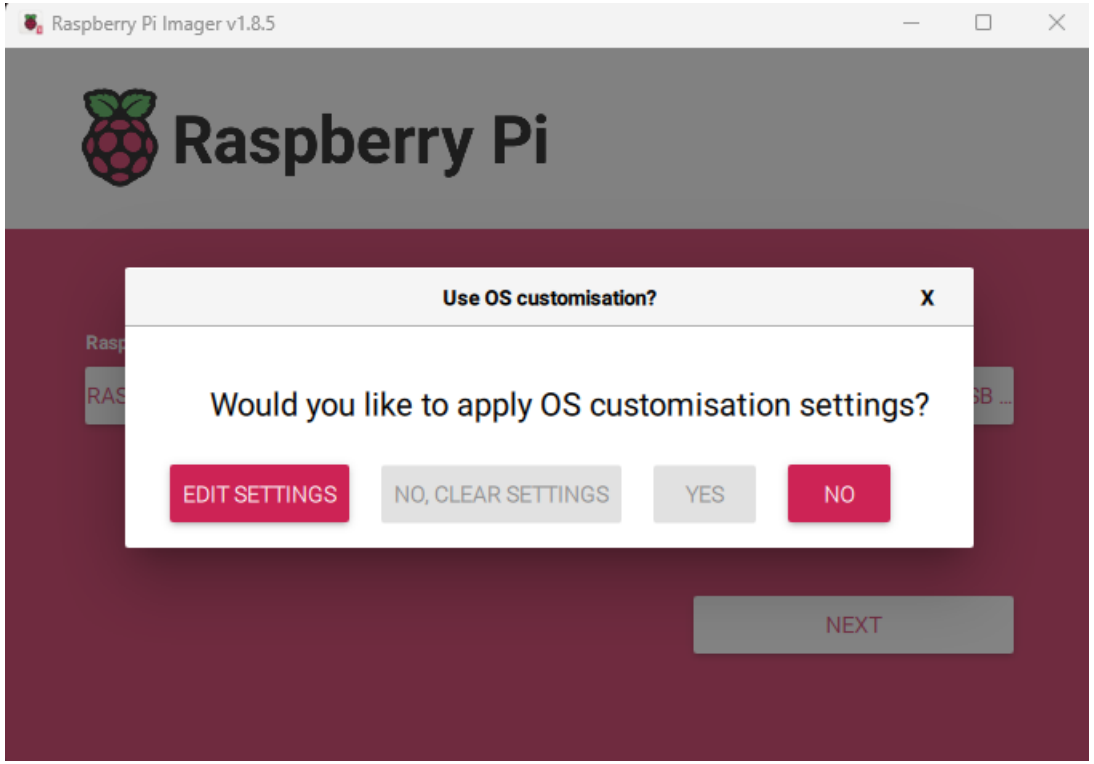


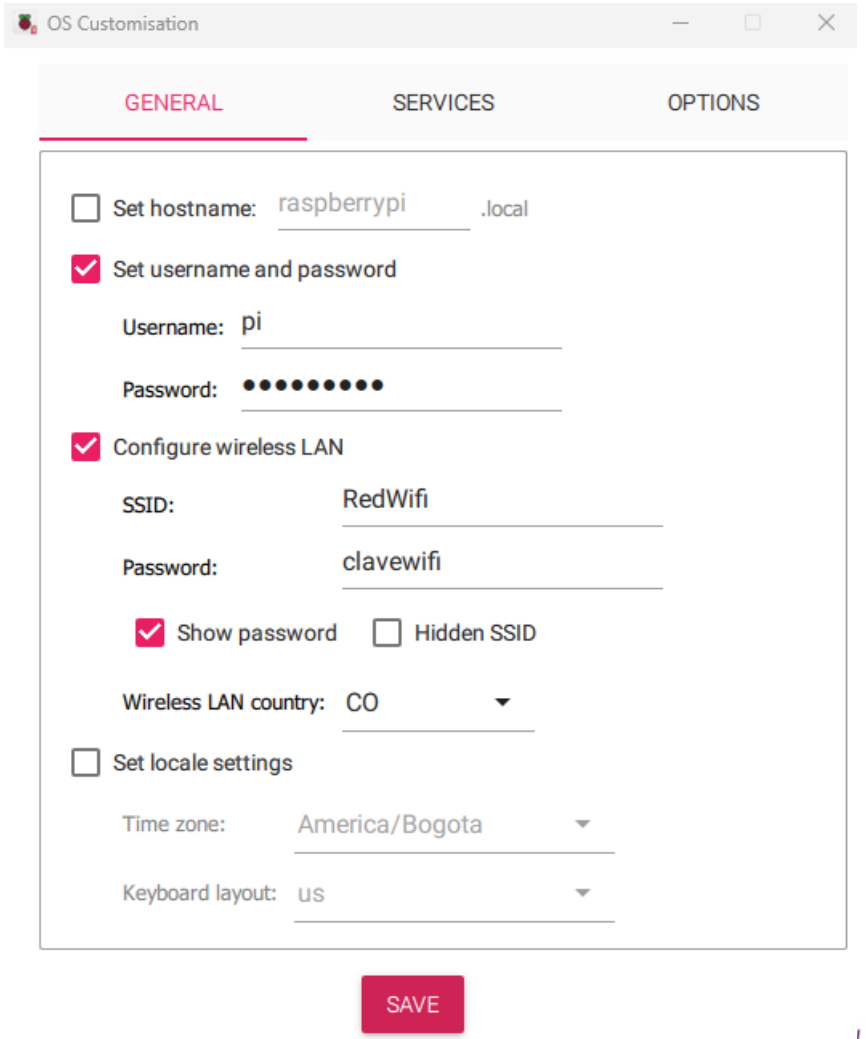


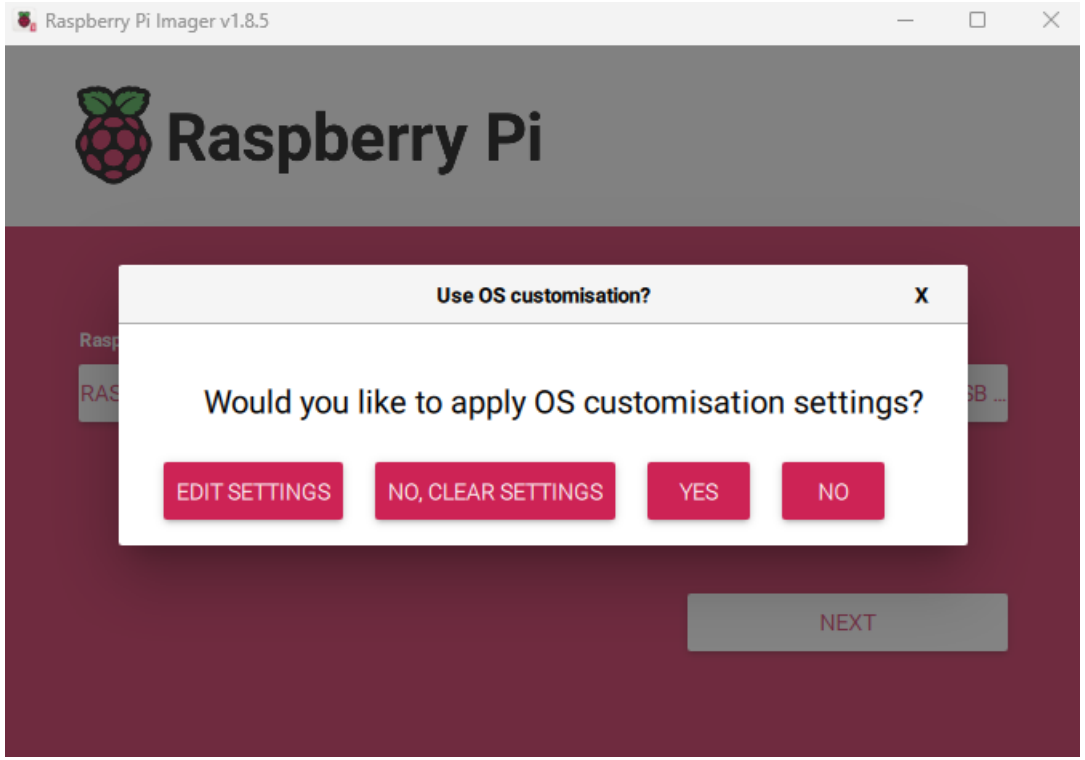




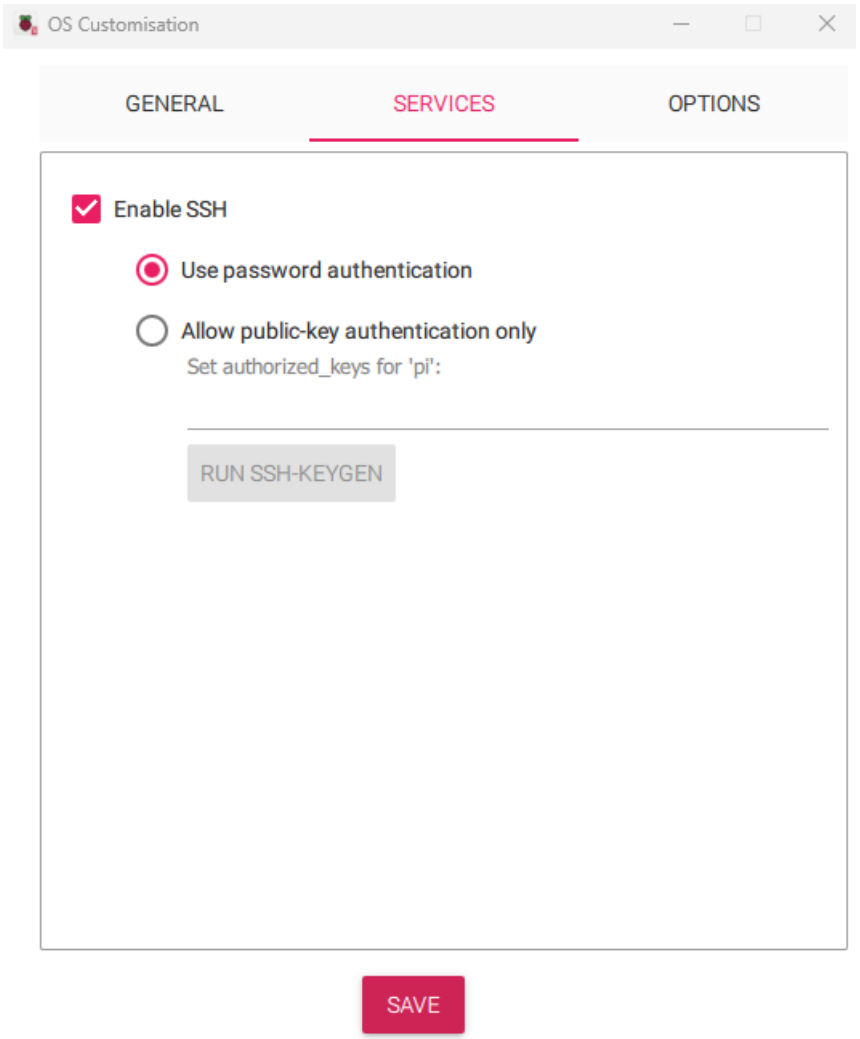


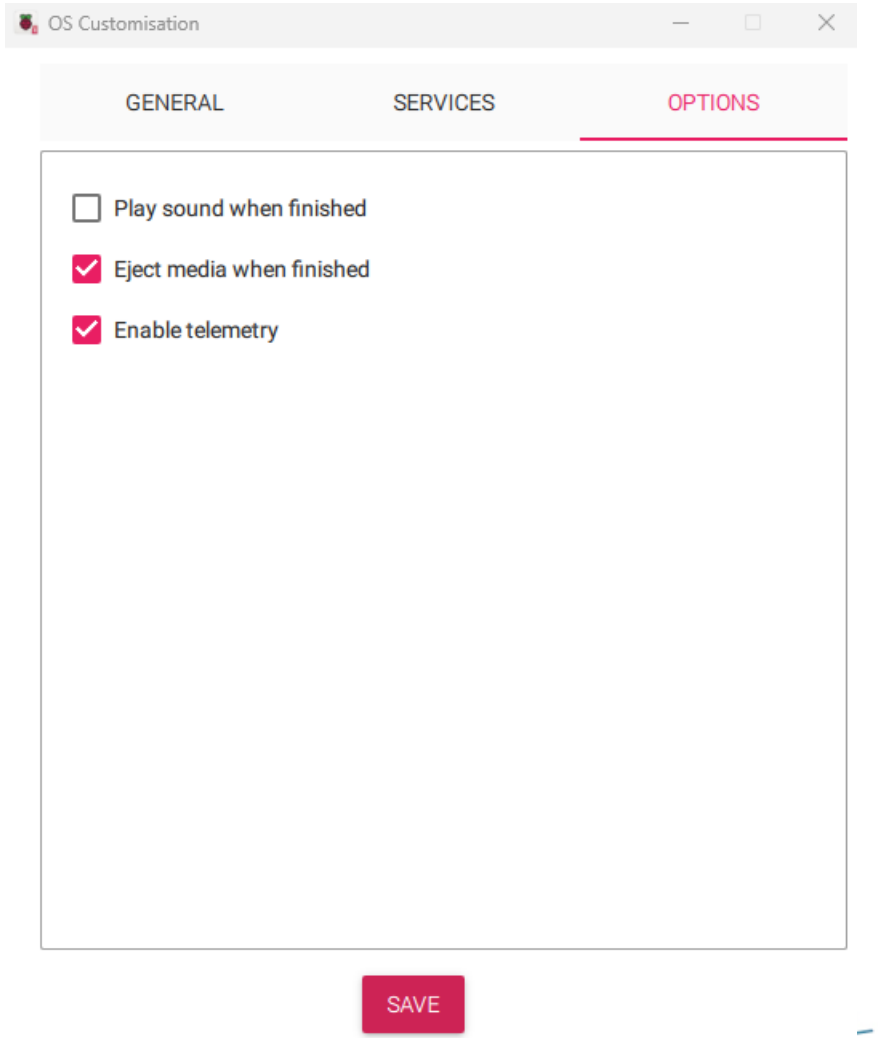






Raspberry Pi - Options





Extra Tools

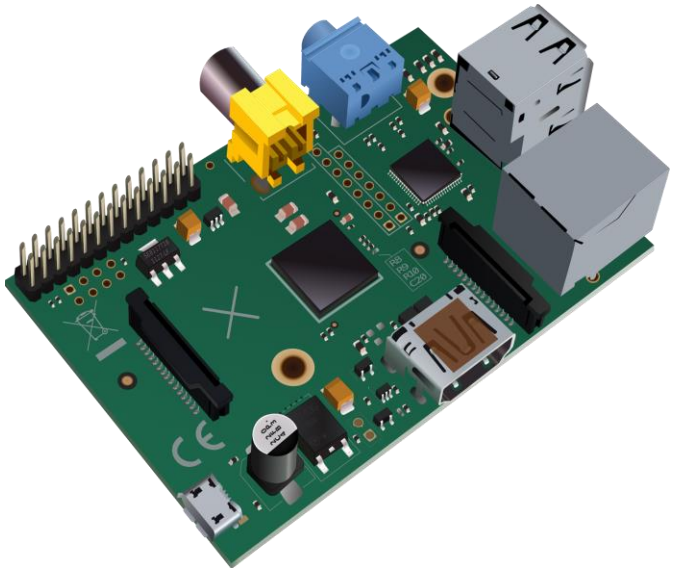
https://raspberrypi-guide.github.io/filesharing/mount-raspberry-pi-sd-card

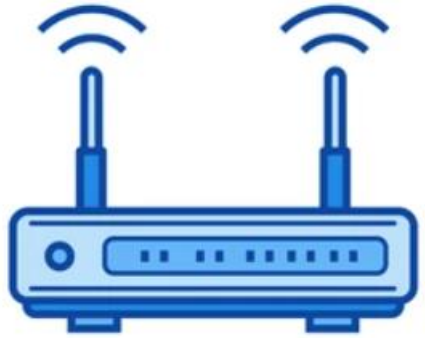
https://sourceforge.net/projects/ext2fsd/files/Ext2fsd/0.53/

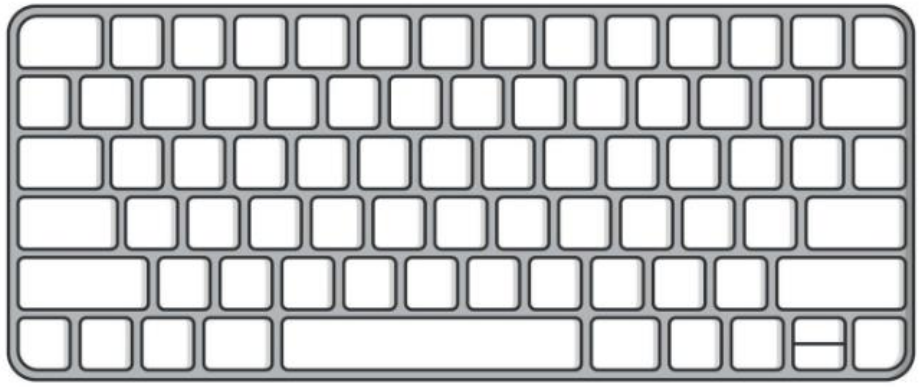
Raspberry Pi

1. Data Acquisition (Images)
2. Install Raspberry Pi
3. Ways to access the Raspberry Pi
4. Connect Raspberry Pi to Edge Impulse
5. Model Deployment in Raspberry Pi

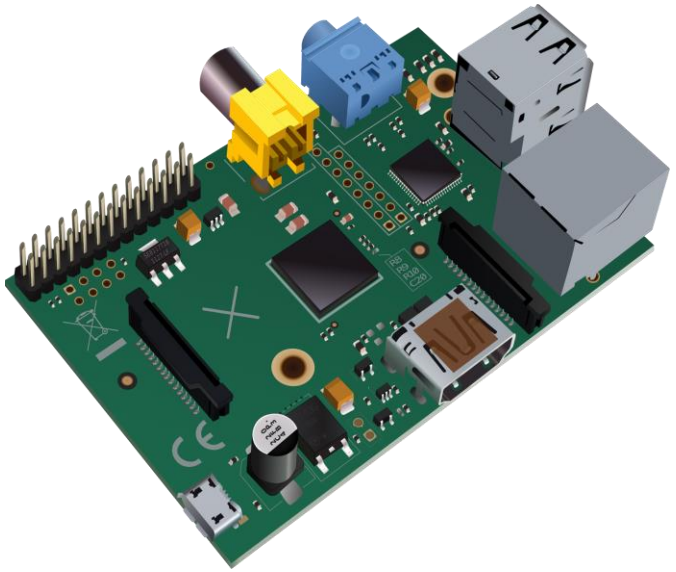
Monitor and Keyboard connected to Raspberry Pi

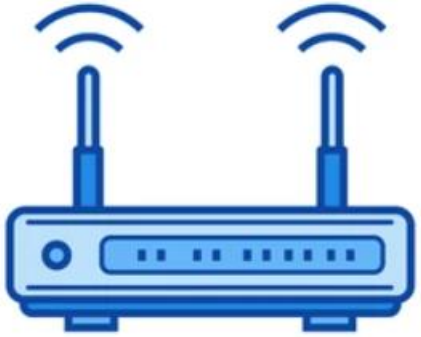




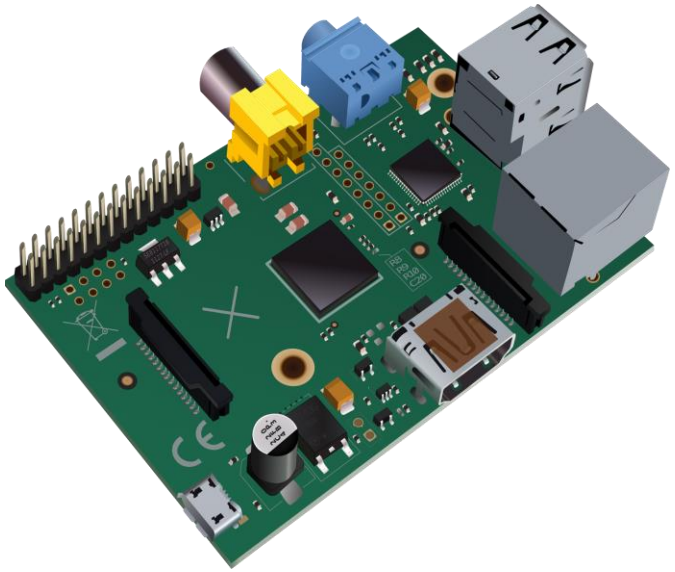


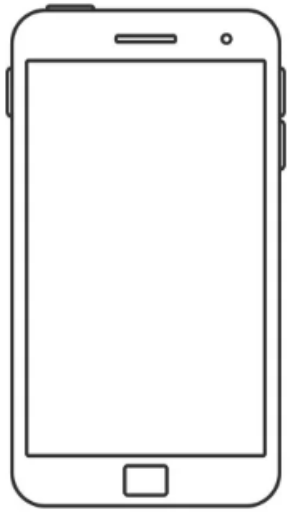
Laptop connected through Wifi using SSH





Laptop connected through HotSpot using SSH





Raspberry Pi

1. Data Acquisition (Images)
2. Install Raspberry Pi
3. Ways to access the Raspberry Pi
4. Connect Raspberry Pi to Edge Impulse and Model definition
5. Model Deployment in Raspberry Pi

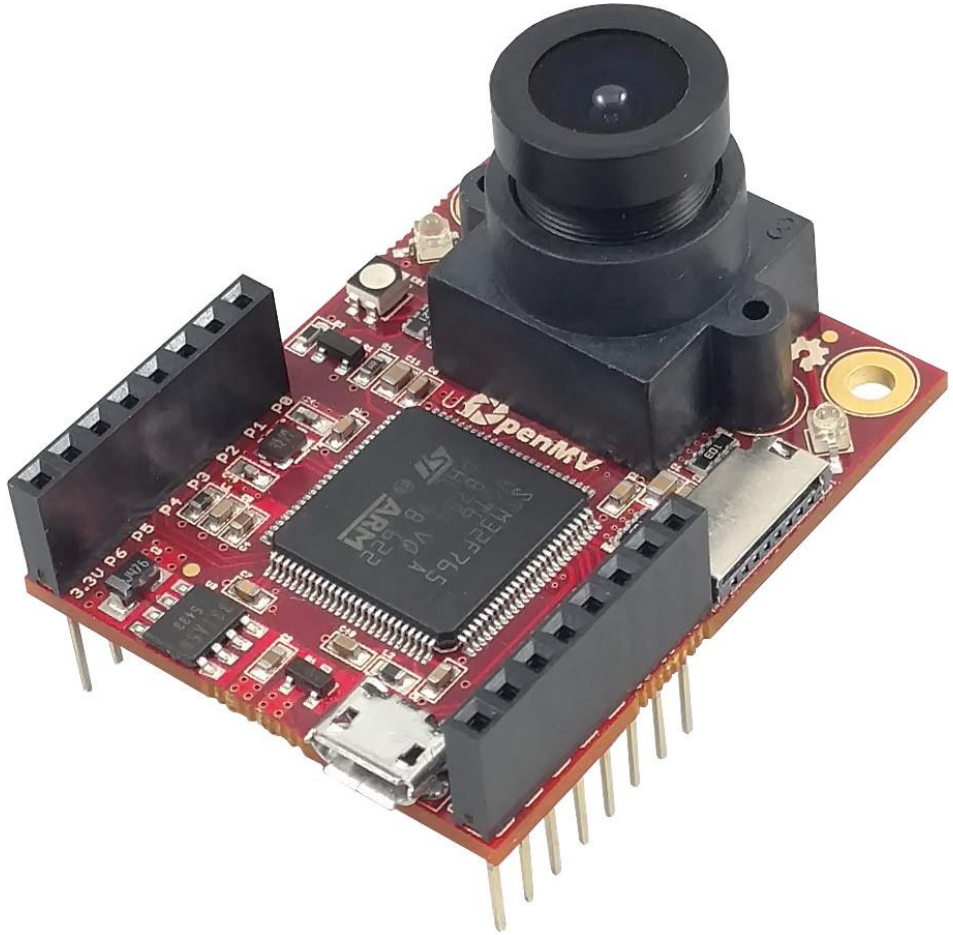
Terminal Installation steps

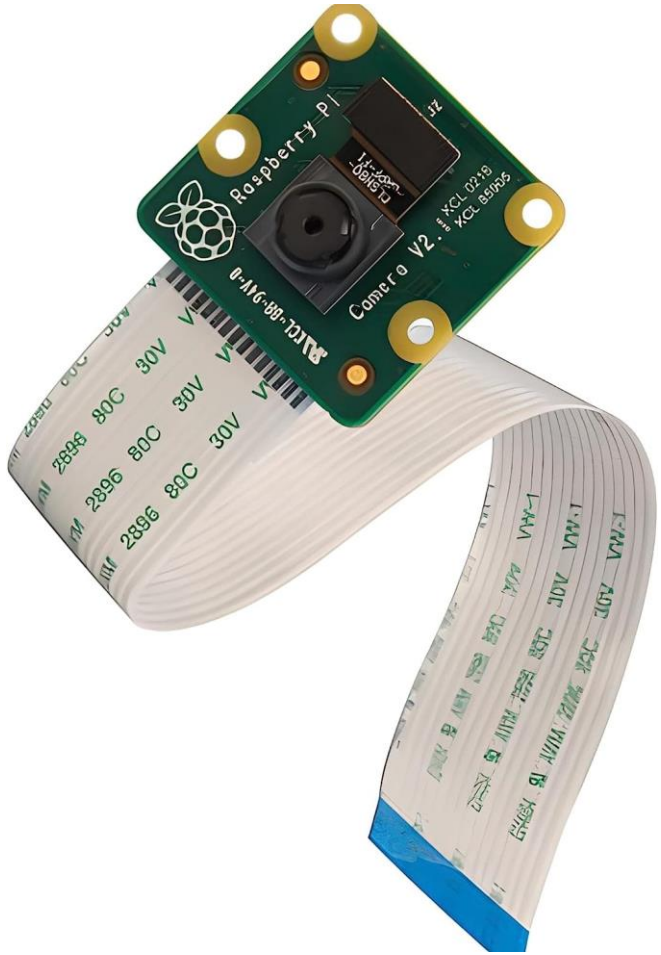
```
sudo apt update
curl -sL https://deb.nodesource.com/setup_20.x | sudo bash -
sudo apt install -y gcc g++ make build-essential nodejs sox gstreamer1.0-tools
  gstreamer1.0-plugins-good gstreamer1.0-plugins-base gstreamer1.0-plugins-base-apps
sudo npm install edge-impulse-linux -g --unsafe-perm

sudo apt-get install libatlas-base-dev libportaudio0 libportaudio2 libportaudiocpp0
  portaudio19-dev
pip3 install edge_impulse_linux -i https://pypi.python.org/simple
```

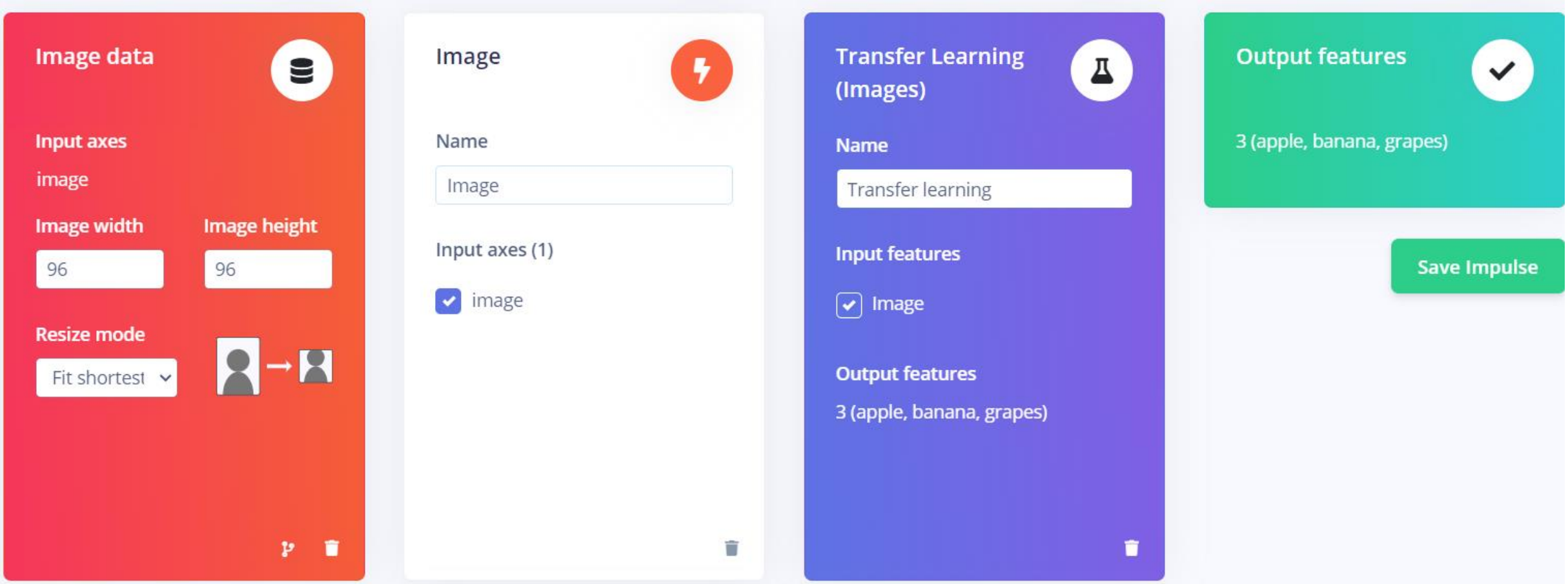
https://github.com/cgl-itm/AAEmbebido/blob/main/Tutoriales/Despliegue_DNN_Raspberry.md

Vision Artificial

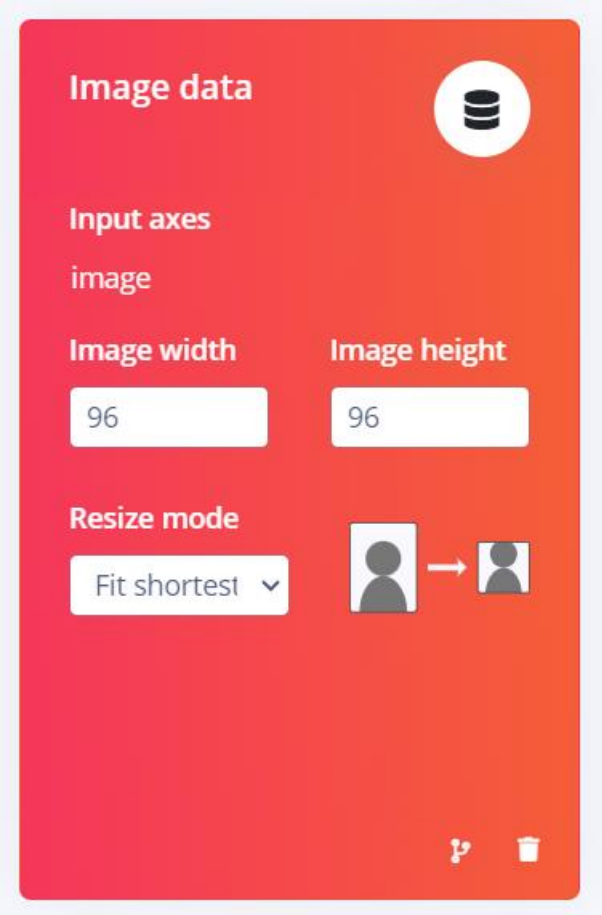




Model Definition



Crop and Scale Input Images



96x96

MobileNet Versions

MobileNetV1	96x96	0.1
Model Version	Input image size	Imagenet Classification Accuracy

MobileNet Versions

MobileNetV1 96x96 0.1 OFFICIALLY SUPPORTED Uses around 53.2K RAM and 101K ROM with default settings and optimizations. Works best with 96x96 input size. Supports both RGB and grayscale.	Edge Impulse	Add
MobileNetV2 96x96 0.35 OFFICIALLY SUPPORTED Uses around 296.8K RAM and 575.2K ROM with default settings and optimizations. Works best with 96x96 input size. Supports both RGB and grayscale.	Edge Impulse	Add
MobileNetV2 96x96 0.1 OFFICIALLY SUPPORTED Uses around 270.2K RAM and 212.3K ROM with default settings and optimizations. Works best with 96x96 input size. Supports both RGB and grayscale.	Edge Impulse	Add

MobileNet Versions

MobileNetV2 160x160 1.0 OFFICIALLY SUPPORTED

Uses around 1.3M RAM and 2.6M ROM with default settings and optimizations. Works best with 160x160 input size. Supports RGB only.

Edge Impulse Add

MobileNetV2 160x160 0.75 OFFICIALLY SUPPORTED

Uses around 1.3M RAM and 1.7M ROM with default settings and optimizations. Works best with 160x160 input size. Supports RGB only.

Edge Impulse Add

MobileNetV2 160x160 0.5 OFFICIALLY SUPPORTED

Uses around 700.7K RAM and 982.4K ROM with default settings and optimizations. Works best with 160x160 input size. Supports RGB only.

Edge Impulse Add

MobileNetV2 160x160 0.35 OFFICIALLY SUPPORTED

Uses around 683.3K RAM and 658.4K ROM with default settings and optimizations. Works best with 160x160 input size. Supports RGB only.

Edge Impulse Add

Raspberry Pi

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Terminal command

edge-impulse-linux-runner

https://github.com/edgeimpulse/edge-impulse-linux-cli

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¡Gracias!

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