

Edge Impulse Lab

Name : Tarun kumar R

Rollno:25MML0057

Task: to train the model for the Data collected from the Camera

The screenshot displays the Edge Impulse Studio web interface. The browser address bar shows the URL: `studio.edgeimpulse.com/studio/874236/acquisition/training?page=1`. The user is logged in as TARUNKUMAR / edge lab, with a 'PERSONAL' profile. The target device is set to Cortex-M4F.

The interface features a sidebar on the left with navigation options: Dashboard, Data acquisition, Experiments, EON Tuner, Impulse design, Create impulse, Image, and Classifier. A 'Upgrade Plan' banner is also visible.

The main workspace is divided into several sections:

- Dataset:** Shows 7 items collected. A circular progress indicator indicates the data is ready for training.
- Train / Test Split:** Shows a 71% / 29% split, with a warning icon indicating the test set is small.
- Collect data:** A button to 'Connect a device' to start building the dataset.
- Dataset Table:** A table listing the training data samples.

SAMPLE NAME	LABEL	ADDED
purple_002	purple_002	Today, 22:02:55
purple_008	purple_008	Today, 22:02:55
purple_013	purple_013	Today, 22:02:55
purple_014	purple_014	Today, 22:02:55
purple_005	purple_005	Today, 22:02:55

The bottom of the interface shows a 'RAW DATA' section with a prompt to 'Click on a sample to load...'.

Impulse #1

An impulse takes raw data, uses signal processing to extract features, and then uses a learning block to classify new data.

Image data

Input axes
image

Image width
96

Image height
96

Resize mode
Fit shortest

Image

Name
Image

Input axes (1)
Image
image

Classification

Name
Classifier

Input features
☒ Image

Output features
5 (purple_002, purple_005, purple_008, purple_013, purple_014)

Output features

5 (purple_002, purple_005, purple_008, purple_013, purple_014)

Save Impulse

Raw Data Features

Parameters

Generate features

Raw data

Show: All labels

purple_002 (purple_

Raw features

0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0x...

Parameters

Image

Color depth ?
RGB

Save parameters

DSP result

Image

Processed features

0, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0, 1,...

On-device performance ?

2)Before the Accuarcy Improvement

TARUNKUMAR / edge lab PERSONAL

Target: Cortex-M4F 80MHz T

Neural Network settings

Training settings

Number of training cycles ⓘ 25

Use learned optimizer ⓘ ☐

Learning rate ⓘ 0.0005

Training processor ⓘ CPU

Advanced training settings

Neural network architecture

Neural network Transfer learning

Input layer (27,648 features)

2D conv / pool layer (16 filters, 3 kernel size, 1 layer)

Training output

Model version: ⓘ Quantized (int8) ▾

Last training performance (validation set)

ACCURACY 0.0%

LOSS 3.24

Confusion matrix (validation set)

	PURPLE_002	PURPLE_005	PURPLE_008	PURPLE_013	PURPLE_014
PURPLE_002	-	-	-	-	-
PURPLE_005	-	-	-	-	-
PURPLE_008	-	-	-	-	-
PURPLE_013	-	-	-	-	-
PURPLE_014	0%	0%	100%	0%	0%
F1 SCORE			0.00		0.00

Metrics (validation set)

METRIC	VALUE
Accuracy	0.00
Loss	3.24
F1 Score	0.00

Edge Impulse Lab

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1)To Capture images of different objects in different angles, label the names, upload the images into edge impulse website, train the images on any model and predict the accuracy of the output.

Download block output (Impulse #1)

TITLE	TYPE	SIZE	
Image training data	NPY file	17 windows	B
Image training labels	NPY file	17 windows	B
Classifier model	TensorFlow Lite (float32)	239 KB	B
Classifier model	TensorFlow Lite (int8 quantized)	63 KB	B
Classifier model	TensorBoard logs	6 MB	B
Classifier model	TensorFlow SavedModel	226 KB	B
Classifier model	Keras h5 model	221 KB	B
Classifier model	Model evaluation metrics (JSON file)	-	B

Performance settings

Use GPU for training

Collaborators (1/3)

TARUNKUMAR (OWNER)

Summary

DEVICES CONNECTED: 1

DATA COLLECTED: 23 items

Project info

Project ID: 884656

Labeling method: One label per data

2)In the project info we can choose any one of the labelling methods, if I take bounding method I have to detect the object specifically by selecting the image position.

Dataset

DATA COLLECTED: 23 items

TRAIN / TEST SPLIT: 74% / 26%

Collect data

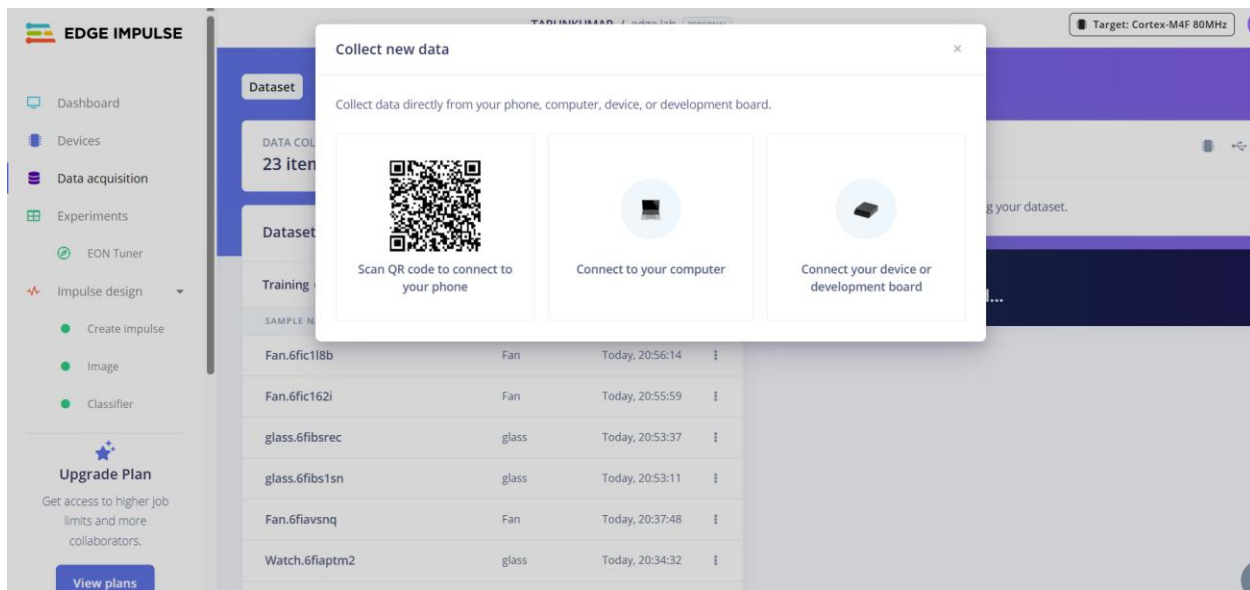
Connect a device to start building your dataset.

RAW DATA

Click on a sample to load...

SAMPLE NAME	LABEL	ADDED
Fan.6fic1l8b	Fan	Today, 20:56:14
Fan.6fic162i	Fan	Today, 20:55:59
glass.6fibsrec	glass	Today, 20:53:37
glass.6fibs1sn	glass	Today, 20:53:11
Fan.6fiavsnq	Fan	Today, 20:37:48
Watch.6fiaptm2	glass	Today, 20:34:32
Watch.6fiap9os	Fan	Today, 20:33:39

From the Data acquisition bar collect the data from either of those options:



Fan Dataset Collected from the device

studio.edgeimpulse.com/studio/884656/acquisition/training?page=1

EDGE IMPULSE

DATA COLLECTED 23 items

TRAIN / TEST SPLIT 74% / 26%

Collect data

Connect a device to start building your dataset.

Dataset

Training (17) Test (6)

SAMPLE NAME	LABEL	ADDED
Fan.6fic1l8b	Fan	Today, 20:56:14
Fan.6fic162i	Fan	Today, 20:55:59
glass.6fibsrec	glass	Today, 20:53:37
glass.6fibs1sn	glass	Today, 20:53:11
Fan.6fiavsnq	Fan	Today, 20:37:48
Watch.6fiaptm2	glass	Today, 20:34:32
Watch.6fiap9os	Fan	Today, 20:33:39
Watch.6fiab2aa	Fan	Today, 20:26:26
Watch.6fia9blo	Fan	Today, 20:25:30

RAW DATA

Fan.6fic1l8b

Metadata

3) Now create the impulse by adding the processing block and learning block and save impulse

EDGE IMPULSE

TARUNKUMAR / edge lab PERSONAL

Target: Cortex-M4F 80MHz

Impulse #1

An impulse takes raw data, uses signal processing to extract features, and then uses a learning block to classify new data.

Image data

Input axes
image

Image width: 96 Image height: 96

Resize mode: Fit shortest

Image

Name: Image

Input axes (1): image

Classification

Name: Classifier

Input features: ☒ Image

Output features: 3 (Fan, book, glass)

Output features

3 (Fan, book, glass)

Save Impulse

4) Now go to image tab and generate features

EDGE IMPULSE

TARUNKUMAR / edge lab PERSONAL

Target: Cortex-M4F 80MHz

Parameters Generate features

Training set

Data in training set: 17 items

Classes: 3 (book, fan, glass)

Generate features

Feature generation output

0

Feature explorer

book glass

5) In the Neural Network choose the setting of the model from the given options and click train & save option

The screenshot displays the Edge Impulse Neural Network settings interface. The left sidebar contains navigation links: Dashboard, Devices, Data acquisition, Experiments, EON Tuner, and Impulse design. The main content area is divided into several sections:

- Neural Network settings:** Includes training settings (Number of training cycles: 10, Use learned optimizer: ☐, Learning rate: 0.0005, Training processor: CPU) and advanced training settings.
- Neural network architecture:** Shows the architecture under the 'Neural network' tab. It includes an input layer (27,648 features), two 2D conv / pool layers (16 filters, 3 kernel size, 1 layer), a flatten layer, a dropout layer (rate 0.25), and an output layer (3 classes). A 'Save & train' button is at the bottom.
- Training output:** Displays the model version (Quantized (int8)) and the last training performance (validation set) with an accuracy of 100.0% and a loss of 0.03.
- Confusion matrix (validation set):** A table showing the performance for three classes: BOOK, FAN, and GLASS. The F1 score is 1.00 for all classes.
- Metrics (validation set):** A table showing the weighted average precision, recall, and F1 score, all of which are 1.00.
- Data explorer (full training set):** A scatter plot showing the distribution of data points for the three classes: book - correct (yellow), glass - correct (green), and unlabeled (grey).

The interface also includes an 'Upgrade Plan' section on the left sidebar, which offers access to higher job limits and more collaborators.

Results: Accuracy = 100%