

Edge Impulse Lab

Name : Tarun kumar R

Rollno:25MML0057

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

The screenshot shows the Edge Impulse Studio interface. On the left, there's a sidebar with various options like Dashboard, Data acquisition, Experiments, EON Tuner, Pulse design, Create impulse, Image, Classifier, and an Upgrade Plan section. The main area has a purple header bar with tabs for Dataset, Data explorer, Data sources, Synthetic data, AI labeling, and CSV Wizard. Below the header, there's a summary card with 'DATA COLLECTED' (7 items), a pie chart icon, and 'TRAIN / TEST SPLIT' (71% / 29%) with a warning icon. A large table below shows the dataset details:

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

To the right, there's a 'Collect data' section with a note to connect a device and a dark blue 'RAW DATA' box with the text 'Click on a sample to load...'. At the top right, it says 'Target: Cortex-M4F'.

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

Name: Image

Input axes: image

Image width: 96

Image height: 96

Resize mode: Fit shortest

Output: 

Image

Name: Image

Input axes (1): 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

2) Before the Accuracy Improvement

The screenshot shows the Edge Impulse IDE interface. On the left, the 'Neural Network settings' tab is active, displaying training parameters like cycles (25), learning rate (0.0005), and processor (CPU). On the right, the 'Training output' tab is active, showing the last training performance (accuracy 0.0%, loss 3.24) and a confusion matrix for validation set categories (PURPLE_002, PURPLE_005, PURPLE_008, PURPLE_013, PURPLE_014). The confusion matrix highlights a 100% correct prediction for category PURPLE_013.

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

Metrics (validation set)

Metric	PURPLE_002	PURPLE_005	PURPLE_008	PURPLE_013	PURPLE_014
ACCURACY	0.0%	0.0%	0.0%	100%	0.0%
LOSS	3.24				
F1 SCORE			0.00		0.00

Training output

Model Model version: Quantized (int8)

Last training performance (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

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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.

The screenshot shows the Edge Impulse Studio interface. On the left, a sidebar menu includes options like Dashboard, Devices, Data acquisition, Experiments, EON Tuner, Impulse design (with sub-options Create impulse, Image, Classifier), and Upgrade Plan. The main area displays a table titled 'Download block output' listing various files: Image training data (NPY file, 17 windows), Image training labels (NPY file, 17 windows), Classifier model (TensorFlow Lite (float32), 239 KB), Classifier model (TensorFlow Lite (int8 quantized), 63 KB), Classifier model (TensorBoard logs, 6 MB), Classifier model (TensorFlow SavedModel, 226 KB), Classifier model (Keras h5 model, 221 KB), and Model evaluation metrics (JSON file). Below this is a 'Performance settings' section with a 'Use GPU for training' toggle. To the right, there's a 'Collaborators (1/3)' section showing 'TARUNKUMAR OWNER'. A 'Summary' box indicates 1 device connected and 23 items collected. A 'Project info' box shows Project ID 884656 and a labeling method dropdown set to '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.

The screenshot shows the Edge Impulse Studio Data acquisition interface. The left sidebar is identical to the previous screenshot. The main area features a 'Dataset' tab with a summary: 'DATA COLLECTED 23 items' and 'TRAIN / TEST SPLIT 74% / 26%'. It includes sections for 'Collect data' (with a note to connect a device) and 'RAW DATA' (with a button to 'Click on a sample to load...'). Below these, a table lists dataset samples: Fan.6fic118b (Fan, Today, 20:56:14), Fan.6fic162i (Fan, Today, 20:55:59), glass.6fibsrc (glass, Today, 20:53:37), glass.6fibsrc1sn (glass, Today, 20:53:11), Fan.6fiavsnq (Fan, Today, 20:37:48), Watch.6fiaptm2 (glass, Today, 20:34:32), and Watch.6fiao9os (Fan, Today, 20:33:39).

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

The screenshot shows the Edge Impulse Studio interface. On the left, there's a sidebar with navigation links like Dashboard, Devices, Data acquisition, Experiments, EON Tuner, Impulse design (with sub-options Create impulse, Image, Classifier), and an Upgrade Plan section. The main area displays a dataset summary: DATA COLLECTED 23 items, TRAIN / TEST SPLIT 74% / 26%. Below this is a table of samples with columns: SAMPLE NAME, LABEL, and ADDED. The samples listed are: Fan.6fic1l8b, Fan.6fic162i, glass.6fibsrc, glass.6fib1sn, Fan.6fiavsnq, Watch.6fiaptm2. A central modal window titled "Collect new data" provides three options: "Scan QR code to connect to your phone" (with a QR code icon), "Connect to your computer" (with a laptop icon), and "Connect your device or development board" (with a device icon). At the top right of the main interface, it says "Target: Cortex-M4F 80MHz".

Fan Dataset Collected from the device

This screenshot shows the same Edge Impulse Studio interface as the previous one, but with a specific dataset selected. The dataset summary at the top now shows 23 items and a 74% / 26% train/test split. The main table has a single highlighted row for "Fan.6fic1l8b". To the right of the table, there's a large preview image of a wall-mounted fan. Below the preview, there's a "Metadata" section with a question mark icon.

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

The screenshot shows the Edge Impulse web interface. On the left, a sidebar lists navigation options: Dashboard, Devices, Data acquisition, Experiments, EON Tuner, Impulse design (selected), Create impulse, Image, Classifier, and an Upgrade Plan section. The main area is titled "Impulse #1" and contains three main blocks: "Image data" (red background), "Image" (purple background), and "Classification" (blue background). The "Image data" block shows input axes for "image", width "96", height "96", and resize mode "Fit shortest". The "Image" block has a "Name" field set to "Image" and "Input axes (1)" set to "image". The "Classification" block has a "Name" field set to "Classifier" and "Input features" checked for "Image". The "Output features" block shows "3 (Fan, book, glass)". A green "Save Impulse" button is located at the bottom right.

4) Now go to image tab and generate features

The screenshot shows the Edge Impulse interface with the "Parameters" tab selected. On the left, the same sidebar is visible. The main area is titled "Parameters" and "Generate features". It shows a "Training set" section with "Data in training set" (17 items) and "Classes" (3: book, fan, glass). A blue "Generate features" button is present. To the right is a "Feature explorer" section containing a scatter plot. The legend indicates "book" (blue dots) and "glass" (orange dots). The plot shows several data points for each class, though the count (17) seems to be a placeholder or total rather than per-class.

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

Neural Network settings (Top Configuration):

- Training settings:**
 - Number of training cycles: 10
 - Use learned optimizer:
 - Learning rate: 0.0005
 - Training processor: CPU
- Advanced training settings:**
- Neural network architecture:**
 - Neural network** (selected)
 - Transfer learning**
 - Input layer (27,648 features)**
 - 2D conv / pool layer (16 filters, 3 kernel size, 1 layer)
 - 2D conv / pool layer (32 filters, 3 kernel size, 1 layer)
 - Flatten layer
 - Dropout (rate 0.25)
 - Add an extra layer

Training output (Top Configuration):

- Model:** Model version: Quantized (int8)
- Last training performance (validation set):**
 - Accuracy:** 100.0%
 - Loss:** 0.03
- Confusion matrix (validation set):**

	BOOK	FAN	GLASS
BOOK	100%	0%	0%
FAN	-	-	-
GLASS	0%	0%	100%
F1 SCORE	1.00		1.00

- Metrics (validation set):**

METRIC	VALUE
Weighted average Precision	1.00
Weighted average Recall	1.00

Neural Network settings (Bottom Configuration):

- Training processor:** CPU
- Advanced training settings:**
- Neural network architecture:**
 - Neural network** (selected)
 - Transfer learning**
 - Input layer (27,648 features)**
 - 2D conv / pool layer (16 filters, 3 kernel size, 1 layer)
 - 2D conv / pool layer (32 filters, 3 kernel size, 1 layer)
 - Flatten layer
 - Dropout (rate 0.25)
 - Add an extra layer

Training output (Bottom Configuration):

- Model:** Model version: Quantized (int8)
- Last training performance (validation set):**
 - Accuracy:** 100.0%
 - Loss:** 0.00
- Confusion matrix (validation set):**

	BOOK	FAN	GLASS
BOOK	100%	0%	0%
FAN	-	-	-
GLASS	0%	0%	100%
F1 SCORE	1.00		1.00

- Metrics (validation set):**

METRIC	VALUE
Weighted average Precision	1.00
Weighted average Recall	1.00
Weighted average F1 score	1.00

- Data explorer (full training set):**

Scatter plot showing data points for book, glass, and unlabeled classes. Legend: book - correct (yellow), glass - correct (green), Unlabeled (grey).

Results: Accuracy = 100%