

25MML0014

Anusree V

Lab 5

Create dataset of lab items like mouse, keyboard etc and classify the object

The screenshot shows the Edge Impulse Studio interface for a new project titled "25mml0014 / new project". The left sidebar includes links for Dashboard, Devices, Data acquisition, Experiments, EON Tuner, Impulse design (with sub-options: Create impulse, Image, Classifier, Retrain model, Live classification, Model testing), and an Upgrade Plan. The main area features a "Getting started" section with three buttons: "Add existing data", "Collect new data", and "Upload your model". Below this is a "Start with a tutorial" section featuring three colored cards: blue (hand icon), teal (camera icon), and orange (audio wave icon). To the right, there's a "Sharing" section indicating the project is private, and a "Published versions (0)" section with a "Publish a version of your project" button. At the bottom right is a "Run this model" button.

The screenshot shows the "Data acquisition / training" page for the same project. The left sidebar remains the same. The main area has tabs for Dataset, Data explorer, Data sources, Synthetic data, AI labeling (new), and CSV Wizard. The "Dataset" tab is active, showing "DATA COLLECTED 45 items" and a "TRAIN / TEST SPLIT 76% / 24%" status. A "Collect data" section with a "Connect a device" button is visible. Below is a "Dataset" table with columns for SAMPLE NAME, LABEL, and ADDED. The table lists items like Monitor.6egijo, Fan.6ghpi, Cpu.6ghko, Monitor.6egiBew, Monitor.6egincd, Cpu.6eglo7n, Mouse.6egiuk1u, Cpu.6egirgcd, and Cpu.6egiqkoc. To the right, there's a "RAW DATA" section for "Keyboard.6egh3c16" showing a photograph of a black keyboard on a wooden desk. A "Metadata" section is at the bottom right.

Create impulse

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, Retrain model, Live classification, Model testing), and an Upgrade Plan section. The main area is titled "Impulse #1" and contains four main blocks: "Image data" (red background), "Image" (white background), "Classification" (purple background), and "Output features" (green background). The "Image data" block shows input axes for image width (96) and height (96), and a resize mode dropdown set to "Fit shortest". The "Image" block has a name field "Image" and an input axes field "(1)". The "Classification" block has a name field "Classifier" and lists "Input features" (Image checked) and "Output features" (5 (Cpu, Fan, Keyboard, Monitor, Mouse)). A "Save Impulse" button is located at the bottom right of the classification block. Below the main blocks are two dashed boxes labeled "Add a processing block" and "Add a learning block".

Image

The screenshot shows the Edge Impulse studio interface with the "Image" configuration screen open. The left sidebar is identical to the previous screenshot. The main area is titled "Raw data" and displays a preview image of a computer monitor with a snowy mountain scene. It includes sections for "Raw features" (listing hex values like 0xd6d2c9, 0xd7d3c9, etc.), "Parameters" (Color depth set to Grayscale), and a "Save parameters" button. To the right, there are sections for "DSP result" (Image), "Processed features" (listing numerical values like 0.8242, 0.8277, etc.), and "On-device performance" (Processing time 7 ms, Peak RAM usage 4 KB). A "Generate features" tab is visible above the raw data section.

Generate features

The screenshot shows the Edge Impulse Studio interface for generating features. 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, Retrain model, Live classification, Model testing), and an Upgrade Plan section. The main area has tabs for 'Parameters' and 'Generate features'. Under 'Parameters', there's a 'Training set' section showing 34 items and 5 classes (Cpu, Fan, Keyboard, Monitor, Mouse). A 'Generate features' button is present. Below it is a 'Feature generation output' section with a dropdown set to '(0)'. To the right is a 'Feature explorer' scatter plot showing the relationships between these five categories. At the bottom, a copyright notice reads '© 2026 EdgeImpulse Inc. All rights reserved.'

Classifier

The screenshot shows the Edge Impulse Studio interface for a classifier. The left sidebar is identical to the previous screenshot. The main area has tabs for 'Neural Network settings' and 'Training output'. Under 'Neural Network settings', there are sections for 'Training settings' (Number of training cycles: 30, Use learned optimizer: off, Learning rate: 0.005, Training processor: CPU) and 'Advanced training settings'. Under 'Neural network architecture', there are tabs for 'Neural network' (selected) and 'Transfer learning'. The 'Neural network' tab shows a stack of layers: Input layer (9,216 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, and Dropout (rate 0.25). To the right, the 'Training output' section displays logs of the training process, including creating embeddings, calculating performance metrics, and job completion. It also shows the 'Model' section with a 'Model version' dropdown set to 'Quantized (int8)', last training performance (accuracy: 85.7%, loss: 0.76), and a confusion matrix table.

	CPU	FAN	KEYBOARD	MONITOR	MOUSE
CPU	100%	0%	0%	0%	0%
FAN	0%	0%	0%	100%	0%
KEYBOARD	-	-	-	-	-
MONITOR	0%	0%	0%	100%	0%

At first I got 42.7% accuracy, after doing these steps I got **85.7%** accuracy

I taken 30 training cycles

Droup out 0.3

Dense layer 32

Dense layer 10

studio.edgeimpulse.com/studio/874101/impulse/1/learning/keras/6

Neural network architecture

Model Model version: ⓘ Quantized (int8)

Last training performance (validation set)

ACCURACY	85.7%
LOSS	0.76

Confusion matrix (validation set)

	CPU	FAN	KEYBOARD	MONITOR	MOUSE
CPU	100%	0%	0%	0%	0%
FAN	0%	0%	0%	100%	0%
KEYBOARD	-	-	-	-	-
MONITOR	0%	0%	0%	100%	0%
MOUSE	0%	0%	0%	0%	100%
F1 SCORE	1.00	0.00	0.80	1.00	1.00

Metrics (validation set)

METRIC	VALUE
Weighted average Precision ⓘ	0.76
Weighted average Recall ⓘ	0.86
Weighted average F1 score ⓘ	0.80

Data explorer (full training set) ⓘ

Legend:

- Cpu - correct
- Monitor - correct
- Mouse - correct
- Fan - incorrect
- Keyboard - incorrect



F1 SCORE	1.00	0.00		0.80	1.00
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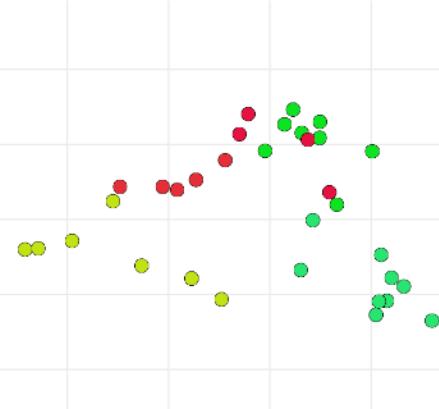
Metrics (validation set)



METRIC	VALUE
Weighted average Precision ?	0.76
Weighted average Recall ?	0.86
Weighted average F1 score ?	0.80

Data explorer (full training set) [?](#)

- Cpu - correct
- Monitor - correct
- Mouse - correct
- Fan - incorrect
- Keyboard - incorrect



On-device performance [?](#)

Engine: [?](#)

EON™ Compiler



INFERRING ...
533 ms.



PEAK RAM USA...
183.1K



FLASH USAGE
610.9K

Deployment

studio.edgeimpulse.com/studio/874101/impulse/1/deployment

Target: Cortex-M4F 80MHz

EDGE IMPULSE

25mmi0014 / new project PERSONAL

Configure your deployment

You can deploy your impulse to any device. This makes the model run without an internet connection, minimizes latency, and runs with minimal power consumption. [Read more](#).

Deployment target

C++ library A portable C++ library with no external dependencies, which can be compiled with any modern C++ compiler.

Inference engine

EON™ Compiler Same accuracy, 17% less RAM.

Run this model

Scan QR code or launch in browser to test your prototype

Launch in browser

Run this model

Scan QR code or launch in browser to test your prototype

Launch in browser

Model optimizations and performance

Model optimizations can increase on-device performance but may reduce accuracy. Performance estimate for Cortex-M4F 80MHz - [Change target](#)

Quantized (int8)	IMAGE	CLASSIFIER	TOTAL
Selected	7 ms.	533 ms.	540 ms.
LATENCY	7 ms.	533 ms.	540 ms.
RAM	4.0K	183.1K	183.1K
FLASH	-	610.9K	-
ACCURACY	-	-	-

Unoptimized

	IMAGE	CLASSIFIER	TOTAL
RAM	-	-	-
FLASH	-	-	-
ACCURACY	-	-	-

Upgrade Plan

Get access to higher job limits and more collaborators.

[View plans](#)

Task 2:

Obtain gaggle dataset and upload and classify the object

I took fruits dataset

The screenshot shows the Edge Impulse Studio interface for a project titled "25mm0014 / fruits". The left sidebar contains navigation links for Dashboard, Devices, Data acquisition, Experiments, EON Tuner, Impulse design (with sub-options Create impulse, Image, Classifier, Retrain model, Live classification, Model testing), and an Upgrade Plan. The main area displays a summary of the dataset: 355 items collected, with a train/test split of 79% / 21%. Below this is a table of training samples, all labeled as "banana". To the right, there's a "Collect data" section with a note to "Connect a device" and a preview of an image labeled "Image_17" showing several ripe yellow bananas. A "Metadata" section is also visible.

The screenshot shows the Edge Impulse Studio interface for creating a new impulse. The left sidebar is identical to the previous screenshot. The main area is titled "Impulse #1" and contains four main components: "Image data" (red card), "Image" (white card), "Classification" (purple card), and "Output features" (green card). The "Image data" card shows input axes for "image" with width and height set to 96, and a "Fit shortest" resize mode. The "Image" card has a "Name" field set to "Image" and an "Input axes (1)" dropdown set to "Image". The "Classification" card has a "Name" field set to "Classifier" and an "Input features" section with a checked checkbox for "Image". The "Output features" card lists nine categories: Mango, apple, banana, cherry, chickoo, grapes, kiwi, orange, and strawberry. A "Save Impulse" button is located at the bottom right. At the bottom, there are buttons to "Add a processing block" and "Add a learning block".

studio.edgeimpulse.com/studio/874089/impulse/1/dsp/image/2

EDGE IMPULSE

- Dashboard
- Devices
- Data acquisition
- Experiments
- EON Tuner
- Impulse design
 - Create impulse
 - Image
 - Classifier
 - Retrain model
 - Live classification
 - Model testing
- Upgrade Plan

Get access to higher job limits and more collaborators.

[View plans](#)

25mmI0014 / fruits PERSONAL Target: Cortex-M4F 80MHz 2

Raw data

Show: All labels Image_17 (banana)

Raw features

0x385709, 0x56791f, 0x6e8c36, 0x739132, 0x5e8220, 0x2946fc, 0x183404, 0x3...

Parameters

Image

Color depth: RGB

Save parameters

DSP result

Image

Processed features

0.2196, 0.3412, 0.0353, 0.3373, 0.4745, 0.1216, 0.4314, 0.5490, 0.2118, 0...

On-device performance

?

studio.edgeimpulse.com/studio/874089/impulse/1/learning/keras/3

EDGE IMPULSE

- Dashboard
- Devices
- Data acquisition
- Experiments
- EON Tuner
- Impulse design
 - Create impulse
 - Image
 - Classifier
 - Retrain model
 - Live classification
 - Model testing
- Upgrade Plan

Get access to higher job limits and more collaborators.

[View plans](#)

25mmI0014 / fruits PERSONAL Target: Cortex-M4F 80MHz 2

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)

2D conv / pool layer (32 filters, 3 kernel size, 1 layer)

Flatten layer

Dropout (rate 0.3)

Training output

Model

Model version: Quantized (int8) 1

Last training performance (validation set)

	ACCURACY	LOSS
%	48.2%	1.38

Confusion matrix (validation set)

	MANGO	APPLE	BANAN	CHEERY	CHICKO	GRAPES	KIWI	ORANGI	STAWBE
MANGO	14.3%	0%	28.6%	0%	14.3%	14.3%	14.3%	14.3%	0%
APPLE	0%	83.3%	0%	16.7%	0%	0%	0%	0%	0%
BANAN	25%	0%	62.5%	0%	0%	0%	12.5%	0%	0%
CHEERY	0%	0%	0%	50%	0%	0%	0%	0%	0%
CHICKO	14.3%	14.3%	0%	14.3%	14.3%	42.9%	0%	0%	0%
GRAPES	0%	0%	0%	0%	16.7%	66.7%	0%	0%	16.7%
KIWI	0%	0%	10%	0%	50%	0%	40%	0%	0%
ORANGI	25%	0%	0%	0%	0%	0%	75%	0%	0%
STAWBE	0%	33.3%	0%	33.3%	0%	0%	0%	0%	33.3%
F1 SCO	0.18	0.77	0.59	0.60	0.12	0.67	0.42	0.75	0.40

Metrics (validation set)

METRIC	VALUE
Area under ROC Curve	0.87
Weighted average Precision	0.48

?

Neural network architecture

Neural network 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 0.3)

Dense layer (64 neurons)

Dense layer (128 neurons)

Add an extra layer

Output layer (9 classes)

Save & train

	MANGO	APPLE	BANANA	CHERRY	CHICKO	GRAPES	KIWI	ORANG	STAWB	F1 SCO
%	14.8%	0%	28.6%	0%	14.3%	14.3%	14.3%	14.3%	0%	0%
0%	0%	83.3%	0%	16.7%	0%	0%	0%	0%	0%	0%
25%	0%	0%	62.5%	0%	0%	0%	0%	12.5%	0%	0%
0%	0%	0%	0%	0%	14.3%	14.3%	14.3%	14.3%	0%	0%
14.3%	0%	0%	0%	0%	14.3%	14.3%	14.3%	14.3%	0%	0%
0%	0%	0%	0%	0%	0%	16.7%	66.7%	0%	0%	16.7%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0.18	0.77	0.59	0.60	0.12	0.67	0.42	0.75	0.40	0.40	0.40

Metrics (validation set)

METRIC	VALUE
Area under ROC Curve ⓘ	0.87
Weighted average Precision ⓘ	0.48
Weighted average Recall ⓘ	0.48
Weighted average F1 score ⓘ	0.48

Data explorer (full training set) ⓘ

- Mango - correct
- apple - correct
- banana - correct
- cherry - correct
- chicko - correct
- grapes - correct
- kiwi - correct
- orange - correct
- strawberry - correct
- Mango - incorrect
- apple - incorrect
- banana - incorrect
- cherry - incorrect
- chicko - incorrect
- grapes - incorrect
- kiwi - incorrect

?

Dense layer 64 and 128 are added

Drop out 0.3

Deployment is scanned through mobile phone I scanned and object with uploaded gaggle dataset

Configure your deployment

You can deploy your impulse to any device. This makes the model run without an internet connection, minimizes latency, and runs with minimal power consumption. [Read more](#).

Deployment target

C++ library

A portable C++ library with no external dependencies, which can be compiled with any modern C++ compiler.

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Quantized (int8)	IMAGE	CLASSIFIER	TOTAL
Selected	7 ms.	848 ms.	855 ms.
RAM	4.0K	183.2K	183.2K
FLASH	-	1.2M	-
ACCURACY			-

Unoptimized	IMAGE	CLASSIFIER	TOTAL

Run this model

Scan QR code or launch in browser to test your prototype

Launch in browser

?

Finally deployed model

