

# Edge Intelligence

## Lab 5

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### Edge Impulse :-

- 1.Create account in edge impulse
- 2.go to data acquisition .
- 3.Choose connect data option.
- 4.scan qr using phone.
5. Select Label data before clicking a photo.
6. Split the clicked photos into train and test data

### Data Samples :-

The screenshot shows the Edge Impulse web interface. On the left is a sidebar with navigation links: Dashboard, Devices, Data acquisition, Experiments, EON Tuner, Impulse design (with sub-options: Create impulse, Image, Classifier, Retrain model, Live classification, Model testing, Deployment), Versioning, and an Upgrade Plan section. The main area is titled "Dataset" and shows a summary: "DATA COLLECTED 14 items" with a pie chart icon, and "TRAIN / TEST SPLIT 71% / 29%" with a progress bar icon. Below this is a table titled "Dataset" with columns "Training (10)" and "Test (4)". The table lists 14 samples with columns "SAMPLE NAME", "LABEL", and "ADDED". The samples are:

SAMPLE NAME	LABEL	ADDED
Mouse.6ebhg36j	Mouse	Jan 08 2026, 19:0...
Pen.6ebhek3j	Pen	Jan 08 2026, 19:0...
Pen.6ebhd29	Pen	Jan 08 2026, 18:5...
I'd card.6ebhcpaa	I'd card	Jan 08 2026, 18:5...
I'd card.6ebhcge5	I'd card	Jan 08 2026, 18:5...
Laptop.6ebh8ft2	Laptop	Jan 08 2026, 18:5...
Laptop.6ebh805a	Laptop	Jan 08 2026, 18:5...
Mouse.6ebh6g6l	Mouse	Jan 08 2026, 18:5...
Book.6ebh4ul8	Book	Jan 08 2026, 18:5...
Book.6ebh4bqv	Book	Jan 08 2026, 18:5...

Below the table is a dark blue button labeled "Click on a sample to load...". To the right of the table is a "Collect data" section with a "Connect a device" button. At the top right of the interface, it says "Target: Cortex-M4F 80MHz".

## Training and Testing :-

The screenshot shows the Edge Impulse web interface. On the left, there's a sidebar with various project management and development tools like Dashboard, Devices, Data acquisition, Experiments, EON Tuner, Impulse design, Upgrade Plan, and View plans. The main area is titled "Dataset" and shows "14 items". A modal window titled "Dataset train / test split ratio" is open, explaining the purpose of training and testing data. It displays a suggested train/test split of 80% / 20%. Below this, a table lists the labels in the dataset with their respective counts: BOOK (100% / 0%), I'D CARD (100% / 0%), LAPTOP (50% / 50%), MOUSE (67% / 33%), and PEN (67% / 33%). A "Dismiss" button is at the bottom right of the modal.

## Image – Generating Features :-

This screenshot shows the Edge Impulse interface after generating features. The left sidebar remains the same. The main area has tabs for "Parameters" and "Generate features", with "Generate features" currently selected. The "Training set" section shows 10 items and 5 classes: Book, I'd card, Laptop, Mouse, and Pen. A "Generate features" button is available. The "Feature explorer" section contains a scatter plot with points colored by class: Book (blue), I'd card (orange), Laptop (green), Mouse (red), and Pen (purple). The "Feature generation output" section shows logs of the process, including job scheduling and creation of windows for each class. The "On-device performance" section displays processing time as 7 ms and peak RAM usage as 4 KB.

## Classifier - Training Output :-

The screenshot shows the Edge Impulse web interface for training a classifier. On the left, a sidebar navigation includes: Dashboard, Devices, Data acquisition, Experiments, EON Tuner, Impulse design (Create impulse, Image, Classifier), Retrain model, Live classification, Model testing, Deployment, and Versioning. Below this is a 'GETTING STARTED' section with Documentation, Forums, and Discord links. An 'Upgrade Plan' section offers access to higher job limits and more collaborators.

**Neural Network settings:**

- 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, Transfer learning).

**Training output:**

- INFO: Creating embeddings...
- INFO: Creating performance metrics...
- INFO: Created TensorFlow Lite MNPACK delegate for CPU.
- INFO: Calculating float32 accuracy...
- INFO: Calculating quantized accuracy...
- INFO: Calculating int8 accuracy...
- INFO: Extracting Tensorboard logs OK
- Model training complete
- Job completed (success)

**Last training performance (validation set):**

Metric	Value
ACCURACY	100.0%
LOSS	0.99

**Confusion matrix (validation set):**

	BOOK	I'D CARD	LAPTOP	MOUSE	PEN
BOOK	-	-	-	-	-
I'D CARD	0%	100%	0%	0%	0%
LAPTOP	0%	0%	100%	0%	0%
MOUSE	-	-	-	-	-
PEN	-	-	-	-	-
F1 SCORE	-	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):**

Shows a scatter plot with points categorized by class: Book - correct, I'D card - correct, Laptop - correct, Mouse - correct, Pen - correct.

## Model Testing Output :-

The screenshot shows the Edge Impulse web interface for testing a model. The sidebar and 'GETTING STARTED' section are identical to the training interface.

**Test data:**

SAMPLE NAME	EXPECTED OUTCOME	ACCURACY	RESULT
Pen.6ebhd7b	Pen	0%	1 uncertain
Laptop.6ebhbe7i	Laptop	0%	1 uncertain
Laptop.6ebh9mv	Laptop	0%	1 uncertain
Mouse.6ebh6en	Mouse	0%	1 uncertain

**Model testing output:**

- Generating features for Image OK
- Classifying data for classifier...
- Classifying data for float32 model...
- Job started at 19 Jun 2020, 15:13:17
- Job completed at 19 Jun 2020, 15:13:17
- INFO: Created TensorFlow Lite MNPACK delegate for CPU.
- Classifying data for classifier OK
- Generating model testing summary...
- Job completed (success)

**Results:**

Metric	Value
ACCURACY	0.00%

**Metrics for Classifier:**

Metric	Value
Weighted average Precision	0.38
Weighted average Recall	0.50
Weighted average F1 score	0.42

**Confusion matrix:**

	BOOK	I'D CARD	LAPTOP	MOUSE	PEN	UN
BOOK	-	-	-	-	-	-
I'D CARD	0%	0%	0%	0%	0%	100%
LAPTOP	0%	0%	0%	0%	0%	-
MOUSE	0%	0%	0%	0%	0%	-
PEN	0%	0%	0%	0%	0%	-
F1 SCORE	0.00	0.00	0.00	0.00	0.00	0.00

**Feature explorer:**

Shows a scatter plot with points categorized by incorrect classification: Laptop - incorrect, Mouse - incorrect, Pen - incorrect.

**Result:** The model achieved **100% accuracy on the training data**, but **0% accuracy on the testing data**, indicating **severe overfitting**. This occurred because the dataset contains **many labels but very limited data samples**, preventing the model from generalizing well to unseen data.