

EDGE INTELLIGENCE

LAB - 5

25MML0038

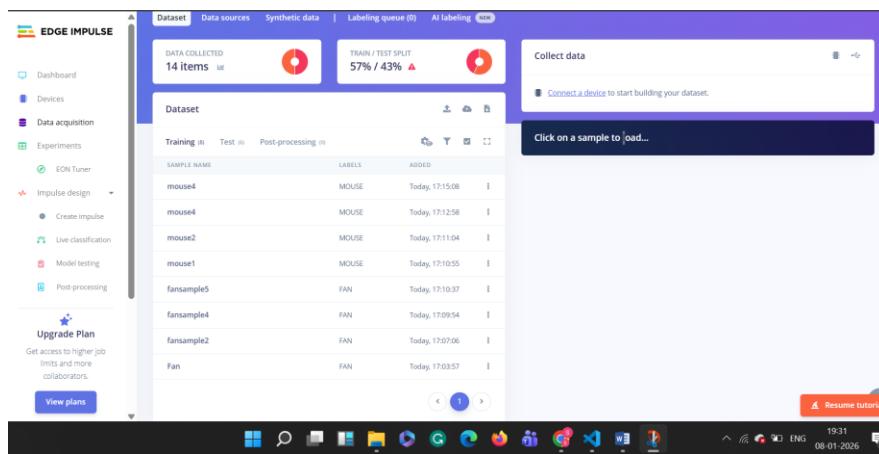
SUBHASHINI M

EDGE IMPLUSE

STEPS:

1. Create an account on **Edge Impulse**.
2. Login to the Edge Impulse platform.
3. Create a **new project**.
4. Click **Data Acquisition**.
5. Select **Connect to device**.
6. Choose **Use mobile phone** and scan the QR code.
7. Connect the mobile phone as a camera.
8. Capture sample images.
9. Collect images for **training** and **testing**.
10. Rename images with meaningful names.
11. Label all images correctly.

Training -8



Testing-6

The screenshot shows the Edge Impulse dashboard with the 'Dataset' tab selected. On the left, a sidebar lists various project management and development tools like Dashboard, Devices, Data acquisition, Experiments, EON Tuner, Impulse design, Live classification, Model testing, Post-processing, and an Upgrade Plan. The main area shows a summary of data collection: 14 items total, with a 57% / 43% train/test split. Below this is a detailed table of samples:

SAMPLE NAME	LABELS	ADDED
unknown.6ebv1cu	mouse	Today, 17:24:46
unknown.6ebvudq	fan	Today, 17:24:05
unknown.6ebbs56o	fan	Today, 17:22:51
unknown.6ebbb29	MOUSE	Today, 17:13:40
mouse3	MOUSE	Today, 17:25:33
unknown.6ebb74qj	MOUSE	Today, 17:11:23

A purple sidebar on the right is titled 'Collect data' and contains a button to 'Connect a device' and a placeholder text 'Click on a sample to load...'. At the bottom right is a red 'Resume tutorial' button.

Steps to Create an Image Classification Model in Edge Impulse

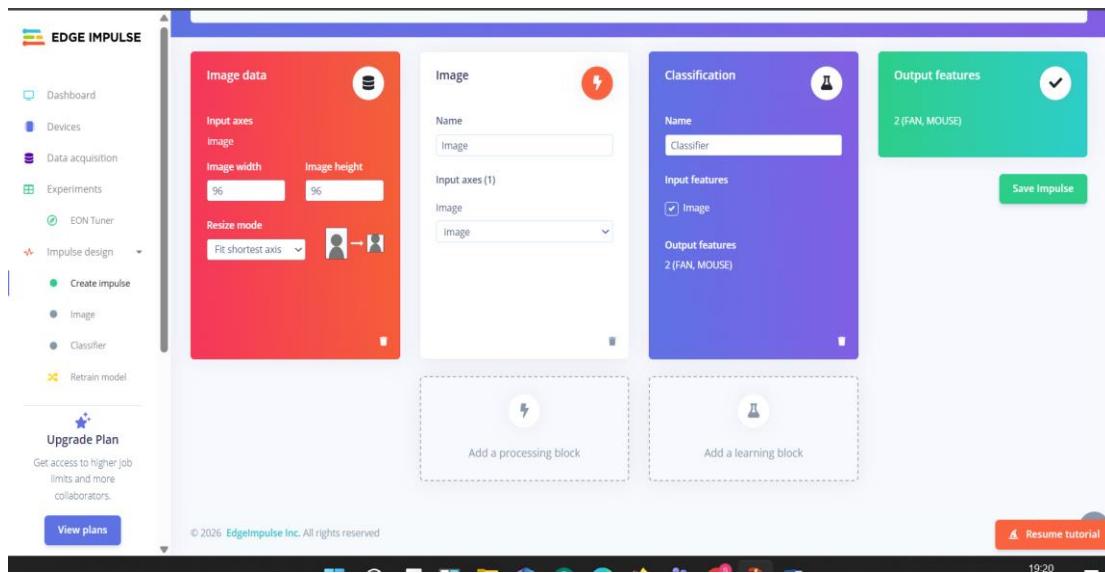
1. Open **Impulse Design** and click **Create Impulse**.
2. Add a **Processing Block** as **Image**.
3. Add a **Learning Block** as **Image Classification**.
4. Click **Save Impulse**.
5. In **Impulse Design**, click on **Image**.
6. Click **Generate Features** to extract image features.
7. After feature generation is complete, go to **Image Classification (Classifier)**.
8. Click **Start Training**.
9. Once training is finished, the **model accuracy** will be displayed for the images you uploaded.

The screenshot shows the Edge Impulse dashboard with the 'Project' tab selected. On the left, a sidebar lists various project management and development tools like Dashboard, Devices, Data acquisition, Experiments, EON Tuner, Impulse design (with sub-options Create impulse, Image, Classifier, Retrain model), and an Upgrade Plan. The main area shows a summary of the project's status:

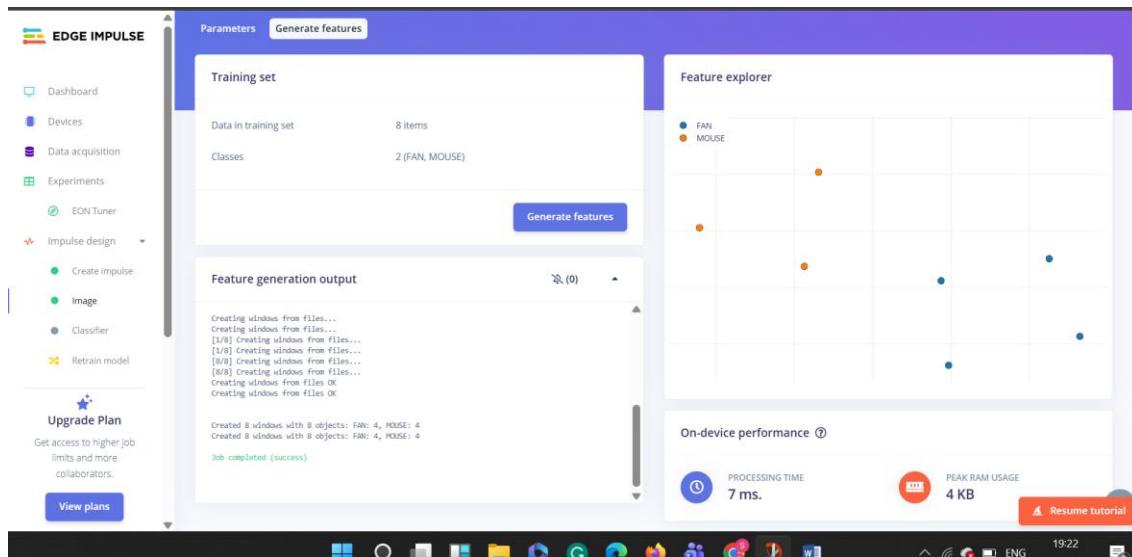
- Motion: Gesture recognition**
- Images: Object detection**
- Audio: Audio classification**
- DEVICES CONNECTED**: 1
- DATA COLLECTED**: 14 items

Below this is a 'Project info' section with fields for Project ID (872551) and Labeling method (Bounding boxes (obj)). A red 'Resume tutorial' button is at the bottom right.

CREATE IMPLUSE



IMAGE



CLASSIFIER

The screenshot shows the Edge Impulse Classifier 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), Upgrade Plan, and View plans. The main area is titled "Neural Network settings" under "Training settings". It contains fields for Number of training cycles (80), Use learned optimizer (unchecked), Learning rate (0.0005), Training processor (CPU), Validation set size (20%), Split train/validation set on metadata key, Batch size (32), Auto-weight classes (unchecked), and Profile int8 model (checkbox). Below this is a "Neural network architecture" section with tabs for Neural network (selected) and Transfer learning, showing an "Input layer (27,648 features)". To the right, a "Training output" panel shows a log message: "Creating job... OK (ID: 42629391)" and "Job scheduled at 08 Jun 2020 13:52:57" followed by "Job started at 08 Jun 2020 13:53:08". A note states: "Failed to start job: Your labeling method is set to 'Bounding boxes (Object detection)', but you're trying to train a non-object detection model. Either change the labeling method (on *Dashboard*), or remove this learn block and add an 'Object detection' block under **Create Impulse**.". A "Resume tutorial" button is at the bottom right.

Error Fix and Image Classification Training in Edge Impulse

1. An error occurred because **Bounding box labeling** was used with an **Image Classification** model.
2. To fix this, go to **Dashboard** and change the labeling method to **One label per data item**.
3. Properly relabel all images using **single class labels** (no bounding boxes).
4. In **Impulse Design**, add **Image** as the processing block and **Image Classification** as the learning block.
5. Generate features, train the model, and the classifier achieved **100% accuracy**.

DASHBOARD

The screenshot shows the Edge Impulse Dashboard. The sidebar menu is identical to the Classifier interface. The main area displays a table of project files with columns for TITLE, TYPE, and SIZE. Files listed include "Image training data" (NPY file, 8 windows), "Image training labels" (NPY file, 8 windows), "Classifier model" (TensorFlow Lite (float32), 167 KB), "Classifier model" (TensorFlow Lite (int8 quantized), 45 KB), "Classifier model" (TensorBoard logs, 31 MB), "Classifier model" (TensorFlow SavedModel, 160 KB), "Classifier model" (Keras h5 model, 154 KB), and "Classifier model" (Model evaluation metrics (JSON file)). Below the table are "Performance settings" for GPU training, enterprise performance, job limit (60 minutes), and train job memory (8192 MB). To the right, a "Collaborators (1/3)" panel shows one collaborator named "subhashin_m" with a "Connect" button. A "Summary" section shows 1 device connected and 14 items collected. "Project info" shows Project ID 872551 and a dropdown for Labeling method set to "One label per data item". A "Resume tutorial" button is at the bottom right.

CLASSIFIER

The screenshot shows the Edge Impulse web interface with a completed classifier project. The left sidebar includes options like Dashboard, Devices, Data acquisition, Experiments, EON Tuner, Impulse design (Create impulse, Image, Classifier, Retrain model), Live classification, Model testing, and Upgrade Plan. The main area displays Neural Network settings (Training settings: Number of training cycles 80, Use learned optimizer, Learning rate 0.0005, Training processor CPU; Advanced training settings: Validation set size 20%, Split train/validation set on metadata key, Batch size 32, Auto-weight classes, Profile int8 model); Neural network architecture (Input layer (27,648 features)); Training output (logs showing success); Model (Model version: Quantized (int8)); Last training performance (accuracy 100.0%, loss 0.04); Confusion matrix (validation set) showing 100% FAN and 0% MOUSE; Metrics (validation set) showing F1 score 1.00; and On-device performance (Inferencing time 339 ms, Peak RAM usage 182.8K, Flash usage 70.4%). A "Resume tutorial" button is visible.

The screenshot shows the Edge Impulse web interface with a neural network architecture configuration. The left sidebar is identical to the top screenshot. The main area shows the Neural network architecture builder with the following layers: 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), and Output layer (2 classes). A "Save & train" button is at the bottom right. To the right, there is a Confusion matrix (validation set) showing 100% FAN and 0% MOUSE, Metrics (validation set) showing F1 score 1.00, a Data explorer (full training set) scatter plot, and On-device performance metrics (Inferencing time 339 ms, Peak RAM usage 182.8K, Flash usage 70.4%). A "Resume tutorial" button is also present.