EDGE INTELLIGENCE

LAB - 5

25MML0038

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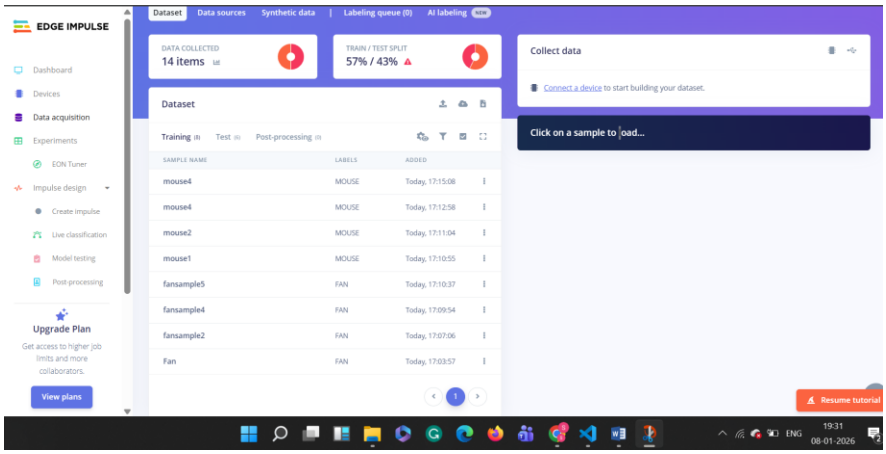
EDGE IMPLUSE

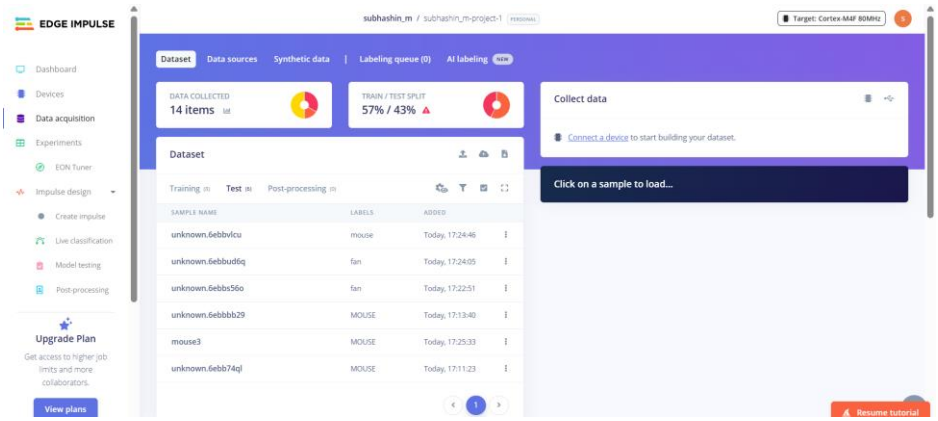
STEPS:

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

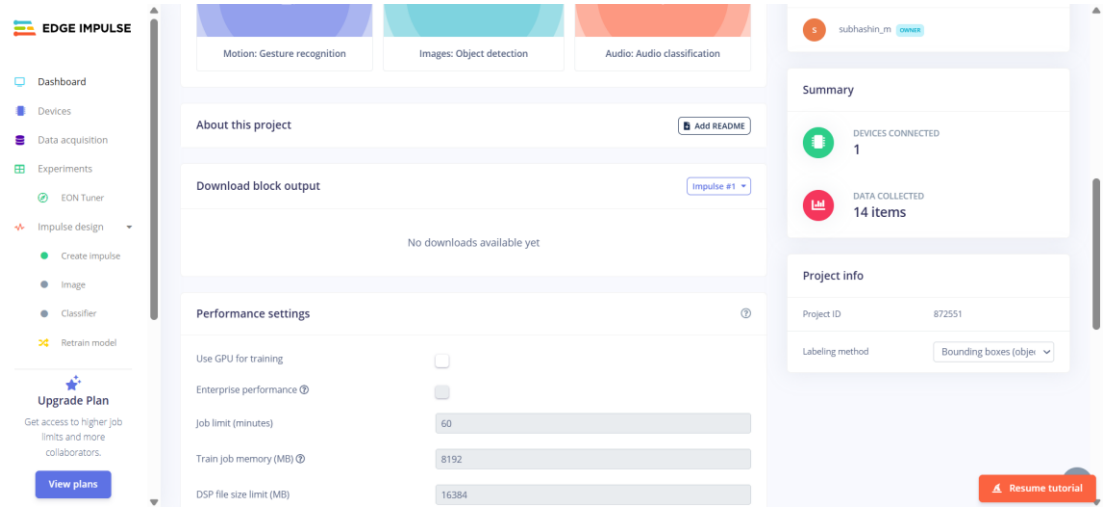


Testing-6

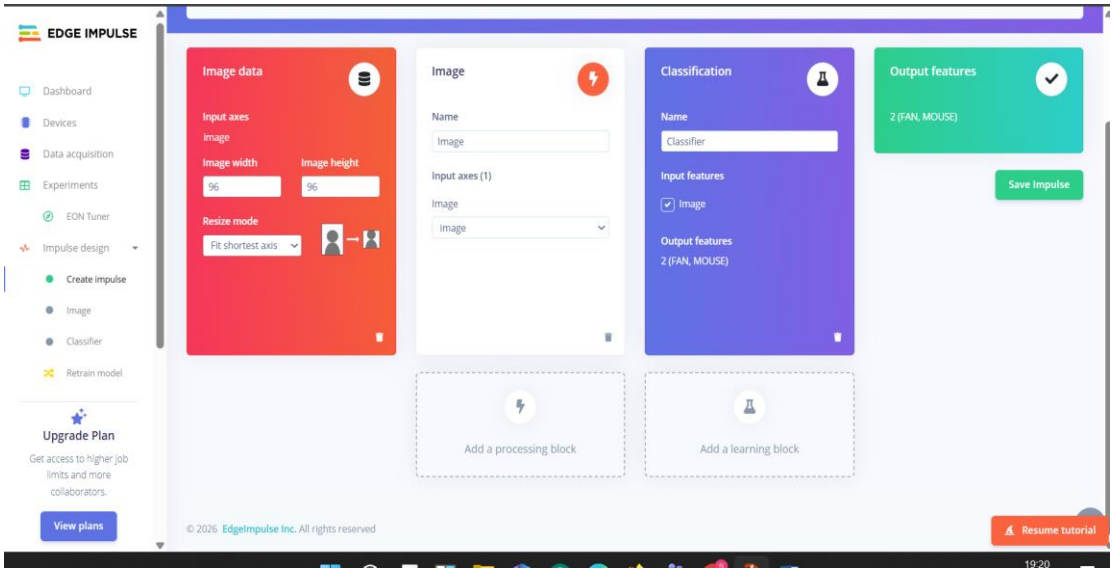


Steps to Create an Image Classification Model in Edge Impulse

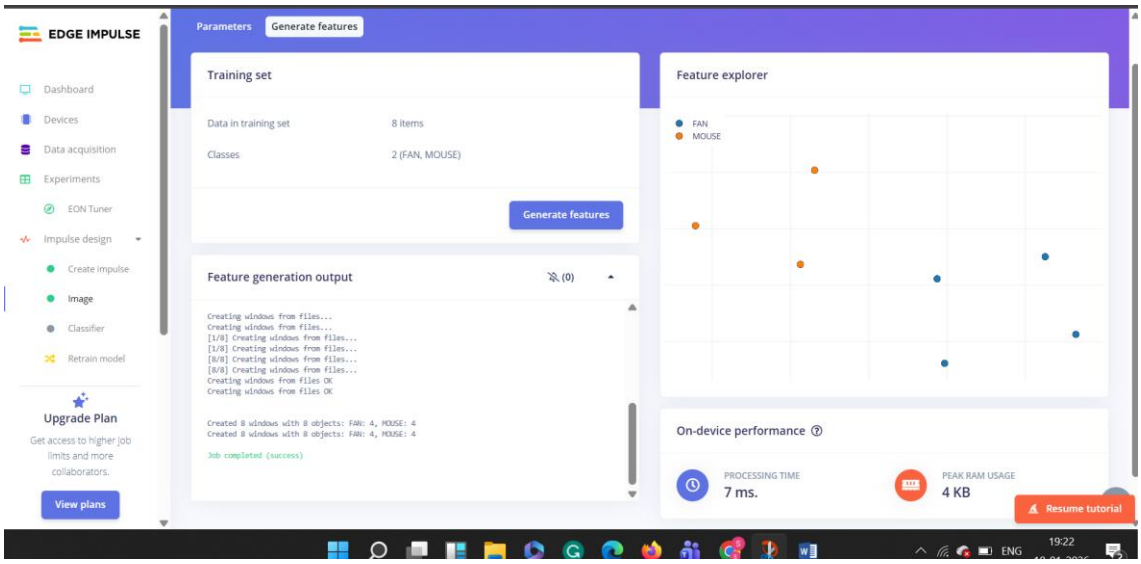
1. Open **Impulse Design** and click **Create Impulse**.
2. Add a **Processing Block** as **Image**.
3. Add a **Learning Block** as **Image Classification**.
4. Click **Save Impulse**.
5. In **Impulse Design**, click on **Image**.
6. Click **Generate Features** to extract image features.
7. After feature 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.



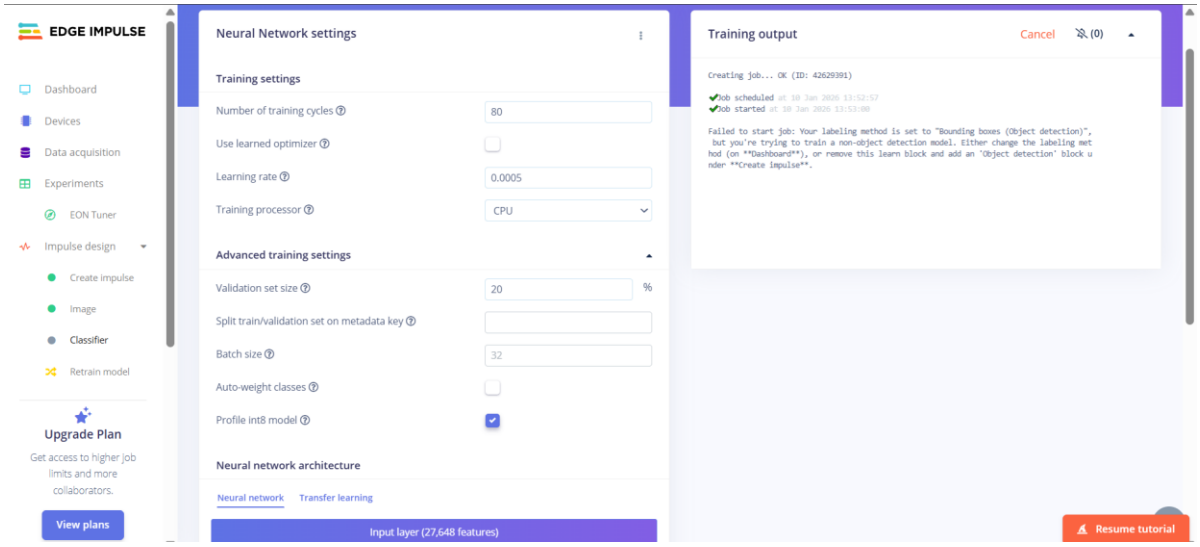
CREATE IMPLUSE



IMAGE



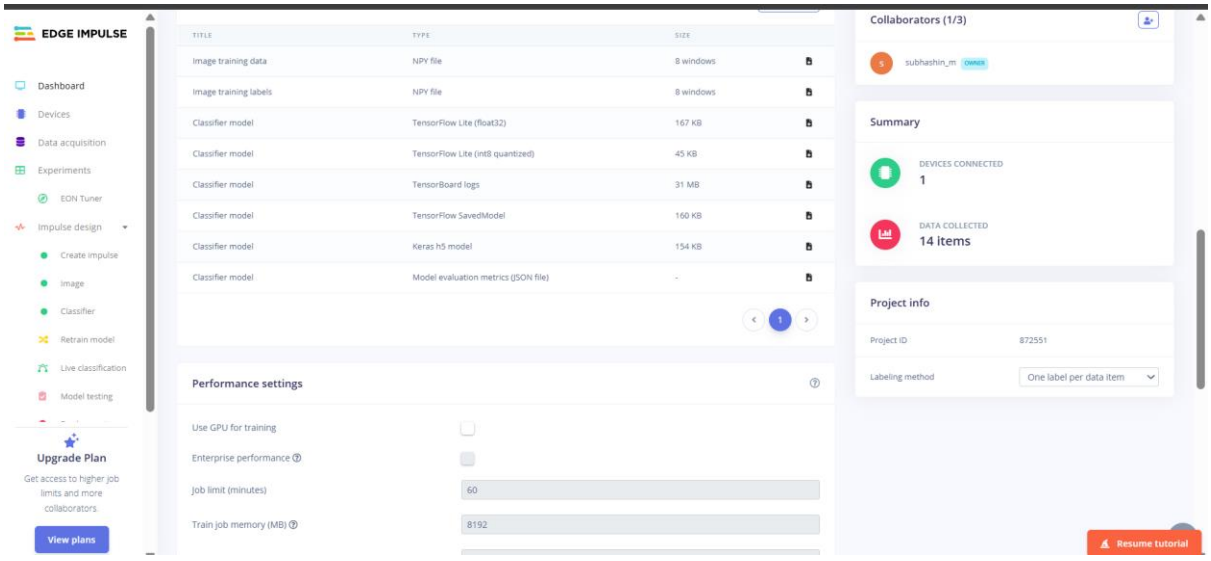
CLASSIFIER



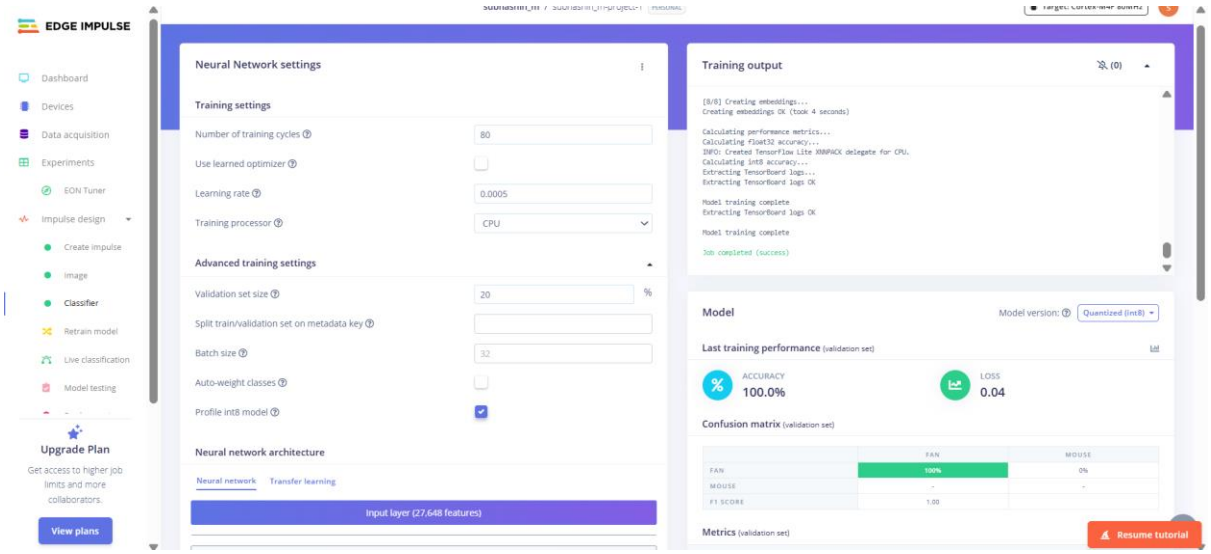
Error Fix and Image Classification Training in Edge Impulse

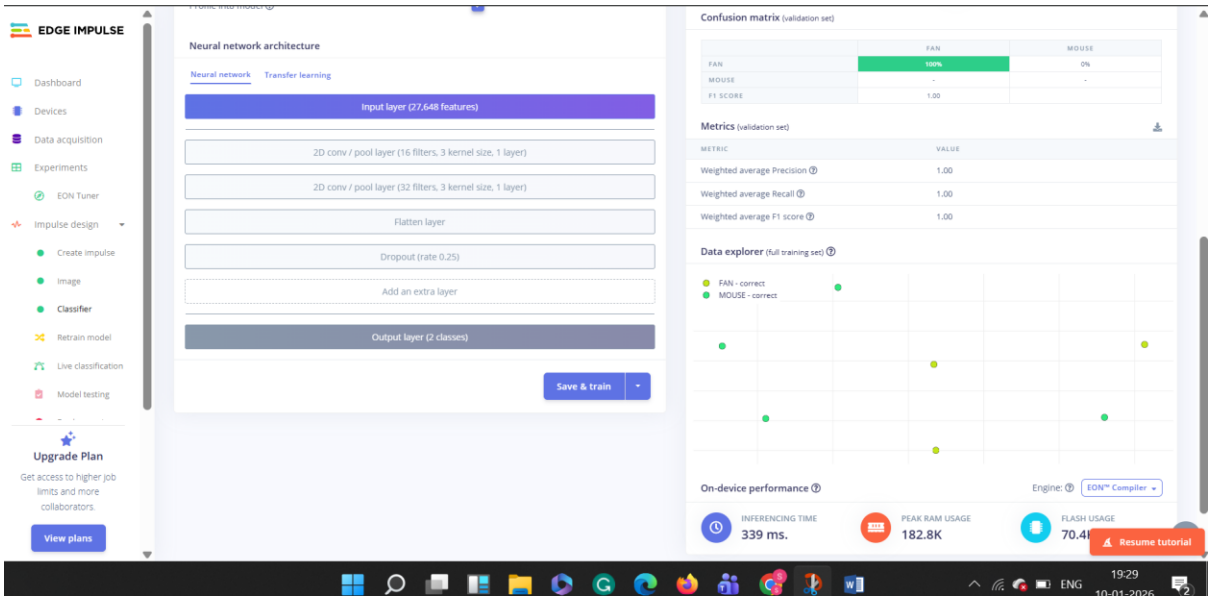
1. An error occurred because **Bounding box labeling** was used with an **Image Classification** model.
2. To fix this, go to **Dashboard** and change the labeling method to **One label per data item**.
3. Properly relabel all images using **single class labels** (no bounding boxes).
4. In **Impulse 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



CLASSIFIER


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
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
Neural network
Transfer learning
Input layer (27,648 features)
Training output
[0/0] Creating embeddings...
Creating embeddings OK (took 4 seconds)
Calculating performance metrics...
Calculating float32 accuracy...
INFO: Created TensorFlow Lite XNNPACK delegate for CPU.
Calculating int8 accuracy...
Extracting TensorBoard logs...
Extracting TensorBoard logs OK
Model training complete
Extracting TensorBoard logs OK
Model training complete
Job completed (success)
Model
Model version:
Quantized (int8)
Last training performance (validation set)
ACCURACY
100.0%
LOSS
0.04
Confusion matrix (validation set)
FAN
MOUSE
F1 SCORE
Metrics (validation set)
Resume tutorial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Model testing
Upgrade Plan
Get access to higher job limits and more collaborators.
View plans
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 0.25)
Add an extra layer
Output layer (2 classes)
Save & train
Confusion matrix (validation set)
FAN
MOUSE
F1 SCORE
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)
FAN - correct
MOUSE - correct
On-device performance
Engine:
EON™ Compiler
INFERENCING TIME
339 ms.
PEAK RAM USAGE
182.8K
FLASH USAGE
Resume tutorial
ENG
19:29