# Traffic Sign Detection and Classification

## Using ResNet

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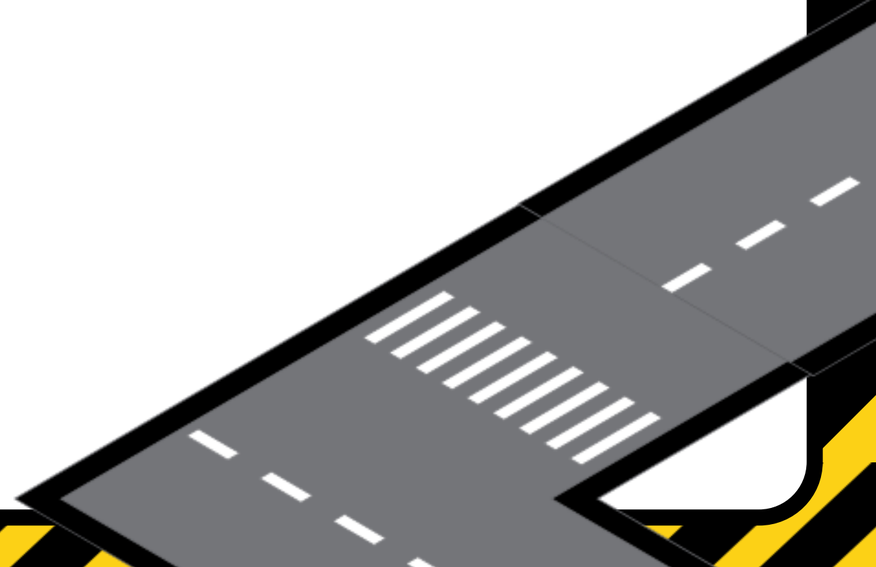


# Problem Statement

- My project addresses the challenge of automatically recognizing and classifying traffic signs from images

- This task is challenging due to variations in lighting conditions, occlusions, and different perspectives.

- Accurate traffic sign classification is essential for ensuring safe driving and reducing accidents on the road.

# Main Steps

**STEP 1**

I chose the dataset related to traffic signs

**STEP 2**

I used ResNet method for detection and classification

**STEP 3**

I filtered images to optimize runtime

**STEP 4**

I achieved the first set of results (acc ~50%)

**STEP 5**

I increased the number of training images and I varied MBS and NEP (final acc ~99%)

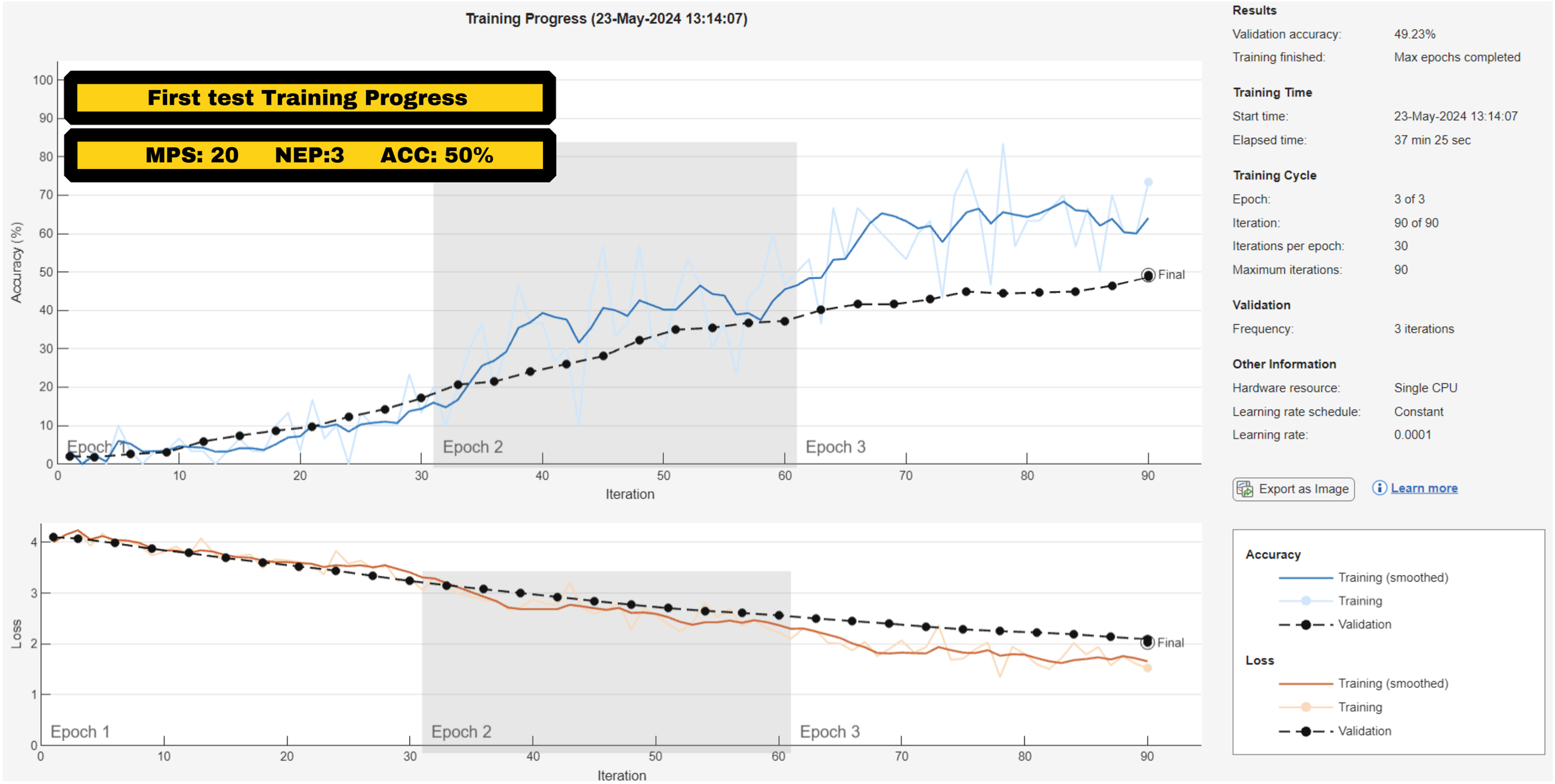
# RESULTS

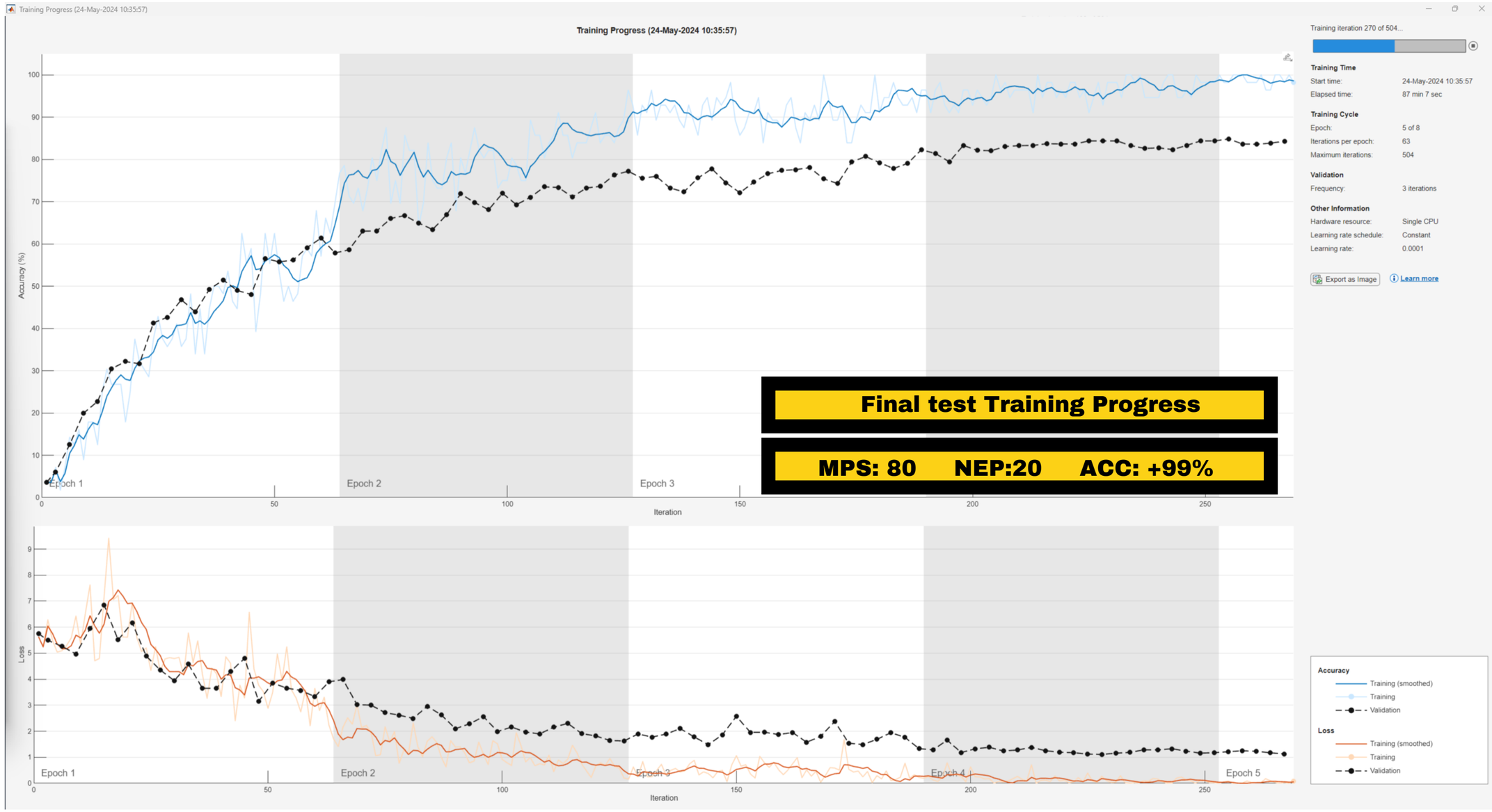
- The trained model achieved an accuracy of 85% on the test dataset.

- This task is challenging due to variations in lighting conditions, occlusions, and different perspectives.

- My results demonstrate the feasibility of using ResNet for traffic sign classification.

- Future work may involve exploring ensemble methods and deploying the model in real-world applications.

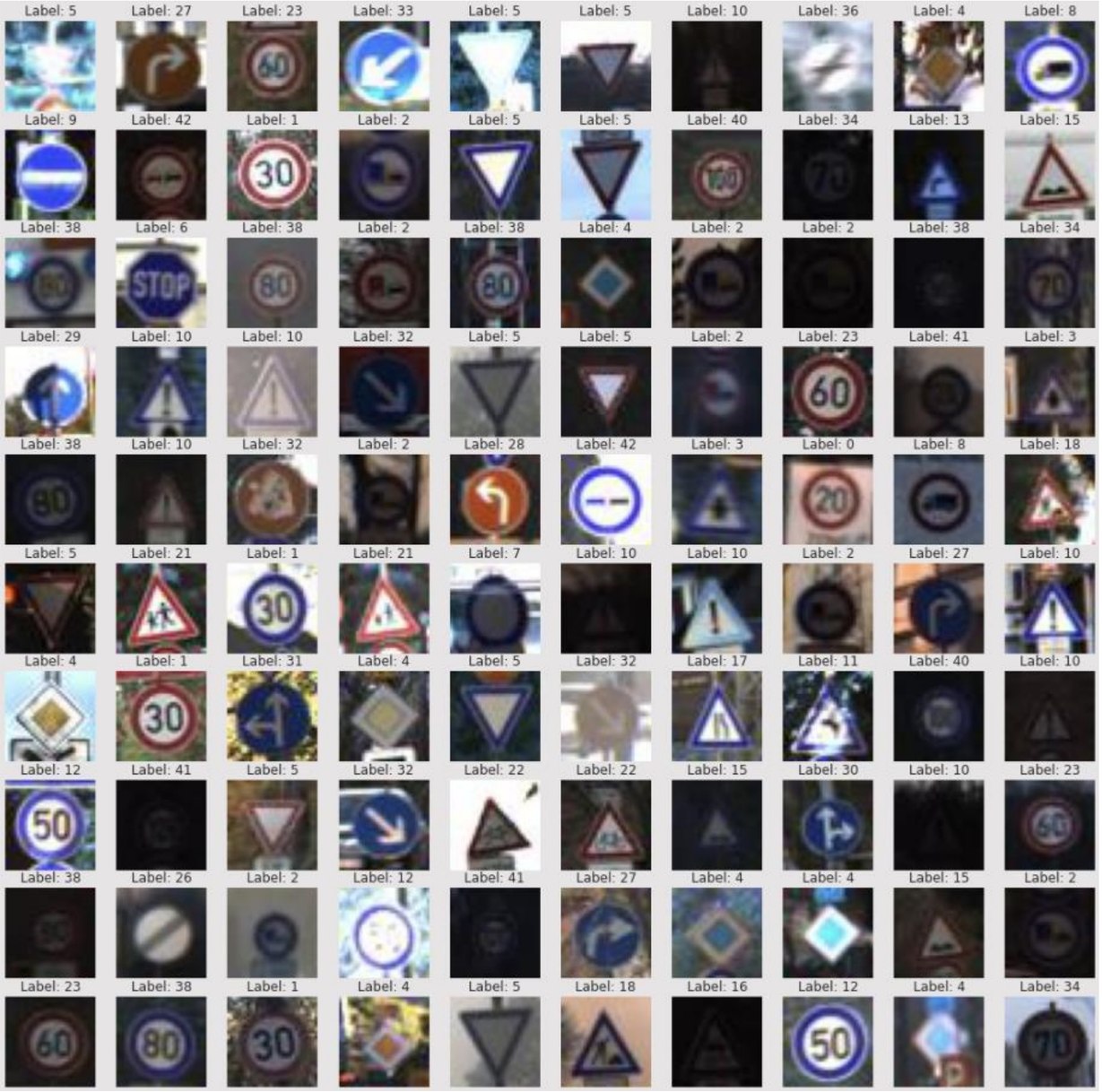

Training Progress (23-May-2024 13:14:07)
First test Training Progress
MPS: 20 NEP:3 ACC: 50%
Accuracy (%)
Iteration
Epoch 1
Epoch 2
Epoch 3
Final
Loss
Iteration
Epoch 1
Epoch 2
Epoch 3
Final
Results
Validation accuracy: 49.23%
Training finished: Max epochs completed
Training Time
Start time: 23-May-2024 13:14:07
Elapsed time: 37 min 25 sec
Training Cycle
Epoch: 3 of 3
Iteration: 90 of 90
Iterations per epoch: 30
Maximum iterations: 90
Validation
Frequency: 3 iterations
Other Information
Hardware resource: Single CPU
Learning rate schedule: Constant
Learning rate: 0.0001
Export as Image
Learn more
Accuracy
Training (smoothed)
Training
Validation
Loss
Training (smoothed)
Training
Validation


Training Progress (24-May-2024 10:35:57)
Training Progress (24-May-2024 10:35:57)
Training iteration 270 of 504...
Training Time
Start time: 24-May-2024 10:35:57
Elapsed time: 87 min 7 sec
Training Cycle
Epoch: 5 of 8
Iterations per epoch: 63
Maximum iterations: 504
Validation
Frequency: 3 iterations
Other Information
Hardware resource: Single CPU
Learning rate schedule: Constant
Learning rate: 0.0001
Export as Image
Learn more
Accuracy (%)
Epoch 1
Epoch 2
Epoch 3
Iteration
Final test Training Progress
MPS: 80 NEP:20 ACC: +99%
Loss
Epoch 1
Epoch 2
Epoch 3
Epoch 4
Epoch 5
Iteration
Accuracy
Training (smoothed)
Training
Validation
Loss
Training (smoothed)
Training
Validation

# Dataset Overview

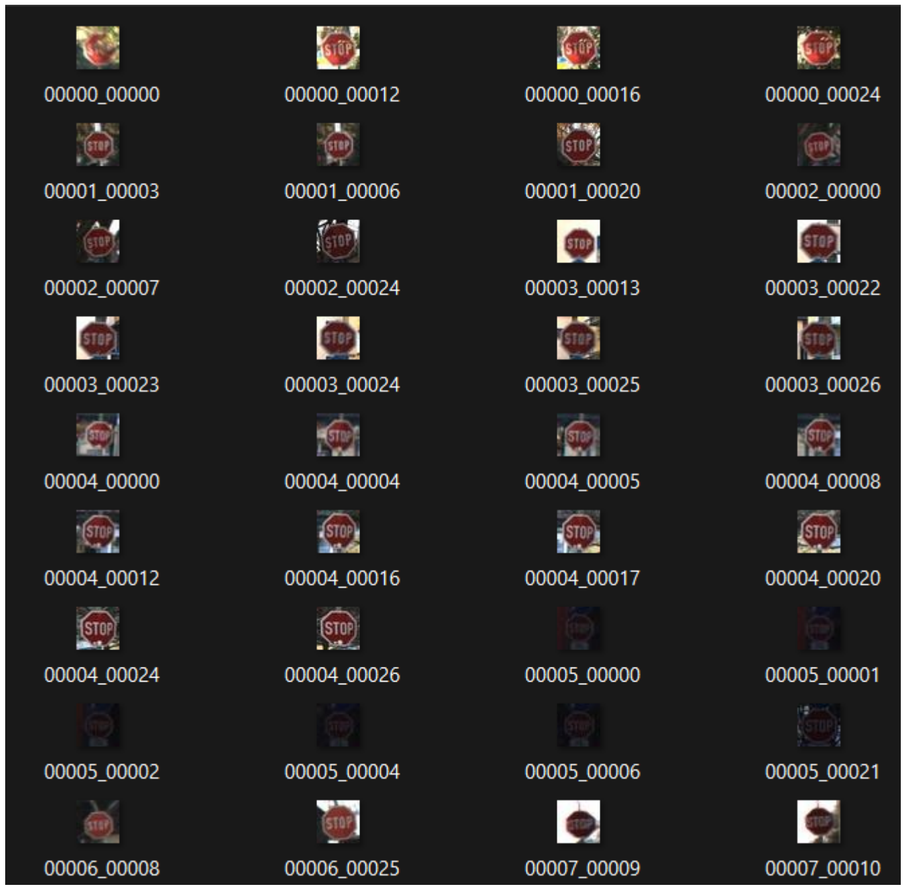
**I employed the ResNet (Residual Network) architecture for traffic sign classification.**

- ResNet is known for its deep layer representations and residual connections, which help in training deeper networks effectively.
- I used a dataset containing images of various traffic signs, including stop signs, yield signs, speed limit signs, etc.
- The dataset consists of 42 labels with 50-200 images per label.

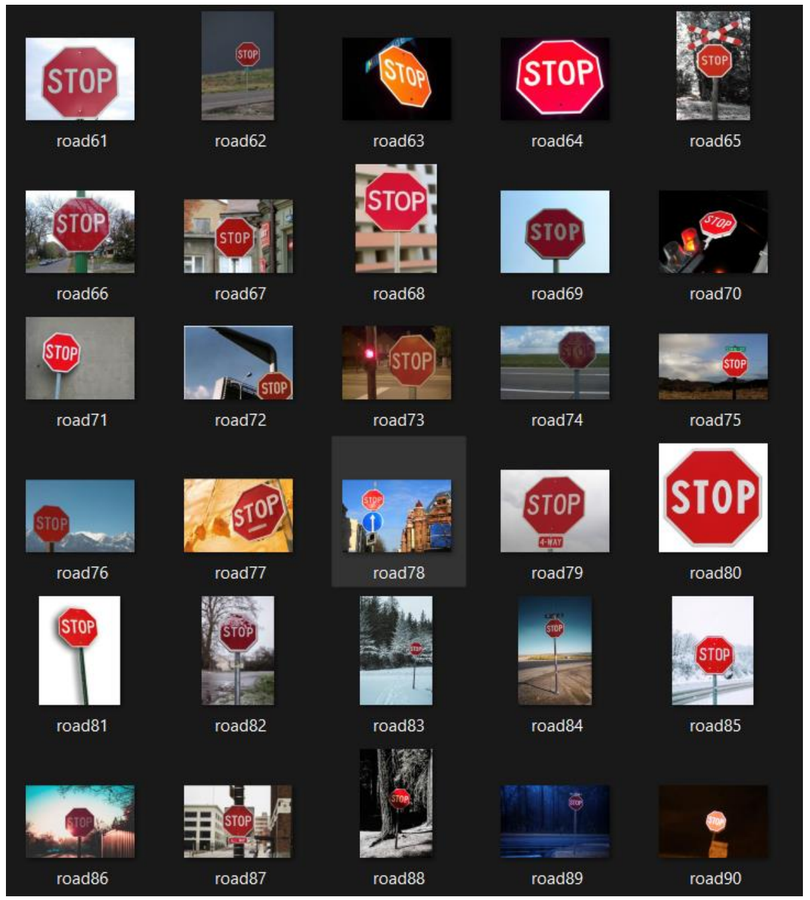


# Dataset Overview

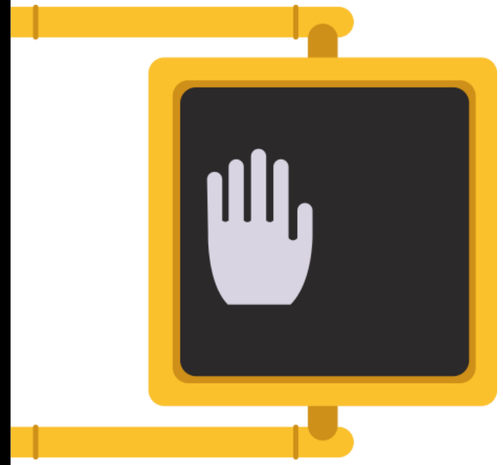
## Training Dataset




## Testing Dataset

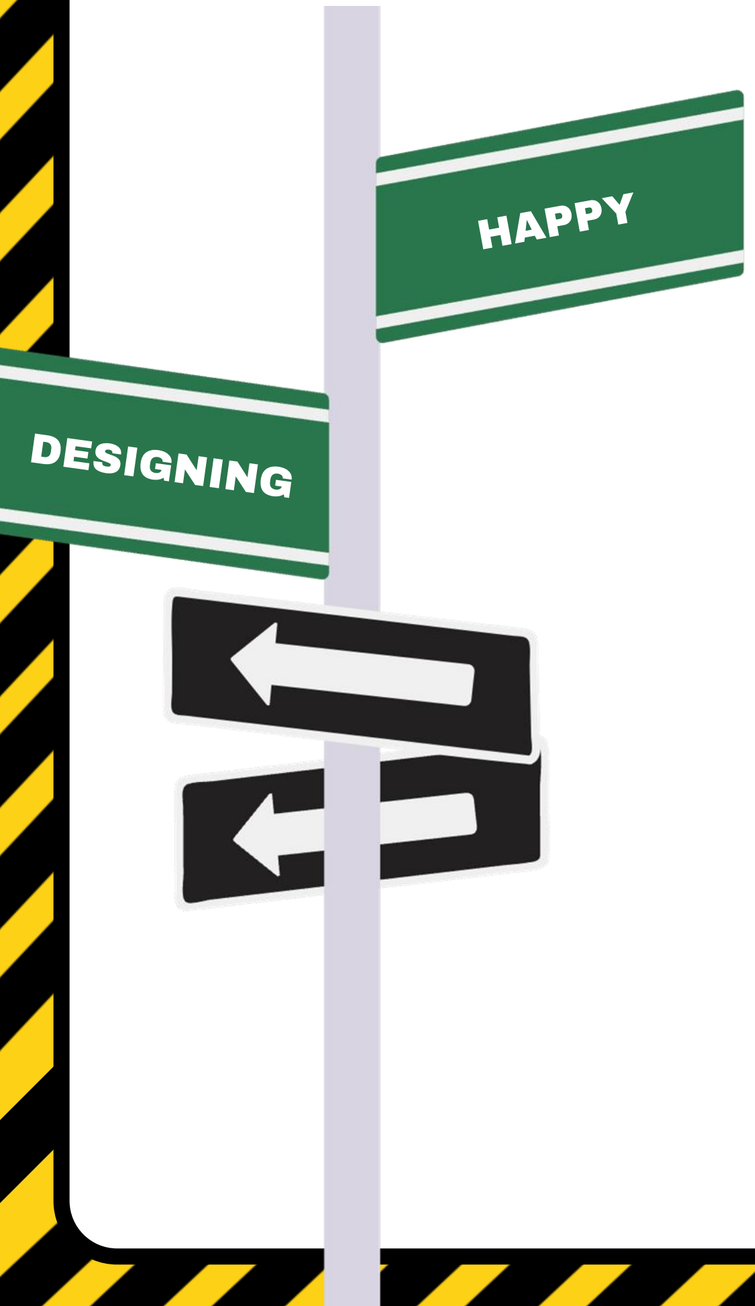


# Conclusion



In conclusion, my project highlights the significance of traffic sign detection and classification in enhancing road safety.

I’ve shown the effectiveness of ResNet in accurately classifying traffic signs, paving the way for further research and development in this field.




# Thank you all for your attention