

CM23021

Digit Recognition (MNIST Dataset)

Output:

Digit Recognition CNN

Train CNN on MNIST digits and predict via console.

```
Loading MNIST dataset...  
Training started...  
Epoch 1: loss=2.3277, val_loss=2.2780, acc=0.1000, val_acc=0.1500  
Epoch 2: loss=2.2856, val_loss=2.2899, acc=0.1300, val_acc=0.1500  
Epoch 3: loss=2.2748, val_loss=2.2870, acc=0.1200, val_acc=0.1500  
Training completed.  
Use predictX(index) in console for predictions.  
> predictX(8)  
Predicted: 3, True Label: 9  
< undefined  
> predictX(4)  
Predicted: 3, True Label: 1  
< undefined  
> |
```

Lab 3: MNIST Digit Recognition

Start Training (5 Epochs)

CNN Model

Final Accuracy: 98.2%

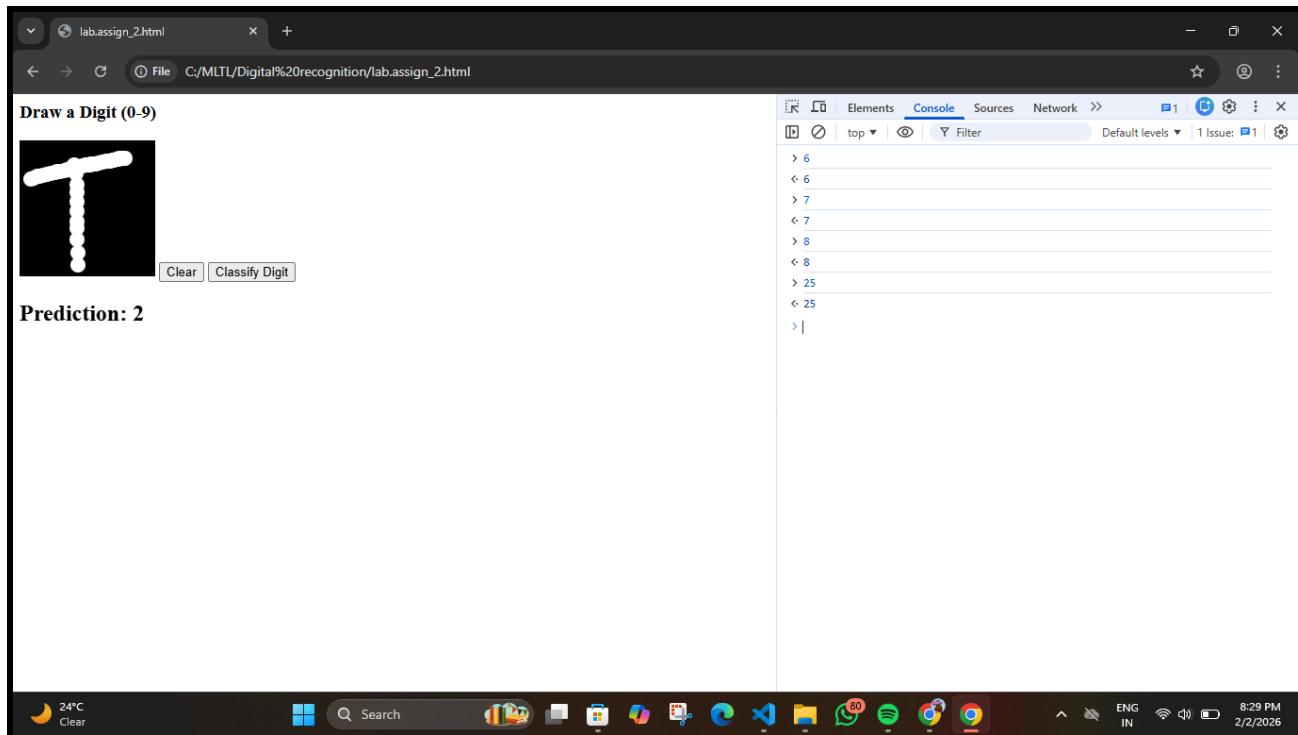
Epochs: 5

Dense Model

Final Accuracy: 92.5%

Reason: CNNs capture spatial patterns better!

```
> s  
< s  
> 9  
< 9  
> a
```



A screenshot of a web browser window titled "MNIST: CNN vs Dense Comparison". The page features a section titled "Task 3: Performance Comparison" with a "Run Comparison Test" button. Below this are two boxes: "Convolutional Network (CNN)" and "Simple Dense Network".

Convolutional Network (CNN)
Architecture: Conv2D -> MaxPooling -> Flatten -> Dense
--%
Status: Ready

Simple Dense Network
Architecture: Flatten -> Dense (128) -> Dense (10)
--%
Status: Ready

Below these boxes is a table comparing the two models:

Feature	Simple Dense Network	CNN (Convolutional)
Spatial Awareness	None (treats image as a flat vector)	High (detects edges, shapes, and patterns)

The browser's developer tools Console tab on the right shows the following log output:

```
> 5  
< 5  
> 6  
< 6  
> 7  
< 7  
> 8  
< 8  
> 9  
< 9
```