

MNIST Classification using Convolutional Neural Network (CNN)

Dataset

- **MNIST Dataset:**
 - 60,000 grayscale training images
 - 10,000 grayscale test images
 - Each image is 28x28 pixels representing digits from 0 to 9

Methodology

- **Preprocessing:**
 - Normalized pixel values to the range [0, 1]
 - Reshaped images to fit the CNN input shape (28x28x1)
 - One-hot encoded the labels for classification
- **Model Architecture:**
 - Conv2D (32 filters, 3x3, ReLU)
 - MaxPooling2D (2x2)
 - Conv2D (64 filters, 3x3, ReLU)
 - MaxPooling2D (2x2)
 - Flatten
 - Dense (128 neurons, ReLU)
 - Dense (10 neurons, Softmax)
- **Training Configuration:**
 - Optimizer: Adam
 - Loss: Categorical Crossentropy
 - Epochs: 5
 - Metrics: Accuracy
- **Evaluation:**
 - Evaluated on 10,000 test images
 - Plotted Accuracy and Loss graphs over epochs
 - Displayed sample predictions