

14/08/25

Ex.no: 4

4. Build a Simple feed forward neural network to register handwritten character

Aim: To build a simple feed forward neural network to recognize handwritten character

Objective

1. To load and preprocess the MNIST dataset for neural network input
2. To build feed forward neural network with hidden layers
3. To train the model using stochastic gradient descent optimizer and sparse Categorical cross-entropy loss
4. Evaluate the trained model on test data and measure its accuracy
5. To predict the class of given handwritten image

Pseudocode

START

Load MNIST dataset (training and testing data)

Flatten each image from 28×28 to 784 feature

Normalize pixel value to range (0,1)

Create a sequential neural network

Layer 1: Dense (128 neurons, ReLU activation)

Layer 2: Dense (64 neurons, ReLU activation)

Output layer: Dense (10 neurons, softmax activation)

Compute model:

optimizer - stochastic gradient descent

loss - sparse categorical_crossentropy

Metric - accuracy

Train model on training data for 5 epochs

Evaluate model on testing data

Print test accuracy

END

Observation

→ The loss decreases with each, showing that the model is learning

→ Accuracy improves steadily during training

Training

Epoch	Accuracy	loss
1	0.9929	0.0232
2	0.9968	0.0128
3	0.9976	0.0099
4	0.9976	0.0088
5	0.9987	0.0058

Testing

~~ext 1, 2, 3, 4, 5~~ Overall accuracy of the model on the entire dataset = 0.9828

Result

Successfully built a simple feed forward neural network to recognize handwritten characters