

Assignment 3

Page No. _____
DATE / /

Title: Convolutional neural network (CNN) MNIST fashion dataset and create a classifier to classify fashioning clothing into categories.

Objectives: Apply the technique of Deep Learning models with Convolutional method.

Pre-requisites:

- 1) The concept of Convolutional Neural Networks
- 2) Basics of deep neural network.

Requirements:

- 1) Jupyter Notebook
- 2) Python and its libraries.

Theory:

Convolutional Neural Network (CNN)

It is a type of a neural network commonly used in Deep learning for image recognition classification and Segmentation tasks. The architecture of a CNN is designed to hierarchical of features from input images.

In a CNN, the input image is first passed through a series of convolutional layers each

which applies a set of filters to input image to extract features at different spatial scales.

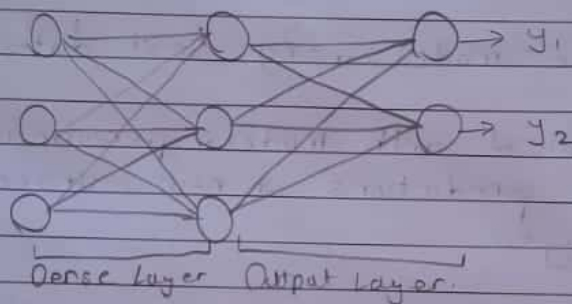
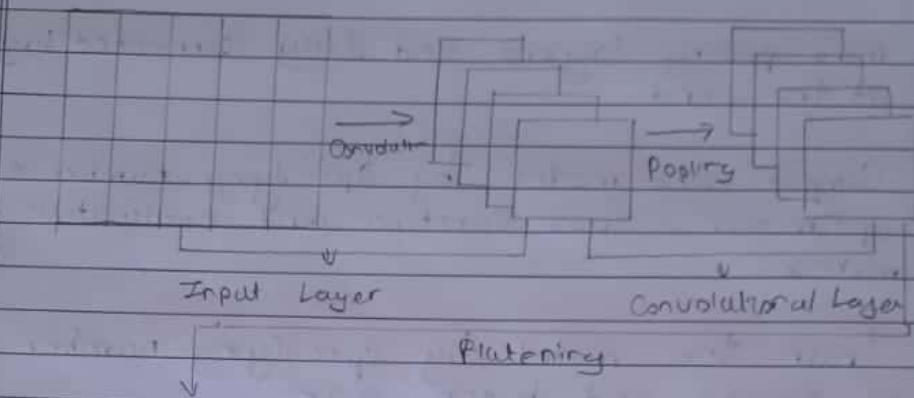
These features are then passed through a pooling layer, which reduces the dimensionality of features while preserving their important spatial information.

Finally, the output of the last pooling layer is passed through one or more fully connected layers, which perform classification or regression based on learnt features.

CNN's are typically trained using the back propagation algorithm along with optimization techniques. During training, CNN learns to automatically extract relevant features from input data. The network adjusts its weights and biases to minimize a defined loss function.

Applications of CNN include:

- 1) Image Classification
- 2) Object Detection
- 3) Image Segmentation
- 4) Natural Language Processing



Algorithm:

- 1) Input all the necessary libraries like tensorflow, pandas, numpy, etc.
- 2) Load dataset and split it into training and testing dataset and normalize data to values between 0 and 1.
- 3) Define the CNN architecture that consists of multiple convolutional layers followed by

max-pooling layers and fully connected layers at the end.

- 4) Compile the model by specifying number of optimizer, loss function and evaluation matrix.
- 5) Train the model by specifying number of epochs and batch size.
- 6) Evaluate the model using test dataset.
- 7) Once satisfied with model's performance, use it to make predictions on new, unseen fashion clothing images.

Conclusion:

Hence, a model to create CNN classifier using MNIST fashion dataset to classify fashion clothing into categories was implemented.