Title : Use MNIST fashion dataset & create a classifier to classify fashion clothing into categories.

Objective : students should be able to use MNIST fashion dataset & create a classifier to classify fashion clothing into categories

Theory :

what is classification ?

classification is a type of supervised learning in machine learning that involves categorizing data into predefined classes or categories based on a set of features or characteristics. It is used to predict the class of new, unseen data based on the patterns learned from the labelled training data.

In classification, a model is trained on a labeled dataset, where each data point has a known class label. The model learns to associate the input features with the corresponding class labels and can then be used to classify new, unseen data.

what is CNN?

Convolutional Neural Networks (CNNs) are commonly used for image classification tasks & they are designed to automatically learn & extract features from input images.

Pooling Layer : It downsample the feature maps to reduce the dimension of data.

Dropout Layer : It is used to prevent overfitting by randomly dropping out a percentage.

Fully connected Layers : It takes the flattered output from the last pooling layer & perform classification tasks.

Optimization : An optimization algorithm, such as stochastic gradient descent, is used to minimize the loss function

Training : The network is trained on a large dataset of labelled images.

Prediction : The network can be used to classify new images by passing them.

MNIST Dataset :

The MNIST Fashion dataset is a collection of 70,000 grayscale images of 28 x 28 pixels, representing 10 different categories of clothing & accessories.
The categories includes T-shirts/Tops, trousers, Pullovers, dresses, coats, sandals, shirts, bags, speakers
The MNIST Fashion dataset was released by zalando research in 2017 & has since become a popular dataset in the machine learning community.

steps to perform CNN on the MNIST

step 1 :   Import the libraries.

step 2 :   Load the dataset using keras built-in fo

step 3 : Preprocess the data by normalizing the p
values between 0 & 1, reshaping the images
of size (28, 28, 1) for compatibility with CNN.

step 4 : Define the CNN architecture, including the
no. & size of filters, activation functions & po
Layers.

step 5 :   compile the model by specifying the loss
optimizer & evaluation metrics

step 6 :   Train the CNN on the training set us
function, specifying the no. of epochs & batch siz

step 7 :   Evaluate the performance of the model
the testing set using the evaluate () function.

step 8 :   Use the trained model to make predicti
new images, using the predict() function.

conclusion :
        we have successfully created a classifier
classify fashion clothing into categories.