

**Assignment # 12**

**Hope To Skills**

**Free Artificial Intelligence Course**

**Instructor: Irfan Malik, Dr. Sheraz**

**Submission:**

● Make a Google Collab notebook to implement this assignment.

● In case you face difficulty in creating the Google Collab Notebook Follow these **Steps** ● Submit a **.ipynb** file names as **HTS\_Assignment\_12.ipynb**

● Deadline for this Assignment is **Tuesday 29-08-2023**

● Also mention your name in the Assignment.

● Make Submission in the **Assignment-12** in Classroom and press the submit button. **Train Convolutional Neural Network on Fashion MNIST dataset 1. Dataset**

**a.** You are provided with the fashion MNIST dataset

**b.** Read the description of dataset here

**2. Split the data into x\_train, y\_train, x\_test and y\_test.**

**a.** Display the sample images from **x\_train**

**b.** Display the shape of **x\_train** and **y\_train**

**3. Flatten the images**

**a.** Reshape the images from **28x28** to **28x28x1**.

**4. Scale the data**

**a.** Convert the data into **float 32** type

**b.** Scale the data by dividing **x\_train** and **y\_train** by **255**

**c.** Display the shape of **x\_train** and **y\_train** after scaling.

**5. Define the hyper parameters for the neural networks**

**a.** No. of Epochs

**b.** Batch size

**c.** Input\_size of image (Img\_height, Img\_width, No of channels)

**d.** No of convolutional layers

**e.** Output\_size (output layers depending upon the number of classes) **6. Define the structure of your neural network**

0



**a.** No of Convolutional layers

**b.** Activation function for each convolutional layer

**c.** Flatten the 2D vectors into 1D vector for FCN

**d.** Number of output layer neurons and activation function

**e.** Compile the model and provide following arguments

**i.** Loss function

**ii.** Optimizer

**iii.** Metric

**f.** Display the summary of the model

**7. Train the Neural Network**

**a.** Fit the Model

**b.** Train the Model for 15 epochs and report the training accuracy. **8. Test the model**

**a.** Find the testing accuracy of the model

**b.** Compare the training and testing accuracy and write you observation in the comments

**c.** Display the predicted labels along the input image.

1