Assignment # 11

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_11.ipynb**
- Deadline for this Assignment is **Monday 21-08-2023**
- Also mention your name in the Assignment.
- Make Submission in the **Assignment-11** in google form and press the submit button.
- To access the submission portal click here

Train a Fully connected 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 **784-dimension** vector.
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. Learning rate
    b. No. of Epochs
    c. Batch size
    d. Input_size
    e. Hidden layer1

   f. Hidden layer2 (You can add more layer depending upon your observation. I have mentioned two layers only for example)
   g. Output_size (output layers depending upon the number of classes)

6. **Define the structure of your neural network**
   a. No of hidden layers
   b. Activation function for each layer neurons
   c. Number of output layer neurons and activation function
   d. Compile the model and provide following arguments
      i. Loss function
      ii. Optimizer
      iii. Metric
   e. Display the summary of the model
7. **Train the Neural Network**
   a. Fit the Model
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.