Name: Kushal Galipally
University ID: 14687649
Drexel University

Fashion MNIST Images Classification Model

Multi-layer Perceptron Model Description:

Number of Layers:

4 layers:

1. Input Layer
2. Hidden Layer - 1
3. Hidden Layer – 2
4. Output Layer

Nodes on each Layer:

1. Input Layer – It has 28 X 28 Images as input which is flattened to make it ***784 neurons***
2. Hidden Layer 1 – ***12 neurons***
3. Hidden Layer 2 – ***10 neurons***
4. Output Layer – ***10 neurons***

Activation function used on each Layer:

1. Hidden Layer 1 – ***ReLu*** Activation function
2. Hidden Layer 2 – ***ReLu*** Activation function
3. Output Layer – ***SoftMax*** Activation function

Description of Loss function used:

- "***Sparse Categorical Cross Entropy***" is a loss function used for multiclass classification problems where labels are provided as integers.
- In this case the labels are given as integers from ***0 – 9*** corresponding to these labels:

```
class_names = ["T-shirt/top", "Trouser", "Pullover", "Dress", "Coat",
               "Sandal", "Shirt", "Sneaker", "Bag", "Ankle boot"]
```

Output Layer Activation Function used:

- "***SoftMax Activation***" is used as Output Layer Activation function.
- Output of the SoftMax Activation Function is a probability distribution over the classes.
- Each value is between 0 and 1, and the sum of all values is 1.
- For example, for one of the testing images in the dataset it has given the probabilities for all 10 classes,

```
array([[0.  , 0.  , 0.  , 0.  , 0.  , 0.03, 0.  , 0.01, 0.  , 0.96]])
```

Training Accuracy:

- After training with the above model, the ***training accuracy is 87.17%***

Validation Accuracy:

- After training with the above model, when validation dataset is passed it got an accuracy of ***86.86%***

Model Performance prediction if subject to unseen data:

- When model is evaluated on unseen test data it got an accuracy of ***84.80 %.***