CS671 - Deep Learning and its Applications

Programming Assignment 2

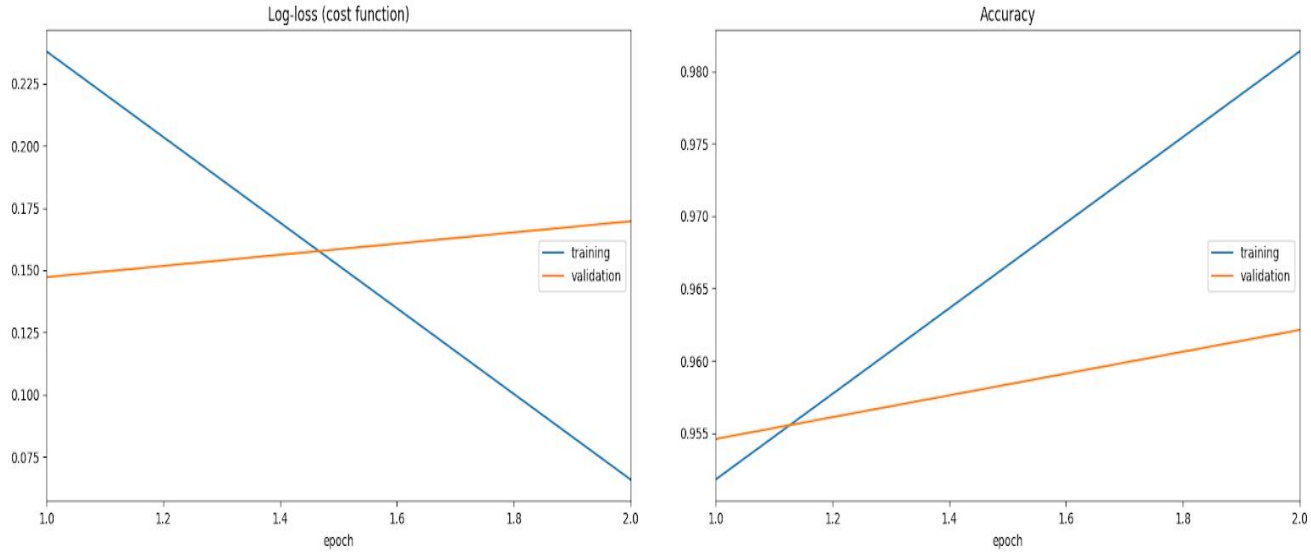
Group - 20

Problem Statement

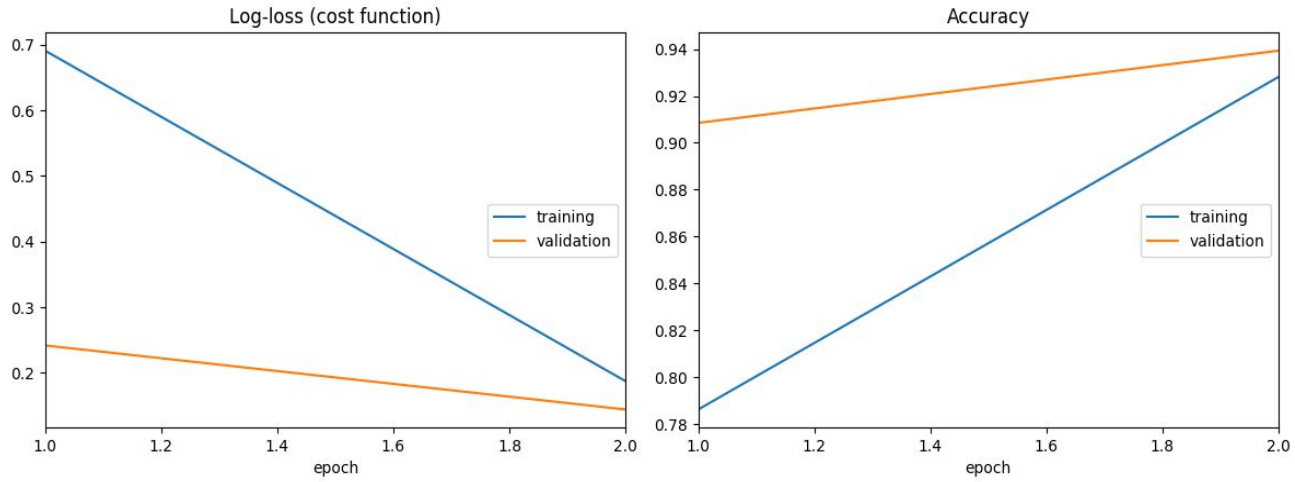
The goal of this assignment is to learn the basic principles of designing deep convolutions neural networks for image classification. Use 60% of training data for training the models and 40% for testing.

Learning Curves

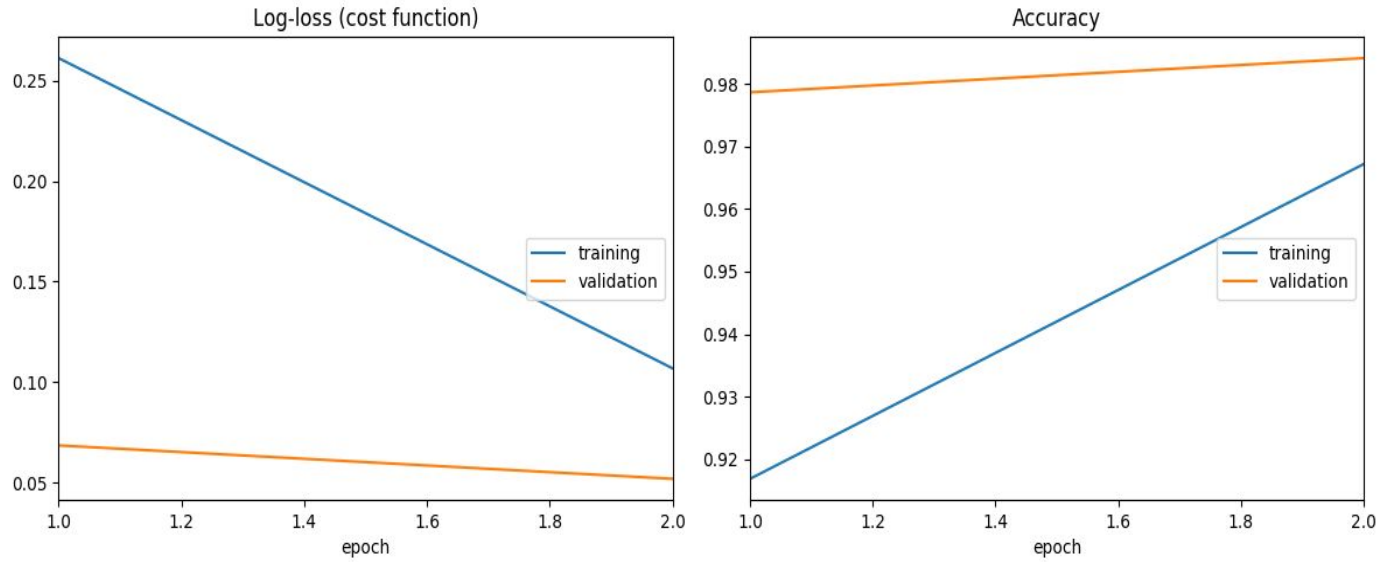
Learning curve for MNIST model 1



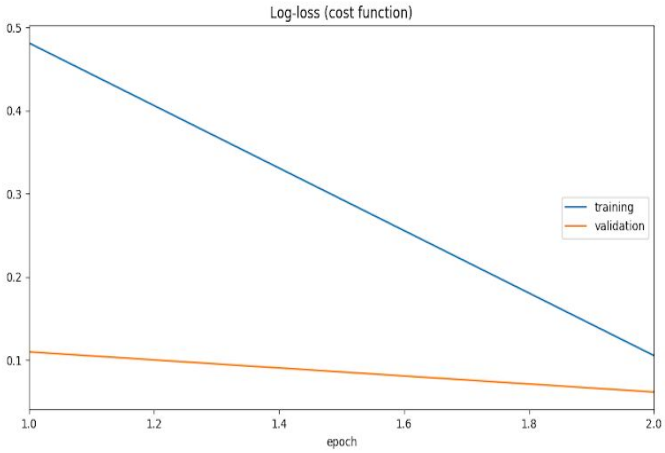
Learning curve for Line Dataset model 1

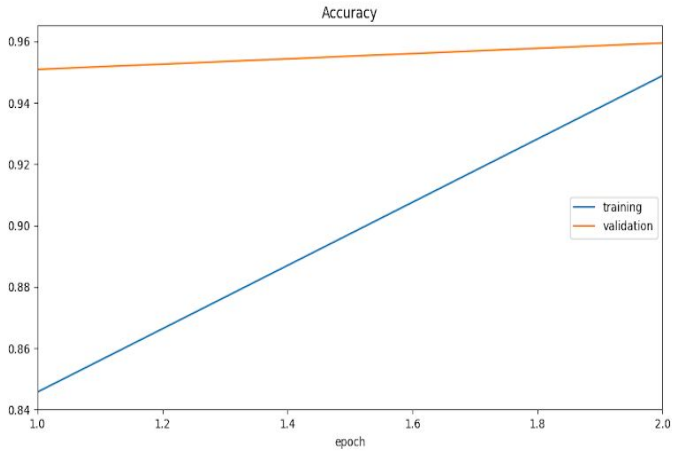


Learning curve for MNIST model 2



Learning curve for Line Dataset model 2





F-Scores

For Line datasets,

1_1_line : 94.36%

1_2_line : 95.48%

For MNIST datasets,

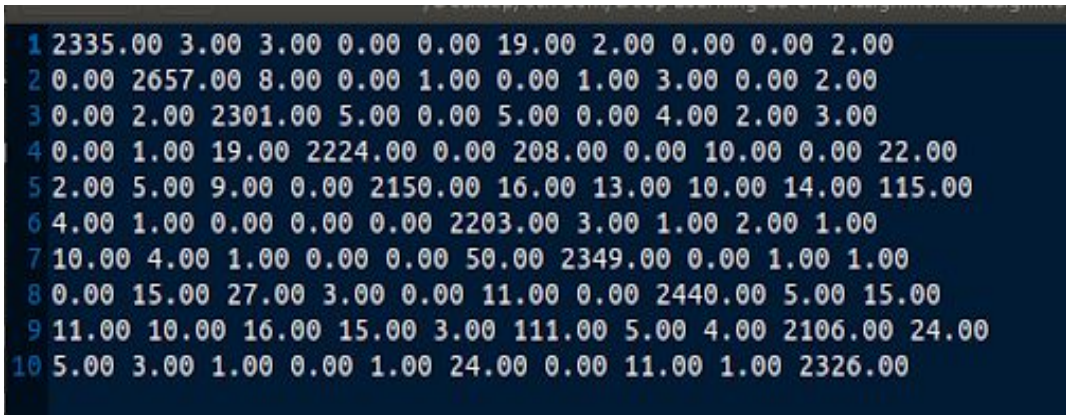
1_1_mnist : 96.24%

1_2_mnist : 98.41%

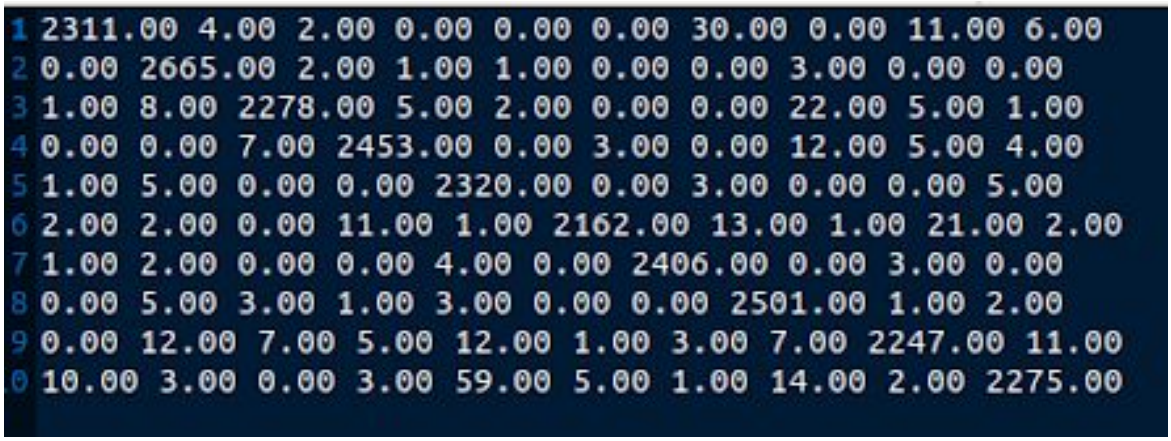
Confusion Matrices

For full confusion matrix of lines data set model 1 created in Line Dataset Generation click here

For full confusion matrix of lines data set model 2 created in Line Dataset Generation click here



For full confusion matrix of MNIST dataset model 1 click here



For full confusion matrix of MNIST dataset model 2 click here

Variations Tried

- Increased the number of units in the hidden layer from 32 to 64 for MNIST dataset to prevent underfitting and tried the same number of units in hidden layer for line dataset.
- Dropout layer increased the model's accuracy by preventing accuracy.
- Tried to train with 2 epochs instead of 5 to prevent overfitting.

Inferences

- We became familiar with the keras usage and computational graph.
- Increasing the number of hidden layers improves the accuracy.

- Increasing the number of units within a hidden layer helps to prevent underfitting.
- Increasing the number of epochs improves the accuracy but may lead to overfitting.
- Training in a batches is recommended so that the weights are not updated very frequently.
- Accuracy
    - For Line dataset model 1: 94.23 %
    - For Line dataset model 2: 94.46 %
    - For MNIST dataset model 1: 95.50 %
    - For MNIST dataset model 2: 97.80 %