TIPM Assignment 2 Report : 01-313

Neural Network Optimization

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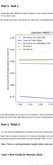
Part 1

Part1 Task 1

Implement an MLP with number of layers (varies between 2 and 5) and number of hidden units (varies between 1 and 10) in each hidden layer.

For this part, I have used the following configuration:



In the above graph we can see that the accuracy on validation data and test data increases with the number of epochs and the cost decreases with the number of epochs. The accuracy on training data increases with the number of epochs and the cost decreases with the number of epochs.

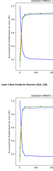
Part1 Task 2

Implement an MLP with number of layers (varies between 2 and 5) and number of hidden units (varies between 1 and 10) in each hidden layer. Use early stopping to stop training when the validation error increases.

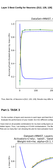
Early stopping is used to monitor the validation accuracy. Whenever the accuracy on validation set increases, the model is saved. Training stops when the accuracy on validation set does not increase for 10 epochs.

Note: These experiments consider a patience value, that is equal to 10 epochs.

Layer 1 Best Config for Neurons (2x2)



Layer 1 Best Config for Neurons (2x3, 2x4)



Layer 1 Best Config for Neurons (2x5, 2x6, 2x8)

Thus, from the, if neurons are (2x5, 2x6, 2x8) Results are the same and best validation, validation and testing the 2x5 is best.

Part1 Task 3

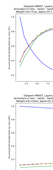
Implement early stopping with the hyperparameter patience as a variable.

Early stopping is used to monitor the validation accuracy. Whenever the accuracy on validation set increases, the model is saved. Training stops when the accuracy on validation set does not increase for 10 epochs.

Part1 Task 4

Try various hidden activation functions and report the results.

Since ReLU and Tanh are the most used activation functions, I have used these two activations. The results are as follows:


Dataset=MNIST, model=MLPN, DO: 1(0), 1(0), 1(0),