

Machine Intelligence and Expert Systems

Computer Assignment-3

Neural Network

Name: Anand Jhunjhunwala

Roll Number: 17EC35032

Aim: Train a neural network for classification of Fisher's Iris data to predict the species of Iris flower.

Specifications:

Neural Network parameters:

No. of nodes in the input layer: 4

No. of hidden layers: 1

No. of nodes in the hidden layer: 3

No. of output nodes: 3

Sigmoid activation function for both hidden layer and output layer

Learning rate: 0.15

No. of epoch: 150

Cost function: SSE

Results:

Training Accuracy after 150 epoch: 97.5%

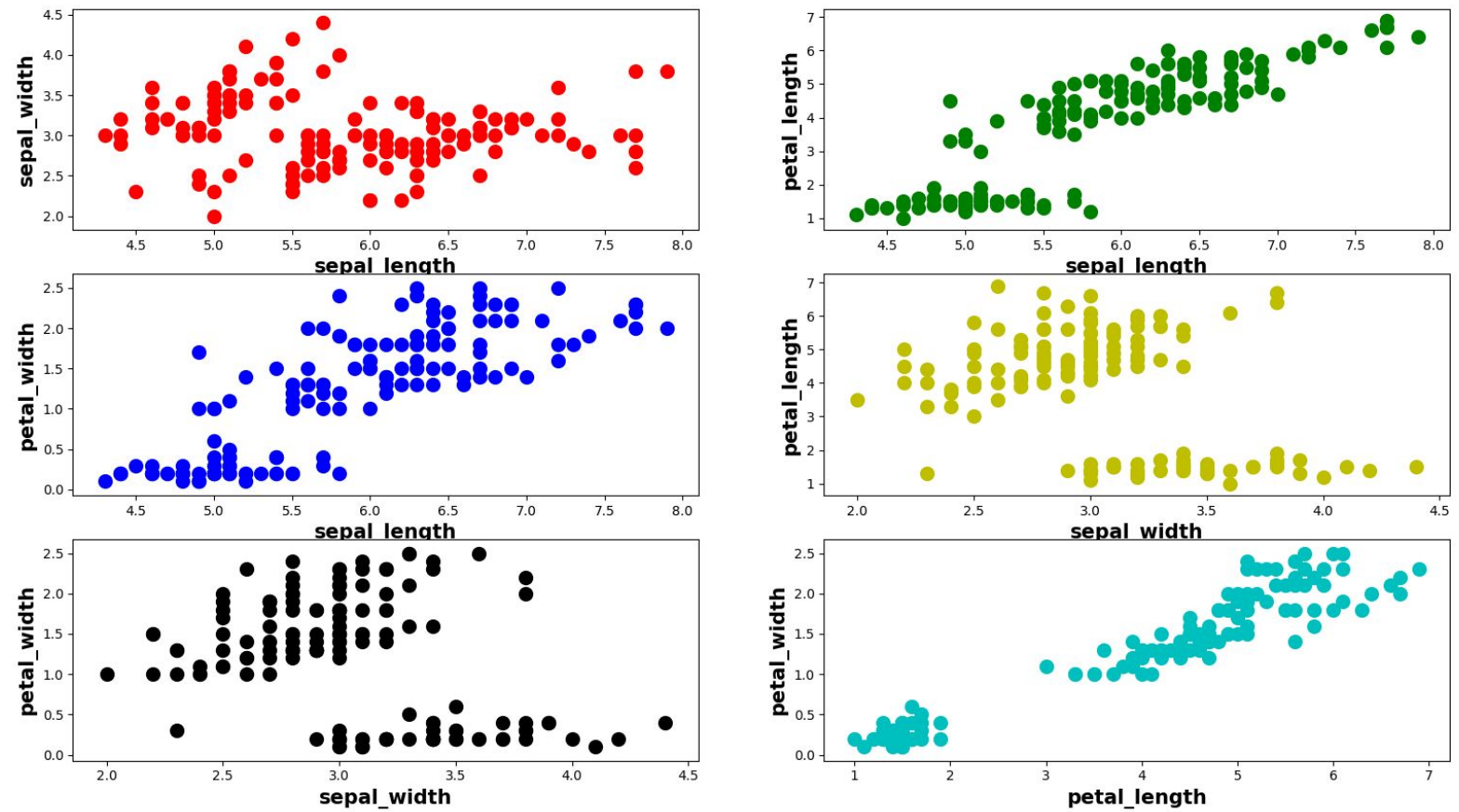
Test Accuracy after 150 epoch: 96.66%

• Classification Result:

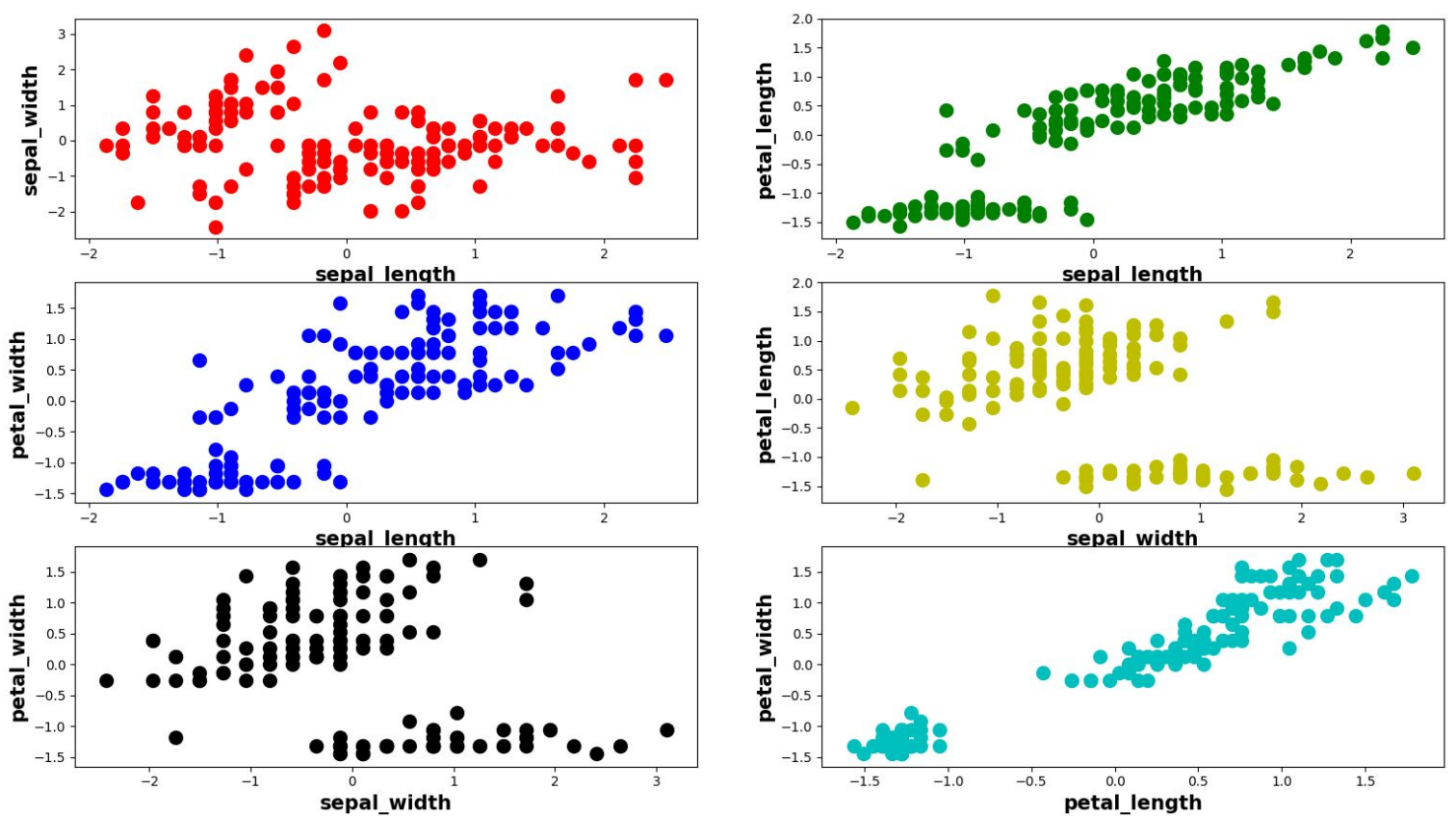
Input				Output
sepal_length	sepal_width	petal_length	petal_width	species
4.6	3.5	1.8	0.2	Iris-setosa
5.9	2.5	1.6	1.6	Iris-versicolor
5.0	4.2	3.7	0.3	Iris-setosa
5.7	4.0	4.2	1.2	Iris-setosa

Graph showing Normalized and unnormalized data:

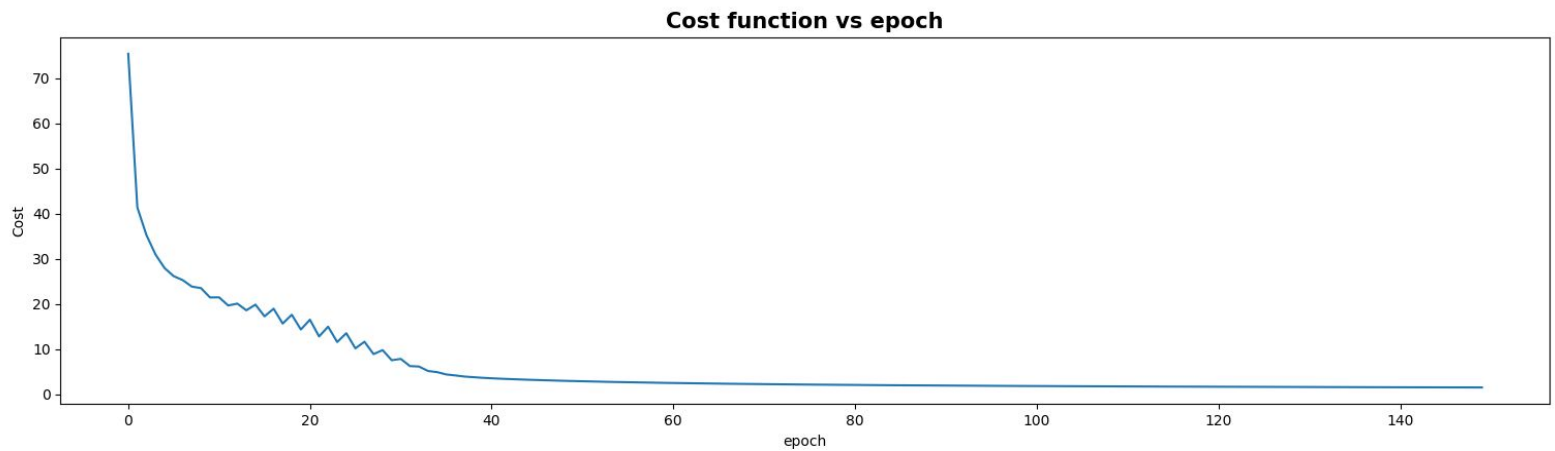
Unnormalized data:



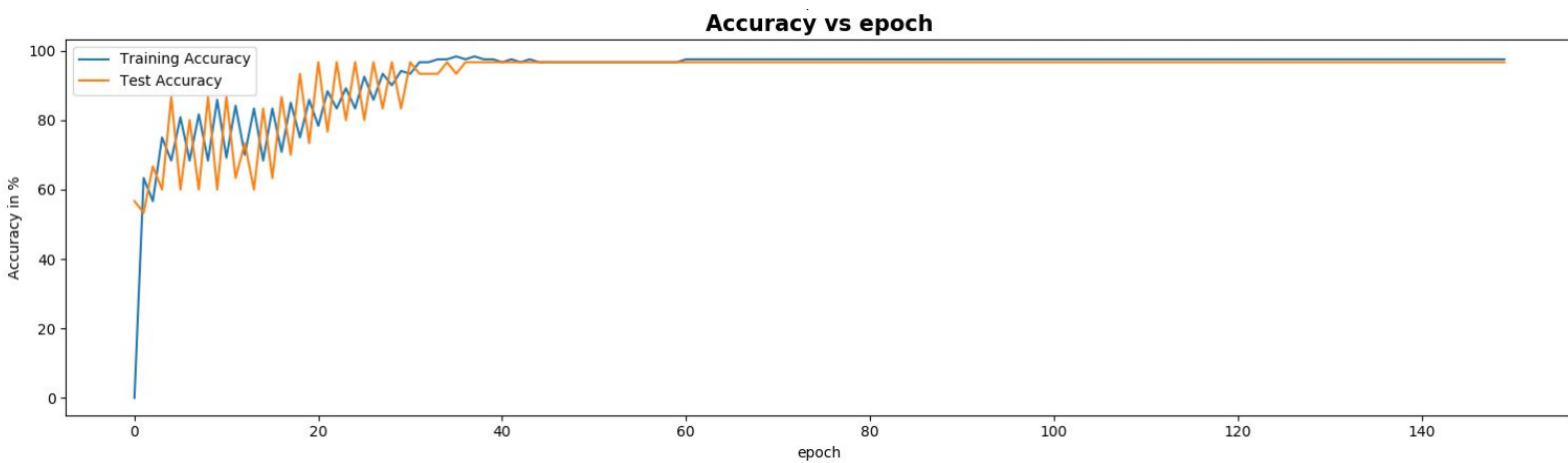
Normalized data:



- **Cost Vs Epoch graph:**



- **Training and Test Accuracy vs epoch:**



Discussion

- From the graph of normalized and unnormalized data I observed that the distribution of sample didn't change, only scaling changed.
- Training accuracy and test accuracy is very close to each other showing good learning.
- From the graph of cost and accuracy, I observed that the improvement in networks saturated after 60 epochs, this could be because gradient descent reached its local minima.
- The zig zag pattern observed in training and test accuracy graphs can be reduced by reducing learning rate, moreover I observed that the accuracy increased exponentially at the start of the training and saturates after 60 epochs.