

Dear all,

“Some of you were saying that we are lost. It seems we are studying mathematics instead of neural network”. The answer is yes because **without strong mathematics foundation you will not be able to understand or develop neural network**. Just to be precise, I have listed out the concepts studied in chapter 1 and chapter 2, lab sheet 1 and lab sheet 2 respectively.

The main objective of lab sheet 1 was to give you an idea of change in the value of iteration as you choose the random weights, the weight adjustment formula developed by you.

The main objective of lab sheet 2 was to give you an idea of how hard it is to find the best solution as you will have a hard time in fitting the curve. Similarly, the choosing of learning rate will adversely affect the converging process and the iteration (epoch) required.

You might be having problem because I haven't given you any notes. I again want to be clear that no notes will be provided to you in future as well. I have provided you the course book. For supplementary you can look Simon Haykin, Bishop and ample resources are available in the net. Thus anything discussed should be researched by you. I expect that from all of you as this is an elective subject. I just don't want you to focus on hard core subject matter and intend to just pass the exam.

So, as an assignment

Assignment 1 make note of every topic discussed.

Assignment 2 make note of every topic discussed.

As you now know about prediction; I think you might have predicted that the rest of the assignments are definitely going to be preparation of notes of the subsequent chapters.

Chapter 1

- a) concept of soft computing
- b) AI, Neural, Fuzzy and Neuro Fuzzy
- c) Brain and Artificial Neural Network
- d) aging of brain and its relation to Neural Network Foundation
- e) Different Structures of Neural Network
- f) Mathematical Notations of Neural Network
- g) Mapping viewpoints
- h) Exhibitory and Inhibitory concept
- i) Salient features of Neural Network
- j) History starting from Aristotle to Kohonen (you gave the presentation)
- k) Application domain: classification, clustering, prediction, optimization, pattern recognition (you gave the presentation)
- l) Took an example of character recognition and talked about choosing of "d" and "c".
- m) Perceptron, activation function (Threshold and sigmoid)

Chapter 2

- a) use of matrix
- b) Practical implication of symmetric, adjacency, square, identity matrix, column and row matrix.
- c) Practicality of eigen value, eigen vector, rank
- d) Least square regression method
- e) Inner product, Linear independence and its use in vector representation
- f) Dimension reduction, "The curse of dimensionality"
- g) Error Calculation: MSE, RMSE, Arctan methods
- h) Error minimization: Gradient Decent (Back Propagation, Resilient Propagation, Simulated Annealing, GA, Manhattan algorithm)

Lab sheet 1

- 1) Formation of Neural Network for OR, AND using Threshold function
 - 2) Graph plot of sigmoid function through program
 - 3) Formation of Neural Network for XOR using sigmoid function
- The entire question required an interface.

Lab sheet 2

- 1) Create a function of your own whose time complexity should be at least $O(n^2)$. Plot the graph for different values of n . (at least 15 plots). Find a generalized equation of those 15 plots (Generalization). Finally, the time complexity of generalized equation should be linear i.e. $O(n)$ or $(n \log n)$.
- 2) Formalize a descriptive statement for the following equation.
$$P(n) = 1 - (1 - P(1)) (1 - \Theta)^{n-1}$$
- 3) Create a neural network structure of just one layer (Choose the number of nodes by yourself). Realize the Mexican hat function with the combination of input and weights.

Last but not the least, all the best for your midterm exam.

Regards,
Sarbin.