**Neural Networks and Deep Learning (NDL) CSE\_3283 Lab**

**Note: List of experiments with numbers to follow while writing the Journal without fail.**

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| **Experiment No** | **Title of the experiment** |
| 1.a) | Implement the basic neuron and update the learning parameter using different activation functions. Show the graph.   1. Binary Step 2. Linear 3. Sigmoid 4. Tanh 5. ReLU 6. Leaky ReLU 7. Softmax |
| 1.b) | Implement the neuron using error correction learning algorithm and memory-based learning algorithm. |
| 2 | Implement the neuron using Hebbian Learning algorithm and show the graph to differentiate the hypothesis between Hebb and Co-variance learning. |
| 3.a) | Implement the Gate Operations using Single Layer Perceptron. |
| 3.b) | Implement the XOR gate operations using multi-layer perception and show the error propagation by iterating the learning rate. |
| 4 | Implement the revision XOR operation using generalized radial bases function network. Also show how the value changes when updated with regularization parameter. |
| 5 | Implement the single linear neuron model with a Hebbian adaptation to describe the principal component of the arbitrary input distribution. |
| 6.a) | Implement the features used in Self organizing maps using competitive learning algorithm. |
| 6.b) | Implement the back propagation algorithm for training a recurrent network using temporal operation as a parameter into a layer feed forward network. |
| 7 | Implement the Hop-field network using associative memory method |
| 8 | Design a neural network system by taking a suitable data set and demonstrate training, testing and performance of the systems. |
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| 10 | Implement and apply optimization methods for neural networks (AdaGrad, RMSProp, Adam) on any relevant dataset. |
| 11 | Apply, train and visualize Different deep CNN architectures like LeNet, AlexNet, VGG, PlacesNet, on MNIST datasets. |
| 12.a) | Implement a single forward step of the RNN-cell |
| 12.b) | Code the forward propagation of the RNN |
| 12.c) | Implement the LSTM cell |