

Neural Network Workshop Course Description

Subject Code	19B16CS311	Semester odd	Semester Sixth Session 2018-2019 Month from Jan to June
Subject Name	Neural network Workshop		
Credits	0-0-4	Contact Hours	4 lab hours

Faculty (Names)	Coordinator(s)	Anuja Arora	
	Teacher(s) (Alphabetically)	Anuja Arora Archana Purwar	Pawan Upadhay Ankit Vidhyarathi

SNO	Description	Cognitive Level (Bloom Taxonomy)
CS311.1	Understand the fundamentals and concepts of neural network, neural network architectures, and its paradigm.	Understand Level (Level 2)
CS311.2	Apply the neural network to solve practical problems	Apply Level (Level 3)
CS311.3	Examine the engineering applications that can learn using neural networks	Evaluate Level (Level 5)
CS311.4	Implement Neural network in context of problem solving and modelling in python	Analyze Level (Level 4)
CS311.5	To develop neural network applications on real-world tasks	Create Level (Level 6)

Module No.	Subtitle of the Module	Topics in the module	No. of Labs for the module
1.	Overview of classification and Regression	Linear Regression, Multiple Linear Regression, KNN classifier, SVM Classifier	4
2.	Neural Fundamental Concept	Neuron models, basic Learning rules, Single Neuron NN, Single layer neural network, Activation Function, Two Layer Neural Network, error function	4

3	Basic neural network models	Multilayer Perceptron Learning Algorithm, Stochastic gradient descent, Forward Propagation, Backpropagation, Real life case studies	8
4	Other Neural network models	Associative memory, Self-organizing feature map, Neural network decision tree, Data visualization with self-organizing feature map	6
5	Convolution Neural Network	Fundamentals of convolution Neural network and Object detection, introducing tensor flow and keras libraries for CNN, neural style transfer Case studies of Convolution neural network.	6
Total number of Lectures			28

Project Based Learning:

The course was linked with minor Project in which students have to develop and solve a problem in 3-4 students group. Students read 4-5 research papers in which neural network have been used in order to resolve a real life problem. Theme and topic of project is chosen based on read research papers. Understanding usage of appropriate Neural Network technique, then implementation of the selected neural network algorithm and evaluating its effectiveness based on performance measure help students to know the concept to learn the system based on knowledge and predict based on learned/trained system.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	S. Haykin, Neural Networks: A Comprehensive Foundation 2nd edition, (Prentice Hall, 1999)
2.	Rajasekaran, S., & Pai, G. V. (2003). Neural networks, fuzzy logic and genetic algorithm: synthesis and applications (with cd). PHI Learning Pvt. Ltd..
3.	C. Looney, Pattern Recognition Using Neural Networks, Oxford University Press, 1997
4.	Hagan, M. T., Demuth, H. B., Beale, M. H., & De Jesús, O. (1996). Neural network design (Vol. 20). Boston: Pws Pub..
5.	Sivanandam, S. N., & Deepa, S. N. (2007). Principles of Soft Computing (With CD). John Wiley & Sons.