



Jansons Institute of Technology

Karumathampatti, Coimbatore - 641 659

Approved by AICTE and Affiliated to Anna University

An ISO 9001:2015 certified institution

Industry Readiness Course - Syllabus

Department of Computer Science and Engineering

Introduction to NN, CNN and GNN

2023 - 2024 (ODD Semester)

Learning Objectives

- Develop a comprehensive understanding of neural networks, covering linear and logistic regression, artificial neurons, single and multi-layer perceptrons, activation functions, and feed-forward network functions.
- Explore regularization techniques for deep learning, including dataset augmentation, noise robustness, semi-supervised learning, multi-task learning, early stopping, and ensemble methods.
- Understand convolutional networks, including the convolution operation, pooling, variants of the basic convolution function, and famous convnet architectures like AlexNet, VGG, ResNet, and EfficientNet.

Learning Outcomes

- Implement deep neural networks and Convolutional Neural Networks for solving problems.
- Employ regularization techniques in deep learning to enhance model robustness and generalization.
- Use transfer learning concepts to solve problems.
- Implement Graph Neural Network to learn the structural relationship in data.

MODULE 1

Neural Networks: Basic concepts of artificial neurons, single and multilayer perceptron, perceptron learning algorithm, activation functions, loss function. Feed-forward Network Functions - Network Training - Backpropagation - Parameter optimization - Hyperparameter Tuning - Regularization for Deep Learning: Dataset Augmentation - Noise Robustness - Early Stopping

MODULE 2

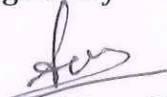
Dropout - Sparse Representation - Bagging and Other Ensemble Methods - Semi-Supervised Learning - Multi-Task Learning - Parameter Tying and Parameter Sharing - Convolutional Networks: The Convolution Operation - Motivation - Pooling - Convolution and Pooling as an Infinitely Strong Prior - Variants of the Basic Convolution Function - ConvNet Architectures - Transfer learning



MODULE 3

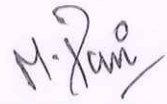
Graph representation learning – Node embedding models – Knowledge graph embedding models – Graph neural networks – Graph neural network architectures – Graph neural networks and knowledge graphs

Course Designed By


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