Deep Neural Network Intermediate

Duration - 1 Day / 8 Hours

Program Description

This training program offers a comprehensive introduction to Deep Neural Networks (DNNs), focusing on their structure, learning mechanisms, and optimization techniques. Participants will explore key concepts such as feedforward networks, backpropagation, activation functions, and regularization methods like dropout and batch normalization. The program also covers practical aspects of training deep models using TensorFlow/Keras. Emphasis is placed on understanding and addressing overfitting and underfitting. A hands-on project on digit classification using the MNIST dataset solidifies learning through real-world application

Learning Goals

- Gain foundational understanding of Deep Neural Networks (DNNs), including their architecture, functioning, and core components such as Feedforward Neural Networks and activation functions.
- Develop practical skills in training deep networks, covering key techniques like backpropagation, gradient descent, and regularization methods including dropout and early stopping.
- Learn to evaluate and improve model performance by addressing challenges like overfitting and underfitting and applying methods like batch normalization for optimization.
- Build and deploy DNN models using TensorFlow/Keras, with hands-on experience in implementing and training a digit classification model (e.g., on MNIST dataset).

Course Topics

- Introduction to Deep Neural Networks
- Feedforward Neural Networks (FNN) and Backpropagation
- Activation Functions: ReLU, Sigmoid, Tanh, Softmax
- Training Deep Networks: Gradient Descent, Loss Functions
- Batch Normalization, Dropout, and Early Stopping
- Overfitting vs Underfitting
- Building and Training DNNs using TensorFlow/Keras
- Hands-on: Digit Classification using Fully Connected Network (e.g., MNIST)

Deep Neural Network Advance

Duration - 1 Day / 8 Hours

Program Description

This training program offers a comprehensive introduction to Convolutional Neural Networks (CNNs), focusing on their role in computer vision tasks such as image classification. Participants will learn the core components of CNNs, including convolution, pooling, and dense layers, along with key concepts like filters, padding, and feature maps. The program covers dimensionality calculations, transfer learning using pretrained models like VGG16 and ResNet, and hands-on implementation with custom datasets. Additionally, it emphasizes model interpretability through the visualization of filters, feature maps, and Class Activation Maps (CAM). The course is designed for practical understanding and real-world application of CNNs.

Learning Goals

- Understand the fundamentals of Convolutional Neural Networks (CNNs), including convolution operations, layers, filters, and padding techniques used in image processing.
- Gain the ability to design, build, and train CNN architectures for image classification tasks using custom datasets.
- Develop proficiency in using pretrained models (e.g., VGG16, ResNet) for transfer learning to improve performance on limited data.
- Acquire skills to interpret and visualize CNN internals, including filters, feature maps, and Class Activation Maps (CAM) for model explainability

Course Topics

- Introduction to Convolutional Neural Networks (CNNs)
- Meaning of Convolution Operation in Vision
- Layers in CNN: Convolution, Pooling, Flattening, Dense
- Kernels/Filters, Padding Techniques (valid, same)
- Feature Maps and Dimensionality Calculation
- Transfer Learning using Pretrained CNNs (e.g., VGG16, ResNet)
- Hands-on: Image Classification using CNN on Custom Dataset
- Visualizing Filters, Feature Maps, and Class Activation Maps (CAM)