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Course Content

Course Outline

Welcome to the course on **Deep Learning**. This course will introduce you to the tools and techniques developed to solve complex problems using Artificial Neural Networks, and how it works on image data along with its applications in graphs.

Objective: The primary goal of this course is to understand various concepts involved in Deep Learning, learn about the problems where Feed-Forward, Convolutional, and Graph Neural Networks find use, and understand how and where to apply these deep learning algorithms.

Topics covered:

- **Intro to Deep Learning**
  - General Intro
  - Concept of Neurons
  - Activation functions
  - Multiple Layers
  - Architecture
  - Cross-Entropy Loss
  - Gradient Descent
  - Basic Training Algorithms - SGD, Minibatch
  - Practical Application
- **Convolutional Neural Networks**
  - Locality, Translation invariance
  - Filters/Convolutions
  - Pooling and Max-Pooling
  - Architecture of CNN
  - Illustration of what CNNs learn
  - Practical Application
- **Graph Neural Networks**
  - The ideas of Pre-Training, Transfer Learning, and Augmentation
  - Contrastive Learning
  - From Images to Graphs
  - Graph Convolutions
  - Example applications
  - Practical Application

Happy Learning!

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