

Deep Learning Curriculum

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Module 1: Neural Networks – Basics:

- Deep Learning - Introduction
- Perceptron
- Artificial Neural Network (ANN)
- Backpropagation
- Activation Functions
- Loss Functions
- Optimization Algorithms

Module 2: Mathematics for Deep Learning:

- Linear Algebra
- Statistics
- Probability
- Calculus

Module 3: Image Data Processing & Augmentation:

- Image Pre-processing
- Image Augmentation

Module 4: Convolutional Neural Networks (CNN) & Computer Vision:

- Convolutional Neural Networks (CNN)
- Transfer Learning in Computer Vision
- Object Detection & Localization
- Image Classification
- Semantic Segmentation
- Generative Models for Image Processing

Module 5: Text Data Processing:

- Tokenization
- Text Data Pre-processing

Module 6: Recurrent Neural Networks (RNN) & NLP:

- Recurrent Neural Networks (RNN)
- Word Embeddings
- Language Modelling
- Text Classification
- Sequence-to-Sequence Models
- Transfer Learning in NLP

Module 7: Generative Adversarial Networks (GANs):

- GAN Architecture
- Discriminator
- Generator
- Training a GAN
- Applications of GANs

Module 8: Autoencoders:

- Introduction to Autoencoders
- Autoencoder Architecture
- Autoencoders – Use Cases
- Variational Autoencoders (VAEs)

Module 9: Transfer Learning:

- Fine Tuning Pre-Trained Models
- Feature Extraction using Pre-Trained Models
- Transfer Learning for Computer Vision tasks
- Transfer Learning for NLP tasks

Module 10: Regularization Techniques:

- Overfitting & Underfitting
- Dropout
- L1 and L2 Regularization
- Early Stopping

Module 11: Pre-Trained Models:

- VGGNet
- ResNet
- Inception
- Transformer
- BERT
- GPT

Module 12: Deep Learning Use Cases (Refer below)

Module 13: Neural Network - Deployment

Module 12: Deep Learning Use Cases:

- Image Classification
- Object Detection

- Semantic Segmentation
- Image Generation & Style Transfer
- Text Generation
- Sentiment Analysis
- Time Series Prediction
- Recommendation Systems
- Anomaly Detection
- Speech Recognition
- Natural Language Processing
- Generative Models for Text
- Generative Models for Images
- Transfer Learning for Computer Vision & NLP
- Building End-to-End Deep Learning Pipelines
- Debugging & Visualizing Deep Learning Models
- Deploying Deep Learning Models on Cloud
- Distributed Deep Learning
- Interpreting Model Predictions