

Deep Learning



Zetlan Technologies

e-Learning Course

Unlock the power of AI with Deep Learning.
Master the techniques to transform industries

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COURSE MODULES

Module 1: Introduction to Deep Learning

- Overview of AI, Machine Learning, and Deep Learning
- Applications of Deep Learning
- Basics of Neural Networks
- Setting Up Deep Learning Environments (TensorFlow/PyTorch)

Module 2: Fundamentals of Neural Networks

- Perceptron and Multi-Layer Perceptron (MLP)
- Activation Functions (ReLU, Sigmoid, Tanh, Softmax)
- Loss Functions (MSE, Cross-Entropy)
- Forward and Backpropagation Algorithm
- Gradient Descent and Optimization (SGD, Adam, RMSprop)

Module 3: Deep Neural Networks (DNNs)

- Vanishing and Exploding Gradients
- Batch Normalization
- Dropout and Regularization
- Weight Initialization Techniques

Module 4: Convolutional Neural Networks (CNNs)

- Introduction to CNNs
- Convolution and Pooling Layers
- Popular CNN Architectures (LeNet, AlexNet, VGG, ResNet)
- Transfer Learning and Fine-Tuning

Module 5: Recurrent Neural Networks (RNNs) & Sequence

- Basics of RNNs
- Vanishing Gradient Problem in RNNs
- Long Short-Term Memory (LSTM)
- Gated Recurrent Units (GRUs)
- Applications in NLP and Time Series Forecasting

Module 6: Natural Lang Processing (NLP) & Transformers

- Word Embeddings (Word2Vec, GloVe)
- Sequence-to-Sequence Models
- Attention Mechanism
- Introduction to Transformers & Self-Attention
- BERT, GPT, and Large Language Models (LLMs)

Module 7: Generative Models & GANs

- Introduction to Generative Models
- Autoencoders (AE, Variational Autoencoders - VAE)
- Generative Adversarial Networks (GANs)
- Applications of GANs (DeepFakes, Image Synthesis)

Module 8: Reinforcement Learning (RL) & Deep Learning

- Basics of Reinforcement Learning
- Deep Q-Networks (DQN)
- Policy Gradient Methods
- AlphaGo and Real-World Applications

Module 9: Deployment & Productionizing Deep Learning

- Model Serialization (ONNX, TensorFlow SavedModel, TorchScript)
- Model Deployment (Flask, FastAPI, Streamlit)
- Cloud Deployment (AWS, Google Cloud, Azure)
- Edge AI and Mobile Deployment (TFLite, CoreML)

Module 10: Advanced Topics & Research Trends

- Self-Supervised & Unsupervised Learning
 - Few-Shot and Meta-Learning
 - Explainable AI (XAI) & Model Interpretability
 - AI Ethics and Bias in Deep Learning
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