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ACADEMY

Deep Learning Training Course

CURRICULUM

Module I – Foundations of Deep Learning

- Introduction to Deep Learning
- Difference between Machine Learning and Deep Learning
- Biological Inspiration: Neurons and the Human Brain
- Artificial Neural Networks (ANNs)
- Structure of a Neural Network (Input, Hidden, Output Layers)
- Activation Functions (Sigmoid, ReLU, Tanh, Softmax)
- Forward Propagation and Backpropagation
- Loss Functions and Optimization
- Gradient Descent and Learning Rate
- Overfitting, Underfitting, and Regularization Techniques

Module II – Neural Network Implementation with Python

- Building Neural Networks from Scratch (NumPy)
- Introduction to Deep Learning Frameworks (TensorFlow & PyTorch)
- Creating and Training Models in TensorFlow
- Creating and Training Models in PyTorch
- Hyperparameter Tuning
- Model Evaluation and Metrics
- Saving and Loading Models
- Batch Normalization and Dropout
- Early Stopping and Callbacks
- Practical Implementation on Simple Datasets

Module III – Model Creation with TensorFlow

- Introduction to TensorFlow Ecosystem
- Tensors, Variables, and Operations
- Building Neural Networks with Keras API
- Model Compilation, Training, and Evaluation
- Callbacks (EarlyStopping, ModelCheckpoint)
- TensorBoard for Visualization
- Implementing CNNs, RNNs, and Transfer Learning
- Hyperparameter Tuning (KerasTuner)
- Saving & Loading Models (SavedModel, H5)
- Hands-on Projects using TensorFlow

Module IV – Model Creation with PyTorch

- Introduction to PyTorch Framework
- Tensors, Autograd, and Computational Graph
- Building Neural Networks using nn.Module
- Optimizers and Loss Functions
- Training Loops and Backpropagation
- GPU Acceleration (CUDA)
- Implementing CNNs, RNNs, and Transformers
- Using torchvision and torchtext
- Model Saving, Loading, and Evaluation
- Real-World Projects with PyTorch

Module V – Computer Vision

- Introduction to CV and Image Processing
- Image Representation and Color Models
- Image Filtering and Edge Detection
- Object Detection (Haar, HOG)
- CNNs for Image Classification
- Image Augmentation Techniques
- Face Detection and Recognition
- Transfer Learning with CNNs
- Image Segmentation
- OCR (Optical Character Recognition)

Module VI – Advanced Deep Learning Architectures

- Convolutional Neural Networks (CNNs) – Theory and Architecture
- Applications of CNNs (Image Classification, Object Detection)
- Recurrent Neural Networks (RNNs)
- Long Short-Term Memory (LSTM) and GRU Networks
- Autoencoders and Variational Autoencoders (VAEs)
- Generative Adversarial Networks (GANs)
- Transfer Learning and Pretrained Models
- Attention Mechanism
- Transformers Overview
- Practical Implementation with Real-World Use Cases

Module VII – Natural Language Processing (NLP) Fundamentals

- Introduction to NLP
- NLP Pipeline and Text Preprocessing
- Tokenization, Stopwords Removal, Stemming, and Lemmatization
- Bag of Words and TF-IDF
- Word Embeddings (Word2Vec, GloVe, FastText)
- Part-of-Speech (PoS) Tagging and Named Entity Recognition (NER)
- Language Models and Probability-Based NLP
- Text Classification and Sentiment Analysis
- Sequence-to-Sequence Models
- Evaluation Metrics in NLP

Module VIII – Neural Network-based NLP Models

- Embedding Layers in Deep Learning
- RNNs, LSTMs, and GRUs for Text Data
- Encoder-Decoder Architecture
- Attention Mechanism in NLP
- Transformer Models (BERT, GPT, T5)
- Fine-tuning Pretrained Models for NLP Tasks
- Text Generation and Summarization
- Machine Translation
- Chatbot and Question-Answering Systems

Module IX – Model Optimization and Regularization

- Gradient Descent Variants (SGD, Momentum, RMSProp, Adam)
- Learning Rate Scheduling
- Weight Initialization Techniques
- Dropout and Early Stopping
- Batch Normalization and Layer Normalization
- Data Augmentation as Regularization
- Loss Function Selection (MSE, Cross-Entropy, Huber, etc.)
- Dealing with Overfitting and Underfitting
- Practical Tips for Training Stability
- Tuning and Debugging Deep Models

Module X – Model Testing and Performance Analysis

- Evaluation Metrics for Classification and Regression
- Confusion Matrix and ROC-AUC
- Precision-Recall and F1-Score Analysis
- Cross-Validation Techniques
- Hyperparameter Tuning (Grid Search, Random Search, Bayesian)
- Experiment Tracking Tools (MLflow, Weights & Biases)
- Error Analysis and Model Diagnostics
- Handling Imbalanced Data (SMOTE, Class Weights)
- Model Comparison and Selection
- Reproducibility and Documentation

Module XI – Model Deployment

- Model Serialization (Pickle, Joblib, SavedModel)
- Creating REST APIs using Flask/FastAPI
- Containerization with Docker
- Deploying Models on Cloud (AWS, GCP, Azure)
- Model Monitoring and Logging
- CI/CD for ML Pipelines
- Streamlit/Gradio for Interactive Demos
- Model Versioning and Rollback
- Model Governance and Lifecycle Management

Module XII – AI Deep Learning Project Development

- Defining Project Objectives
- Problem Formulation
- Data Collection and Cleaning
- Model Selection
- Training and Tuning
- Evaluation and Metrics
- Deployment Strategy
- Feedback Loop and Maintenance
- Documentation and Reporting
- Case Study Development

Deep Learning Training Course

Schedule

Duration

2 Months

(8 Weeks)

Training Schedule

Weekdays Training

Monday to Friday

Weekend Training

Saturday & Sunday

Daily / Weekly Session

Live Online Instructor Led Session



Deep Learning Training Course Fee

Limited Time Offer

Currency	Code	Offer Price	Regular Price
US dollar	USD	450	~~650~~
Canadian dollar	CAD	620	~~820~~
Australian dollar	AUD	700	~~900~~
Sterling pound	GBP	360	~~560~~
New Zealand dollar	NZD	780	~~980~~
Indian rupee	INR	35,000	~~55,000~~

Fee is inclusive of all applicable taxes and include examination and certification fee.

No other hidden charges of any type.

Thank You!

Thank you for downloading our curriculum! We're excited to be part of your learning journey. Feel free to reach out if you need more information.

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