AI/ML Development Training program

SYLLABUS

Month 1: AI/ML Fundamentals and Python Mastery

Week 1: Introduction to AI/ML

- Objective, Scope and Outcomes of the Course
- Overview of AI,its applications, use cases, and how it is transforming our lives,Application Domains for AI
- History and Evolution of AI
- Introduction to AI Project Cycle
  - Problem Scoping
  - Data Acquisition
  - Data Exploration
  - Modelling
  - Evaluation
- Overview of ML
- Types of Machine Learning
- Applications of Machine Learning
- Key Elements of Machine Learning
- Python for AI/ML Development

Week 2: Python Programming for AI/ML

- Python Essentials (Python Basics
- (Variables, Arithmetic Operators, Expressions, Data Types -
- integer, float, strings, using print() and input() functions,Control Flow)
- NumPy and Pandas DataFrame and Series for Data Manipulation
- Data Visualization with Matplotlib and Seaborn

Week3- Machine Learning with Scikit-learn

- Supervised Learning-
- Introduction to Supervised Learning
- Linear Regression
- Logistic Regression
- Decision Trees and Random Forests
- Model Evaluation and Metrics

Week 4- Unsupervised Learning-

- Clustering (K-Means, Hierarchical)
- Dimensionality Reduction (PCA)
- Anomaly Detection
- Model Evaluation and Selection

Month 2: Neural Networks and Deep Learning

Week 1-2: Computer Vision

- Introduction to Computer Vision
- Image Processing and Feature Extraction
- Object Detection with OpenCV

Introduction to Artificial Neural Networks

- Feedforward Neural Networks
- Convolutional Neural Networks (CNNs)
- Building and Training Deep Learning Models
- Image Classification with CNNs
- Recurrent Neural Networks (RNNs)
- Generative Adversarial Networks (GANs)

- Transfer Learning and Fine-tuning

Week 2-3 : Natural Language Processing (NLP)

- Introduction to NLP
- Text Preprocessing
- Text Classification
- Word Embeddings (Word2Vec, GloVe)
- Sequence-to-Sequence Models (e.g., LSTM)
- Building NLP Models with NLTK and spaCyIntroduction to NLP

Week 4: Production-Level Development

- Software Development Principles
- Version Control with Git
- Unit Testing and Code Quality
- Deploying Models with Flask and Docker
- Model Monitoring with MLflow and TensorBoard
- Introduction to Cloud Platforms (AWS, Azure, GCP)

Month 3: Advanced AI/ML Topics and Project Work

Week 1: Reinforcement Learning

- Introduction to Reinforcement Learning
- Markov Decision Processes
- Q-Learning
- Deep Q-Networks (DQNs)

Week 2: Big Data Processing with Apache Spark

- Introduction to Big Data and Spark
- Working with Spark DataFrames

- Building AI/ML Pipelines

Week 3: AI Ethics and Responsible AI

- Understanding AI Bias and Fairness
- Ethical Considerations in AI/ML Development
- Emerging trends in AI/ML
- OpenAI
- Prompt Engineerining
- Langchain Method

Week 4: AI/ML Project Development

- Collaborative Project Work
- Presentation Skills
- Final Project Kickoff
- Final Project (1 Month Extension)

Apply Your Skills to a Real AI/ML Project

Collaborate with Team Members

Present Your Project to the Class