



AI Engineer Specializing in Data Science and Machine Learning



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Introduction

This AI Engineer Specializing in Data Science and Machine Learning course provides a structured pathway into AI engineering, with a strong focus on data science and machine learning. It builds foundational knowledge in statistical thinking, programming, and data handling for AI systems. Participants explore supervised and unsupervised learning techniques used in modern AI solutions. The program develops a practical understanding of deep learning and neural network architectures. It introduces real-world AI workflows from data preparation to model evaluation. It prepares learners for industry-level AI engineering roles by equipping them with applied machine learning capabilities.

Targeted Groups

This AI Engineer Specializing in Data Science and Machine Learning training targets professionals seeking knowledge and skills:

- Data analysts seeking an AI career transition.
- Software developers entering machine learning.
- IT professionals expanding AI capabilities.
- Graduates in computer science or engineering.
- Business analysts working with data systems.
- Engineers interested in predictive modeling.
- Researchers exploring applied machine learning.
- Professionals pursuing an AI engineer course certification.

Course Objectives

Participants will achieve the following objectives by completing the AI Engineer Specializing in Data Science and Machine Learning course:

- Understand core concepts of AI and machine learning systems.
- Apply data science methods for structured and unstructured data.
- Build a strong foundation in Python for machine learning workflows.
- Analyze datasets using statistical and computational techniques.
- Implement supervised learning and classification models.
- Apply unsupervised learning for clustering and pattern detection.
- Develop neural network models for deep learning applications.
- Evaluate model performance using standard AI metrics.
- Understand model tuning and optimization techniques.
- Gain knowledge in AI model deployment processes.

Targeted Competencies

Participants will gain the following competencies during the AI Engineer Specializing in Data Science and Machine Learning program:

- Data preprocessing and feature engineering skills.
- Machine learning model development using Python tools.
- Ability to design supervised learning pipelines.
- Competence in clustering and unsupervised methods.
- Understanding of neural networks and deep learning models.
- Skills in model evaluation and validation techniques.
- Ability to interpret AI model outputs effectively.
- Knowledge of AI workflow integration in business systems.

Studying Scenarios

In this AI Engineer Specializing in Data Science and Machine Learning training, participants develop skills through the following scenarios:

- Building predictive models for business forecasting tasks.
- Designing classification systems for customer segmentation.
- Analyzing real datasets for pattern discovery.
- Creating recommendation systems for digital platforms.
- Applying AI models to financial risk analysis cases.
- Developing image recognition models using neural networks.
- Optimizing machine learning models for performance accuracy.
- Simulating real-world AI deployment environments.

Course Content

Unit 1: Foundations of Artificial Intelligence and Data Science

- Introduction to artificial intelligence principles and evolution.
- Core concepts of data science and machine learning systems.
- Understanding the AI engineer role in modern industries.
- Overview of the AI lifecycle from data to deployment.
- Types of data used in machine learning projects.
- Basic probability and statistics for AI modeling.
- Introduction to the AI engineer course structure and workflow.

Unit 2: Python Programming and Data Handling for Machine Learning

- Python fundamentals for AI and data science applications.
- Data structures used in machine learning programming.
- Working with NumPy for numerical computations.
- Data manipulation using the Pandas library techniques.
- Data cleaning methods for structured datasets.
- Data visualization techniques for analytical insights.
- Preparing datasets for machine learning training models.

Unit 3: Machine Learning Algorithms and Predictive Modeling

- Introduction to machine learning training concepts.
- Supervised learning models and regression techniques.
- Classification algorithms for predictive analysis tasks.
- Decision trees and ensemble learning methods.
- Support vector machines for classification problems.
- Unsupervised learning and clustering techniques.
- K-means clustering for pattern detection systems.
- Model evaluation metrics for performance analysis.

Unit 4: Deep Learning and Neural Networks

- Introduction to deep learning course fundamentals.
- Structure and function of neural networks.
- Activation functions in deep learning models.
- Forward and backward propagation concepts.
- Convolutional neural networks for image processing.
- Recurrent neural networks for sequence data.
- Optimization techniques in neural network training.
- Deep learning model tuning and improvement methods.

Unit 5: MLOps, Deployment, and AI Engineering Practices

- Introduction to MLOps training and workflows.
- Model deployment strategies in production systems.
- AI model lifecycle management techniques.
- Version control for machine learning models.
- Monitoring model performance in real environments.
- API integration for AI applications.
- Scalable machine learning system architecture.
- Automation of AI pipelines for business solutions.



Final Insights & Key Takeaways

This course builds a strong foundation in AI engineering, integrating applied machine learning and data science. It prepares learners to handle real-world AI systems from development to deployment with structured technical expertise.