Faysal Aziz

Mastering AI, Data, and Cloud

An Accelerated Exploration of Cutting-Edge Technologies in 1 day

FA-0301 · 1 day

Agentic & Generative AI · DevOps, Cloud & Infrastructure · Cybersecurity · Data & Analytics · Automation, RPA & Power Platform

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Introduction

Harness the power of Machine Learning, Cloud, and DevOps to innovate at scale.

Introduction

In today’s tech-driven world, expertise in Machine Learning, Cloud Computing, Data Engineering, and DevOps is essential to build scalable, secure, and efficient systems. This one-day exploratory course brings together these interconnected disciplines to give participants a holistic view of modern software and AI engineering practices. With hands-on demos in Python and real-world workflows, participants will learn to leverage the synergy between ML, MLOps, Cloud, and DevOps to solve complex problems and deliver value-driven solutions. Whether you're working in AI, cloud infrastructure, or data pipelines, this course will equip you with in-demand skills to stay ahead in the industry.

Learning outcomes

By the end of this course, participants will:

- Understand the fundamentals and advanced concepts of Machine Learning, including specialized applications like NLP, Computer Vision, Time Series, and Anomaly Detection.
- Learn best practices for MLOps, including CI/CD pipelines, model monitoring, and infrastructure management.
- Grasp the essentials of Generative AI, including Retrieval-Augmented Generation (RAG) and Explainable AI (XAI).

- Explore Cloud Computing architectures, including multi-cloud strategies, serverless computing, and cost optimization.
- Gain insight into cybersecurity principles, cloud security, and networking for distributed systems.
- Build scalable data pipelines with ETL/ELT tools, real-time streaming, and big data platforms.
- Master database management techniques, including SQL/NoSQL, data modeling, and query optimization.
- Understand the role of DevOps in automating infrastructure and workflows for reliable CI/CD deployments.

Prerequisites [Mandatory]

- Good experience with Python programming.
- Deep understanding of software development or data workflows.
- Working experience with POSIX.

Training outline

1. 1. Machine Learning (ML): From Basics to Advanced Applications

Fundamentals of ML

- Overview of supervised and unsupervised learning.
- Core ML workflow: Data preparation, training, and evaluation.
- Key metrics: Precision, recall, and F1-score.

Advanced Techniques

- Feature engineering for performance improvement.
- Deep learning basics: Neural networks and optimization techniques.

Domain-Specific Applications

- **Natural Language Processing (NLP):** Tokenization, embeddings, and transformer-based models.
- **Computer Vision:** Image classification and object detection with pre-trained CNNs.

- **Time Series Analysis:** Forecasting with ARIMA and LSTMs.
- **Anomaly Detection:** Techniques like Isolation Forests and Autoencoders.

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2. 2. MLOps: Operationalizing Machine Learning

Introduction to MLOps

- The need for production-grade ML pipelines.
- Overview of MLOps workflows and tools.

Key Practices

- **CI/CD for ML Pipelines:** Automating training, testing, and deployment.
- **Model Monitoring and Drift Detection:** Tracking performance over time.
- **Model Versioning:** Managing experiments with MLFlow and DVC.
- **Infrastructure for ML:** Leveraging cloud and containerized environments.

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3. 3. Generative AI (Gen AI): Shaping the Future of AI

Transformers in Action

- Anatomy of transformers like GPT and BERT.
- Applications: Text generation, summarization, and translation.

RAG Systems

- The significance of retrieval in augmenting generative models.
- Demo: Building a RAG pipeline with OpenAI API and Hugging Face's LLama.

Explainable AI (XAI) for Generative Models

- Understanding attention mechanisms and interpretability in transformers.

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4. 4. Cloud Computing: Scalable and Cost-Effective Solutions

Cloud Platforms Overview

- Comparing Azure, AWS, and GCP services.
- Hybrid and multi-cloud strategies.

Serverless Architectures

- Introduction to serverless computing: Functions-as-a-Service (FaaS).
- Use cases for event-driven applications.

Cost Optimization

- Resource scaling and management.
- Techniques to minimize cloud expenditure.

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5. 5. Network & Security: Safeguarding Systems

Cybersecurity Fundamentals

- Principles of encryption, authentication, and authorization.

Cloud Security Best Practices

- Securing APIs, data, and virtual environments.

Networking Principles for Distributed Systems

- Load balancing and fault-tolerant architectures.

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6. 6. Data Engineering: Building Robust Pipelines

ETL/ELT Pipelines

- Designing workflows for data ingestion, transformation, and storage.

Streaming Data Processing

- Real-time systems with Kafka and Spark Streaming.

Big Data Ecosystems

- Using data lakes and big data tools for large-scale analytics.

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7. 7. Database Management: SQL and Beyond

SQL vs. NoSQL Databases

- Strengths, weaknesses, and use cases of relational vs. non-relational databases.

Query Optimization

- Techniques for performance tuning in SQL queries.

Data Modeling

- Designing schemas for scalability and efficiency.

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8. 8. DevOps: Automating Infrastructure and Workflows

Infrastructure as Code (IaC)

- Automating cloud and on-prem infrastructure with tools like Terraform.

Containerization and Orchestration

- Docker basics and Kubernetes for deploying scalable systems.

CI/CD Automation

- Building end-to-end automated deployment pipelines.

This one-day intensive training program is your gateway to mastering cutting-edge technologies that shape modern data-driven solutions. Delivered by an instructor with over 30 years of industry experience, the course combines actionable insights, practical demos, and a focus on real-world relevance, ensuring participants gain the skills to excel in AI, Cloud, and DevOps. Whether you're building the next AI product, designing resilient data pipelines, or scaling enterprise-grade infrastructure, this course sets the foundation for success.

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