AI Engineering for Production Systems Training

Duration: **2 Day**

BILGINÇ IT Academy
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Overview

AI Engineering for Production Systems Training focuses on the engineering principles and practices required to design, develop, and reliably operate AI-powered applications in production environments.

The course explores modern AI product architectures, the capabilities and limitations of large language models (LLMs), AI application design, context engineering, Retrieval-Augmented Generation (RAG) systems, and AI agent development. Participants gain an understanding of how different AI architectures can be structured for specific use cases and integrated into production systems.

The program also addresses reliable AI application development, evaluation techniques, performance optimization, and enterprise AI engineering practices. By combining fundamental concepts with practical exercises, the training helps participants develop the skills needed to design scalable, maintainable, and production-ready AI solutions for real-world business requirements.

Prerequisites

Basic knowledge of software development, API usage, and Python programming is recommended. Familiarity with fundamental artificial intelligence concepts and large language models will help participants gain greater value from the training.

Who Should Attend

- Software Developers
- Data Scientists
- AI Researchers
- IT Professionals
- Professionals Working in Enterprise Digital Transformation Teams

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What You Will Learn

By the end of this training, you will be able to:

- Apply modern AI architecture and system design principles.
- Manage prompt, memory, and retrieval strategies using context engineering techniques.
- Build RAG-based AI applications that incorporate external knowledge sources.
- Design AI agent systems using workflows and multi-agent architectures.
- Implement guardrails, structured outputs, and error recovery mechanisms.
- Evaluate AI applications using different testing and assessment methods.
- Manage deployment, CI/CD, observability, and scaling processes.
- Optimize token consumption, latency, and operational costs.
- Address security, privacy, governance, and compliance requirements in enterprise AI solutions.

Outline

1. AI Engineering Foundations

- Modern AI Product Stack
- LLM Capabilities & Limitations
- AI System Design Principles
- Prompt vs Workflow vs Agent
- Introduction to Context Engineering

2. AI Application Architecture

Core architectural concepts and system design approaches for building AI-powered applications.

3. Context Engineering

Managing application context through prompt design, memory management, and retrieval strategies.

4. RAG Systems

Retrieval-Augmented Generation (RAG) architectures and the development of AI applications that incorporate external data sources.

5. Agent Engineering

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Developing AI agents and designing workflow-based systems, supervisor patterns, and multi-agent architectures.

6. Reliable AI Systems

- Guardrails
- Structured Output
- Error Recovery Strategies

7. AI Evaluation Methods

- Offline Evaluations
- Golden Sets
- Human Evaluation

8. Production AI Operations

- Observability and Monitoring
- CI/CD Pipelines
- Deployment Strategies
- Scaling AI Applications

9. AI Performance and Cost Optimization

- Token Usage Optimization
- Latency Management
- Balancing Cost and Performance in AI Applications

10. Enterprise AI Engineering

- Security and Data Privacy
- AI Governance
- Compliance and Enterprise Requirements