



Develop Search and Agents with AI Applications

Course description

In this comprehensive course, you will delve into the fundamental concepts, methods, and strategic approaches for integrating Artificial Intelligence into search functionalities and developing intelligent agents. You will gain a profound understanding of how AI can revolutionize information retrieval, personalize user experiences, and automate complex tasks through sophisticated agent design. The course provides practical insights into cutting-edge AI technologies, including Large Language Models (LLMs), embeddings, and vector databases, and demonstrates how to leverage them to solve real-world challenges in search and agent development. By the end of this program, you will be equipped to plan, design, and discuss the implementation of advanced AI-powered search systems and intelligent agents within your organization.

- Course level: Fundamental
- Duration: 1 day

Activities

This course includes presentations, hands-on labs, demonstrations, and group exercises.

Course objectives

In this course, you will learn to:

- Summarize key AI concepts, methods, and strategies relevant to building advanced search capabilities and intelligent agents
- Discuss the appropriate application of AI and machine learning technologies for enhancing search relevance, personalization, and agent autonomy
- Describe how to develop and deploy AI-powered search and agents responsibly, addressing ethical considerations, bias, and safety
- Recognize various types of AI-driven search solutions (e.g., semantic search, vector search) and intelligent agent architectures with specific use cases
- Explain the implementation roadmap and project planning methodologies for integrating AI search and agent systems into your organization

Intended audience

This course is intended for those with limited prior knowledge of AI in search and agents:

- Software Developers
- Data Scientists
- AI/ML Engineers
- Product or Project Managers
- Solutions Architects
- Business Analysts
- IT Managers

Prerequisites

We recommend that attendees of this course have:

- None

Course outline

Module 1: Introduction to AI for Search and Agents

- The Evolution of Search: From Keyword to AI-Powered
- Understanding Intelligent Agents: Definition, Types, and Applications
- Core AI Technologies for Search and Agents (LLMs, Embeddings, Knowledge Graphs)
- Overview of Use Cases for AI in Search and Agents

- Demo: Exploring a Basic AI-Enhanced Search Interface

Module 2: Core Concepts of AI-Powered Search

- Traditional Search vs. Semantic and Vector Search Paradigms
- Deep Dive into Embeddings and Vector Databases for Information Retrieval
- Natural Language Processing (NLP) for Semantic Understanding in Search
- AI-driven Relevance Ranking, Personalization, and Faceted Search
- Exploring Enterprise Search, E-commerce Product Search, and Content Discovery Use Cases

Module 3: Designing and Building AI Agents

- Agent Architectures: Percept-Act Cycle, Memory, Planning, and Reasoning
- Types of AI Agents: Conversational, Goal-Oriented, Autonomous, and Multi-Agent Systems
- Integrating Large Language Models (LLMs) for Agent Intelligence and Natural Language Interaction
- Introduction to Agent Development Frameworks (e.g., LangChain, LlamaIndex)
- Hands-on Lab: Building a Simple Conversational AI Agent for a Specific Task

Module 4: Advanced Search and Agent Capabilities

- Hybrid Search Strategies: Combining Keyword and Semantic Search for Optimal Results
- Retrieval Augmented Generation (RAG) for Enhancing Search Answers and Agent Knowledge
- Multi-modal Search: Integrating Text, Image, and Audio for Richer Experiences
- Agent Orchestration, Tool Use, and Advanced Planning Mechanisms
- Hands-on Lab: Implementing RAG to Power an Intelligent Q&A System

Module 5: Responsible AI in Search and Agents

- Identifying and Mitigating Bias in Search Results and Agent Responses
- Ensuring Fairness, Transparency, and Explainability (XAI) in AI Applications
- Data Privacy, User Consent, and Security Considerations for AI-Powered Interactions

- Implementing Guardrails, Safety Mechanisms, and Content Moderation for Agent Behavior
- Ethical Guidelines and Compliance for AI-driven Search and Agent Systems

Module 6: Deployment and Operationalizing AI Search and Agents

- Infrastructure Considerations: Vector Database Selection, LLM Hosting, and Compute Resources
- Monitoring, Logging, and Observability for Performance, Relevance, and User Experience
- Continuous Improvement: Feedback Loops, A/B Testing, and Model Fine-tuning Strategies
- Scaling AI Applications for Production Environments and High Traffic Loads
- Demo: Deploying a Basic AI-Powered Search Service to the Cloud

Module 7: Integrating AI Search and Agents into Applications

- Leveraging APIs and SDKs for Seamlessly Embedding AI Capabilities
- Designing User Interfaces (UIs) and User Experiences (UX) for AI-Powered Interactions
- Automating Workflows and Business Processes with Intelligent Agents
- Best Practices for Integrating Search and Agents into Existing Systems
- Hands-on Lab: Integrating an AI Agent into a Web Application for Customer Support

Module 8: Course Wrap-up

- Project Planning for AI Search and Agent Initiatives: Defining Scope, Metrics, and Teams
- Emerging Trends and Future Directions in AI-Powered Search and Autonomous Agents
- Course Summary: Key Takeaways and Actionable Insights
- Next Steps and Additional Resources for Continued Learning

Your course overview ends here.
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