Automation, Workflows and Agents

Level: Introductory

Developing AI Agents and Agent Pipelines

2 days

Are you ready to take your AI skills to the next level? This cutting-edge course will teach you how to harness the power of large language models to build highly capable and practical AI agents.

Throughout this hands-on course, you'll dive deep into the latest techniques and tools for developing AI agents that can understand complex queries, reason, and interact with their environment to deliver valuable insights. You'll gain a thorough understanding of the components needed to build them, including transformer architectures, prompting techniques, and using the LangChain framework.

Whether you're a developer looking to enhance your skillset, a data scientist aiming to build more intelligent models, or an AI/ML engineer striving to create impactful systems, this course will equip you with the knowledge and practical abilities to tackle real-world challenges using AI agents. By the end of the course, you'll be able to design and implement your own AI agents and pipelines to revolutionize your organization's capabilities.

Join us to explore the frontiers of modern AI development and gain the skills to build the intelligent systems of tomorrow.

Introduction & Agent Demo

- What are AI agents and why are they useful?
- Live demo of a complex multi-step agent that:
    - Takes in a user's query
    - Searches for relevant info across data sources
    - Analyzes data and generates insights
    - Returns an insightful summary addressing the query
- Preview of the skills and concepts the course will cover to build this

Transformer Models Deep Dive

- What are transformer language models? How do they work?
- Attention mechanism, self-attention, multi-head attention

- Transformer architecture - encoders, decoders
- Training transformers on large language modeling tasks
- Capabilities of pretrained transformers (GPT, BERT, etc.)
- Hands-on: Explore transformer models in Hugging Face

Prompting Techniques

- Zero-shot, one-shot, few-shot prompting
- Chain-of-thought (CoT) prompting
- ReAct prompting - generation, action, observation
- Prompt engineering tips and best practices
- Hands-on: Prompt a model to perform multi-step reasoning

LangChain Refresher

- What is LangChain and why is it useful for agents?
- Key concepts - prompts, llms, chains, agents, tools
- Introducing Langflow for visual LangChain development
- Hands-on: Build a QA chain in LangChain

Developing AI Agents

- Key components: agent, prompt, tools, memory
- Defining an agent's goals and capabilities
- Writing effective agent prompts
- Choosing and integrating tools (search, calculator, APIs)
- Agent memory - remembering interactions and info
- Anthropic's function calling vs OpenAI's approaches
- Hands-on: Develop a news summarization agent

Agent Pipelines

- Chaining agents together into pipelines
- Use cases: Complex tasks, specialized skills, scale
- Considerations: Inter-agent communication, error handling
- Tools for building pipelines - LangChain, Langflow
- Hands-on: Build an agent pipeline to generate financial reports
    - Agent 1: Searches and collects relevant financial data
    - Agent 2: Cleans, analyzes and visualizes the data

    - Agent 3: Generates natural language summary of insights

Putting it All Together

- Review of key concepts
- Live coding demo combining all concepts
- Q&A and discussion
- Ideate agent use cases for students' organizations
- Students present ideas and get feedback
- Resources and next steps for learning more

Intended Audience

This course is designed for developers, data scientists and AI/ML engineers who want to level up their skills and learn cutting-edge techniques for building intelligent AI systems. It assumes foundational Python skills and basic knowledge of ML and NLP. Learners will gain practical experience in prompt engineering, working with transformers, using LangChain, and designing agent pipelines to tackle complex real-world use cases.

Prerequisites

Those attending this course should meet the following:

- Comfortable with Python programming
- Familiarity with basic machine learning concepts
- Some experience with NLP and language models
- Exposure to transformer models like GPT is helpful