Generative AI and Prompt Engineering

Duration: 5 Days

You'll receive a comprehensive education in the fundamental theories and methodologies behind Generative AI. Our meticulously curated curriculum delves into cutting-edge topics such as deep learning, natural language processing, and predictive analytics. Through hands-on labs, you'll apply these skills to real-world projects, ensuring a strong focus on practical training. This curriculum is designed to equip you with the knowledge and capabilities essential for a thriving career in artificial intelligence.

Undeniably, generative AI has revolutionized the tech landscape, introducing ground breaking applications like generating original content, programming, and enhancing customer support, as seen in examples such as Cohere Command. The potential uses for this technology continue to expand daily. Companies that effectively leverage this disruptive technology will become the future industry leaders and stand out in the market. This free on-demand course aims to swiftly familiarize you with generative AI, ensuring you're up-to-date with this transformative technology.

Prerequisites:

- Programming Skills: Proficiency in Python.
- Familiarity with Machine Learning Concepts: Understanding of fundamental machine learning concepts such as supervised and unsupervised learning, neural networks, and training models.
- Mathematics and Statistics: Basic understanding of linear algebra, calculus, probability, and statistics as these form the basis of machine learning algorithms.HD
- Data Handling Skills: Knowledge of data manipulation, pre-processing, and data visualization techniques.
- Understanding of AI Fundamentals: Basic knowledge of artificial intelligence and its subsets like computer vision and natural language processing.

Target Audience:

- AI Enthusiasts: Individuals passionate about artificial intelligence, looking to delve deeper into generative AI to expand their knowledge and skill set.
- Software Developers: Professionals aiming to integrate generative AI into software development, whether for content generation, enhancing user experiences, or other applications.
- Data Scientists/Engineers: Those working in the field of data science interested in exploring advanced AI techniques for data analysis and processing.
- Tech Professionals and Innovators: Professionals seeking to stay updated with the latest advancements in AI and harness generative AI's potential to innovate within their industries.
- Entrepreneurs/Managers: Individuals aiming to understand how generative AI can be leveraged for business innovation, product development, and gaining a competitive edge in the market.

This course accommodates varying levels of expertise, from beginners with a solid foundational understanding of AI to intermediate learners wanting to expand their knowledge and practical skills in generative AI applications. The hands-on labs and practical projects ensure that learners gain real-world experience and skills that can be directly applied in various domains.HD

Topics

Day 1

**Module 1**. Introduction to Generative AI

Session 1. Introduction to AI and Machine Learning

- Artificial Intelligence, Machine Learning and Deep Learning

Session 2. Introduction to Generative AI

- An Overview of Generative AI
- Mechanics of Generative AI
- Discriminative and Generative Models

**Module 2**. Prompt Engineering for Generative AI

Session 3. Prompt Engineering for Generative AI

- Introduction to Prompt Engineering
- Principles, Techniques and Best Practices
- Zero Shot, One Shot, Few Shot Prompts
- Tokens, Max Tokens and Temperature
- Chain of Thoughts
- Formatting, Summarizing and Inferring Prompts
- Retrieval Augmented Generation - RAG

**Module 3.** Generative AI Applications

Session 4. Generative AI Applications

- Text Based Applications
- Image-based Applications
- Video Generation
- Audio Applications
- Generative AI Ecosystem

- Cohere Command,
- LaMDA, LLaMA-2,
- Cohere embed-english,
- Aya
- DALLE-2

Day 2

**Module 4.** Getting Started with Cohere

Session 5. Getting Started with Cohere

- Getting started with the Cohere
- Understanding of Cohere Models
- Temperature, token length, penalties, Top P.
- Using the Cohere Playground on OCI
- Getting Started with Cohere API
- Authentication and Access Keys
- The Chat endpoint
- The Summarize endpoint

Session 6. Using Large Language Models, Fine Tuning, Security and Privacy

- Using Large Language Models
- Fine Tuning the Model
- Controlling Hallucinations
- Cohere Privacy and Security

**Module 5.** Open Source LLM Ecosystem

Session 7. Understanding Large Language Models

- Large Language Models
- Transformers, Sequence Models, RNN, Encoder - Decoder
- Embeddings, Tokenization

Session 8. Open Source LLM Ecosystem

- Open source LLM Ecosystem

- Deep Dive into Meta Llama 2, Falcon
- Leveraging Models from Hugging Face

Day 3

**Module 6.** Generative AI - LLM Ecosystem and Frameworks

Session 9. LangChain with Cohere

- LangChain Ecosystem
- Langchain Concepts
- Using Multiple Chains
- Working with Chains

Session 10. Working with Memory Embeddings Agents

- Working with Memory, Embeddings and Agents
- Structured Data and Output Parsing Techniques
- Data Loaders - Ingesting documents
- Text Splitters - Chunking Data
- LlamaIndex and Its usage.
- Haystack and Its usage

Session 11. Vector Databases and Embedding Techniques

- Working with Vector Databases (Pinecone)
- Embedding Techniques (working with Embedding)
- Various Embedding Models
- Capabilities and Benefits
- Embedding for Image/Text

Day 4

**Module 7** - Generative AI - for Software Engineering

Session 12. Generative AI - for Software Engineering

- Leveraging Generative AI to Improve Quality and Productivity in SoftwareEngineering
- Prompts for Code Generation
- Prompts for Test Case Generation

- Prompts for Code Translation

**Module 8.** Building Applications using Generative AI

Session 13. Building Applications Using Generative AI

- Role of Developers as Consumers of Generative AI APIs.
- Building Applications from Generative AI Outputs.
- Session & Chat History Management Best Practices
- Framework for Output Validation & Continuous Improvement of Prompts
- Deployment Options and Best Practices.

Introduction to GitHub Copilot

- Overview of GitHub Copilot
- Installation and setup
- Understanding how GitHub Copilot works
- Exploring supported programming languages and platforms

Getting Started with GitHub Copilot

- Basic usage and interface overview
- Generating code snippets for common tasks
- Understanding code suggestions and completions
- Hands-on exercises to practice using GitHub Copilot for code generation

Advanced Usage and Customization

- Exploring advanced features and capabilities
- Customizing prompts and preferences
- Using GitHub Copilot for specific programming tasks
- Best practices for integrating GitHub Copilot into your workflow

Collaboration and Code Reviews with GitHub Copilot

- Collaborative coding with GitHub Copilot

- Leveraging GitHub Copilot for code reviews and feedback
- Integrating GitHub Copilot with version control systems
- Tips and tricks for effective collaboration using GitHub Copilot
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Day 5

**Module 9** - Generative AI Legal, privacy, Security Concerns

Session 14. Generative AI Legal, privacy, Security Concerns

- Concerns around Legal, Privacy, Security Concerns
- Concerns around IP
- Responsible AI
- Enterprise Best Practices

**Module 10** - Building Application using Gen AI - Case Studies

Session 15. Building Application using Gen AI - Case Study

- Practical Case study using Cohere
- Build a Chain for PDF Documents with RAG Retriever

Session 16. Document Insights Extraction

- Entity Extraction with Generative AI

**Module 11** – Solution Architecture for Gen AI

Session 17. Solution Architecture for Gen AI

- Solution Guidelines - Well-Architected Principles
- Chat Session Management
- Cohere Model Fine Tuning
- Standard Architectures for Various Use Cases
- Provisioning Security, Privacy & Transparency
- Manage Token Limitations
- Deployment Standards – Cloud On-Premise.
- Private GPT Standards