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.
- **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**.
- **Software Developers**.
- **Data Scientists/Engineers**.
- **Tech Professionals and Innovators**.
- **Entrepreneurs/Managers**.

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.

Hands on Labs

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Lab 1. Setting Up the Environment
Lab 2. Getting Started with Prompt Engineering
Lab 3. Generate Images from Text using Stable Diffusion
Lab 4. Prompt Engineering - Summarizing and Inferring
Lab 5. Working with Cohere Playground
Lab 6. Cohere Model Fine Tuning
Lab 7. Working with LLAMA -2
Lab 8. Working with LangChain
Lab 9. Getting started with LlamaIndex
Lab 10. Working with Memory and Haystack with Cohere.
Lab 11. Working with Pinecone Vector Database
Lab 12. Generating Code with Generative AI
Lab 13. Brainstorming Story Ideas with Cohere and Stable Diffusion
Lab 14. Cohere and LangChain - Create a Chatbot for PDF Files
Lab 15. Article Recommender with Extraction
Lab 16. References Only - Evaluating a Custom Model
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Topics

Part - 1 : Building Blocks of Generative AI and Prompt Engg.

Day 1

Module 1. Introduction to Generative AI

Session 1. Introduction to AI and Machine Learning

- Artificial Intelligence
- Language-Related AI Tasks
- Vectors
- Language AI Models
- Speech-Related AI Tasks
- Vision Related AI Tasks
- Relationship Between AI and ML
- Machine Learning and its Types

Session 2. Introduction to Generative AI

- Overview of Generative AI
- Generative AI Models
- Mechanics of Generative AI

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Lab 1. Setting Up the Environment on OCI
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Module 2. Prompt Engineering for Generative AI

Session 3. Prompt Engineering for Generative AI

- Introduction to Prompt Engineering
- Principles, Techniques and Best Practices
- K-Shot Prompts
- Tokens, Max Tokens, Temperature, Top-K and Top-P
- Chain of Thoughts

- Formatting, Summarizing and Inferring Prompts

`Lab 2. Getting Started with Prompt Engineering`

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 and Command-R-Plus,
  - LaMDA, LLaMA-3,
  - Cohere Embed-English,
  - Aya
  - DALL-E-3

`Lab 3. Generating Images using Stable Diffusion`

Day 2

Module 4. Getting Started with Cohere

Session 5. Getting Started with Cohere

- Getting started with the **Cohere.**
- Understanding of **Cohere** Models
- Using the Cohere Playground
- Getting Started with **Cohere API**
- Authentication and Access Keys
- The ***Chat*** endpoint
- The **Summarize** Endpoint

`Lab 4. Working with Cohere Playground`

Session 6. Understanding Large Language Models

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

`Lab 5. Prompt Engineering - Summarizing and Inferring`

Session 7. LLM Fine Tuning and RAG

- Using Large Language Models
- Fine Tuning the Model
- Retrieval Augmented Generation

- Controlling Hallucinations

Lab 6. Cohere Model Fine Tuning (10 Requests Per Day)

Module 5. Open Source LLM Ecosystem

Session 8. Open Source LLM Ecosystem

- Open source LLM Ecosystem
- Deep Dive into Meta Llama 3 and Falcon LLMs
- Leveraging Models from Hugging Face

Lab 7. Working with Meta LLAMA-3

Part - 2 : Architectural Components of GenAI

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

Lab 8. Working with LangChain

Session 10. Working with Memory and Agents

- Memory and Agents
- Structured Data and Output Parsing Techniques
- Data Loaders - Ingesting Documents
- Text Splitters - Chunking Data
- LlamaIndex and Its usage
- Haystack and Its usage

Lab 9 Getting started with LlamaIndex

Lab 10. Working with Memory and Haystack with Cohere.

Session 11. Vector Databases and Embedding Techniques

- Vector Databases
- Working with Embedding
- Embedding Models
- Capabilities and Benefits
- Embedding for Image/Text

Lab 11. Working with Pinecone Vector Database

Part - 3 : A Developers Day

Day 4

Module 7 - Generative AI Legal, Privacy, Security Concerns

Session 12 Generative AI Legal, Privacy, Security Concerns

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

Module 8 - Generative AI - for Software Engineering

Session 13. Generative AI - for Software Engineering

- Leveraging Gen AI to Improve Quality and Productivity in Software Engineering
- Prompts for Developers and DBAs
- Prompts for Writing Unit Tests
- LLMs for Developers

Lab 12. Generating Code with Generative AI

Module 9. Building Applications using Generative AI

Session 14. 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

Lab 13 Brainstorming Story Ideas with Cohere and Stable Diffusion

Part - 4 : Case Studies and Project

Day 5

Module 10 - Building Application using Gen AI - Case Studies

Session 15. Building Application using Gen AI - Case Studies

- Practical Case Studies of **Cohere**
- Build a Chain for PDF Documents with RAG Retriever

- Domain Specific ChatBOT
- Automate AI Workflows with AutoGPT & LangChain

Lab 14. Cohere and LangChain - Create a Chatbot for PDF Files

Session 16. Document Insights Extraction

- Article Recommender with Extraction with Generative AI

Lab 15. Article Recommender with Extraction

Module 11 – Solution Architecture for Gen AI

Session 17. Solution Architecture for Gen AI

- Solution Guidelines - Well-Architected Principles
- Chat Session Management
- Standard Architectures for Various Use Cases
- Manage Token Limitations
- Deployment Standards – Cloud V/s On-Premise.
- Private GPT

Lab 16 - References Only - Evaluating a Custom Model