Generative AI and Prompt Engineering G2025

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. Working with Cohere Playground
Lab 5. Prompt Engineering - Summarizing and Inferring
Lab 6. Cohere Model Fine Tuning
Lab 7. Working with LLAMA 3
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. Named Entity Recognition with SpaCy
Lab 16. Working with LocalChat
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Topics

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

Day 1

Session 1. Introduction to AI and Machine Learning

- Artificial Intelligence
- Language AI Models
- Relationship Between AI and ML
- Machine Learning and its Types

Session 2. Introduction to Generative AI

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

`Lab 1. Setting Up the Environment`

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
- Prompt Injection

`Lab 2. Getting Started with Prompt Engineering`

Session 4. Generative AI Applications

- Text Based Applications
- Image-based Applications
- Video Generation
- Audio Applications
- Generative AI Ecosystem
  - Cohere Command-A, Command-R
  - LLaMA-3,
  - Cohere Embed-English,
  - Aya
  - DALL-E-3

`Lab 3. Generating Images using Stable Diffusion`

Day 2

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

`Lab 4. Working with Cohere Playground`

Session 6. Understanding Large Language Models

- Large Language Models Lifecycle
- RNN,
- Encoder - Decoder,
- Transformers
- 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 Chatbots with Cohere Models`

Session 8. Open Source LLM Ecosystem

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

Lab 7. Working with Meta LLAMA Models

Part - 2 : Architectural Components/Frameworks for GenAI

Day 3

Session 9. LangChain with Cohere Models

- LangChain Ecosystem
- Langchain Concepts
- Using Multiple Chains
- Working with Chains
- Output Parsing Techniques
- Data Loaders - Ingesting Documents
- Text Splitters - Chunking Data

Lab 8. Working with LangChain

Session 10. LlamaIndex and Its usage

- LlamaIndex and Its usage

Lab 9 Getting started with LlamaIndex

Session 11. Working with Memory and Agents

- Memory and Agents
- **Haystack and Its usage**

Lab 10a. Working with Conversational Memory
Lab 10b. Working with Haystack

Session 12. Vector Databases and Embedding Techniques

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

Lab 11. Working with Chroma Vector Database

Part - 3 : A Developers Day

Day 4

Session 13. Generative AI Legal, Privacy and Security Concerns

- Concerns around Legal, Privacy, Security

- Concerns around IP
- Responsible AI
- Enterprise Best Practices

Session 14. Generative AI - for Software Developers

- 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 LLMs`

Session 15. 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

Session 16. Building Application using Gen AI - Case Studies

- Practical Case Studies using **Cohere Command-R**
- Build a Chain for PDF Documents with RAG Retriever
- Domain Specific ChatBOT
- Automate AI Workflows

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

Session 17. Document Insights Extraction

- Named Entity Recognition with SpaCy
- Article Recommender with Extraction with Generative AI

`Lab 15 Named Entity Recognition with SpaCy`

Session 18. 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.
- LocalChat

Lab 16. Working with LocalChat