Generative AI

Course Duration: 5 days (40 hours)

⇒ Course Outcomes:

- Gain insights into the fundamentals of Generative AI, explore its applications, and learn how to implement Generative Models, including GANs and Autoencoders, to innovate and solve complex problems.
- Delve into the architecture of LLMs, understand their capabilities across various media, and customize them for specific data, ensuring a robust integration within enterprise architectures.
- Learn the intricacies of prompt engineering with ChatGPT, industrialize AI models with ModelOps, and create cutting-edge applications using tools like LangChain and LlamaIndex, while adhering to responsible AI practices.

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⇒ Module 01: Introductory Session

- Machine Learning
- Deep Learning
- **Hands-on Lab**

⇒ Module 02: Introduction to GenAI

- Generative AI Applications
- Understanding Probability and Statistics in Generative AI
- Introduction to Generative Models
- Deep Learning for Generative Models
- Introduction to Generative Adversarial Networks (GANs)
- Autoencoders
- Transformers and Attention Mechanisms - "Attention is all you need".
- **Hands-on Lab**

⇒ Module 03: Learning Prompt Engineering

- Introduction to Prompt Engineering
- Designing a prompt - The process and workflow
- Avoiding prompt injections using delimiters
- Defining constraints
- Zero-shot Prompting
- Few-shot Prompting
- Persona Prompting
- Chain of Thought
- Adversial
- **Hands-on lab**

⇒ Module 04: Introduction of LLM Model & Non-Microsoft Solutions

- Architecture of Large Language Models
- Text AI LLMs (GPT-3, GPT-4, LaMDA, LLaMA, Stanford Alpaca, Google FLAN, Poe, Falcon LLM)
- Image AI Models & Services (Midjourney, Stable Diffusion, ControlNet (SD))
- Video AI Models (Runway - Gen 1 & 2, Kaiber, D-ID)
- Audio AI Models (ElevenLabs)
- **Hands-on Lab**

⇒ Module 05: AI App Development using LangChain and LlamaIndex

- The LangChain Ecosystem
- Supported LLMs
- Case Study: Getting started with LangChain and OpenAI
- Prompt composition and templates
- Using multiple LLMs (Chains)
- Working with Data loaders - Ingesting documents
- Working with text splitters - Chunking Data
- Working with Chains (Conversational Retrieval QA, Retrieval QA, Summarization, API etc.)
- Working with Memory
- Working with Embedding
- Basics of LlamaIndex
- **Hands-on Lab**

⇒ Module 06: Customizing LLM for own data

- Type of Customization (Fine Tuning, Embeddings, RLHF, etc.)
- Knowledge Graphs
- **Hands-on Lab**

⇒ Module 07: Azure OpenAI

- Overview of Azure OpenAI
- Code of Conduct
- Azure OpenAI Playground
- Generating Text using Azure OpenAI
- Generating Image using Azure OpenAI
- Build a Front-end Application using our own data
- **Hands-on Lab**

⇒ Module 08: Responsible AI in GenAI

- Impact on environment
- Biases and other ethical Issues
- Copyrights and ownership
- License types for models and its implications

⇒ Module 09: GenAI and Enterprise Architecture

- Gen AI positioning within Enterprise Architecture
- Attention Architecture

- Transformer Architecture
- End to End AI Model Architecture with GenAI
- Day in life of Data Scientist

⇒ Module 10: Industrialization and demos

- When and how to re-calibrate, re-train, re-build models
- Search Architecture
- Chatbot Architecture
- Domain specific architectures