

Industrial Training | FDP | Internship cum Training

**2-weeks Online Live Training on**

**GENERATIVE AI & PROMPT ENGINEERING FOR BEGINNERS**

**Duration:** 30-Hrs (10-days)

**Prerequisite:** Basic understanding of Python programming

## **COURSE CONTENT:**

### **Module: Introduction to AI, NLP, and Language Models**

- Overview of Traditional Artificial Intelligence
- Demystifying Machine Learning
- Unravelling Deep Learning
- Distinguish Discriminative and Generative Models
- Overview of Traditional Artificial Intelligence
- Distinguish Discriminative and Generative Models
- Basics of Machine Learning
- Introduction to Natural Language Processing
- Key Challenges in NLP

### **Module: Generative Artificial Intelligence**

- Introduction to Generative Artificial Intelligence
- What are Transformers
- Prompt Engineering
- What are Foundation Models
- Types of GenAI
- Distinction between traditional AI and Generative AI
- Applications of Generative AI in image, text, and audio generation

### **Module: Fundamentals of Neural Networks**

- Definition and overview of neural networks
- Biological inspiration for artificial neural networks
- Basic structure of a neural network: neurons, layers, and connections
- Activation functions: sigmoid, tanh, ReLU, softmax
- Forward Propagation and Backward Propagation



### **Module: Large Language Models (LLM)**

- Introduction to Large Language Models
- Benefits of Using LLMs
- Examples of LLMs
- LLM Development
- Importance of Tuning LLMs

### **Module: Generative Models**

- Understanding GANs in-depth
- Exploring GAN architectures (DCGAN, WGAN, etc.)
- Training strategies for stable GANs
- Applications of GANs in image generation, style transfer, and data augmentation
- **Code example:** Implementing a GAN for image generation

### **Transformers Understanding Large Language Models (LLM)**

- Explanation of Large Language Models
- Significance in natural language processing and understanding.
- Overview of popular LLMs in the industry (e.g., GPT-3, BERT, T5)
- Applications in various domains
- Architecture of Large Language Models Transformer Architecture
- Explanation of the Transformer architecture as a foundation for LLMs
- Components such as attention mechanisms, layers, and heads
- Discussion on the impact of scaling model size on performance
- Trade-offs and considerations in choosing model sizes
- Different Open-Source Large Language Models
- Overview of Hugging Face Transformers

### **Advanced NLP and Transformers Understanding Large Language Models (LLM)**

- Explanation of Large Language Models
- Significance in natural language processing and understanding.
- Overview of popular LLMs in the industry (e.g., GPT-3, BERT, T5)
- Applications in various domains
- Architecture of Large Language Models Transformer Architecture
- Explanation of the Transformer architecture as a foundation for LLMs
- Components such as attention mechanisms, layers, and heads
- Discussion on the impact of scaling model size on performance
- Trade-offs and considerations in choosing model sizes
- Different Open-Source Large Language Models
- Overview of Hugging Face Transformers
- Explanation of the library's capabilities.
- Installation and basic usage.
- Working with Pre-trained Models:
- Loading and using pre-trained models from Hugging Face.
- Fine-tuning models for specific tasks.

## GPT-3 and OpenAI Models

- Understanding GPT-3
- Overview of GPT-3 Architecture and capabilities
- Use Cases and Applications
- OpenAI's Approach to Language Models
- OpenAI's contributions to the field of language models
- Ethical considerations and guidelines

## BERT and Other Transformer-Based Models

- Introduction to BERT
- Bidirectional Encoder Representations from Transformers
- Applications in natural language understanding tasks
- Transformer-Based Models Comparison
- Comparative analysis of GPT, BERT, and other models
- Strengths and weaknesses of each model

## Foundations of Prompt Engineering

- What is Prompt Engineering?
- Importance of Prompt Design in AI Interactions
- Types of Prompts: Zero-shot, One-shot, Few-shot
- Understanding Model Responses to Prompts
- Best Practices in Prompt Construction
- Zero-shot Learning: Theory and Examples
- One-shot Learning: Theory and Examples
- Few-shot Learning: Theory and Examples
- Comparative Analysis of Prompt Types
- **Hands-on:** Crafting Effective Prompts for Different Scenarios

## Advance Prompt Engineering Techniques

- Chain of Thought (CoT) Prompting
- Introduction to Chain-of-Thought Prompting
- The Role of Chain-of-Thought in Complex Problem Solving
- Designing Effective Chain-of-Thought Prompts
- Examples of Chain-of-Thought Prompting in Action 5. Evaluating the Effectiveness of Chain-of-Thought Responses
- Practical Applications of Chain-of-Thought Prompting
- Building Chain-of-Thought Prompts for AI Models
- Tree of Thoughts (ToT) Prompting
- Tree of Thoughts (ToT) Prompting: Example
- CoT vs. ToT
- **Demo:** Tree of Thoughts Prompting with LangChain and OpenAI
- **Hands-on:** Solving Math Word Problems Using Chain-of-Thought
- **Case Studies:** Chain-of-Thought in Various Domains
- Advanced Techniques and Optimization Strategies
- **Hands-on:** Developing an Iterative Prompting System

- **Case Examples:** Iterative Prompting in Creative Writing

### **Module: Hugging Face Transformers and Prompt Engineering**

- Deep dive into Hugging Face Transformers library
- Utilizing pre-trained models for various NLP tasks
- Fine-tuning language models using Hugging Face
- Techniques for prompt engineering in GPT models
- Code Example:
- **Code Example:** Conversational Chatbot using GPT
- **Code example:** Fine-tuning a pre-trained model for a specific task

### **LangChain for LLM Application Development (Part I)**

- LangChain Prompts
- Prompt Templates
- Prompt Templates: Example
- Chat Prompt Template
- Flow of Chatbot Application
- Model I/O: Prompts, Language Models, Output Parsers
- Demo: LangChain-Models, Prompts, and Output Parsers
- Chatbot Application Flow
- Document Loaders: CSV Document Loader, File Directory Loader, HTML Document Loader, PDF Document Loader
- Text Splitters
- CharacterTextSplitter
- Text Embedding Models in LangChain
- Demo: Multiple File QA Retriever with ChromaDB and LangChain

### **LangChain for LLM Application Development (Part II)**

- Introduction to VectorStore
- How VectorStore Works?
- Demo: Loaders, text splitters, embeddings, VectorStores
- LangChain Retriever
- LangChain Chains
- Foundational LangChain Chain
- Simple LLMChain: Example
- Sequential Chain in LangChain
- Sequential Chain: Example
- Stuff Chain, Refine Chain, Map Reduce Chain
- LangChain Memory
- Building Memory into a System
- LangChain Agents
- **Demo:** Langchain Loader Splitter Embeddings & Vectorstore

### **Module: Retrieval-Augmented Generative models (RAGs)**

- Understanding the concept of retrieval-augmented models
- Applications of RAGs in NLP tasks
- Implementing a simple RAG model for information retrieval

- **Code example:** Building a RAG model and Creating Conversational Bot.

#### **Module: Image Generation, Diffusion Model**

- In-depth exploration of diffusion models for image synthesis
- DALL-E and its capabilities in generating diverse images
- **Code example:** Implementing an image generation model using diffusion

#### **Industry Applications and Case Studies & Project**

- Prompt Engineering in Content Creation and Journalism
- **GenAI Applications in Healthcare:** Generative AI using Transformer Model for Diagnostic Assistance and Patient Care
- **GenAI Applications in Telecom:** Enhancing Customer Service with AI and Prompt Engineering
- Fine tuning BERT for Multi label text classification.
- Creating and Fine-tuning Conversational Chatbot using GPT - 3
- **Project:** Customer Support Chatbots: Develop conversational AI chatbots for customer support in various industries such as e-commerce, banking, or telecommunication.

#### **Training Highlights**

- 30+ Hours live online Hands-on based learning with Projects.
- **Training includes:** Soft copy of Training material, Training PPT's, Project code & Training Recording.
- 2-weeks **Certificate of completion** in association with **Mechanica IIT Madras**

#### **Who can attend?**

- Training is best suitable for Engineering college faculty, Research scholar, Student & Working IT Professional.

**To Know More & Register Now:** <https://www.eduxlabs.com/gen-ai-training>

#### **EduxLabs Teams**

(Esoir Business Solutions Gurugram)

**M: +91-7053133032 | 8851533667**

**Email** [info@eduxlabs.com](mailto:info@eduxlabs.com) | [www.eduxlabs.com](http://www.eduxlabs.com)