Generative AI Advanced Course contents (5 Days)
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Module 1: Introduction to Generative AI
- Introduction to Artificial Intelligence and Machine Learning
- Understanding Generative AI: An Overview
- Mechanics of Generative AI
- Difference between Discriminative and Generative Models
Module 2: Generative AI Applications
- Text-based Applications: Content generation, Language translation, and more
- Image-based Applications: Image synthesis, Style transfer, and more
- Video Generation: MAV by Meta, GEN-1, IMAGEN by Google
- Audio Applications: Speech synthesis, Music generation, and more
- Generative AI Ecosystem Understanding - ChatGPT, Azure OPEN AI, Google's BARD, Hugging Face, Ilmanda, AutoGPT, Midjourney, LaMDA, LLaMA, Stable Diffusion DALLE-2 etc.
Module 3: Prompt Engineering for Generative AI
- Introduction to Prompt Engineering
- The Art of Crafting Prompts: Principles, techniques & best practices
- Type of Prompt Engineering - Zero shot, One Shot , Few shop prompts
- Conceptual understanding - Tokens, Max Tokens, temparature
- Chain of Thoughts understanding
- Standard methods for formatting, summarizing, inferring prompts to get best results.
- Conceptual understanding of RAG - Retrieval augmented generation
Module 4 - Getting Started with Open AI/Azure Open AI
- Getting started with the OpenAI/Azure Open AI Platform
- Understanding of Models
- Understanding temperature, token length, penalties, Top P etc.
- Using the Playground
- Getting started with the OpenAI API
- Authentication and Access Keys
- The Completions endpoint
- The Chat Completion endpoint

– Fine-tuning the model
– Controlling Hallucinations
– Azure Open AI Understanding
– Azure Open AI Privacy, security , Integration with Azure Services etc.
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Module 5 - Getting started with Open Source LLM ecosystem
– Understanding of Open source LLM ecossytem
– Deep dive Meta Llama 2, Falcon etc.
– Leveraging Models from Hugging face
Module 6 - Generative AI - LLM Ecosystem and Frameworks
– LangChain Ecosystem Deep dive
– Langchain Concepts
– Using multiple LLMs (Chains)
– Working with Chains (Conversational Retrieval QA, Retrieval QA, Summarization, API etc.)
– Working with Memory, Embeddings, Agents
– Structured Data and Output Parsing Techniques
– Working with Data loaders - Ingesting documents
– Working with text splitters - Chunking Data
– Understanding of LlamaIndex & its usage.
Explore the capabilities in detail simliar to concepts in langchain
– Understanding of Haystack & its usage .
Explore the capabilities in detail simliar to concepts in langchain
– Vector Databases
Conceptual Understanding
Working with Vector Databases (PineCone, fiass/chroma)
Differences between them
– Embedding Techniques (open ai embedding, sentence transformer embeeding to name few ... this has to be detailed)
What is embedding techniques
Various embedding model
Capabilities and Benefits
Embedding for image/text etc.
Module 6 - Generative AI - for Software Engineering
– How to leverage Generative AI to improve quality, productivity in software engineering

– Github Copilot
– Prompts for code generation
– Prompts for Test case generation
– Prompts for Code modernization/translation
– Next Gen AI thinking to leverage Gen AI to its best of capability
Module 7 - Building Applicaiton using Generative AI
– Role of Developers as consumers of Generative AI APIs.
– API integration: How to connect and make requests to Generative AI services.
– Building applications that leverage Generative AI outputs.
– Session & Chat History management best practices
– Framework for output validation & continuous prompts improvement cycle
– Deployment Options and Best Practices - Open AI , Open source models etc.
Module 8 - Generative AI Legal, privacy, Security Concerns
– Concerns around Legal, privay, Security Concerns
– Concerns around IP
– Responsible AI
– Enterprise Best Practices
Module 9 - Building Application using Generative AI
– Practical Case study (using open ai & open source equivalent)
– Knowledge Management – Build a Q&A Chain ChatBot for a set of HTML/PDF documents. – Leveraging RAG
– Domain specific Chat BOT – Finetuning of Models
– Automate AI workflows with AutoGPT & LangChain
– Use Midjourney/Dall e to generate stunning images from text
– Document Insights extraction tool - Summary & entity extraction using Generative AI
Module 10 – Solution Architecture for Gen AI
Solution Guidelines (Well–Architected principles)
Chat Session management
Open AI Model Finetuning
Standard Architectures for various usecases

How to provision security, privacy & transparency
Manage Token limitation
Deployment Standards – Cloud, on Prem
Private GPT Standards
PII information protection