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The Creativity of your Mind

ROBOTRONIX ENGINEERING TECH PVT. LTD.

GENERATIVE AI ARTIFICIAL INTELLIGENCE



Generative AI : Concepts, Techniques, and Applications (8 Weeks)

This course provides a comprehensive introduction to Generative AI (Gen AI), exploring its core concepts, powerful techniques, and diverse applications. You'll gain the knowledge and skills to understand this rapidly evolving field and its potential to revolutionize various industries.

Course Structure :

Week 1: Introduction to Generative AI

- **Demystifying Generative AI:** Differentiating Gen AI from traditional AI. Understanding generative models' ability to create new data or experiences.
- **Generative AI Landscape:** Exploring various Gen AI models like Variational Autoencoders (VAEs), Generative Adversarial Networks (GANs), and Autoregressive models.
- **Generative AI in Action:** Showcasing real-world applications of Gen AI in creating realistic images, music, and text.
- **Introduction to Popular Platforms:** Highlighting key Generative AI platforms like OpenAI, Azure AI, AWS (Amazon Web Services) foundation models, and Hugging Face.
- Introduction of NLP
- Python for Generative AI
- Hands_On_python.ipynb
- Hands_On_TextPreprocessing.ipynb

Week 2 : Embeddings and Vector Databases: Foundations for Retrieval

- **From Text to Vectors:** Introducing the concept of embeddings and how they represent text data numerically. Exploring different embedding models and their importance for efficient retrieval.
- **The Power of Vector Databases:** Understanding vector databases designed for storing and searching high-dimensional vectors like text embeddings.
- **Relevance to Gen AI:** Connecting embeddings and vector databases to Gen AI. Showing how they facilitate information retrieval for tasks like question answering and text generation.
- Chunking Strategies
- Hands_On_Text_embedding.ipynb
- Hands_On_Embedding_implementation.ipynb
- Hands_on_FAISS_operations.ipynb
- Hands_On_ChromaDB_operations.ipynb
- Hands_On_Pinecone_operations.ipynb



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Week 3 : Data Ingestion and Concept of Retriever

- Concept of data ingestion
- Concept of retriever
- Hands_On_DifferentDataSources.ipynb
- Hands_On_Retriever.ipynb





Week 4 : Unveiling Large Language Models (LLMs)

- **LLMs Demystified:** Defining Large Language Models and their role in various generative tasks. Exploring their architecture, training process, and capabilities.
- **Understanding LLM Outputs:** Examining how LLMs generate text, translate languages, and address potential challenges like bias and factual accuracy.
- **LLMs and Generative AI:** Discussing how LLMs empower various generative tasks like creative text generation, dialogue systems, and translation.
- Explore about langchain functionality
- Hand_On_LLM_introduction.ipynb
- Hand_On_memory_module.ipynb
- Hand_On_prompt_template.ipynb
- Hand_On_utility_chain.ipynb



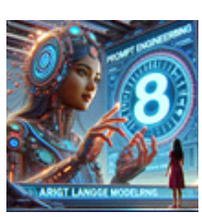
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Week 5: Retrieval-Augmented Generation (RAG): Putting it Together

- **Combining Strengths:** Introducing Retrieval-Augmented Generation (RAG), a technique that combines retrieval of relevant information with generation capabilities.
- **Delving into RAG Architecture:** Exploring the key components of RAG models, including the retrieval and generation modules, and how they work together to produce informative outputs.
- **RAG Applications in Action:** Demonstrating how RAG models are used for tasks like question answering, summarization, and even dialogue generation.
- Hands_On_RAG_application.ipynb







Week 6 : Applications and Case Studies : Witnessing the Power

- **A Spectrum of Applications:** Exploring the diverse applications of Gen AI across various industries:
    - **Text Generation:** Creative writing, marketing copy generation, code completion.
    - **Image Generation:** Creating new images, editing existing images, photorealistic representations.
    - **Text Summarization:** Generating concise summaries of lengthy text passages.
    - **Text Classification:** Categorizing text data into predefined categories.
- **Real-World Success Stories:** Showcasing inspiring case studies where Gen AI has been used to solve problems and create innovative solutions.
- Hands_On_Text_generation.ipynb
- Hands_On_Image_geneartion.ipynb
- Hand_On_Text_classification.ipynb







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Week 7 : End-to-End Project 1: Building Your Skills

- **Hands-on Learning:** This week marks the start of your first end-to-end project! You'll apply learned concepts to a practical Generative AI task like building a "Resume Filter Assistant" using Gen AI techniques.
- **Project Selection and Guidance:** We offer guidance on choosing a project that aligns with your interests and helps develop new skills.
- **Project Development Support:** Receive support and resources to navigate the project development process. You'll define project goals, choose appropriate generative models, and utilize relevant tools and libraries.





Week 8: End-to-End Project 2: Deepen Your Expertise

- **Independent Exploration:** This week provides an opportunity to choose and develop your second end-to-end project. You'll further your Generative AI expertise by applying your knowledge to a new challenge.
- **Project Showcase:** Present your completed projects to the class and share your learning experiences.
- **Building a Custom Chatbot:** Learn how to build a chatbot using Generative AI by training it on your own customized dataset.
- **Chatbot Applications:** Explore the possibilities of chatbots in various fields like customer service, education, and entertainment.



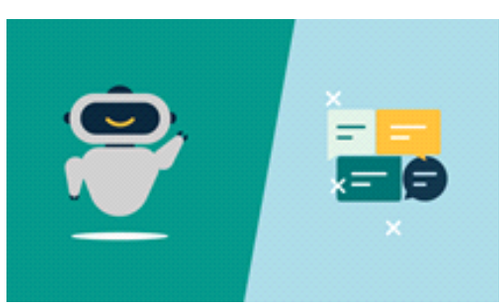
Skills You Will Learn:

- Understanding of Generative AI concepts and techniques
- Deep understanding of Generative AI concepts
- Proficiency in using OpenAI and AWS platforms
- Knowledge of Python SDK and API calls
- Mastery of natural language processing concepts

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Tools You Will Learn:

- OpenAI
- AWS foundation models
- Hugging Face
- FAISS
- ChromaDB
- Pinecone
- Langchain modules and chains
- Llama Index



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An ISO 9001 : 2015 Certified Company
Corporate Identity No.: U72200MP2011026171

Reg. Address
"अतुल्य" IT Park, Madhya Pradesh Industrial Development Corporation
Khandwa Road, Indore (M.P.)
Contact : 0731-2970998, 77248-52726
Website: www.robotronix.co.in, Email: info@robotronix.co.in