Agentic AI & GenAI Course Overview by EthianTech

This comprehensive course by EthianTech (ethiantech.com) is designed for AI enthusiasts and professionals eager to master Agentic AI and Natural Language Processing (NLP). Through a blend of theory and hands-on practice, participants will explore intelligent agent design, advanced NLP techniques, generative AI (GenAI), and state-of-the-art frameworks such as LangChain, LangFlow, and AWS services. The curriculum is structured to guide learners from foundational concepts to the deployment and monitoring of sophisticated AI applications, ensuring proficiency in building, deploying, and optimizing agentic and generative AI systems.

The following document outlines the course structure, learning objectives, prerequisites, and a detailed breakdown of each module, culminating in practical projects and cloud deployment strategies.

Learning Objectives and Prerequisites

The course aims to provide a deep understanding of NLP techniques and their applications, including text classification, sentiment analysis, and named entity recognition using libraries like SpaCy and Hugging Face. Learners will explore generative AI methods such as transformers and language models, and develop agentic systems capable of multi-agent collaboration and decision-making. Mastery of retrieval-augmented generation (RAG), scalable NLP workflows, and conversational agent deployment is also emphasized. Observability and monitoring of LLMs and agentic systems using tools like LangWatch are integral to the curriculum.

- Solid grasp of Python fundamentals, including libraries like NumPy, Pandas, and Matplotlib.
- Experience with NLP tools such as NLTK, SpaCy, and TextBlob for text processing and machine learning basics.
- Familiarity with deep learning frameworks (TensorFlow, PyTorch) and generative models (transformers, GANs, VAEs).

The course is designed for completion over Five-Six months, with an estimated commitment of 5-6 hours per week, allowing ample time for practical implementation and real-world application.

Foundations of Agentic AI

The initial modules introduce the fundamentals of Agentic AI, clarifying what constitutes an agent and how agentic systems differ from traditional AI agents and generative AI. The curriculum covers the significance of multi-agent systems in complex problem solving, automation, and decision-making. Learners will gain an overview of key frameworks that enable the creation, management, and orchestration of intelligent agents, setting the stage for advanced applications.

- What is Agentic AI?
- Differences between Agentic AI, AI Agents, and Generative AI
- Role of Multi-Agents in Problem Solving
- Overview of Agentic AI Frameworks

Agentic AI Frameworks: Phi Data and LangChain

The course delves into Phi Data, a robust framework for building agentic AI systems. Participants will learn to integrate agents with diverse models, tools, and knowledge sources, employing chunking, vector databases, and embedding techniques for efficient data processing and retrieval. Real-world use cases, such as web search and financial agents, illustrate practical applications.

The LangChain module introduces a framework that streamlines the creation of complex AI applications using large language models (LLMs). Learners will master data ingestion, document loading, text splitting, and embedding integration with vector storage systems like FAISS and ChromaDB. By the end, students will be adept at structuring, processing, and storing data within LangChain for advanced AI models and agents.Agentic AI Frameworks: Phi Data and LangChain

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Phi Data Topics

- Agent Integration
- Chunking & Storage
- Vector Databases & Embeddings
- Workflow Design
- Use Cases: Web, Finance, RAG Agents

LangChain Topics

- Core Components Data Ingestion & Loaders
- Text Splitting Techniques Embeddings:
- OpenAI, Hugging Face, Ollama Vector
- Storage: FAISS, ChromaDB
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Advanced Agentic AI: LCEL, LangServe, and LangGraph

Building on foundational frameworks, the course explores LangChain Expression Language (LCEL) for efficient LLM workflows, including prompt and output chain creation and deployment of LangServe runnables as APIs. The LangServe module focuses on deploying and scaling AI models in production, covering environment setup, API-driven model serving, and integration with external tools.

The LangGraph module introduces advanced workflow management, emphasizing state management, deployment strategies, and message handling. Learners will understand how to structure and manage state within LangGraph applications, enabling the development of scalable, robust AI systems.

LCEL

Build and deploy LLMs, create prompt/output chains, and deploy APIs with LangServe.

LangServe

Efficient model serving, environment setup, and API-driven deployment for production AI.

LangGraph

Advanced workflow and state management, deployment strategies, and message handling.

Human-in-the-Loop, Agentic RAG, and Multi-Agent Systems

The curriculum advances into human-in-the-loop workflows using LangGraph, where learners integrate human feedback to optimize AI outputs and user experience. The Agentic Retrieval-Augmented Generation (RAG) module teaches how agents autonomously retrieve and generate information, enhancing performance in complex tasks.

The design of multi-agent systems is covered in depth, focusing on agent communication, collaboration, and coordination within LangGraph. The CrewAI platform is introduced as a solution for managing AI teams, automating workflows, and optimizing collaborative decision-making across multiple agents.

Human-in-the-Loop

- Feedback Integration
- Dynamic Breakpoints
- Time Travel

Agentic RAG

- Adaptive RAG Techniques
- Local & Cohere Variants
- Self RAG with VectorDB

Multi-Agent Systems

- Agent Nodes & Roles
- Communication Protocols
- CrewAI Collaboration

LangFlow, Observability, and Model Monitoring

The course introduces LangFlow for managing AI-driven workflows, covering setup, UI, and integration with LangChain. Learners will build applications using nodes, chains, and pre-built or custom workflows, and explore prompt engineering within LangFlow.

Observability is addressed through Langfuse and LangWatch, tools for tracking and monitoring LLM performance. Participants will learn to integrate Langfuse for monitoring outputs, analyzing system performance, and optimizing LLMs. LangWatch provides real-time metrics and insights into AI model health, supporting reliable system operation through effective monitoring strategies.

LangFlow

- Workflow Management
- UI & Terminologies
- Prompt Engineering

Langfuse

- LLM Observability
- Integration & Monitoring
- Key Metrics Tracking

LangWatch

- Real-Time Monitoring
- API Integration
- System Health Insights

End-to-End Projects and Cloud Deployment with AWS

The final modules guide learners through building, deploying, and optimizing end-to-end agentic AI projects. Participants will apply their knowledge to real-world tasks, incorporating data retrieval, processing, and decision-making within unified AI systems.

The course covers AWS Cloud services for generative AI, including EC2, S3, SageMaker, and Lambda. Learners will explore AWS Bedrock for foundation models, SageMaker for end-to-end ML development, Lambda for serverless compute, and API Gateway for scalable API management. These modules ensure proficiency in deploying, managing, and scaling AI applications in cloud environments.

AWS Cloud & Bedrock

- EC2, S3, SageMaker, Lambda
- Bedrock for Foundation Models
- Model Deployment & Inference

Serverless & API Management

- Lambda Functions
- API Gateway Integration
- Efficient API Development

Project-Based Learning

- End-to-End Agentic AI Projects
- Unified Data Processing
- Optimization & Monitoring