**Lang Chain**

**What is Laang Chain:**

* LangChain is a framework for developing applications powered by large language models (LLMs). It helps AI interact with databases, APIs, and documents, allowing for real-time decision-making and automation.

**History of Lang Chain:**

* created in October 2022 by Harrison Chase.

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**Role of Lang Chain:**

* Standard AI models (like ChatGPT) rely only on pre-trained knowledge and cannot access real-time data.
* LangChain enables AI to retrieve and process external information (e.g., from websites, PDFs, and databases).
* **LangChain connects AI models to external data sources like:**
* Databases (SQL, NoSQL)
* APIs (Google Search, Wikipedia)
* Documents (PDFs, Word, Notion)
* Vector Databases (Pinecone, FAISS, Weaviate)

**Applications of Lang Chain:**

* **LangChain is integrated into various applications, including:**
* AI-powered search assistants
* Automated business workflows
* Data analysis and decision-making
* Customer support chatbots
* Document processing and summarization

**Examples of Lang Chain:**

* Querying an E-Commerce Orders Database:

Let’s assume a customer asks:"What is the status of order #12345?“

* If we don’t use Langchain, then it generates static answers like “Orders are usually processed within 2-3 days and shipped within 5-7 business days. Please check your email for tracking details.“
* **How** **it works:**

AI does not retrieve real-time order status.

AI gives a generic response, even if the order is already delivered.

* If we use Langchain, then it generates dynamic answers using RAG like "Your order #12345 has been shipped. The tracking number is **TRK12345**. Estimated delivery: **March 15**.“
* **How it works:**

AI queries the database to get real-time order status.

The response changes dynamically based on actual order details.

How Lang Chain Automates Tasks:

* **LangChain allows AI to perform actions beyond answering questions using:**
* Agents: AI that selects and executes tasks.
* Tools: APIs, databases, and automation services.

Example: 'Summarize this week’s sales report and send it via email.'

LangChain fetches the latest data, summarizes it, and emails the report automatically.

**How Lang Chain works with Databases:**

* LangChain enables AI to query structured databases:
* Converts natural language queries into SQL commands.
* Fetches real-time structured data.
* Generates meaningful insights.

**Example:** 'What are the top-selling products in the last 30 days?'

* LangChain generates an SQL query and retrieves data from the sales database.

**Comparison between Traditional Models vs. Lang Chain:**

**Traditional AI Model:**

* Uses pre-trained data.
* Lacks real-time updates.
* Cannot perform actions.

**LangChain:**

* Connects AI to live data sources.
* Automates tasks (e.g., sending emails, querying databases).
* Enhances AI decision-making with external tools.

**Security Issues in Lang Chain:**

**Potential risks and solutions:**

* Data privacy concerns → Use self-hosted models.
* API cost and rate limits → Optimize API calls.
* Incorrect AI-generated SQL queries → Implement validation checks.