

### What is AI (Artificial Intelligence)?

AI is the ability of a computer to perform tasks that usually require human intelligence. These tasks include understanding language, recognizing images, making decisions, or having conversations.

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### What is NLP (Natural Language Processing)?

NLP helps computers understand and work with human language (like English or Hindi).

**Examples of NLP:** - Voice assistants (Alexa, Siri) - Chatbots - Language translation (English to Hindi) - Spam detection in emails

**Advantages:** - Helps computers understand real language - Automates text and voice tasks

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### What is LLM (Large Language Model)?

LLMs are advanced AI models trained on a huge amount of text (books, websites, conversations). They can understand questions and generate smart, human-like answers.

**Popular LLMs:** - ChatGPT (OpenAI) - LLaMA (Meta) - Claude (Anthropic) - Mistral, Gemma, etc.

**Uses:** - Writing content - Answering questions - Translating languages - Summarizing text

**How it works (simplified):** 1. You type a question 2. The LLM breaks it into small parts (tokens) 3. It looks at its training data to predict the best answer 4. It writes the full answer and shows it to you

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### What are AI Agents?

An AI Agent is a smart assistant that: - Has a goal (like "write a summary") - Can think and make decisions - Can use tools (search, email, APIs) - Often powered by LLMs

**Example:** "Find the top 3 news stories and summarize them" - Agent searches news - Reads content - Summarizes it - Sends back to you

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### What is Agentic AI?

Agentic AI is a system made of **multiple AI agents** working together. They: - Communicate - Share tasks - Solve problems together

**Think of it like a team:** - One agent plans - Another researches - Another writes

**Use Cases:** - Automated research - Building apps from just a prompt - Personal digital assistants

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## Popular Agent Frameworks

1. **LangChain**
2. Helps build chains and agents using LLMs
3. Can use tools like search, calculator, file reader
4. **CrewAI**
5. Teamwork between agents (planner, researcher, writer)
6. Clear roles for each agent
7. **AutoGen (Microsoft)**
8. More advanced teamwork and memory sharing
9. Great for multi-agent tasks

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## Dependencies (Tools Used)

- **Python** – Language used to build everything
- **Ollama** – Runs local LLMs like Gemma, LLaMA
- **LangChain/CrewAI/AutoGen** – AI agent frameworks
- **FAISS** – Fast search engine for memory/RAG
- **FastAPI** – Used to run the AI app as a web server
- **HuggingFace** – For loading embeddings and models

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## What is RAG (Retrieval-Augmented Generation)?

RAG means: "Look up the answer before responding."

When an LLM doesn't know the latest info, RAG helps it **search your own documents** before answering.

**How RAG works (simple):** 1. You ask a question 2. RAG searches your files (PDFs, notes, etc.) 3. It finds the best matching text 4. Sends that text to the LLM 5. LLM uses it to answer more accurately

**RAG = Search (Retrieval) + Write Answer (Generation)**

**When to Use RAG:** - When answers must come from YOUR data (not just the LLM) - For private company data, research papers, FAQs, etc.

**Tools used in RAG:** - FAISS (for fast search) - HuggingFace Embeddings - LangChain or LlamaIndex

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## How Data Is Processed (AI Pipeline)

**1. User Input:** You ask a question (like “What’s the refund policy?”) **2. Text is Tokenized:** LLM breaks the question into pieces **3. Retrieval (RAG):** Searches your documents **4. Context Building:** Gathers useful data **5. LLM Responds:** Generates a human-like answer **6. Answer is Returned to You**

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## Benefits of Using AI Agents with RAG

- Answers are grounded in real data
  - You control the knowledge base
  - It can automate full tasks (not just chat)
  - You can build assistants for legal, medical, coding, support, etc.
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## Summary

Term	Meaning
NLP	Helps computers understand language
LLM	Smart model that generates text
AI Agent	An LLM-powered assistant with a goal
Agentic AI	Many agents working together
RAG	Search + Answer using your data
LangChain	Tool to build smart agents with tools
FAISS	Fast text search engine
FastAPI	Turns your agent into an API

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Need help building your own AI Agent or RAG system? Just ask!