Lab 1 : Introduction to ChatGPT

Introduction:
AI models like **ChatGPT** are transforming in the way we interact with technology. Developed by **OpenAI**, ChatGPT is a conversational AI built on the **GPT (Generative Pre-trained Transformer)** architecture. It can understand, generate, and respond to text in a human-like manner.

How It Works (In Simple Terms):
ChatGPT uses the **Transformer architecture**, which was introduced in 2017. It's trained on a large amount of text data and uses **self-attention** mechanisms to understand context. The training happens in two main stages:

1. **Pre-training:** The model learns general language patterns from massive datasets.
2. **Fine-tuning:** The model is improved using feedback from real human responses (using RLHF – Reinforcement Learning from Human Feedback).

Visualization tools like **attention maps** help us understand how the model "pays attention" to different parts of input text while generating responses.

Key Capabilities of ChatGPT:

- Natural language conversations
- Writing help (essays, stories, code, emails)
- Code generation and debugging (Python, C++, Java, etc.)
- Summarization and language translation
- Image understanding (in GPT-4o)

Real life scenario: Use Case: College Student Support (Education Sector).

A student is having difficulty comprehending the Merge Sort algorithm in Data Structures.

What ChatGPT do:

- The student initiates ChatGPT and enters:
- "Explain merge sort in simple terms with an example in C++."

How ChatGPT Reacts:

- ChatGPT rapidly processes the question, knows the subject, and comes up with an easy-to-understand explanation accompanied by C++ code for merge sort. It can even provide step-by-step output or discuss time complexity.

Conclusion:
ChatGPT is a powerful example of how AI is changing industries. As an AI & DS student, learning how it works helps me understand real-world AI implementation. It's not just about theory anymore—tools like ChatGPT show us how AI can solve real problems across fields like education, business, and healthcare.