Lab 1: Introduction to ChatGPT

Objective

To understand the basics of ChatGPT, its origin, working mechanism, capabilities, and real-world applications.

Activities

- Explored ChatGPT interface
- Studied transformer architecture using visualization tools
- Identified use-cases in education, healthcare, business, and creativity

Summary

ChatGPT is developed by **OpenAI** and is based on the **Generative Pre-trained Transformer (GPT)** architecture. It works by converting input text into tokens, applying self-attention mechanisms, and predicting the most probable sequence of words. It has two stages of training:

1. **Pre-training** – learns from vast datasets of books, websites, and articles.
2. **Fine-tuning** – improves alignment with human feedback for accurate responses.

Capabilities

- Natural language conversation
- Content generation (essays, emails, stories)
- Problem-solving in coding and mathematics
- Custom responses tailored to user needs

Applications

- **Education**: Acts as a tutor, generates quizzes, explains topics.
- **Healthcare**: Assists in patient communication, documentation, symptom checking.

- **Business**: Automates customer support, drafts marketing material, supports decision-making.

- **Creativity**: Produces poems, scripts, and brainstorming ideas.

Conclusion
ChatGPT is a versatile AI tool capable of supporting various domains by enabling human-like conversation and problem-solving.

Lab 2: Types of Prompts & Prompt Engineering Basics

Objective
To understand prompt types (instructional, interrogative, zero/few-shot) and apply prompt engineering techniques.

Activities

- Tried zero-shot vs few-shot prompts

- Designed prompts with increasing complexity

What is a Prompt?
A prompt is the input given to an AI model to guide its response. **Prompt Engineering** is the practice of designing effective prompts for accurate, useful outputs.

Examples of Prompts (5 each)

a) Instructional Prompts

1. Summarize a paragraph in 3 bullet points.

2. Write a formal leave application.

3. Translate English to Hindi.

4. Generate a 5-day diet plan.

5. List 5 AI applications in healthcare.

b) Interrogative Prompts

1. What are the advantages of cloud computing?
2. How is deep learning different from machine learning?
3. Why is renewable energy important?
4. Which is better: SQL or NoSQL?
5. When should recursion be used?

c) Zero-Shot Prompts

1. Classify the sentiment: *“I enjoyed the service but delivery was late.”*
2. Write a haiku about rain.
3. Explain Newton’s first law.
4. Generate 3 startup ideas.
5. Summarize a research article in 2 lines.

d) Few-Shot Prompts

1. Sentiment analysis with labeled examples.
2. Translation with examples.
3. Short story with given structure.
4. Math solution step-by-step with example.
5. Table formatting with given schema.

Comparison

- Instructional → task-specific & precise.
- Interrogative → explanation-focused.
- Zero-Shot → quick but less structured.

- Few-Shot → consistent, structured, and accurate.

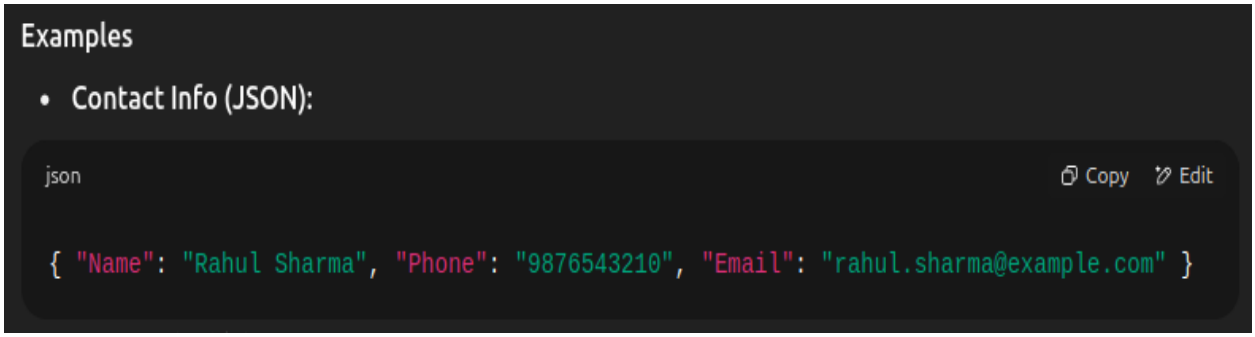
Conclusion
Prompt engineering helps improve ChatGPT's accuracy by providing clarity, examples, and formatting instructions.

Lab 3: Precision Prompting for Information Extraction

Objective
To extract structured data from ChatGPT using JSON and tabular formatting.

Activities

1. Extract contact info
2. Extract resume sections
3. Extract keywords
4. Extract address
5. Exact event details



Conclusion
Precision prompting improves extraction accuracy and ensures structured outputs for real-world applications like resumes, documents, and chatbots.

Lab 4: Summarization & Text Transformation

Objective
To apply ChatGPT for summarizing long texts and rewriting content in different tones.

Activities & Examples

- **News Summarization**
  Original: “India launched Chandrayaan-3 to explore the Moon’s south pole.”
  Summary: “Chandrayaan-3 aims to land safely on the Moon’s south pole.”

- **Research Abstract Summarization**
  Original: AI is used in healthcare for diagnosis and monitoring but faces ethical issues.
  Summary: “AI helps in healthcare but has ethical and privacy challenges.”

- **Email (Formal)**
  Original: “Hi sir, I can’t come tomorrow because of a function.”
  Output: “Dear Sir, I will not be able to attend tomorrow due to a family function.”

- **Email (Informal)**
  Original: “Dear Professor, I request an extension.”
  Output: “Hi Prof, can I get some extra time for my project?”

- **Tone Transformation (Strict → Friendly)**
  Original: “Your payment is overdue. Clear immediately.”

Output: “Reminder: your payment is pending. Please clear soon 😊.”

Conclusion
Summarization condenses large texts while tone transformation adapts communication styles for different audiences.

Lab 5: ChatGPT in Code Generation & Debugging

Objective
To explore ChatGPT’s ability in generating and debugging code.

Activities

- Generated Python, C++, and Java code from prompts
- Debugged incorrect code snippets

Examples

- **Python Code Generation (Prompt → Code):**
  Prompt: “Write Python code to calculate factorial of a number.”
  Output:

```
def factorial(n):
    return 1 if n == 0 else n * factorial(n-1)
print(factorial(5))
```

- **Debugging Example (C++):**
  Original Code: Missing semicolon caused error.
  ChatGPT Output: Corrected with proper syntax and explanation.
- **Java Example:**
  Prompt: “Generate Java program to print Fibonacci series.”
  Output: Complete working code with loop.

Conclusion
ChatGPT helps in code generation, debugging, and explanations, making it useful for students and developers.

Lab 6: Domain-Specific Applications

Objective
To apply ChatGPT in specific domains like healthcare, law, and education.

Activities (Example Chosen: Educational Quiz Generation)

Prompt:
"Generate 5 multiple-choice questions on Artificial Intelligence with answers."

Output:

1. AI stands for?
   a) Artificial Idea
   b) Artificial Intelligence ✅
   c) Automated Integration
   d) None

2. Who is known as the father of AI?
   a) John McCarthy ✅
   b) Alan Turing
   c) Charles Babbage
   d) Marvin Minsky

… (3 more questions generated)

Evaluation:

- Accuracy: High
- Format: Readable and reusable for education

Other Applications:

- Medical chatbot for symptom checking

- Legal document summarization

Conclusion

Domain-specific prompting tailors ChatGPT for professional applications in healthcare, law, and education.