lab1

**Lab1 :**Introduction to ChatGPT

### **🔍 What is ChatGPT?**

**ChatGPT is an AI-powered language model developed by OpenAI. It uses the GPT (Generative Pre-trained Transformer) architecture to understand and generate human-like text. It can chat, write, summarize, translate, and even solve programming or logical tasks.**

### **🧬 Origin of ChatGPT**

* **Developed by OpenAI, founded in 2015.**
* **Built on the GPT series of models:**
  + **GPT (2018): First major language model.**
  + **GPT-2 (2019): Powerful but initially restricted due to misuse concerns.**
  + **GPT-3 (2020): Huge leap with 175 billion parameters.**
  + **ChatGPT (Nov 2022): Fine-tuned version of GPT-3.5 made accessible to the public.**
  + **GPT-4 (2023): Multimodal (text + images), more accurate, safer.**

### **⚙️ How ChatGPT Works**

* **Based on the Transformer architecture.**
* **Pre-training: Learns from massive datasets (books, websites).**
* **Fine-tuning: Adjusted with human feedback for safe, helpful responses.**
* **Processes input as "tokens" and uses attention mechanisms to understand context and generate meaningful replies.**

### **🚀 Capabilities**

* **Text Generation: Writing emails, essays, stories, or scripts.**
* **Summarization: Shortening long documents while keeping key ideas.**
* **Translation: Between languages like English, Hindi, French, etc.**
* **Code Help: Debugging and writing code in Python, C++, etc.**
* **Reasoning & Logic: Solving math or logic problems.**

### **🌍 Real-World Applications**

#### **📚 Education:**

* **Virtual tutors, homework help, content creation.**

#### **🏥 Healthcare:**

* **Symptom checking, report summarization (with human oversight).**

#### **🏢 Business:**

* **Customer service bots, report writing, email drafting.**

#### **🎨 Creativity:**

* **Song lyrics, poetry, storytelling, brainstorming ideas.**

### **🧩 Interface Exploration**

**Users interact with ChatGPT via a chat-style interface, entering prompts and receiving AI-generated responses. Tools like transformer visualization help users and developers understand how the model pays attention to different words and parts of input.**

### **✅ Conclusion**

**ChatGPT is a powerful and versatile AI tool built to assist in education, health, business, and creative fields. Its foundation in GPT architecture and Transformer models allows it to generate human-like text, making it a breakthrough in human-computer interaction.**

### 

Lab 2

**Lab 2 : Types of Prompt and Prompt Engineering Basics**

## **Report: Prompt Engineering – Types, Techniques, and Examples**

### **🎯 Objective**

**To understand different types of prompts — *Instructional, Interrogative, Zero-shot, and Few-shot* — and analyze how prompt design affects the quality of AI responses. This includes experimenting with examples of each type and comparing their effectiveness.**

### **📘 What is a Prompt?**

**A prompt is the input (question or instruction) given to an AI language model to generate a response. The design of the prompt plays a key role in determining the quality, accuracy, and relevance of the response.**

### **🔧 What is Prompt Engineering?**

**Prompt Engineering is the strategic crafting of prompts to get optimal results from an AI. It involves:**

* **Providing context**
* **Giving clear, direct instructions**
* **Including examples (few-shot prompting)**
* **Structuring the prompt logically (like tables, bullet points)**
* **Encouraging step-by-step thinking for complex tasks**

## **📂 Types of Prompts with Examples**

### **🔹 1. Instructional Prompts**

**Prompts that *instruct* the model to perform a task.**

**Examples:**

1. **"Write a paragraph about the importance of clean water."**
2. **"Summarize the poem 'The Road Not Taken' by Robert Frost."**
3. **"Translate this sentence into French: 'Good morning, how are you?'"**
4. **"Create a shopping list for a vegetarian dinner."**
5. **"Generate five fun facts about the planet Mars."**

### **🔹 2. Interrogative Prompts**

**These are *question-based* prompts that directly ask something.**

**Examples:**

1. **"What is the capital of Australia?"**
2. **"How does photosynthesis work?"**
3. **"Why do objects float in water?"**
4. **"What are the main causes of inflation?"**
5. **"Who wrote 'To Kill a Mockingbird'?"**

### **🔹 3. Zero-Shot Prompts**

**The AI is expected to perform a task with *no examples provided* — just the instruction or question.**

**Examples:**

1. **"Write a haiku about winter."**
2. **"List the advantages of solar energy."**
3. **"What is a palindrome? Explain with examples."**
4. **"Convert this sentence into passive voice: 'She painted the wall.'"**
5. **"Summarize the given paragraph in 3 sentences."**

### **🔹 4. Few-Shot Prompts**

**These include *examples within the prompt*, guiding the AI on what kind of output is expected.**

**Examples:  
 1.  
 Prompt:  
 Translate English to Spanish:**

* **"Good morning" → "Buenos días"**
* **"How are you?" → "¿Cómo estás?"**
* **"See you later" →  
   Response: "Hasta luego"**

**Prompt:  
 Create a rhyming pair:**

* **Sun → Fun**
* **Tree → Free**
* **Night →  
   Response: Light**

**Prompt:  
 Identify the part of speech:**

* **Quickly → Adverb**
* **Cat → Noun**
* **Run →  
   Response: Verb**

**Prompt:  
 Give analogies:**

* **Hot is to Cold as Up is to Down**
* **Big is to Small as Fast is to  
   Response: Slow**

**Prompt:  
 Describe the emotion:**

* **Winning a prize → Excitement**
* **Losing a friend →  
   Response: Sadness**

## **Conclusion**

* **Effective prompt design is crucial for guiding AI models like ChatGPT. By using different types of prompts — instructional, interrogative, zero-shot, and few-shot — users can control and improve the quality of responses. Few-shot prompting generally yields better and more reliable results, especially for complex or structured tasks, while zero-shot is efficient for simpler requests. Mastering prompt engineering helps users unlock the full potential of AI in various domains.**

Lab3

**Lab 3 :Precision Prompting for Information Extraction**

## **Report: Precision Prompting for Information Extraction**

### **🎯 Objective**

**The objective of this task is to extract structured data (like names, contact information, keywords, or resume sections) from natural language text using precision prompting techniques. This involves crafting prompts that instruct ChatGPT to return outputs in JSON or table format for better readability and programmatic use.**

### **🧰 Activities**

1. **Ask ChatGPT to format responses in structured formats like JSON and tables.**
2. **Extract:**
   * **Contact information (name, phone, email, address)**
   * **Resume sections (education, experience, skills)**
   * **Keywords from job descriptions or essays**
3. **Document the prompt used, AI output, and formatting accuracy.**

## **🔎 Examples of Prompts and Outputs**

### **🧪 Activity 1: Extract Contact Information in JSON**

**Input Paragraph:  
 “Hi, I’m Priya Sharma, living in Pune. You can reach me at priya.sharma@gmail.com or call me on +91-9876543210.”**

**Prompt:  
 Extract the contact information from the paragraph in JSON format with fields: name, email, phone, and address.**

**Output:**

**{**

**"name": "Priya Sharma",**

**"email": "priya.sharma@gmail.com",**

**"phone": "+91-9876543210",**

**"address": "Pune"**

**}**

### **Activity 2: Extract Resume Sections in Tabular Format**

**Input Paragraph:  
 “I am Rahul Verma. I completed my B.Tech in Computer Science from IIT Delhi in 2021. I worked as a Software Engineer at Infosys from 2021 to 2023. I’m skilled in Python, Java, and SQL.”**

**Prompt:  
 Extract the resume details and present them in a table with columns: Section, Details.**

**| Section | Details**

**| Name | Rahul Verma**

**| Education | B.Tech in Computer Science, IIT Delhi, 2021**

**| Experience | Software Engineer at Infosys (2021–2023)**

**| Skills | Python, Java, SQL**

### **Activity 3: Extract Keywords from a Job Description**

**Input Paragraph:  
 “We are looking for a Data Analyst with experience in Excel, SQL, data visualization, and statistical modeling. Strong communication and reporting skills are a plus.”**

**Prompt:  
 List all the key skills required for the job in JSON array format.**

**Output:**

**[**

**"Excel",**

**"SQL",**

**"Data Visualization",**

**"Statistical Modeling",**

**"Communication Skills",**

**"Reporting Skills"**

**]**

## **Conclusion**

**Precision prompting helps in converting unstructured text into structured data formats like JSON and tables. This makes ChatGPT a powerful tool for tasks like resume parsing, contact extraction, and information indexing. By giving clear formatting instructions, users can reliably extract clean, machine-readable outputs from natural language inputs.**

Lab4

**Lab 4 :Summarization and Text Transformation**

### **Learning Objective**

* **Understand how to use AI for:**
  + **Condensing lengthy content into concise summaries.**
  + **Rewriting content in different tones (formal vs informal).**
  + **Preserving meaning while adjusting style.**

## **🧪 Activities and Results**

### **🧠 Activity 1: Summarize a News Article**

**Original Text:**

***"India’s Chandrayaan-3 mission successfully landed on the moon’s south pole on August 23, 2023, making India the first country to reach this region. The mission, led by ISRO, aims to study the moon’s surface and analyze its mineral composition and seismic activity. The mission is seen as a major leap in India’s space ambitions and scientific capabilities."***

**Prompt:  
 Summarize the article in 2–3 lines.**

**Output (Summary):**

***India's Chandrayaan-3 successfully landed on the moon’s south pole, a global first. Led by ISRO, the mission aims to study the lunar surface, minerals, and seismic activity, marking a milestone in India’s space journey.***

**✅ Summary Quality: Excellent – concise, clear, and informative.**

### **✉️ Activity 2: Rewrite Email in Formal Tone**

**Original Informal Email:**

***"Hey, just checking if you got my report. Let me know if anything needs fixing. Thanks!"***

**Prompt:  
 Rewrite the email in a formal tone.**

**Output (Formal Version):**

***Dear [Recipient],  
 I hope this message finds you well. I am writing to confirm whether you have received the report I submitted. Please let me know if any revisions are required.  
 Thank you and best regards,  
 [Your Name]***

**✅ Tone Adjustment: Successfully transformed into professional format.**

### **✉️ Activity 3: Rewrite Email in Informal Tone**

**Original Formal Email:**

***Dear Team,  
 Please be informed that the scheduled meeting will commence at 10:00 AM sharp in the main conference room. Kindly ensure your attendance.***

**Prompt:  
 Rewrite the above in an informal tone.**

**Output (Informal Version):**

***Hey everyone,  
 Just a reminder — our meeting's at 10:00 AM in the main conference room. Hope you all can make it on time!***

**✅ Tone Adaptation: Casual, clear, and team-friendly.**

### **📚 Activity 4: Research Abstract Summarization**

**Original Abstract:**

***“This research explores the integration of AI in crop disease detection using image-based models. A hybrid CNN-Transformer approach is proposed to improve precision across varied agricultural environments. The results show significant improvement in detection accuracy compared to traditional methods.”***

**Prompt:  
 Summarize this abstract in one sentence.**

**Output (Summary):**

***The study presents a CNN-Transformer model that enhances AI-based crop disease detection with improved accuracy in diverse farm conditions.***

**✅ Summary Quality: Condensed and accurate.**

## **Conclusion**

**ChatGPT proves highly effective in summarizing complex information and transforming tone in various communication formats. These skills are crucial for academic writing, professional communication, and adapting content for different audiences.**

**Well-crafted prompts help guide the AI in preserving original meaning while tailoring the structure or tone of the output. This makes ChatGPT a valuable assistant for tasks involving clarity, brevity, and audience-specific writing.**

lab5

**Lab 5: ChatGPT in Code Generation and Debugging**

### **Activities Performed**

1. Code Generation from natural language prompts.
2. Debugging existing code snippets using ChatGPT.
3. Comparing ChatGPT-generated outputs with expected results for validation.

## 🧪 Activity 1: Python Code Generation

### 📝 Prompt:

*Write a Python program to check if a number is prime.*

### ✅ ChatGPT-Generated Code:

def is\_prime(n):

if n <= 1:

return False

for i in range(2, int(n\*\*0.5)+1):

if n % i == 0:

return False

return True

# Example usage

num = 29

if is\_prime(num):

print(f"{num} is a prime number.")

else:

print(f"{num} is not a prime number.")

Expected Output:

29 is a prime number.

## **🧪 Activity 2: C++ Code Generation**

### **📝 Prompt:**

*Generate C++ code to reverse a string.*

### **✅ ChatGPT-Generated Code:**

#include <iostream>

#include <algorithm>

using namespace std;

int main() {

string str = "OpenAI";

reverse(str.begin(), str.end());

cout << "Reversed string: " << str;

return 0;

}

🎯 Expected Output:

Reversed string: IAnepO

## **🧪 Activity 3: Java Code Generation**

### **📝 Prompt:**

*Write a Java program to find the factorial of a number using recursion.*

### **✅ ChatGPT-Generated Code:**

public class Factorial {

public static int factorial(int n) {

if (n <= 1)

return 1;

else

return n \* factorial(n - 1);

}

public static void main(String[] args) {

int num = 5;

System.out.println("Factorial of " + num + " is " + factorial(num));

}

}

🎯 Expected Output:Factorial of 5 is 120

## **🧪 Activity 4: Python Code Debugging**

### **🐞 Original Buggy Code:**

def add\_numbers(a, b):

return a + b

print(add\_numbers(5)) # Error: missing argument

### **✅ ChatGPT Debug Suggestion:**

*The function call is missing the second argument. Fix it by adding the missing value.*

### **🔧 Fixed Code:**

def add\_numbers(a, b):

return a + b

print(add\_numbers(5, 3)) # Now works correctly

### **Output:**

8

## **✅ Conclusion**

This lab demonstrates that **ChatGPT is a powerful tool for both generating and debugging code**. It produces correct, readable programs in multiple languages and can identify logical and syntax errors quickly. With natural language prompts, students and developers can enhance their productivity and understanding of programming logic.

lab6

**Lab 6: Domain-Specific Applications**

### **elected Activity: Educational Quiz Generation**

## **🛠️ Prompt Design**

**Effective quiz generation requires:**

* **Defining the subject area (e.g., science, history).**
* **Specifying the question type (MCQ, true/false, fill-in-the-blanks).**
* **Setting difficulty level (easy, medium, hard).**
* **Requesting answers for evaluation or self-checking.**

### **📝 Sample Prompt 1:**

**Generate 5 multiple-choice questions in basic physics for high school students. Include 4 options per question and mention the correct answer.**

### **✅ Output:**

1. **What is the SI unit of force?  
    a) Joule  
    b) Newton ✅  
    c) Pascal  
    d) Watt**
2. **Which law explains the relationship between force, mass, and acceleration?  
    a) Newton's First Law  
    b) Newton's Second Law ✅  
    c) Newton's Third Law  
    d) Law of Gravity**
3. **What is the speed of light in a vacuum?  
    a) 3×10⁸ m/s ✅  
    b) 1.5×10⁸ m/s  
    c) 3×10⁶ m/s  
    d) 1.5×10⁶ m/s**
4. **Which of the following is a vector quantity?  
    a) Speed  
    b) Temperature  
    c) Distance  
    d) Velocity ✅**
5. **What causes objects to fall to the ground?  
    a) Magnetism  
    b) Friction  
    c) Gravity ✅  
    d) Inertia**

### **📝 Sample Prompt 2:**

**Create a quiz on world history with 3 true/false questions. Include the correct answers.**

### **✅ Output:**

1. **The Great Wall of China was built during the Ming Dynasty.  
    ✅ True**
2. **World War I ended in 1918.  
    ✅ True**
3. **Napoleon Bonaparte was a king of Spain.  
    ❌ False**

## **📊 Output Evaluation**

|  |  |
| --- | --- |
| **Criteria** | **Evaluation** |
| **Relevance** | **✅ All questions aligned with chosen topics** |
| **Accuracy** | **✅ Correct facts and answer keys** |
| **Clarity** | **✅ Clear and concise question wording** |
| **Difficulty Control** | **✅ Questions suitable for high school level** |
| **Usefulness** | **✅ Suitable for study, assessment, or revision** |