Assignment 03: Assignment and practice of ChatGPT and its usage

Title: Introduction to ChatGPT

Objective:

Understand the basics of ChatGPT, its origin, capabilities, and real-world applications.

Overview:

What is ChatGPT?
ChatGPT is a conversational AI developed by OpenAI, based on the Generative Pre-trained Transformer (GPT) architecture. It excels at understanding and generating human-like text, enabling applications ranging from casual conversation to complex problem-solving.

Origins & Architecture
Introduced in November 2022, ChatGPT builds upon the transformer architecture, specifically GPT-3.5 and GPT-4 models. The transformer model utilizes self-attention mechanisms to process and generate text efficiently. For an interactive visualization of how transformers work.

Capabilities

- **Conversational AI**: Engages in dynamic, context-aware dialogues.

- **Content Generation**: Creates essays, poems, code, and more.

- **Language Translation**: Translates text between multiple languages.

- **Summarization**: Condenses long texts into concise summaries.

- **Personal Assistance**: Helps with scheduling, reminders, and information retrieval.

Real-World Applications:

Education
ChatGPT aids in personalized learning by generating quizzes, summarizing topics, and

providing explanations tailored to individual learning styles. Educators use it to develop lesson plans and educational materials.

Healthcare
In the medical field, ChatGPT assists in summarizing patient records, providing information on medical conditions, and supporting mental health through conversational engagement .

Business
Companies leverage ChatGPT for customer support, drafting emails, and automating routine tasks, thereby increasing efficiency and productivity .

Creativity
Writers and artists use ChatGPT to brainstorm ideas, overcome creative blocks, and generate content, enhancing the creative process .

Conclusion

ChatGPT represents a significant advancement in AI, offering versatile applications across various sectors. Its ability to understand and generate human-like text makes it a valuable tool for education, healthcare, business, and creative endeavors.

❖ Task 2:Types of Prompts and Prompt Engineering Basics

Objective:

Learn types of prompts (instructional, interrogative, zero/few-shot).

Activities:

● Try zero-shot vs few-shot prompts

● Design prompts with increasing complexity

Zero‑Shot Prompts :-

1. **Instruction**:
   "Translate the following sentence into Spanish: The weather is beautiful today."

2. **Interrogative**:
   "What are the three main benefits of solar energy?"

3. **Classification**:
   "Classify the sentiment of this review as positive, negative, or neutral: I didn't enjoy the movie."
4. **Summarization**:
   "Summarize this paragraph in one sentence: [paragraph text]"

5. **Reason-step** (chain-of-thought zero-shot):
   "Solve: If a train travels at 60 km/h for 2 hours, how far does it go? Let's think step by step."

Few-Shot Prompts :

1. **Sentiment classification**:

   Text: The service was terrible. Sentiment: Negative

   Text: I love this place. Sentiment: Positive

   Text: It's just okay. Sentiment: Neutral

   Text: I didn't enjoy the movie. Sentiment:

2. **Translation (English → Spanish)**:

   "I like tea." → "Me gusta el té."

   "She is reading a book." → "Ella está leyendo un libro."

   "They are playing soccer." → "Ellos están jugando fútbol."

   "We are cooking dinner." →

3. **Summarization**:

   Article: "A dog chased a cat and ran away." → Summary: "A dog scared a cat off."

   Article: "He studied hard and passed the exam." → Summary: "He passed after much study."

   Article: "She decorated the room with bright colors." → Summary: "She painted the room vibrantly."

   Article: [new] → Summary:

4. **Math Q&A:**

Q: If 4×5 = 20, then 20 ÷ 4 = 5.

Q: If 6×3 = 18, then 18 ÷ 6 =

Q: If 9×2 = 18, then 18 ÷ 9 =

5. **Intent classification:**

User Input: "Please send the summary to Jane." Intent: SendEmail

User Input: "Remind me tomorrow at 9 AM." Intent: CreateTask

User Input: "Let everyone know the meeting started." Intent: SendMessage

User Input: "Forward the report to Sam." Intent:

Comparison of Results:-

- **Zero-Shot**: Fast and simple, but may misinterpret instructions or provide inconsistent format.
- **Few-Shot**: Typically highest format consistency and accuracy—model sees multiple examples and generalizes better.

❖ Task 3:Precision Prompting for Information Extraction

● The response asked to chat/gpt to convert json format :-

{
  "paragraph": "Ratan Naval Tata (born December 28, 1937; died October 9, 2024) was a renowned Indian industrialist and philanthropist who led the Tata Group as Chairman from 1991 to 2012, and briefly again during 2016–17. Under his leadership, the conglomerate expanded globally, acquiring brands like Tetley, Corus, Jaguar, and Land Rover, transforming Tata into a global enterprise. He was equally celebrated for his ethical leadership and widespread philanthropic initiatives through the Tata Trusts, supporting education, healthcare, and rural development. His contributions earned him prestigious awards including India's Padma Bhushan in 2000 and Padma Vibhushan in 2008. Tata was admired not only for his business acumen but also his modesty, discipline, and unwavering commitment to national progress."
}

- **Extracted contact info, resume sections, keywords from a paragraph:-**

```
{
 "contact": {
  "name": "Ratan Naval Tata",
  "email": null,
  "phone": null
 },
 "education": [
  "Bachelor of Architecture, Cornell University (1962)",
  "Advanced Management Program, Harvard Business School (1975)"
 ],
 "awards": [
  "Padma Bhushan (2000)",
  "Padma Vibhushan (2008)"
 ],
 "keywords": [
  "global expansion",
  "acquisitions",
  "Tata Nano",
  "philanthropy",
  "leadership"
 ]
}
```

❖ Task 4: Summarization and Text Transformation Report

Objective:

Use ChatGPT for summarization, rewriting, tone transformation.

Activity : Summarize News Article / Research Abstract

Original Text (News Article Excerpt):

> *"India's moon mission Chandrayaan-3 successfully landed on the lunar south pole on August 23, 2023. This historic achievement makes India the first country to land*

near the Moon's south pole and the fourth nation to perform a soft landing on the Moon. The mission aims to study lunar soil and search for water ice."

Summarized Output:

India's Chandrayaan-3 became the first mission to land near the Moon's south pole, marking a historic milestone on August 23, 2023. The mission aims to study the lunar surface and detect water ice.

Rewrite Email in Formal Tone:-

Original Email (Informal):

Hey team, just a heads-up that our client meeting got moved to Thursday at 11. Let me know if that doesn't work for anyone. Cheers, Rahul.

Transformed Output (Formal Tone):

Dear Team,
Please note that the client meeting has been rescheduled to Thursday at 11:00 AM. Kindly inform me if this timing poses any issues.
Best regards,
Rahul

Rewrite Email in Informal Tone:-

Original Email (Formal):

Dear Mr. Sharma,
I hope this message finds you well. I am writing to follow up on the documents submitted last week. Please let me know if any further information is required.
Sincerely,
Priya Kapoor

Transformed Output (Informal Tone):

Hi Mr. Sharma,
Hope you're doing well! Just checking in about the documents I sent last week—let me know if you need anything else from my side.
Best,
Priya

Summary and Transformation Report:-

In this lab, ChatGPT was used for summarization and tone transformation tasks. A news article about India's Chandrayaan-3 mission was summarized to highlight key

points—its historic landing near the Moon's south pole and its scientific objectives. Additionally, two emails were rewritten: an informal team message was transformed into a formal version, and a formal follow-up email was converted into a casual, friendly tone.

❖ Task 5: ChatGPT in Code Generation and Debugging

Objective:

Explore how ChatGPT can assist in programming.

Activity : Code Generation from Prompt

Prompt:

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

```python
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
```

```python
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.

Actual Output from ChatGPT Code:

29 is a prime number.

Activity : Code Debugging

Given Buggy Code (C++):

```cpp
#include<iostream>
using namespace std;

int main() {
    int n = 5;
    for (int i = 0; i <= n; i++) {
        cout << i << endl;
    }
    return 0;
}
```

ChatGPT Debugged Code:

```cpp
#include<iostream>
using namespace std;

int main() {
    int n = 5;
    for (int i = 1; i <= n; i++) {
        cout << i << endl;
```

```
    }
    return 0;
}
```

Expected Output:

1
2
3
4
5
Actual Output:
1
2
3
4
5

Conclusion:

ChatGPT effectively generated and debugged code across multiple languages. The Python program produced accurate results using optimal logic, and the C++ code debugging corrected an off-by-one error. In both cases, the output matched expectations, demonstrating ChatGPT's usefulness in code generation, debugging, and understanding logic—making it a valuable assistant for programmers and learners.

Task 6: Domain-Specific Applications

Objective:

 Use ChatGPT tasks.

Activities:

Educational Quiz Generation:-

ChatGPT Output (Generated Quiz):

Topic: Photosynthesis – High School Biology

1. What is the primary site of photosynthesis in a plant?
   a) Roots
   b) Stems
   c) Leaves ✅
   d) Flowers

2. Which gas is used by plants during photosynthesis?
   a) Oxygen
   b) Carbon dioxide ✅
   c) Nitrogen
   d) Hydrogen

3. What is the name of the green pigment that absorbs sunlight?
   a) Hemoglobin
   b) Melanin
   c) Chlorophyll ✅
   d) Keratin

4. What are the main end products of photosynthesis?
   a) Water and carbon dioxide
   b) Oxygen and glucose ✅
   c) Oxygen and ATP
   d) Glucose and nitrogen

5. Which organelle in plant cells is responsible for photosynthesis?
   a) Mitochondria
   b) Nucleus
   c) Chloroplast ✅
   d) Ribosome