Lab 1: Introduction to ChatGPT

Summary

ChatGPT is an advanced conversational AI developed by **OpenAI**, built on the **transformer architecture** introduced in 2017. It works as a large language model trained on massive text datasets, enabling it to understand natural language and generate human-like responses.

The core working principle of ChatGPT is **predicting the next word** in a sequence. Using the transformer model's *self-attention mechanism*, it can capture relationships between words and maintain context across long conversations. This allows it to generate coherent, context-aware, and grammatically correct responses.

Capabilities of ChatGPT

- **Information & Learning:** Explains complex topics in simple words, creates study notes, and answers questions.
- **Text Processing:** Summarization, rewriting, translation, and tone transformation.
- **Programming:** Code generation, debugging, and explaining algorithms.
- **Creativity:** Story writing, brainstorming, and content creation.

Real-World Applications

1. **Education:** Students use ChatGPT to clarify doubts, create quizzes, and summarize textbooks.
2. **Healthcare:** Doctors and patients use it for preliminary health awareness, symptom explanation, and mental health chatbots.
3. **Business:** Companies integrate ChatGPT in customer service, marketing content creation, and report generation.
4. **Creativity:** Writers and artists use it for idea generation, lyrics, or script drafts.

Conclusion

ChatGPT represents a major leap in artificial intelligence, showcasing how language models can assist in **learning, productivity, business, and creativity**. With careful and responsible use, it is becoming a powerful tool that transforms the way humans interact with technology.

Lab 2: Types of Prompts and Prompt Engineering Basics

Objective:

To learn different types of prompts (instructional, interrogative, zero-shot, few-shot) and compare their results.

Instructional Prompts (5 examples)

1. Prompt: Write a haiku about rain.
   Output: Gentle drops falling / Whispers on the windowpane / Nature’s lullaby.

2. Prompt: List 5 uses of Artificial Intelligence in healthcare.
   Output: Diagnosis, Drug discovery, Virtual health assistants, Personalized treatment, Predictive analytics.

3. Prompt: Summarize the plot of The Lion King in 3 sentences.
   Output: Simba grows up, faces challenges, defeats Scar, and becomes king.

4. Prompt: Explain Newton’s 3 laws of motion in simple words.
   Output: Rest unless moved, Force = Mass × Acceleration, Every action has equal opposite reaction.

5. Prompt: Create a motivational quote for students.
   Output: "Every small effort brings you closer to success."

Interrogative Prompts (5 examples)

1. Prompt: Why is the sky blue?
   Output: Because of Rayleigh scattering of sunlight.

2. Prompt: What are the benefits of eating fruits daily?
   Output: Provide vitamins, minerals, fiber, hydration, and boost immunity.

3. Prompt: How does Wi-Fi work?
   Output: Uses radio waves to transmit data between devices and routers.

4. Prompt: Which planet is known as the Red Planet?
   Output: Mars.

5. Prompt: What is the importance of recycling?
   Output: Saves resources, reduces pollution, protects the environment.

Zero-Shot Prompts (5 examples)

1. Prompt: Translate "Good Morning" into French.
   Output: Bonjour.

2. Prompt: Classify this animal: Whale → Mammal or Fish?
   Output: Mammal.

3. Prompt: Summarize in 5 words: Artificial Intelligence is changing education.
   Output: AI transforming learning and teaching.

4. Prompt: Convert 50 km into miles.
   Output: 31.07 miles.

5. Prompt: Generate a creative title for a story about robots.
   Output: "The Awakening of Steel."

One-Shot Prompts (5 examples)

1. Prompt: Hello → Bonjour; Good Night → ?
   Output: Bonne Nuit.

2. Prompt: Apple → Fruit; Carrot → ?
   Output: Vegetable.

3. Prompt: For School → "Learning for Life"; For Library → ?
   Output: "Where Knowledge Lives."

4. Prompt: Big → Large; Small → ?
   Output: Tiny.

5. Prompt: France → Paris; Japan → ?
   Output: Tokyo.

Few-Shot Prompts (5 examples)

1. Prompt: Hello → Bonjour; Good Night → Bonne Nuit; Thank You → Merci; Good Morning → ?
   Output: Bonjour.

2. Prompt: Apple → Fruit; Carrot → Vegetable; Salmon → Fish; Mango → ?
   Output: Fruit.

3. Prompt: School → "Learning for Life"; Library → "Where Knowledge Lives"; Hospital → ?

Output: "Caring for Every Life."

4. Prompt: Big → Large; Small → Tiny; Happy → Joyful; Sad → ?
Output: Unhappy.

5. Prompt: France → Paris; Japan → Tokyo; India → New Delhi; Germany → ?
Output: Berlin.

Comparison & Observation

- Instructional: Works well when the task is clear and specific.
- Interrogative: Answers factual or explanatory questions.
- Zero-shot: No prior examples, accuracy depends on clarity of instruction.
- One-shot: One example improves understanding of the expected format.
- Few-shot: Multiple examples make outputs highly consistent and accurate.

Conclusion:

Prompt engineering helps in designing better instructions for AI. The more structured the prompt (especially with few-shot), the more accurate and context-aware the output becomes.

Lab 3: Precision Prompting for Information Extraction

Objective:

To extract structured data from ChatGPT responses by formatting outputs in JSON or tabular format.

Example 1: Contact Information Extraction (JSON)

Prompt:
Extract details in JSON format:
"Riya Sharma, Email: riya123@gmail.com, Phone: 9876543210, City: Mumbai."

Output:

```
{
  "Name": "Riya Sharma",
  "Email": "riya123@gmail.com",
  "Phone": "9876543210",
  "City": "Mumbai"
}
```

Accuracy: All details extracted correctly.

Example 2: Resume Section Extraction (JSON)

Prompt:
Extract Education details from this resume in JSON:
"Arjun Mehta completed B.Tech in AI & DS from NMIET Pune in 2025 with 8.2 CGPA."

Output:

```
{
  "Name": "Arjun Mehta",
  "Degree": "B.Tech",
  "Branch": "AI & DS",
  "College": "NMIET Pune",
  "Year": 2025,
  "CGPA": 8.2
}
```

Accuracy: Correctly structured resume section.

Example 3: Keyword Extraction (Table)

Prompt:
Extract keywords from the following text and present them in a table:
"Artificial Intelligence is used in education, healthcare, and business automation."

Output:

Keyword	**Domain**
Artificial Intelligence	Application
Education	Application
Healthcare	Application
Business automation	Application

Example 4: Book Details (JSON)

Prompt:
Extract book details in JSON format:
"The book 'Wings of Fire' was written by Dr. A.P.J. Abdul Kalam and published in 1999."

Output:

```
{
  "Title": "Wings of Fire",
  "Author": "Dr. A.P.J. Abdul Kalam",
  "Year": 1999
}
```

Accuracy: Extracted all details correctly.

Example 5: Student Data (Table)

Prompt:
Extract Name, Roll No, and Marks in a table:
"Student Asha, Roll No 17, scored 89 marks in Mathematics."

Output:

Name	Roll no	Subject	Marks
Asha	17	Mathematics	89

Accuracy: Output is structured and accurate.

Observation
- JSON helps present clear, structured data (useful for resumes, contacts, books).
- Tables are better for comparisons and lists (keywords, student marks).
- Precision prompting ensures ChatGPT follows the required format and avoids vague answers.

Lab 4: Summarization and Text Transformation

Objective:
To use ChatGPT for summarization, rewriting, and tone transformation.

Example 1: News Article Summarization

Original Text:
"India successfully launched its latest weather satellite INSAT-3D, which will help improve weather forecasting, cyclone tracking, and disaster warning systems."

Prompt:
Summarize this news in two lines.

Output:
India launched the INSAT-3D weather satellite to enhance forecasting, cyclone tracking, and disaster warnings.

Example 2: Research Abstract Summarization

Original Text:
"Artificial Intelligence (AI) is increasingly used in education to create adaptive learning systems. These systems analyze student performance data to personalize lessons, thereby improving engagement and outcomes."

Prompt:
Summarize this research abstract in simple words.

Output:
AI is used in education to make learning personal by studying student progress and improving results.

Example 3: Email Rewriting (Informal → Formal)

Original Text:
"Hey Sir, I can’t come to class today, not feeling well. Will check notes later."

Prompt:
Rewrite this email in a formal tone.

Output:

"Respected Sir, I am feeling unwell and will not be able to attend today’s class. I will go through the notes later. Regards, [Your Name]"

Example 4: Email Rewriting (Formal → Informal)

Original Text:
"Dear Manager, I regret to inform you that I will not be able to attend the meeting today due to personal reasons."

Prompt:
Rewrite this email in an informal tone.

Output:
"Hi, I won’t be able to join the meeting today, something personal came up. Sorry about that!"

Example 5: Tone Transformation (Neutral → Motivational)

Original Text:
"Studying regularly is important to score good marks in exams."

Prompt:
Rewrite this sentence in a motivational tone.

Output:
"Every hour you dedicate to studying brings you closer to success in your exams. Keep pushing forward!"

Observation

- Summarization converts long text into short, clear versions while retaining meaning.
- Tone transformation adapts content to suit different audiences (formal, informal, motivational).
- ChatGPT helps in rewriting and polishing content effectively for professional and academic use.

Lab 5: ChatGPT in Code Generation and Debugging

Objective:

To explore how ChatGPT can assist in programming by generating and debugging code.

Example 1: Python Code Generation

Prompt:

Write a Python program to calculate factorial of a number.

Output (Generated Code):

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

num = 5
print("Factorial of", num, "is", factorial(num))
```

Expected Output:

Factorial of 5 is 120

Example 2: C++ Code Generation

Prompt:

Write a C++ program to find the sum of first N natural numbers.

Output (Generated Code):

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

int main() {
    int n = 10, sum = 0;
    for (int i = 1; i <= n; i++) {
    sum += i;
    }
    cout << "Sum of first " << n << " numbers is " << sum;
    return 0;
}
```

Expected Output:
Sum of first 10 numbers is 55

Example 3: Debugging Python Code

Prompt:
Debug the following Python code to correctly print numbers 1 to 5.

```
for i in range(1,5):
print(i)
```

Corrected Code:

```
for i in range(1,6):
    print(i)
```

Expected Output:
1
2
3
4
5

Example 4: Debugging C++ Code

Prompt:
Debug this C++ code which is giving an error.

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

int main() {
    int a = 5
    cout << "Value of a is " << a;
    return 0;
}
```

Corrected Code:

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

int main() {
    int a = 5;
    cout << "Value of a is " << a;
```

```
    return 0;
}
```

Expected Output:
Value of a is 5

Observation

- ChatGPT can generate working code in multiple languages.
- It can also identify and fix syntax/logic errors in given code snippets.
- The outputs matched the expected results, showing its usefulness in coding and debugging tasks.

Lab 6: Domain-Specific Applications

Objective:

To use ChatGPT for domain-specific tasks.

Example: Educational Quiz Generation

Prompt:

Generate 5 multiple-choice questions on Computer Networks.

Output:

1. Which device is used to connect multiple computers in a LAN?
   a) Router
   b) Switch
   c) Modem
   d) Hub
   Answer: b) Switch

2. What does IP stand for in networking?
   a) Internet Process
   b) Internal Protocol
   c) Internet Protocol
   d) Integrated Program
   Answer: c) Internet Protocol

3. Which layer of the OSI model is responsible for data encryption?
   a) Application Layer
   b) Session Layer
   c) Presentation Layer
   d) Transport Layer
   Answer: c) Presentation Layer

4. What is the default port number of HTTP?
   a) 21
   b) 25
   c) 80
   d) 110
   Answer: c) 80

5. Which protocol is used to send emails?
   a) SMTP
   b) FTP

c) HTTP
d) SNMP
Answer: a) SMTP

Evaluation

- The questions cover key concepts of Computer Networks.
- Each question provides 4 options with one correct answer.
- The output is accurate, relevant, and useful for educational purposes.