**AI P3 Lab-1**

Introduction to ChatGPT

**Lab-1**

**Objective:** To understand the fundamentals of ChatGPT, including its origin, capabilities, and practical applications across various fields.

**Overview:** ChatGPT is an AI language model developed by OpenAI, built upon the transformer architecture. It is designed to understand and generate human-like text by analyzing vast amounts of data. By learning patterns in language, it can respond coherently and contextually to a wide range of prompts.

**How ChatGPT Works:** ChatGPT operates using the transformer model, which processes input text by breaking it down into smaller units called tokens. It predicts the next token based on the surrounding context, enabling it to generate meaningful and relevant responses. The model is trained on diverse datasets using unsupervised learning and fine-tuning techniques, which enhance its understanding of language nuances and complex queries.

**Activities to Understand ChatGPT:**

* Exploring the ChatGPT interface allows users to interact with the model and see its capabilities firsthand.
* Studying transformer architecture with visualization tools helps in grasping how the model processes and generates language.
* Identifying use-cases in education, healthcare, business, and creativity demonstrates its versatility.

**Real-World Applications:**

* **Education:** ChatGPT serves as a virtual tutor, explaining concepts, answering questions, and generating learning materials.
* **Healthcare:** It assists in preliminary symptom checking and helps with medical documentation, improving efficiency (though not a substitute for professional advice).
* **Business:** The model automates customer support via chatbots, drafts professional communication, and aids in report generation.
* **Creativity:** Writers and artists use ChatGPT to brainstorm ideas, draft content, and compose creative works such as poems or stories.

**Conclusion:** ChatGPT represents a significant advancement in AI-driven language understanding and generation. By bridging the gap between humans and machines, it enhances productivity and creativity across multiple domains, proving to be a valuable tool in real-world scenarios.

**Tab 2**

**Types of Prompts and Prompt Engineering Basics**

**Lab -2**

### 1. Instructional Prompts

**You give a clear instruction or command to the AI, e.g., “Explain,” “List,” “Summarize.”**

**Example:**

* **“Explain the causes of World War I.”**

### 2. Interrogative Prompts

**You ask a direct question.**

**Example:**

* **“What are the main causes of World War I?”**

### 3. Zero-shot Prompts

**You give the AI a task without any examples or prior context.**

**Example:**

* **“Translate the following sentence to French: ‘I love reading books.’”  
  4. Few-shot Prompts**

**You provide a few examples in the prompt before asking the AI to perform the task.**

**Example:**

* **“Translate these sentences to French:**
  1. **I like apples. -> J’aime les pommes.**
  2. **She is happy. -> Elle est heureuse.  
      Translate this: ‘We are friends.’”**

## Prompt Engineering Basics

**To get better responses, you can:**

* **Add context: “In the context of climate change, explain…”**
* **Be clear and specific: “List 3 causes of deforestation.”**
* **Use examples: (few-shot)**
* **Specify format: “Answer in bullet points.”**
* **Ask for reasoning: “Explain step-by-step why…”**

# Your Task

**Create 5 examples each of:**

* **Instructional prompts**
* **Interrogative prompts**
* **Zero-shot prompts**
* **Few-shot prompts**

**Then compare results (I’ll help you do that too).**

## Examples to get started:

### Instructional Prompts

1. **Describe the process of photosynthesis.**
2. **List five benefits of exercising daily.**
3. **Summarize the plot of Romeo and Juliet.**
4. **Explain how a car engine works.**
5. **Provide three tips for improving memory.**

### Interrogative Prompts

1. **What is photosynthesis?**
2. **Why is exercise important for health?**
3. **How does the plot of Romeo and Juliet end?**
4. **How does a car engine function?**
5. **What are some ways to improve memory?**

### Zero-shot Prompts

1. **Translate “Good morning” to Spanish.**
2. **Generate a poem about the ocean.**
3. **List the capitals of three European countries.**
4. **Provide a recipe for a simple chocolate cake.**
5. **Write a formal email requesting a meeting.**

**Few-shot Prompts**

1. **Translate to Spanish:**
   1. **Hello -> Hola**
   2. **Thank you -> Gracias  
       Translate: “Good night”**
2. **Generate a poem about nature:**
   1. **The sun sets low, the sky turns gold,  
       Birds sing softly, stories told.  
       Now write a poem about the moon.**
3. **List capitals:**
   1. **France - Paris**
   2. **Italy - Rome  
       Name the capital of Germany.**
4. **Recipe examples:**
   1. **Pancakes: flour, eggs, milk, sugar.**
   2. **Omelette: eggs, cheese, salt, pepper.  
       Give a recipe for a salad.**
5. **Formal email examples:**
   1. **Dear Sir/Madam, I would like to request...**
   2. **To whom it may concern, Please find attached...  
       Write a formal email asking for a job interview.**

**Tab 3**

Precision Prompting for Information Extraction

Lab-3

**Prompt:** *Extract the contact information from the following paragraph and present it as JSON with fields: name, phone, email, address.*

**Expected Output:**

**{**

**"name": "John Doe",**

**"phone": "(555) 123-4567",**

**"email": "john.doe@example.com",**

**"address": "123 Maple St, Springfield"**

**}**

### Extract Resume Sections in Table Format

**Prompt:  
 *Extract the following sections from this resume paragraph and present as a table with columns: Section, Content.***

**Paragraph:  
 “Jane Smith is a software engineer with 5 years experience in Python and Java. She graduated from MIT in 2018 and worked at Google. Skills include machine learning, cloud computing, and data analysis.”**

**Expected Output (Markdown Table):**

| **Section** | **Content** |
| --- | --- |
| **Name** | **Jane Smith** |
| **Profession** | **Software engineer** |
| **Experience** | **5 years** |
| **Skills** | **Python, Java, machine learning, cloud computing, data analysis** |
| **Education** | **Graduated from MIT in 2018** |
| **Previous Employer** | **Google** |

**Prompt:** *From the following paragraph, extract 5 main keywords related to technology and present them in a JSON list.*

**Paragraph:** “The rise of artificial intelligence and machine learning has transformed many industries, including healthcare, finance, and transportation.”

[

"artificial intelligence",

"machine learning",

"healthcare",

"finance",

"transportation"

]

### Prompt:

*Extract the following contact information from the paragraph below and format it as JSON with these fields: name, phone, email, and address.*

### Expected output:

{

"name": "Emily Rogers",

"phone": "720-555-7890",

"email": "emily.rogers@mail.com",

"address": "456 Oak Avenue, Denver"

}

**Tab 4**

## Summarization and Text Transformation

## Lab-4

## How to design prompts:

### Summarization

* **Prompt:** “Summarize the following article in 3 sentences.”
* Provide the full text or abstract.

### Rewriting (Tone Transformation)

* **Prompt:** “Rewrite this email in a formal tone.”
* Or: “Rewrite this email in an informal, friendly tone.”

## Example 1: Summarization of News Article

**Original text:** “Scientists have discovered a new species of bird in the Amazon rainforest. The bird, with vibrant colors and unique calls, was found during an expedition last summer. Researchers believe this discovery highlights the rich biodiversity of the region and the importance of conservation efforts.”

**Prompt:** *Summarize the above news article in two sentences.*

**Output:** Scientists discovered a new species of bird in the Amazon rainforest, characterized by vibrant colors and unique calls. This finding underscores the region's biodiversity and the need for conservation.

## Example 2: Rewriting an Email in Formal Tone

**Original email:** “Hey John, just wanted to check if you got the report I sent yesterday. Let me know if you need anything else. Thanks!”

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

**Output:** Dear John,  
 I hope this message finds you well. I wanted to confirm whether you received the report I sent yesterday. Please let me know if you require any further information.  
 Thank you.

## Example 3: Rewriting an Email in Informal Tone

**Original email:** “Dear Sarah, I am writing to inform you that your appointment has been scheduled for next Thursday at 3 PM. Please arrive 10 minutes early.”

**Prompt:** *Rewrite the email above in an informal, friendly tone.*

**Output:** Hi Sarah,  
 Just letting you know your appointment is set for next Thursday at 3 PM. Try to get here about 10 minutes early. See you then!

## Output: Summary & Transformation Report Template

| **Task** | **Original Text** | **Prompt** | **AI Output** | **Notes** |
| --- | --- | --- | --- | --- |
| News Article Summary | [Original news paragraph] | Summarize in 2 sentences | [Summary] | Concise, retains main points |
| Email Formal Rewrite | “Hey John...” | Rewrite in formal tone | [Formal email] | Polite and professional |
| Email Informal Rewrite | “Dear Sarah...” | Rewrite in informal tone | [Informal email] | Friendly and casual |

**Tab 5**

## ChatGPT in Code Generation and Debugging

## Lab-5

## Objective

Explore how ChatGPT can assist with generating and debugging code in languages like Python, C++, and Java.

## Activities & Prompt Examples

### 1. Generate Code from Prompts

* **Prompt:** “Write a Python function that returns the factorial of a given number.”
* **Expected output:** Python code implementing factorial using recursion or iteration.

### 2. Debug a Given Code Snippet

* **Prompt:** “Here is a Python code snippet that should calculate the sum of numbers from 1 to n but has an error. Find and fix the bug.”

def sum\_to\_n(n):

total = 0

for i in range(n):

total += i

return total

## Output Comparison Template

| **Task** | **Input Prompt** | **ChatGPT Output** | **Expected Output** | **Notes** |
| --- | --- | --- | --- | --- |
| Code Generation | Factorial function in Python | [ChatGPT factorial code] | [Expected factorial code] | Check correctness, style |
| Debugging | Sum to n code snippet | [ChatGPT fixed code snippet] | Loop corrected to include last number | Identify bug and fix |

def factorial(n):

if n == 0 or n == 1:

return 1

else:

return n \* factorial(n-1)

## Example: Debugging

**Prompt:** Fix the bug in the following code that sums numbers from 1 to n:

def sum\_to\_n(n):

total = 0

for i in range(n):

total += i

return total

Output:

def sum\_to\_n(n):

total = 0

for i in range(1, n+1):

total += i

return total

**Tab 6**

Domain-Specific Applications

Lab-6

**Objective:** Use ChatGPT to generate quiz questions from educational content.

### Prompt Design:

**Prompt:** *Generate a 5-question multiple choice quiz (with 4 options each) based on the topic “Photosynthesis in Plants.” Include the correct answer after each question.*

**Why this prompt works:**

* **Specific topic** (Photosynthesis)
* **Clear task** (generate quiz)
* **Constraints** (5 questions, multiple choice, 4 options)
* **Expected structure** (include correct answer)

### ChatGPT Output:

**Quiz: Photosynthesis in Plants**

1. What is the main purpose of photosynthesis?  
    A. To break down food  
    B. To produce oxygen for animals  
    C. To convert sunlight into chemical energy  
    D. To absorb water  
    **Answer:** C
2. Which organelle in the plant cell is responsible for photosynthesis?  
    A. Mitochondria  
    B. Nucleus  
    C. Ribosome  
    D. Chloroplast  
    **Answer:** D
3. What gas do plants absorb during photosynthesis?  
    A. Oxygen  
    B. Nitrogen  
    C. Carbon dioxide  
    D. Hydrogen  
    **Answer:** C
4. What is the main pigment involved in photosynthesis?  
    A. Hemoglobin  
    B. Keratin  
    C. Chlorophyll  
    D. Melanin  
    **Answer:** C
5. What are the products of photosynthesis?  
    A. Water and sunlight  
    B. Carbon dioxide and glucose  
    C. Oxygen and glucose  
    D. Oxygen and carbon dioxide  
    **Answer:** C

**Evaluation:**

| **Criteria** | **Evaluation** |
| --- | --- |
| Relevance | All questions accurately reflect the topic |
| Structure | Clear multiple-choice format, 4 options |
| Correctness | All answers are scientifically accurate |
| Clarity | Questions are well-written and understandable |
| Educational Use | Suitable for students at middle/high school level |