Tab 1

# **Lab 1: Introduction to ChatGPT**

### **ChatGPT: Working and Real-World Applications**

**Introduction** ChatGPT is an AI language model created by OpenAI based on the GPT (Generative Pre-trained Transformer) architecture. It uses deep learning and transformers to understand and generate human-like text. GPT-4, the latest version, was trained on vast amounts of text data, enabling it to answer questions, write content, and hold conversations.

**How It Works** ChatGPT operates in two main stages:

* **Pre-training:** The model learns language by predicting the next word in large text datasets, developing understanding of syntax and facts.
* **Fine-tuning:** Human feedback improves the model’s responses, making them more accurate and appropriate.

The transformer architecture uses *self-attention* to focus on important words within context, helping ChatGPT generate relevant and coherent replies. Visualization tools illustrate how attention weights shift across sentences.

**Applications**

* **Education:** Personalized tutoring, homework help, content summarization.
* **Healthcare:** Assisting with medical documentation, patient communication, and health education.
* **Business:** Customer support chatbots, email drafting, data analysis.
* **Creativity:** Storytelling, poetry, idea generation for design and branding.

**Conclusion** ChatGPT is a versatile AI that enhances communication and creativity across various fields. Its transformer-based design allows for powerful language understanding, making it a valuable tool in education, health, business, and creative industries.

Tab 2

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

### **Objective**

* Understand different prompt types: **Instructional, Interrogative, Zero-shot, Few-shot**
* Practice zero-shot vs few-shot prompting
* Design prompts with increasing complexity

### **What is a Prompt?**

A prompt is the input or instruction given to an AI language model (like ChatGPT) to generate a meaningful, relevant response. Prompts can be simple questions or complex instructions with context and constraints.

### **What is Prompt Engineering?**

Prompt Engineering is the art and science of designing effective prompts to get the best results from AI. Techniques include:

* Providing context
* Giving clear instructions
* Using examples (few-shot prompting)
* Formatting requests (JSON, tables, bullets)
* Asking for step-by-step reasoning

## **Types of Prompts and Examples**

### **1. Instructional Prompts**

**Definition:** Direct instructions telling the AI what to do.

**Examples:**

1. Write a summary of the book *To Kill a Mockingbird* in 3 sentences.
2. Explain photosynthesis in simple terms.
3. List 5 health benefits of drinking water.
4. Describe how to bake a chocolate cake step by step.
5. Create a bullet-point list of the causes of World War II.

### **2. Interrogative Prompts**

**Definition:** Questions asked to the AI to elicit information.

**Examples:**

1. What are the main themes in *To Kill a Mockingbird*?
2. How does the internet work?
3. Why do leaves change color in autumn?
4. Who was Albert Einstein?
5. When was the Declaration of Independence signed?

### **3. Zero-Shot Prompts**

**Definition:** Prompts given without any examples; the AI must respond based on the prompt alone.

**Examples:**

1. Translate "Good night" to Spanish.
2. Summarize the novel *1984*.
3. Generate a motivational quote.
4. Convert 100 miles to kilometers.
5. Name 3 famous paintings by Van Gogh.

### **4. Few-Shot Prompts**

**Definition:** Prompts where a few examples are provided before the actual question/task, guiding the AI on how to respond.

**Examples:**

1. Translate English to Spanish:  
   * Cat → Gato
   * Dog → Perro  
      Translate: Bird → ?
2. Solve math problems:  
   * "If you have 3 apples and get 2 more, how many apples do you have?" → 5  
      Solve: "If you buy 4 books and read 1, how many unread books remain?"
3. Sentiment analysis examples:  
   * "I love this movie." → Positive
   * "This food tastes bad." → Negative  
      Analyze: "The weather is perfect today."
4. Synonyms:  
   * Happy → Joyful
   * Sad → Unhappy  
      Find synonym for: Angry → ?
5. Summarize headlines:  
   * "Stock markets soar amid optimism." → The stock market increased due to positive outlook.  
      Summarize: "Scientists discover new exoplanet."

## **Comparison: Zero-Shot vs Few-Shot Prompts**

* **Zero-shot** prompts work well for simple or well-known tasks but may produce vague or less accurate results on complex tasks.
* **Few-shot** prompts improve accuracy by providing examples that show the AI the format, style, or depth expected, especially for tasks requiring reasoning or specific formats.

Tab 3

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

## **Objective:**

Learn how to extract structured data from ChatGPT responses by using precise prompts, with outputs in JSON or tabular formats.

* **JSON Formatting:**

1. **Prompt**

"Extract the following information from this paragraph and provide it in JSON format:

* Contact Info: name, email, phone number, address
* Resume Sections: Education, Work Experience, Skills  
   Paragraph: 'Ravi Kumar is a project manager based in Bangalore. You can contact him at ravi.kumar@example.in or call him at +91-98765-43210. His office is located at 45 MG Road, Bangalore, Karnataka, 560001. Ravi completed his MBA from IIM Bangalore. He worked at TCS as a project manager for 5 years. His skills include leadership, project management, and business strategy.'"

1. **Output**

{

"Contact Info": {

"name": "Ravi Kumar",

"email": "ravi.kumar@example.in",

"phone": "+91-98765-43210",

"address": "45 MG Road, Bangalore, Karnataka, 560001"

},

"Resume": {

"Education": "IIM Bangalore, MBA",

"Work Experience": "TCS, Project Manager, 5 years",

"Skills": ["leadership", "project management", "business strategy"]

}

}

### **Output Accuracy and Format:**

* Accuracy: All contact and resume fields correctly extracted.
* Format: Nested JSON structure is clean and well-organized, separating Contact Info and Resume sections.

Tab 4

# **Lab 4: Summarization and Text Transformation**

## **Objective:** Use ChatGPT for summarization, rewriting, tone transformation.

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

**Original Article:**

“The Government of India has launched a new electric vehicle initiative to provide subsidies for manufacturers and buyers. The scheme aims to reduce carbon emissions and boost sustainable transportation. Experts predict significant growth in the EV market over the next five years.”

**Summary:**

The Indian government has launched a scheme promoting electric vehicles, offering subsidies to manufacturers and buyers. The initiative aims to reduce carbon emissions and encourage sustainable transportation, with the EV market expected to grow significantly in the next five years.

### **2. Rewrite emails in formal/informal tone**

**Purpose:** Rewrite content in a specific tone.

**Output:**

* Rewritten version in requested tone
* Transformation report comparing **original vs transformed text**

**Example:**

**Original Email:**

“Hi, I read about the new city transport project. It seems interesting.”

**Transformed Versions:**

* **Formal / Professional:**

“Dear [Colleague], I wanted to share that the city council has approved a new transportation initiative to improve commuting. The plan includes expanded bus routes, electric buses, and new bike lanes.”

* **Friendly / Informal:**

“Hey! Did you hear about the city’s new transport plan? More buses, bike lanes, and electric buses are coming—sounds like commuting will get easier soon!”

### **3. Combined Output / Report**

When performing both summarization and tone transformation:

|Section | Original |Summary |Formal Tone |Informal Tone

|Text | Full news/article/email |Condensed summary |Formal rewrite |Friendly rewrite

Tab 5

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

**Objective:** Explore how ChatGPT can assist in **programming**, including code generation and debugging.

## **Activities & Workflow**

### **1. Code Generation**

**Purpose:** Generate functional code in Python, C++, or Java based on a given prompt.

**Input Example:**

*“Write a Python function to check if a number is prime.”*

**ChatGPT Generated Code (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

print(is\_prime(7)) # Output: True

* **Expected Output:**

**True**

* **Comparison Table:**

| **Section** | **ChatGPT Code** | **Expected Output** | **Result** |
| --- | --- | --- | --- |
| **Prime Check** | **Python function as above** | **True** | **Matches** |

### **2. Debugging**

### **Purpose:** Use ChatGPT to identify and fix errors in a code snippet.

**-Input Code (with Error):**

def add\_numbers(a, b)

return a + b

**-print(add\_numbers(5, 10))**

**-ChatGPT Debugged Code:**

def add\_numbers(a, b):

return a + b

print(add\_numbers(5, 10))

# Output: 15

**-Comparison Table:**

| **Section** | **Original Code** | **ChatGPT Fix** | **Expected Output** | **Result** |
| --- | --- | --- | --- | --- |
| Addition | Missing colon in function def | Added colon in function def | 15 | Correct |

### **3. Combined Output / Report**

| **Section** | **Task Description** | **Original Code / Prompt** | **ChatGPT Code / Fix** | **Expected Output** | **Result** |
| --- | --- | --- | --- | --- | --- |
| Code Gen | Prime number check | Python prompt | Python function as above | True | Matches |
| Debugging | Add two numbers | Code with syntax error | Corrected Python function | 15 | Correct |

Tab 6

# **Lab 6: Domain-Specific Applications**

**Objective:** Explore the use of ChatGPT in **domain-specific tasks** such as medical, legal, or educational applications.

## **Activities (Choose One)**

### **Medical Chatbot Simulation**

**Purpose:** Simulate a medical assistant that provides general health guidance.

**Example Prompt:**

*“Act as a medical chatbot. A patient complains of frequent headaches. Provide general advice and suggest lifestyle changes.”*

**ChatGPT Output:**

“I’m not a doctor, but frequent headaches can be caused by stress, dehydration, lack of sleep, or eye strain. Make sure to drink plenty of water, take regular breaks from screens, get enough rest, and consider keeping a headache diary. If headaches persist, consult a healthcare professional.”

**Evaluation:**

| **Section** | **Prompt** | **Output** | **Notes / Evaluation** |
| --- | --- | --- | --- |
| Medical Chatbot | Patient with frequent headaches | General advice on hydration, sleep, stress, screen breaks, and professional consultation recommendation | Appropriate, safe, and informative |