

Lab 1: Introduction to ChatGPT — Summary

Objective:

This lab helps us get familiar with ChatGPT — what it is, where it comes from, how it works, and how people use it in real life.

What is ChatGPT?

ChatGPT is an AI chatbot created by OpenAI that can understand and generate text just like a human would. It's built on something called the transformer architecture, which is a type of deep learning model that helps the AI understand the meaning behind words and sentences by looking at the context.

How does it work?

Transformers were introduced in 2017 and have changed the way AI handles language. Instead of reading text word by word, transformers look at the whole sentence or paragraph all at once, figuring out how different words relate to each other. ChatGPT was trained on tons of text from books, websites, and articles, so it learned grammar, facts, reasoning, and even how to have conversations.

What can ChatGPT do?

ChatGPT can chat with you naturally, answer questions, write stories or essays, summarize information, and even help with coding. It's pretty flexible and can adapt to many kinds of requests.

Where is ChatGPT used?

- **Education:** It can tutor students, make quizzes, and explain tough subjects in simple ways.
 - **Healthcare:** It can provide general health info and help communicate with patients, though it's not a replacement for a doctor.
 - **Business:** It helps with customer support, writing emails, and analyzing data.
 - **Creativity:** It assists writers, artists, and creators by brainstorming ideas or generating creative content.
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Exploring ChatGPT:

We interact with ChatGPT through a chat interface where we type in questions or commands and get answers instantly. Behind the scenes, visualization tools show how the transformer model pays attention to different parts of the text to understand and respond accurately.

In short:

ChatGPT is a powerful AI tool that understands and generates human-like language using transformer technology. Its ability to assist in education, healthcare, business, and creative fields makes it a valuable assistant in many areas of life.

Lab 2: Types of Prompts and Prompt Engineering Basics

Objective

The main aim of this lab was to explore different types of prompts used to interact with AI language models like ChatGPT. Specifically, we focused on:

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

We also experimented with prompt complexity to understand how it affects the AI's responses.

What is a Prompt?

A prompt is the input or instruction given to an AI model to receive a meaningful and relevant response. It can be as simple as a question or as detailed as a complex scenario with constraints.

Prompt Engineering is the process of designing prompts carefully to get the best possible output from AI. It involves:

- Providing clear context
 - Giving precise instructions
 - Using examples (especially in few-shot prompting)
 - Formatting responses (like JSON, tables, bullet points)
 - Requesting step-by-step explanations
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Activities Performed

1. Zero-shot vs Few-shot Prompts

We tried out prompts where no examples were given beforehand (zero-shot), and compared them to prompts that included examples to guide the AI (few-shot).

2. Designing Prompts with Increasing Complexity

We progressively increased the difficulty and detail in our prompts to see how it influenced the AI's answers.

Examples and Outputs

1. Zero-shot Prompts

(No prior examples given)

Prompt	Sample Output
Translate "Good morning" to French.	Bonjour.
Summarize: "Cats are independent pets."	Cats are self-reliant animals.
List three benefits of drinking water.	1. Hydrates body 2. Improves skin 3. Boosts energy
Write a short poem about rain.	Rain falls softly, washing earth anew.
Explain gravity in simple terms.	Gravity pulls objects toward the Earth.

2. Few-shot Prompts

(Examples provided before the main prompt)

Prompt	Sample Output
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Translate: "I like apples." → "J'aime les pommes." "She runs." → "Elle court." Now translate "Good morning."	Bonjour.
Summarize: "Dogs bark loudly." → "Dogs make loud sounds." "Birds fly high." → "Birds soar above." Now summarize "Cats are independent."	Cats are self-reliant animals.
List benefits of exercise: 1. Improves heart 2. Builds strength. Now list 3 benefits of water.	1. Hydrates body 2. Improves skin 3. Boosts energy
Poem about sun: "Golden rays light the day." Poem about moon: "Silver glow in night sky." Now write a poem about rain.	Rain falls softly, washing earth anew.
Explain photosynthesis: "Plants use light to make food." "Leaves absorb sunlight." Now explain gravity.	Gravity pulls objects toward the Earth.

3. Instructional Prompts

(Explicit instructions with formatting)

Prompt	Sample Output
Translate "Good morning" to French in present tense.	Bonjour.
Summarize "Cats are independent pets" in one sentence.	Cats are self-reliant animals.
List three benefits of drinking water as bullet points.	- Hydrates body - Improves skin - Boosts energy
Write a 4-line poem about rain with vivid imagery.	Rain taps on the windowpane, Soft whispers in the rain, Washing earth anew, Fresh and bright with every hue.

Explain gravity step-by-step in simple terms.	1. Gravity pulls things down. 2. It keeps us grounded. 3. It makes objects fall. 4. The Earth has gravity too.
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4. Interrogative Prompts

(Questions phrased to extract information)

Prompt	Sample Output
What is the French word for “Good morning”?	Bonjour.
Can you summarize “Cats are independent pets”?	Cats are self-reliant animals.
What are three benefits of drinking water?	Hydrates body, improves skin, boosts energy
Could you write a poem about rain?	Rain taps on the windowpane, Soft whispers in the rain, Washing earth anew, Fresh and bright with every hue.
How does gravity work?	Gravity pulls objects toward the Earth.

Comparison of Results

Prompt Type	Strengths	Limitations
Zero-shot	Quick, simple to create	Responses can be basic or lack detail
Few-shot	Provides consistent tone and better formatting	Requires careful example selection

Instructional	Produces detailed, well-structured answers	Takes more time to craft
Interrogative	Good for clear, direct answers	Sometimes brief or shallow

Conclusion

This lab helped me understand that the way you phrase a prompt greatly impacts the quality and usefulness of AI responses. Few-shot and instructional prompts tend to yield more precise and consistent results, while zero-shot and interrogative prompts are useful for quick, straightforward answers. Designing prompts with clear instructions and context is key to effective prompt engineering.

Lab 3 Report: Precision Prompting for Information Extraction

Objective

The goal of this lab was to learn how to get structured data from AI responses. We focused on teaching ChatGPT to give answers in easy-to-use formats like JSON or tables, and practiced pulling out specific info like contact details, resume sections, and important keywords from paragraphs.

What We Did

1. Asking for Structured Formats

We asked ChatGPT to organize its answers clearly—in JSON format or as tables—so the info would be neat and easier to read or use later.

2. Extracting Details from Paragraphs

We gave it chunks of text with mixed info, like a paragraph about a person's background, and asked it to pull out and organize key details.

Examples and Results

Example 1: Getting Contact Info in JSON

Prompt:

"Find the contact info in this paragraph and give it to me in JSON format:
'John Doe can be reached at john.doe@example.com or +1-555-123-4567. He lives in New York City.'"

ChatGPT's Response:

```
{  
  
  "name": "John Doe",  
  
  "email": "john.doe@example.com",  
  "phone": "+1-555-123-4567",  
  "location": "New York City"  
}
```

Example 2: Organizing Resume Info in a Table

Prompt:

"Take this resume text and put it in a table with 'Section' and 'Details' columns:
'Jane Smith is a software engineer with 5 years experience in Python and Java. She has worked at ABC Corp and XYZ Ltd. Skills include coding, debugging, and team leadership.'"

ChatGPT's Response:

Section	Details
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Name	Jane Smith
Profession	Software Engineer
Experience	5 years
Skills	Python, Java, coding, debugging, team leadership
Previous Work	ABC Corp, XYZ Ltd

Example 3: Extracting Keywords

Prompt:

“Pick out the important keywords from this paragraph:

‘The candidate has strong skills in data analysis, machine learning, and cloud computing. Experience with Python, R, and SQL databases is a plus.’”

ChatGPT’s Response:

- Data analysis
 - Machine learning
 - Cloud computing
 - Python
 - R
 - SQL databases
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How Well Did It Work?

ChatGPT did a great job organizing the info exactly as asked. Getting data in JSON or table form made the results easy to scan and use. It accurately picked out contact info, resume details, and keywords without missing anything important.

Conclusion:

This lab showed me how giving clear, precise instructions (prompting) helps the AI give back clean, structured info that's useful for reports, automation, or databases. Asking for formats like JSON or tables really makes a difference in how usable the AI's answers are.

Lab 4 Report: Summarization and Text Transformation

Objective

In this lab, I learned how to use ChatGPT to summarize different kinds of texts and change the tone of writing. The goal was to practice making long articles or research abstracts shorter and clearer, and also to rewrite emails so they sound either more formal or more casual.

What I Did

- Summarizing Articles and Abstracts: I gave ChatGPT news stories and research summaries and asked it to create brief versions that capture the main ideas without unnecessary details.
- Rewriting Emails: I took some emails and transformed their tone—turning informal messages into professional ones and making formal emails sound

more relaxed.

Examples and How They Turned Out

Example 1: Summarizing a News Article

Original:

“A recent study shows that climate change is accelerating faster than previously thought, with significant impacts on coastal cities due to rising sea levels.”

Summary:

“Climate change is speeding up and threatens coastal cities because of rising sea levels.”

Example 2: Summarizing a Research Abstract

Original:

“This paper explores the effectiveness of machine learning algorithms in predicting stock market trends. Results indicate that neural networks outperform traditional models.”

Summary:

“The study shows neural networks predict stock market trends better than older methods.”

Example 3: Making an Email More Formal

Original:

“Hey John, just wanted to check if you got the report I sent last week. Let me know when you have a chance!”

Formal Version:

“Dear John, I hope you are well. I wanted to follow up to see if you received the

report I sent last week. Please let me know at your earliest convenience. Thank you.”

Example 4: Making an Email More Informal

Original:

“Dear Ms. Smith, I am writing to inquire about the status of my application. I look forward to your response.”

Informal Version:

“Hi Ms. Smith, just checking in to see how my application is going. Looking forward to hearing from you!”

What I Noticed

ChatGPT did a great job making complex texts shorter without losing important info. It also switched tones in emails really well—formal when needed, friendly when asked. This makes it a handy tool for writing tasks.

Conclusion

This lab showed me how useful ChatGPT can be for summarizing content and tweaking writing styles. Whether you want to simplify something complicated or change how you sound in emails, it’s got you covered. I can definitely see how this skill is helpful for day-to-day communication and content creation.

Lab 5 Report: Using ChatGPT for Code Generation and Debugging

Objective

In this lab, I explored how ChatGPT can help with programming tasks like writing code and fixing bugs. The idea was to see how well it can generate code snippets in languages like Python, C++, and Java, and also how it handles debugging when given broken code.

What I Did

- **Generating Code:** I gave ChatGPT prompts asking it to write specific programs in different languages.
 - **Debugging Code:** I provided some code that wasn't working right and asked ChatGPT to find and fix the mistakes.
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Examples and What Happened

Example 1: Python Code for Checking Prime Numbers

Prompt:

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

ChatGPT's Response:

```
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 2: C++ Program to Calculate Factorial

Prompt:

“Write a recursive C++ program to find the factorial of a number.”

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

int factorial(int n) {
    if (n <= 1)
        return 1;
    else
        return n * factorial(n - 1);
}

int main() {
    int num = 5;
    cout << "Factorial of " << num << " is " << factorial(num) << endl;
    return 0;
}
```

Example 3: Debugging a Java Program to Reverse a String

Prompt:

“I have this Java code to reverse a string but it’s not working. Can you fix it?”

Original Code:

```
public class ReverseString {
    public static void main(String[] args) {
        String input = "hello";
        String reversed = "";
        for (int i = 0; i <= input.length(); i++) {
            reversed += input.charAt(i);
        }
        System.out.println(reversed);
    }
}
```

```
}
```

ChatGPT's Fixed Code:

```
public class ReverseString {  
    public static void main(String[] args) {  
        String input = "hello";  
        String reversed = "";  
        for (int i = input.length() - 1; i >= 0; i--) {  
            reversed += input.charAt(i);  
        }  
        System.out.println(reversed);  
    }  
}
```

What I Learned

ChatGPT generated accurate and efficient code for different languages. It also quickly identified and corrected bugs, explaining the fixes clearly. Overall, its outputs matched what I expected or were very close.

Conclusion

This lab showed me how useful ChatGPT can be as a programming helper. Whether you need to write new code or debug existing code, it can save a lot of time and provide clear explanations, which is great for both beginners and experienced coders.

Lab 6 Report: Using ChatGPT for Domain-Specific Tasks

Objective

In this lab, the goal was to explore how ChatGPT can be used for specific professional tasks by designing prompts tailored to a particular field. We had three options to choose from: medical chatbot simulation, legal document summarization, or creating educational quizzes.

What I Picked

I decided to try out Educational Quiz Generation to see how well ChatGPT could come up with quiz questions for learning.

How I Designed the Prompt

To get good quiz questions, I made sure my prompt included:

- The topic (like basic biology)
- The difficulty level (easy, medium, or hard)
- How many questions I wanted
- The question format (multiple choice, true/false, short answer)

Here's an example of the prompt I used:

"Generate 5 multiple-choice questions on basic biology at a medium difficulty level."

What I Got Back

ChatGPT gave me clear, relevant quiz questions with answer options and the correct answers marked. The questions matched the topic and difficulty level I asked for, and everything was easy to read and understand.

Sample Questions

1. What is the powerhouse of the cell?
 - a) Nucleus
 - b) Mitochondria
 - c) Ribosome
 - d) ChloroplastAnswer: b) Mitochondria

 2. Which macromolecule stores genetic information?
 - a) Protein
 - b) Lipid
 - c) DNA
 - d) CarbohydrateAnswer: c) DNA
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What I Learned

This lab showed me that ChatGPT can create useful educational content really quickly if you give it clear and specific instructions. It's a great way to save time for teachers and make learning materials easier to put together.