Hope to Skills

Lecture# 02

Irfan Malik, Dr. Sheraz Naseer

XevenSkills

XEVEN SOLUTIONS

ChatGPT: Possibilities for us ?

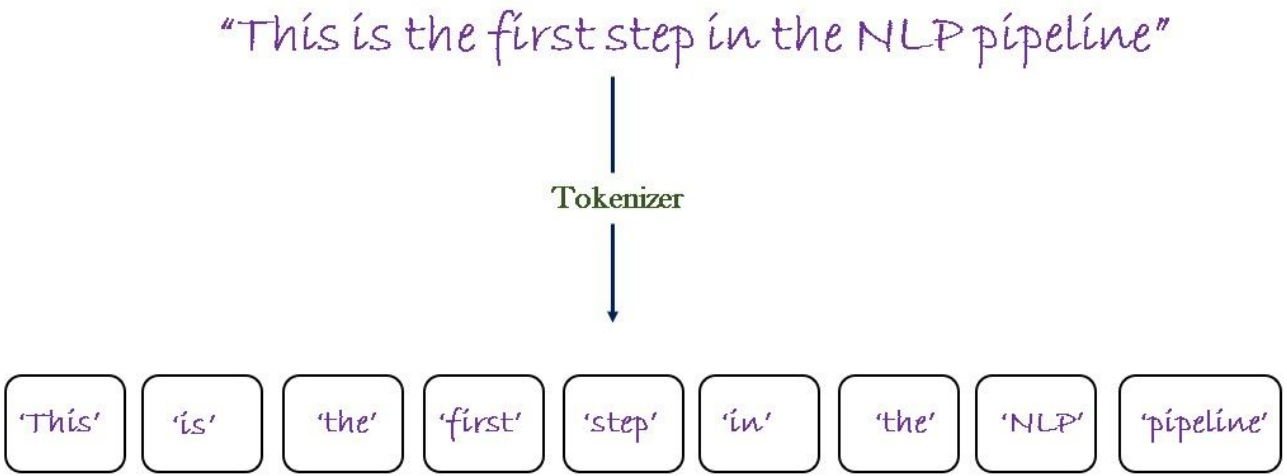
Basics of NLP

Stemming vs Lemmatization

Stemming	Lemmatization
Removing the **last few characters** of a given word, to obtain a shorter form, often leading to **incorrect meanings and spelling**	Lemmatization considers the **context** and converts the word to its **meaningful** short form
For example: Stemming the word '**Caring**' would return '**Car**'	For example: lemmatizing the word '**Caring**' would return '**Care**'

Tokenization

Definition: Tokenization is the process of **breaking down** text into **smaller units** called tokens, which can be **words**, **phrases**, or **even characters**.



Introduction to ChatGPT

- ChatGPT stands for Generative Pretrained Transformer.
- ChatGPT is an advanced AI language model developed by OpenAI.
- ChatGPT revolutionizes Natural Language Processing.

Applications of ChatGPT

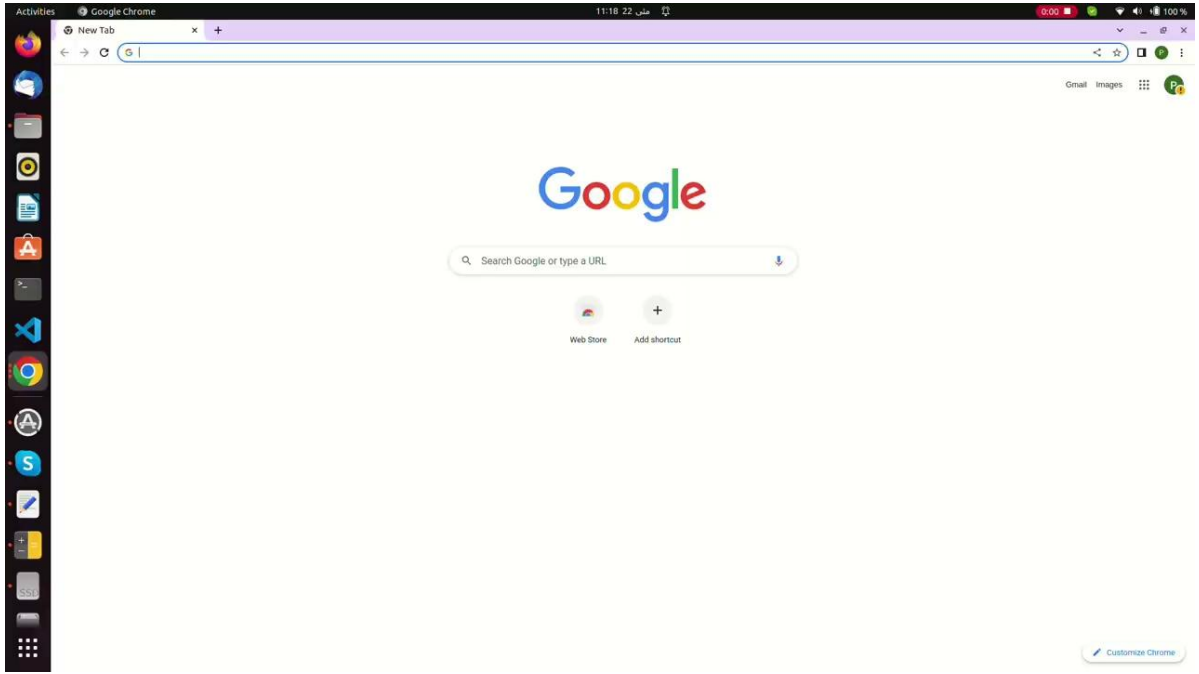
1. Content Generation
2. Text Summarization
3. Chatbots, Virtual Assistants, and Customer Support (Question Answering)
4. Language Translation
5. Interactive Storytelling
6. Education and Tutoring

Getting Started with chat.openai: A Tutorial for Beginners

(Click to skip the Tutorial)

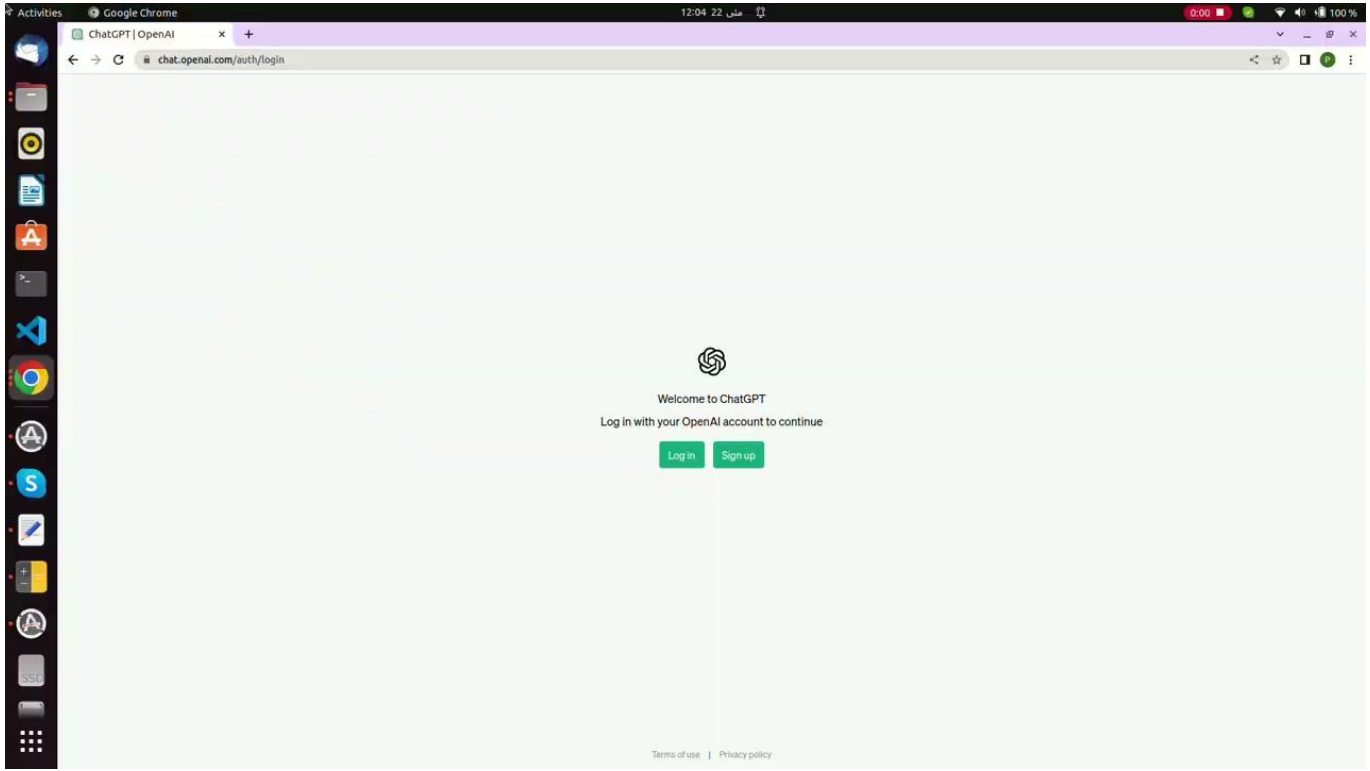
Step 1: Accessing chat.openai

To begin, open your preferred web browser and navigate to the chat.openai website. The website URL is https://chat.openai.com/auth/login .



Step 2: Creating an Account

- If you already have an account, you can skip this step and proceed to Step 3. If not, you will need to create a new account.
- Look for the "Sign Up" or "Register" button on the login page and click on it.
- Click on “Continue with Google”, and then select your google account.
- Follow the on-screen instructions to open the dashboard.


Activities
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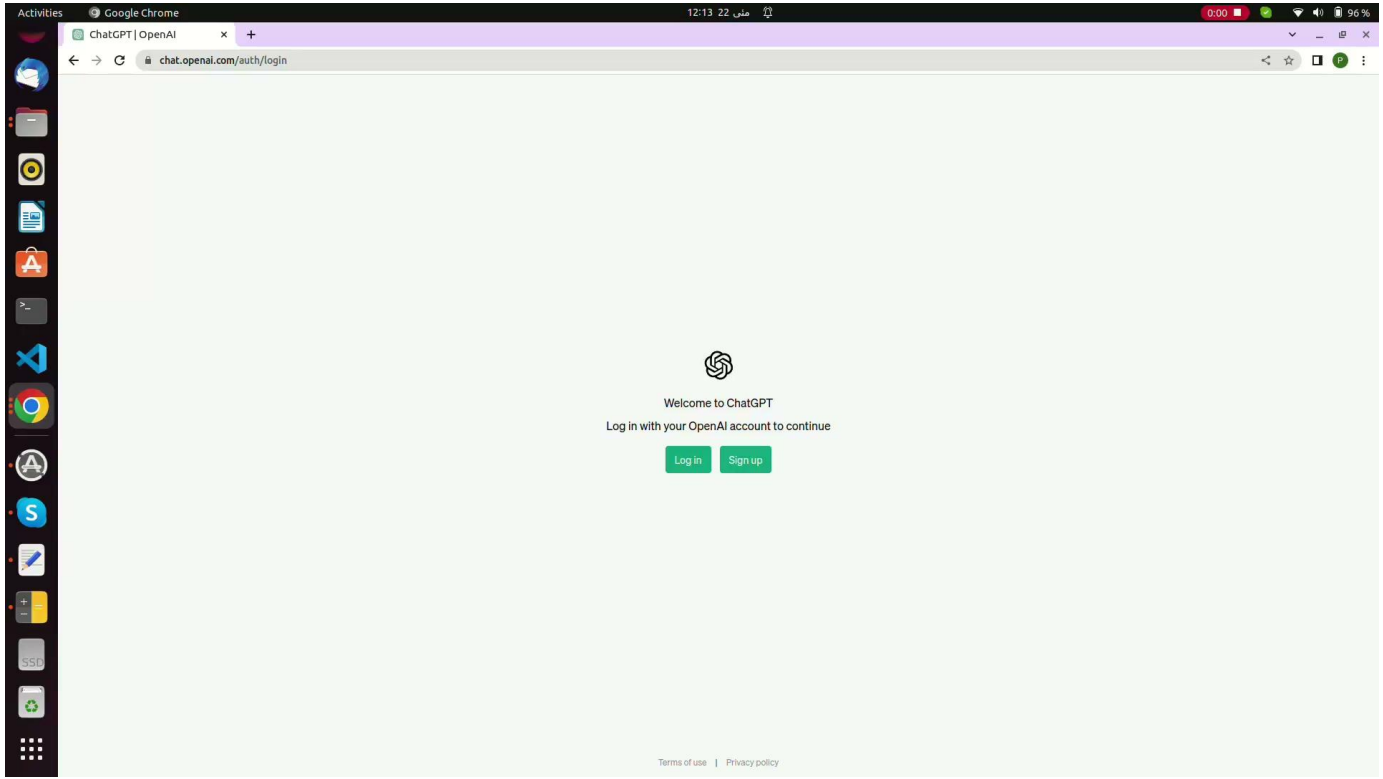
ChatGPT | OpenAI
chat.openai.com/auth/login
Welcome to ChatGPT
Log in with your OpenAI account to continue
Log in
Sign up
Terms of use | Privacy policy

Step 3: Logging In

- Click on the "Log In" button to access your chat.openai account.
- Click on “Continue with Google”, and then select your google account.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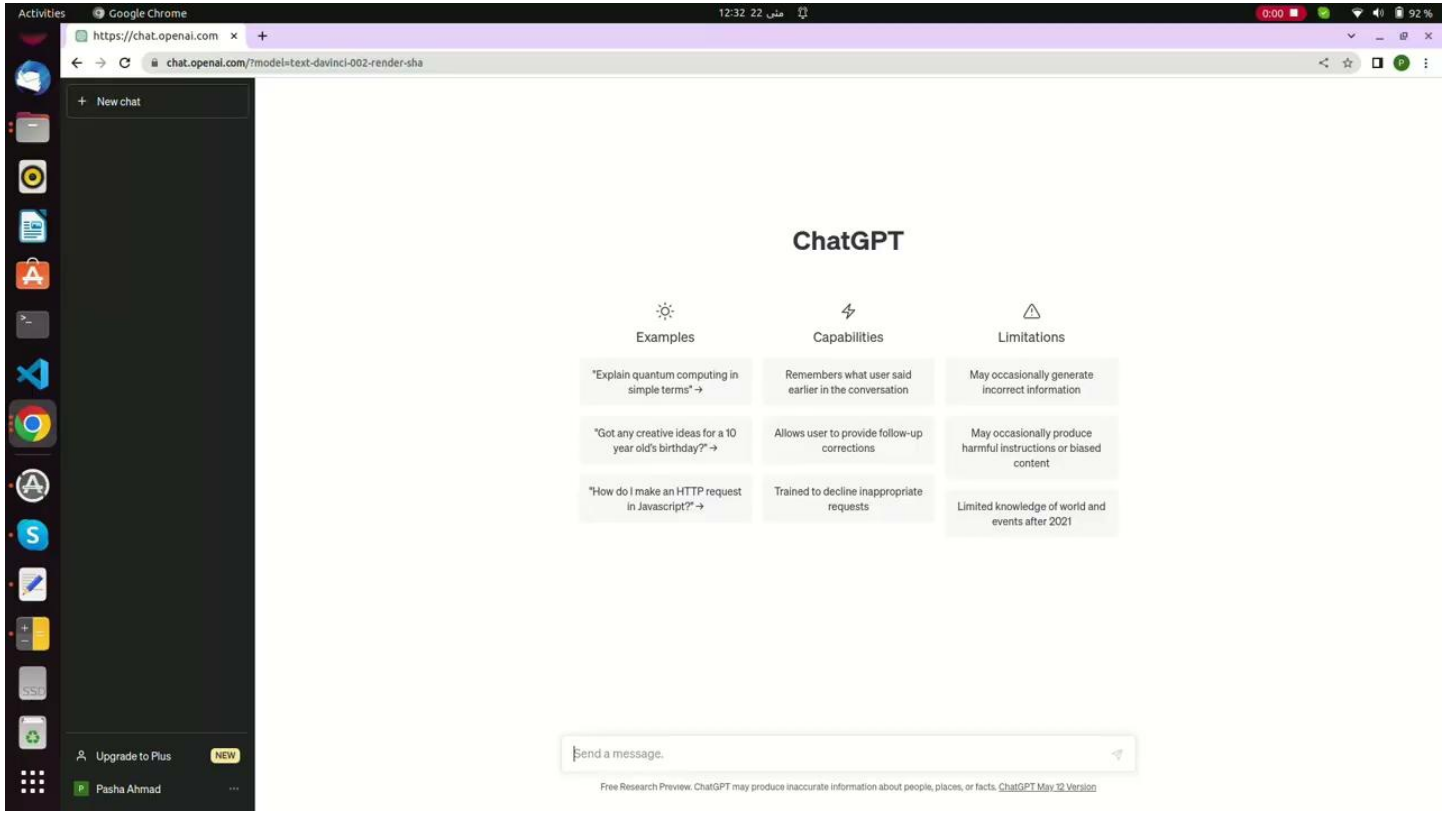
ChatGPT | OpenAI
chat.openai.com/auth/login
Welcome to ChatGPT
Log in with your OpenAI account to continue
Log in
Sign up
Terms of use | Privacy policy

Step 4: Engaging in Conversation

- In the chat interface, you will see a text input box where you can type your message or question.
- Simply enter your text and press "Enter" or click the send button to send your query to the AI model.
- Once you've sent your message, the AI model will process it and generate a response.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https://chat.openai.com
chat.openai.com/?model=text-davinci-002-render-sha
New chat
ChatGPT
Examples
"Explain quantum computing in simple terms" →
"Got any creative ideas for a 10 year old's birthday?" →
"How do I make an HTTP request in Javascript?" →
Capabilities
Remembers what user said earlier in the conversation
Allows user to provide follow-up corrections
Trained to decline inappropriate requests
Limitations
May occasionally generate incorrect information
May occasionally produce harmful instructions or biased content
Limited knowledge of world and events after 2021
Send a message.
Free Research Preview. ChatGPT may produce inaccurate information about people, places, or facts. ChatGPT May 12 Version
Upgrade to Plus
NEW
Pasha Ahmad

Tokens in Language Models

Definition: Tokens are the fundamental **units** of text used by language models. They can be as short as a **single character** or as long as a **word** or **phrase.**

Importance: Language models process text at the token level, allowing them to analyze and generate text based on the context and relationships between individual tokens.

Context in Prompting

Definition: Context refers to the **information** and preceding text that **informs** the **language model** about the desired output or influences its response.

Role of Context:

- **Guidance: Context** helps shape the model's behavior and generate more accurate responses.
- **Relevance:** Context ensures continuity and relevance in the generated text.
- **Interpretation:** The language model uses context to understand the desired meaning and tone of the prompt.

Prompt Limits in Language Models

Definition: Prompt limits refer to the constraints imposed on the input provided to a language model.

Reasons for Prompt Limits:

- **Memory limitations:** Language models have a finite capacity to process and store information.
- **Computational constraints:** Longer prompts require more processing time and computational resources.
- **Response coherence:** Extremely long prompts may result in less coherent or relevant outputs.

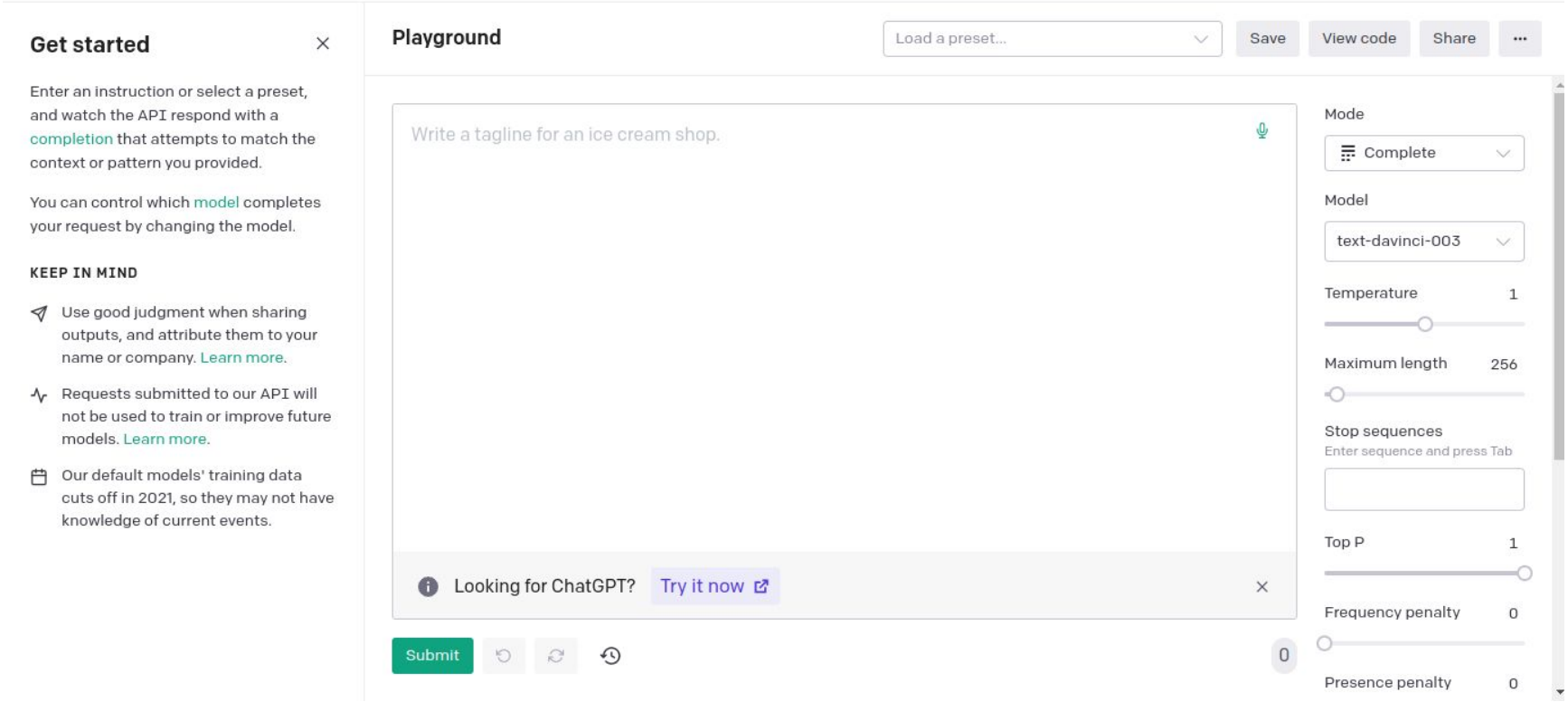
Temperature of Language Model

Definition: Temperature is a **parameter** used in language models that controls the **randomness** of generated text.

Purpose: Temperature determines the degree of **exploration** versus **exploitation** in the model's output.

- **Low Temperature** (e.g., 0.1): Results in more deterministic and focused responses, with the model choosing the most probable tokens.
- **High Temperature** (e.g., 1.0): Introduces randomness, allowing for more diverse and creative responses from the model.

OpenAI Playground



A Brief Overview

AN

Give me a list of all parameters you can use in ChatGPT and their ranges plus a short sentence that explains what each of them is used for.

1. **Temperature (0 to 1)**: Controls the randomness and creativity of the generated text. Lower values result in more focused outputs, while higher values yield diverse and creative text.
2. **Diversity_penalty (0 to 2)**: Penalizes tokens that have already appeared in the response, ensuring the output is diverse. Higher values lead to more diverse text, while lower values may have more repetitive phrases.
3. **Max tokens (positive integer)**: Sets the maximum length of the generated text, controlling the verbosity of the output. Set a limit based on the desired word or character count.
4. **Top_p (0 to 1)**: Sets the probability mass cutoff for token sampling, affecting the breadth of options the AI considers. Higher values lead to more randomness, while lower values result in more focused outputs.

Prompt Engineering

What is Prompt Engineering?

- Prompt engineering involves crafting tailored instructions or queries to guide the language model towards desired outputs.
- It helps shape the behavior of the model and improves response quality.

Anatomy of Prompt

Definition: In the context of language models, a prompt refers to the **input** or **instruction provided** to the model to generate a specific response or output

Parts of a Good Prompt (Not all are necessary for each and every prompt.)

1- Simulate Persona
2- Task
3- Steps to complete Task
4- Context/Constraints
5- Goal
6- Format Output

General Structure of Prompt

Context: Start the prompt by providing relevant information or context that informs the model about the desired output.

Instruction: Clearly state the desired task, format, or outcome to guide the model's response.

Additional Details: Include any specific constraints, requirements, or specifications that shape the response.

Example: Provide an example or demonstration to illustrate the expected format or desired output.

Importance of Prompt Engineering

- Ensures accurate and relevant responses.
- Mitigates bias and promotes ethical use of AI.
- Helps avoid undesired or harmful outputs.
- Enables control over chatbot behavior.

Tips for Effective Prompt Engineering

- **Be explicit:** Clearly specify the desired format or output.
- **Provide context:** Offer relevant information or background to guide the model.
- **Control output length:** Instruct the model to generate responses of a specific length.
- **Restrict responses:** Utilize techniques like temperature adjustment to refine output quality.
- **Experiment and iterate:** Refine prompts through experimentation and feedback loops.

Best Practices

- **Understand the model:** Familiarize yourself with the strengths and limitations of the language model you are using.
- **Start simple:** Begin with straightforward prompts and gradually refine them based on experimentation and feedback.
- **Domain-specific prompts:** Tailor prompts to specific topics or domains to enhance response quality in specialized areas.

Open AI Playground

(Click here to use)

Scenario 1: Essay Writing For Students

Step 1 (Bad Prompt): "Write an essay about your favorite hobby."

Step 2 (Refined Prompt): "Write an engaging essay describing how your favorite hobby has positively influenced your personal growth and development."

Step 3 (Further Refinement): "Write an insightful essay explaining how your favorite hobby, such as playing a musical instrument, has enhanced your problem-solving skills, increased your patience, and boosted your self-confidence."

Scenario 2: Historical Event Analysis

Step 1 (Bad Prompt): "Analyze the causes of World War II."

Step 2 (Refined Prompt): "Provide a comprehensive analysis of the political, economic, and social factors that contributed to the outbreak of World War II, considering both domestic and international influences."

Step 3 (Further Refinement): "Compose a well-structured and nuanced analysis of the immediate triggers and long-term underlying causes of World War II, highlighting key events and decisions that escalated tensions and ultimately led to the global conflict."

Scenario 1: Diagnosis of a Patient's Symptoms

Step 1 (Bad Prompt): "Diagnose a patient with chest pain."

Step 2 (Refined Prompt): "Based on a patient presenting with acute chest pain, provide a differential diagnosis considering common causes such as angina, myocardial infarction, pericarditis, and gastroesophageal reflux disease (GERD)."

Step 3 (Further Refinement): "Analyze the symptoms, medical history, and relevant diagnostic tests of a patient experiencing acute chest pain, and formulate a well-reasoned diagnosis, including the most likely primary condition along with potential differential diagnoses that should be ruled out."

Scenario 2: Treatment Plan for a Chronic Disease

Step 1 (Bad Prompt): "Design a treatment plan for a patient with diabetes."

Step 2 (Refined Prompt): "Develop an individualized treatment plan for a newly diagnosed patient with type 2 diabetes, taking into account their age, lifestyle factors, comorbidities, and preferences, with a focus on diet modification and exercise."

Step 3 (Further Refinement): "Construct a comprehensive, evidence-based treatment plan for a middle-aged patient recently diagnosed with type 2 diabetes, addressing glycemic control, weight management, cardiovascular risk reduction, and patient education, while considering medication options, monitoring protocols, and psychological support."

Scenario 1: Debugging Code

Step 1 (Bad Prompt): "Fix the code. It's not working."

Step 2 (Refined Prompt): "Debug the provided code snippet and identify and correct any syntax errors or logical issues that prevent it from functioning as intended. Clearly explain the changes made and provide a tested version of the corrected code."

Step 3 (Further Refinement): "Analyze the given code segment, isolate the bugs, and systematically address each issue, including incorrect variable assignments, missing semicolons, and logical errors. Provide a comprehensive explanation of the debugging process and present a refined version of the code that produces the expected output."

Scenario 2: Algorithm Optimization

Step 1 (Bad Prompt): "Optimize the algorithm for sorting an array."

Step 2 (Refined Prompt): "Analyze the provided sorting algorithm and identify areas where its time complexity can be improved. Suggest specific modifications or alternative algorithms to achieve better performance."

Step 3 (Further Refinement): "Evaluate the time and space complexity of the given sorting algorithm, propose algorithmic modifications (e.g., switching from bubble sort to quicksort or introducing caching techniques), and explain the expected impact on efficiency. Discuss trade-offs and provide empirical evidence to support the proposed optimization."

Introduction to Stable Diffusion

- A cutting-edge image generation tool utilizing stable diffusion models.
- Generates realistic and high-quality images through advanced diffusion techniques.
- Allows users to explore the possibilities of image generation by controlling diffusion parameters.
- Used in various fields including art, design, and computer vision for diverse image generation tasks.

Introduction to Stable Diffusion (Try it)

Important Announcement

There will be a **Quiz** in the next lecture from the content of **lecture#01** and **Lecture#1.5**