UTM
UNIVERSITI TEKNOLOGI MALAYSIA

Module 2: Generative AI Workshop for Engineering Students

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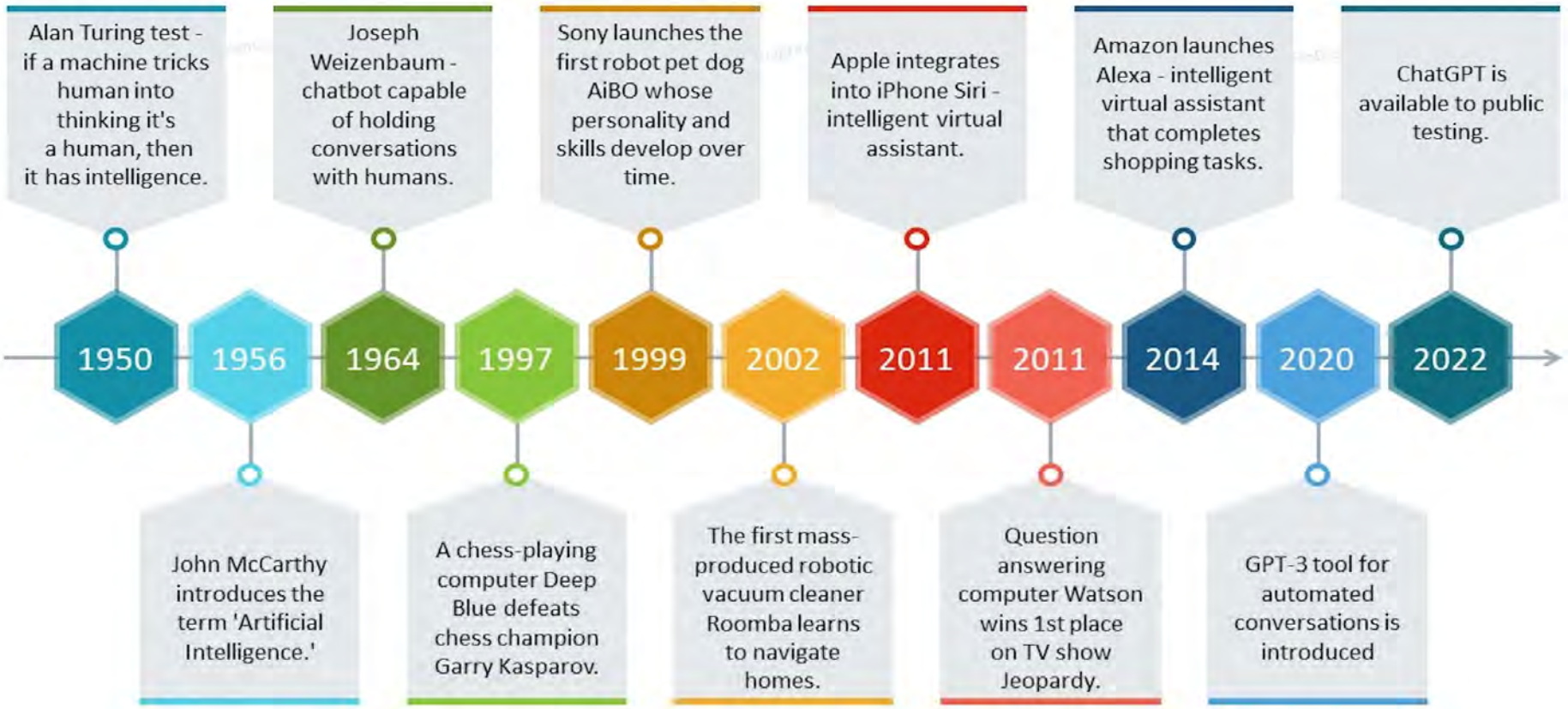
Definition of Artificial Intelligence

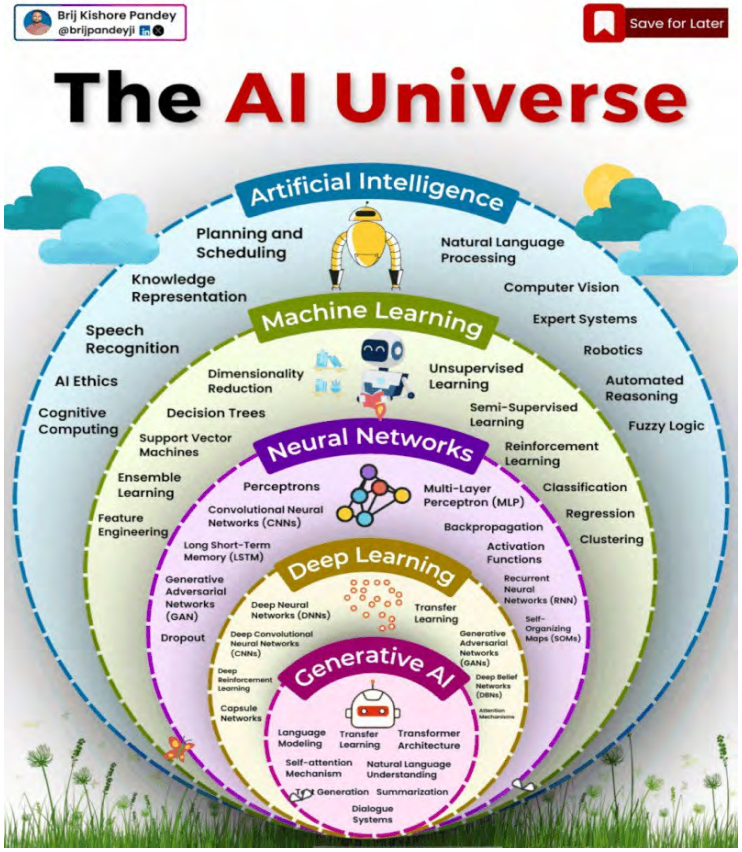
A branch of computer science that enables computers to simulate aspects of human intelligence such as speech recognition, deduction, inference, creative response, learning from experience, and the ability to make inferences when given incomplete information.

Which image is generated by AI?

History of Artificial Intelligence



World of Artificial Intelligence



Generative AI

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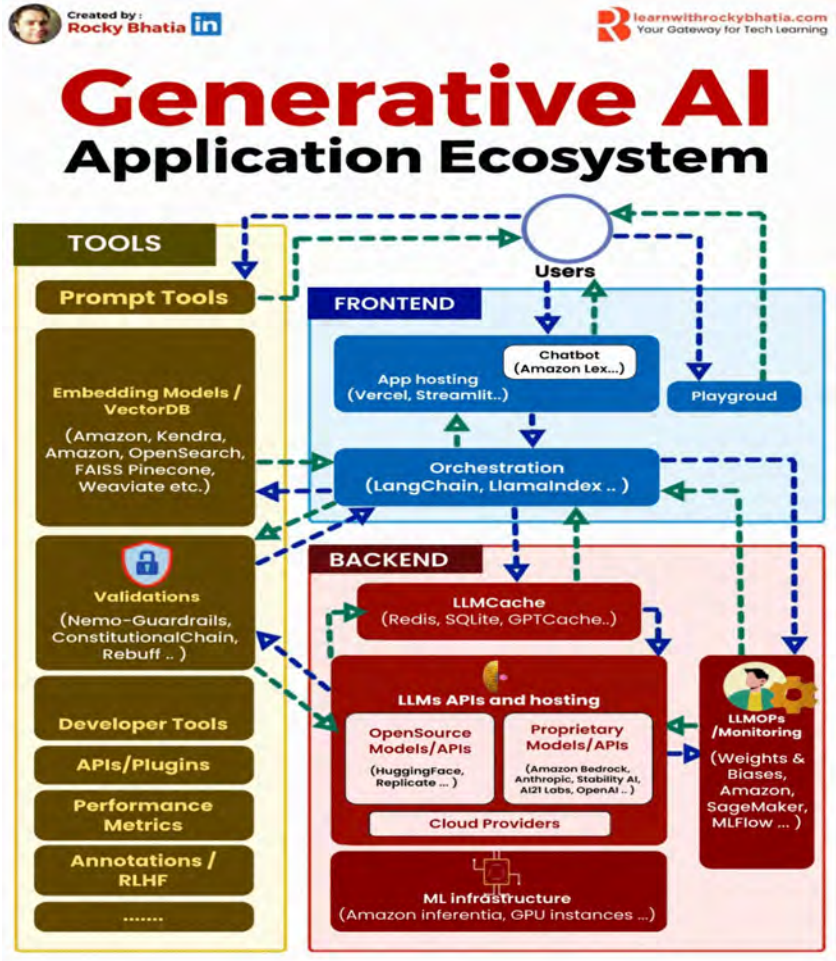
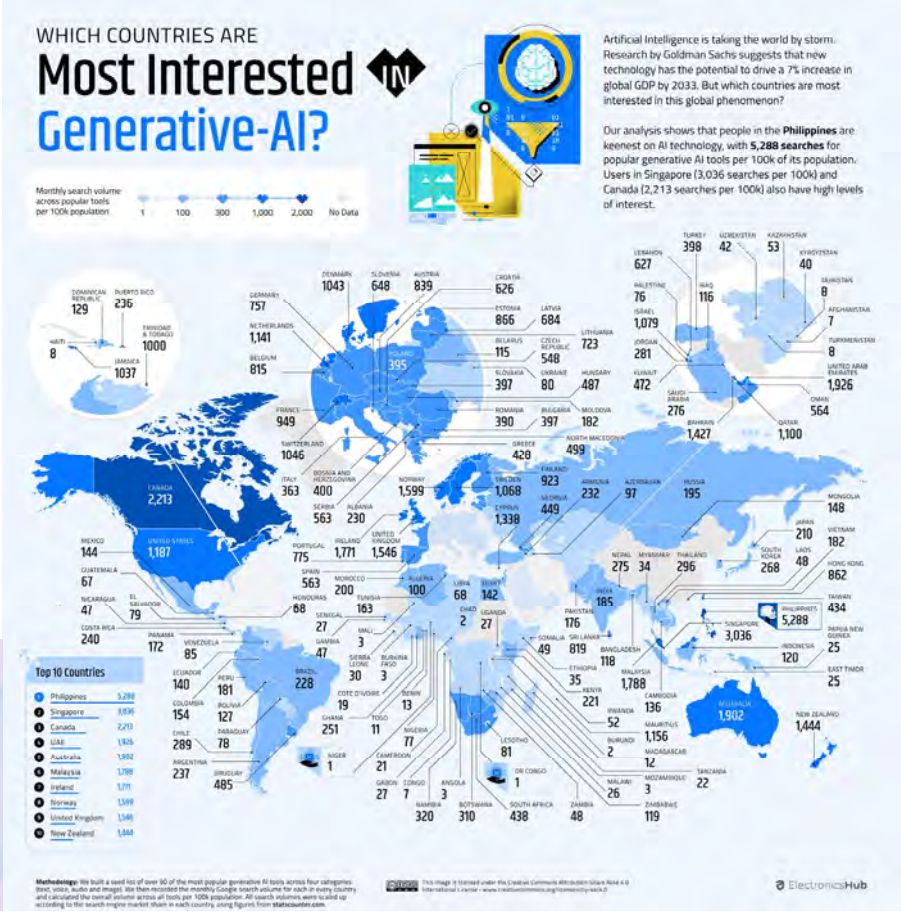

Created by : Rocky Bhatia
learnwithrockybhatia.com
Your Gateway for Tech Learning
Generative AI
Application Ecosystem
TOOLS
Prompt Tools
Embedding Models / VectorDB
(Amazon, Kendra, Amazon, OpenSearch, FAISS Pinecone, Weaviate etc.)
Validations
(Nemo-Guardrails, ConstitutionalChain, Rebuff ..)
Developer Tools
APIs/Plugins
Performance Metrics
Annotations / RLHF
.....
Users
FRONTEND
App hosting
(Vercel, Streamlit..)
Chatbot
(Amazon Lex...)
Playgroud
Orchestration
(LangChain, LlamaIndex ..)
BACKEND
LLMCache
(Redis, SQLite, GPTCache..)
LLMs APIs and hosting
OpenSource Models/APIs
(HuggingFace, Replicate ...)
Proprietary Models/APIs
(Amazon Bedrock, Anthropic, Stability AI, AI21 Labs, OpenAI ..)
Cloud Providers
ML infrastructure
(Amazon inferentia, GPU instances ...)
LLMOPs /Monitoring
(Weights & Biases, Amazon, SageMaker, MLFlow ...)

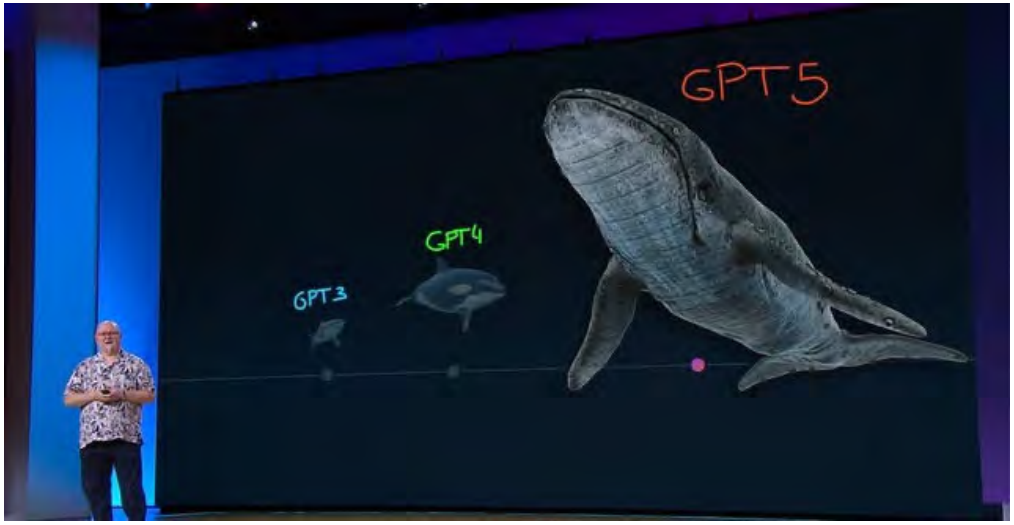
Generative AI

- Generative Artificial Intelligence refers to AI techniques that learn from data to generate new content that resembles but does not replicate the original data.
- This can include text, images, videos, and other media.

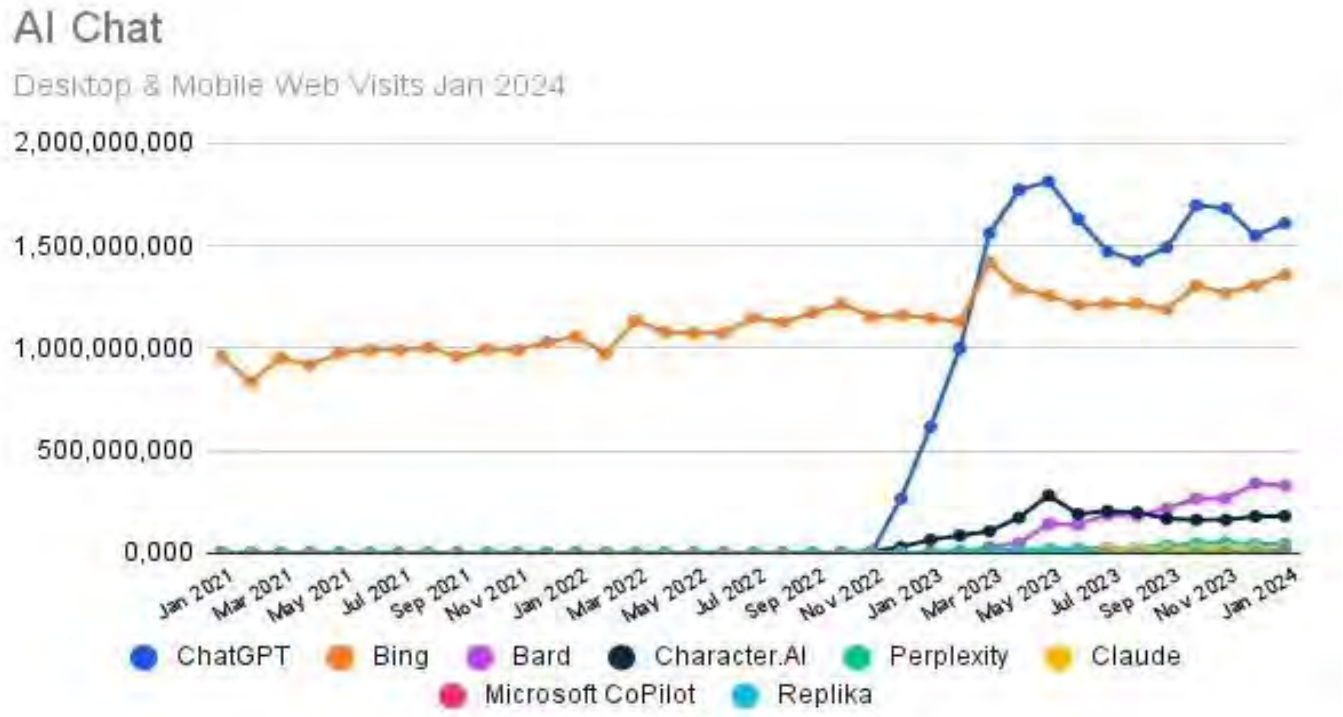


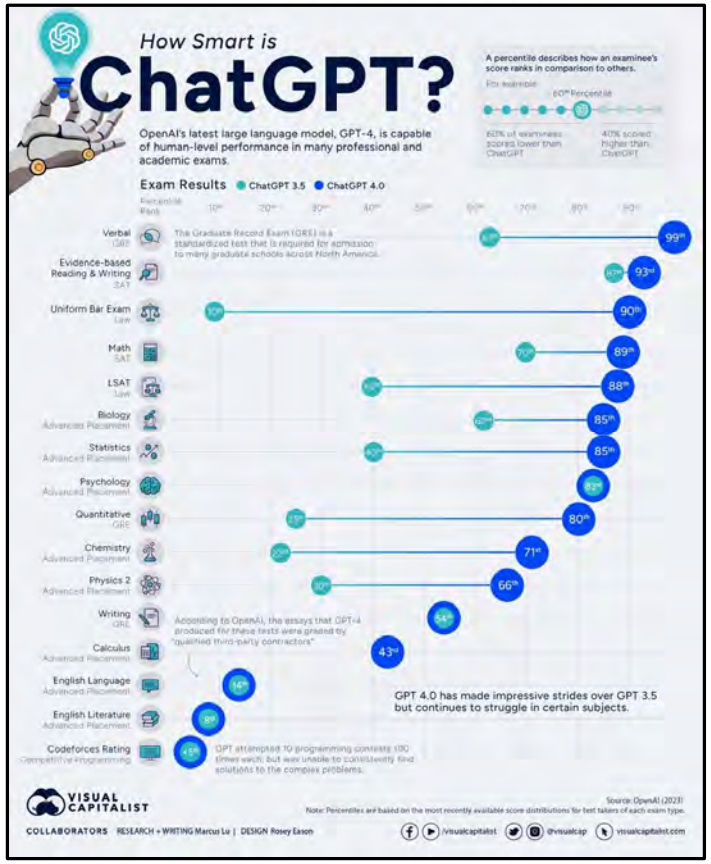
Generative Pre-trained Transformer (GPT)

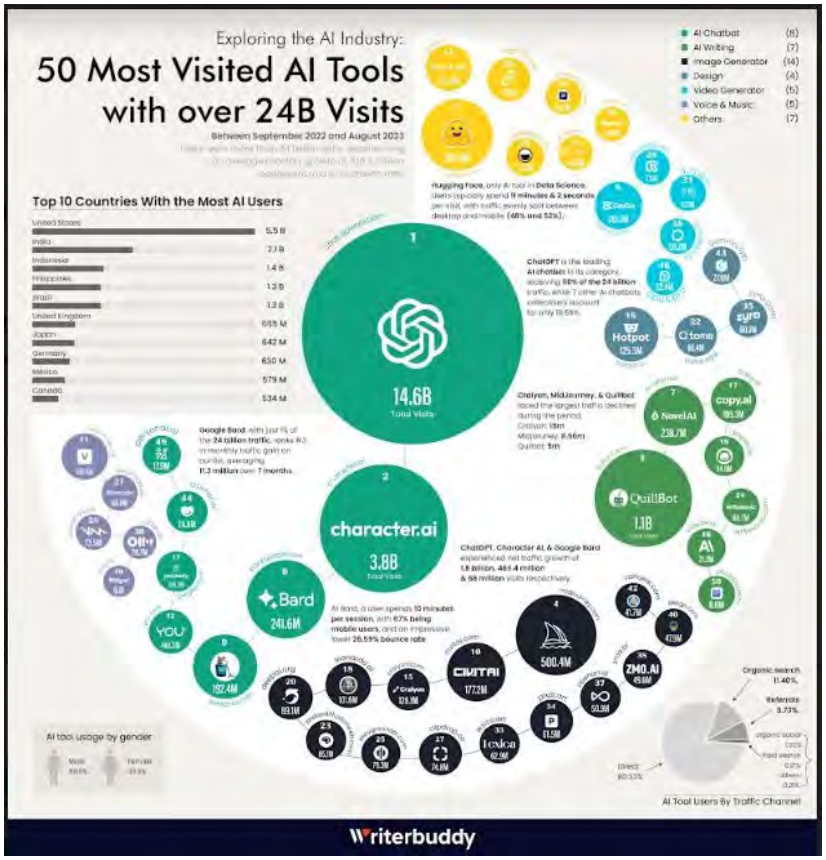
- Artificial intelligence designed to understand and generate human language in a way that mimics human thought.
- GPT can be used for various applications, including answering questions, translating languages, summarizing text, and even creating creative content such as poems or stories.



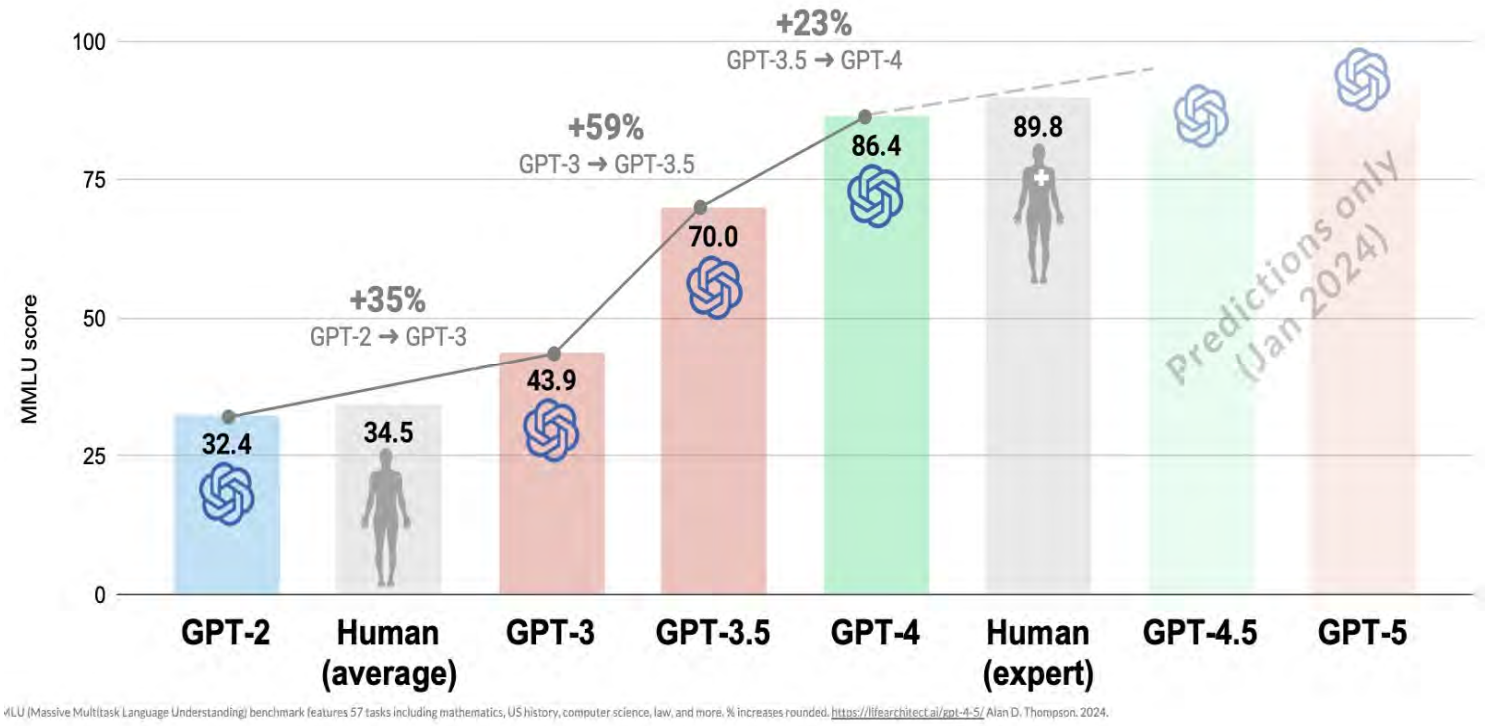
Development of Generative AI




How Smart is
ChatGPT?
OpenAI's latest large language model, GPT-4, is capable of human-level performance in many professional and academic exams.
A percentile describes how an examinee's score ranks in comparison to others.
Exam Results
ChatGPT 3.5
ChatGPT 4.0
Verbal
Evidence-based Reading & Writing
Uniform Bar Exam
Math
LSAT
Biology
Statistics
Psychology
Quantitative
Chemistry
Physics 2
Writing
Calculus
English Language
English Literature
Codeforces Rating
99th
93rd
90th
89th
88th
85th
85th
80th
71st
66th
64th
43rd
14th
2nd
GPT 4.0 has made impressive strides over GPT 3.5 but continues to struggle in certain subjects.
VISUAL CAPITALIST
COLLABORATORS RESEARCH + WRITING Marcus Lu | DESIGN Rosey Eason

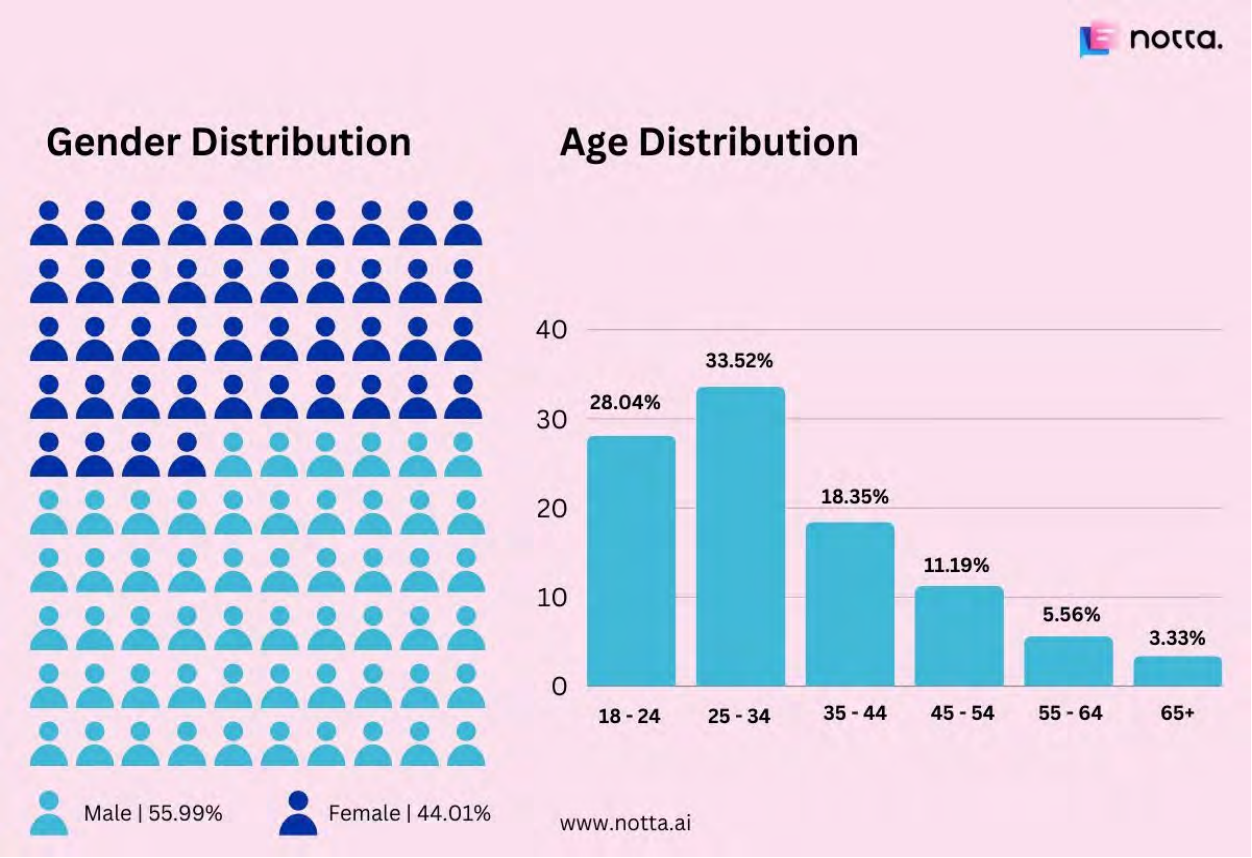

Exploring the AI Industry:
50 Most Visited AI Tools with over 24B Visits
Between September 2022 and August 2023
Top 10 Countries With the Most AI Users
14.6B
Total Visits
character.ai
3.8B
Bard
241.6M
QuillBot
1.1B
500.4M
Writerbuddy

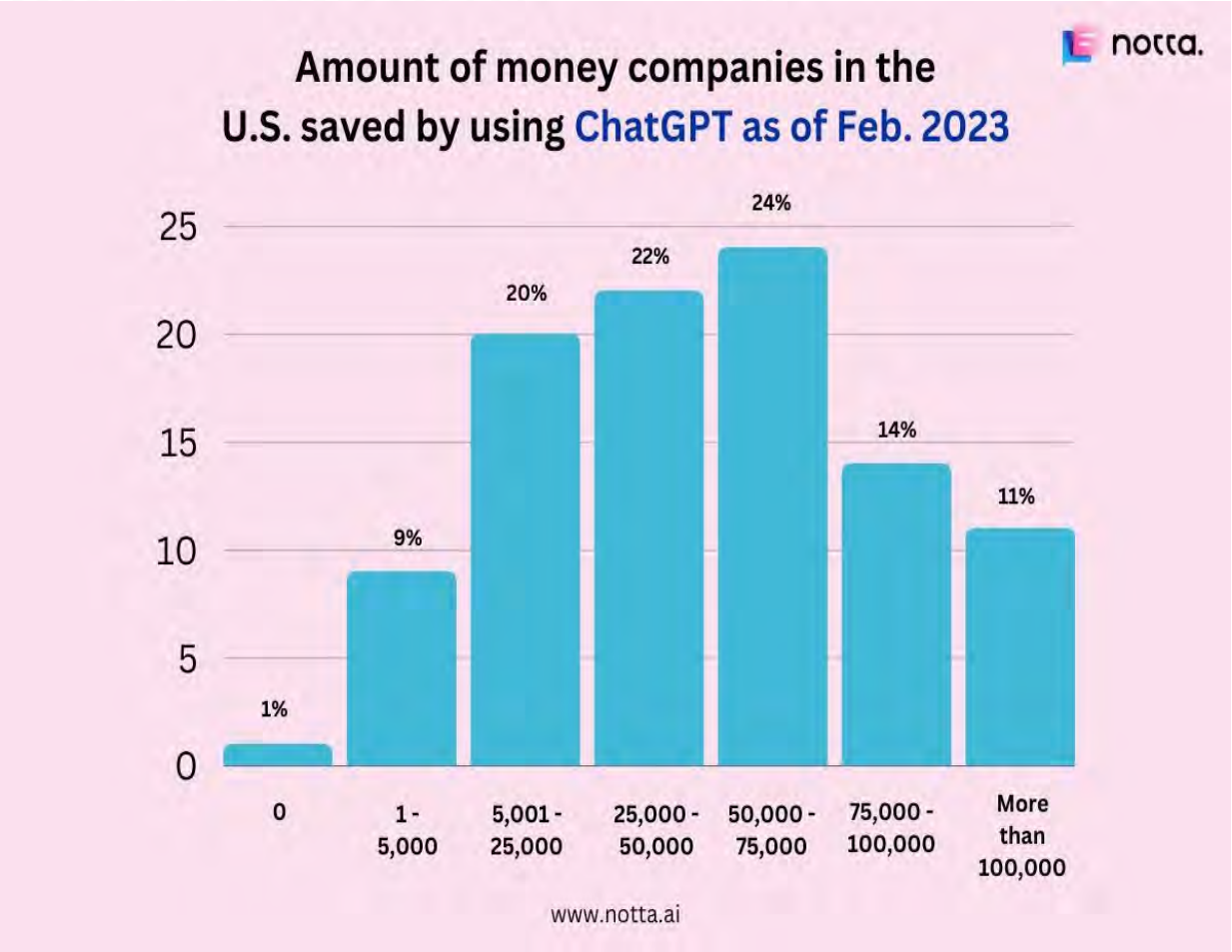
Generative AI vs. Humans (Jan 2024)



MLU (Massive Multitask Language Understanding) benchmark features 57 tasks including mathematics, US history, computer science, law, and more. % increases rounded. https://lifearchitect.ai/gpt-4-5/ Alan D. Thompson. 2024.

Demographics of Generative AI Usage

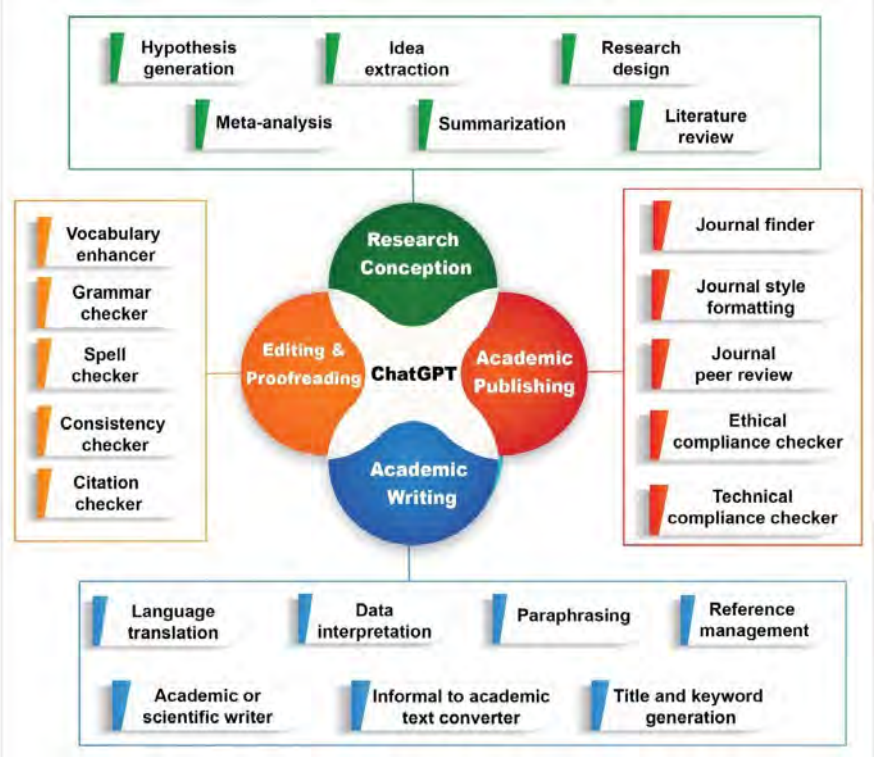



notta.
Amount of money companies in the U.S. saved by using ChatGPT as of Feb. 2023
25
20
15
10
5
0
1%
9%
20%
22%
24%
14%
11%
0
1 - 5,000
5,001 - 25,000
25,000 - 50,000
50,000 - 75,000
75,000 - 100,000
More than 100,000
www.notta.ai

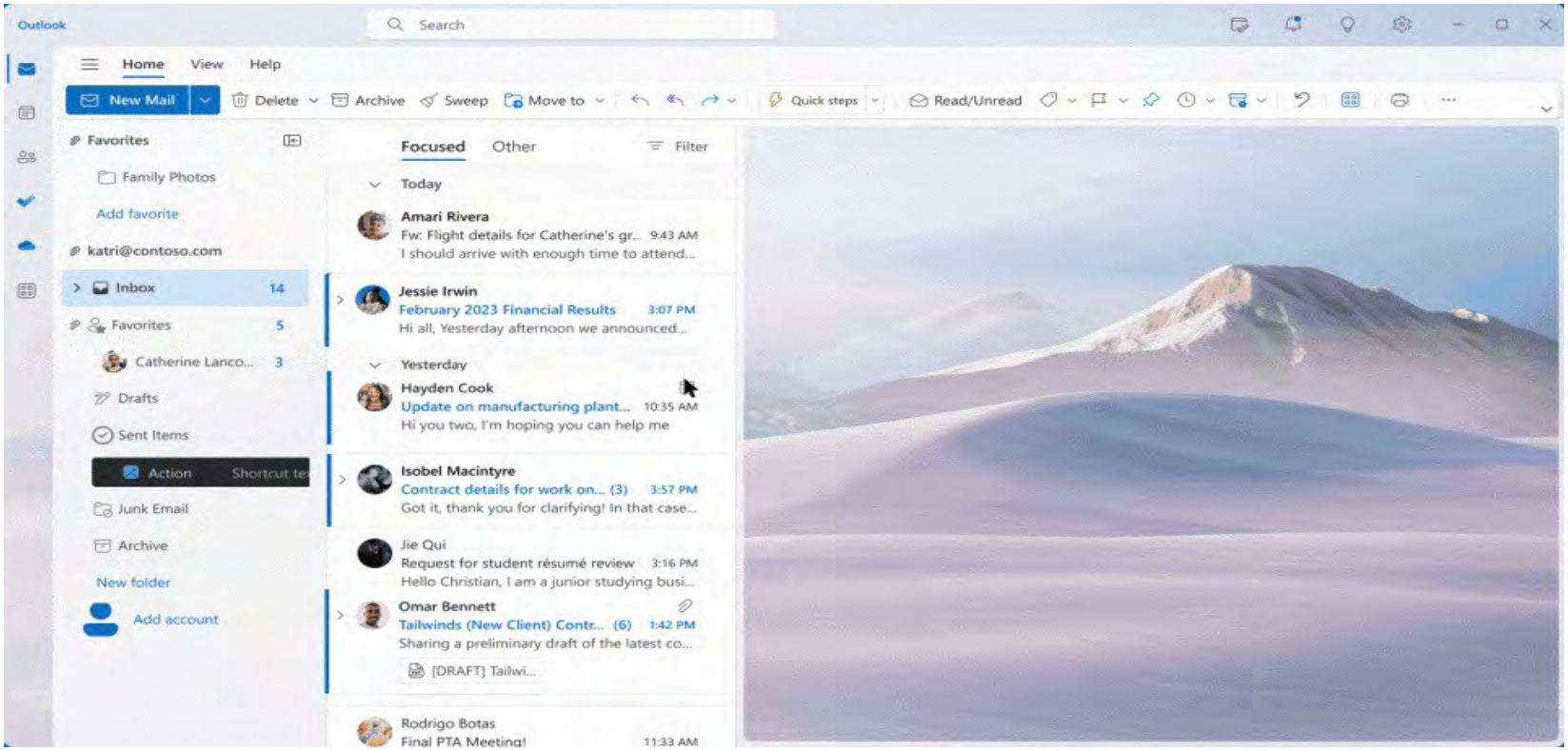
Advantages of Generative AI

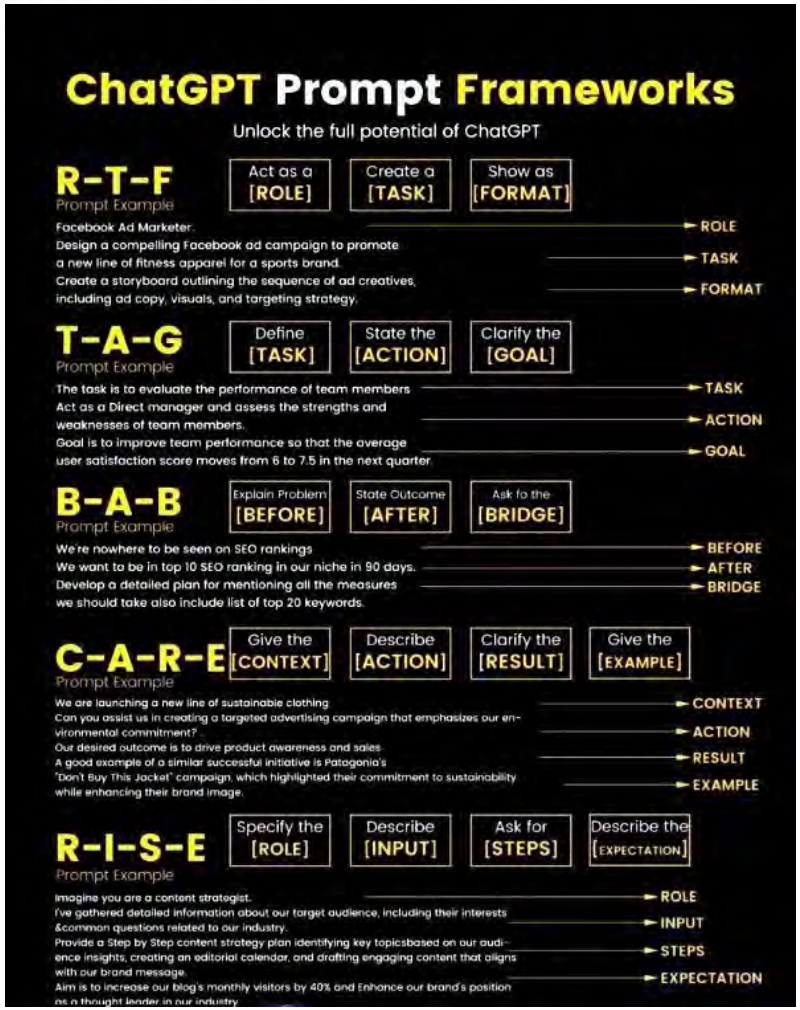
1. **Automation of Repetitive Tasks:**
   Generative AI can be used to automate repetitive and time-consuming tasks, such as scheduling meetings, generating reports, and managing emails.
2. **Creativity and Content Generation:**
   Generative AI can help create creative content such as text, music, and visual art.
3. **Learning and Education:**
   Generative AI can create learning materials, provide explanations, or offer tailored training and quizzes to help students understand difficult concepts.
4. **Innovation in Research:**
   Speeds up the research process with big data analysis and automatic pattern discovery.
5. **Efficient Product Development:**
   Helps in designing and prototyping products by suggesting creative solutions.

Applications of ChatGPT in Writing and Academic Publishing



Microsoft 365 Copilot




ChatGPT Prompt Frameworks
Unlock the full potential of ChatGPT
R-T-F
Prompt Example
Act as a [ROLE]
Create a [TASK]
Show as [FORMAT]
Facebook Ad Marketer.
Design a compelling Facebook ad campaign to promote a new line of fitness apparel for a sports brand.
Create a storyboard outlining the sequence of ad creatives, including ad copy, visuals, and targeting strategy.
ROLE
TASK
FORMAT
T-A-G
Prompt Example
Define [TASK]
State the [ACTION]
Clarify the [GOAL]
The task is to evaluate the performance of team members
Act as a Direct manager and assess the strengths and weaknesses of team members.
Goal is to improve team performance so that the average user satisfaction score moves from 6 to 7.5 in the next quarter.
TASK
ACTION
GOAL
B-A-B
Prompt Example
Explain Problem [BEFORE]
State Outcome [AFTER]
Ask fo the [BRIDGE]
We're nowhere to be seen on SEO rankings
We want to be in top 10 SEO ranking in our niche in 90 days.
Develop a detailed plan for mentioning all the measures we should take also include list of top 20 keywords.
BEFORE
AFTER
BRIDGE
C-A-R-E
Prompt Example
Give the [CONTEXT]
Describe [ACTION]
Clarify the [RESULT]
Give the [EXAMPLE]
We are launching a new line of sustainable clothing
Can you assist us in creating a targeted advertising campaign that emphasizes our environmental commitment?
Our desired outcome is to drive product awareness and sales
A good example of a similar successful initiative is Patagonia's "Don't Buy This Jacket" campaign, which highlighted their commitment to sustainability while enhancing their brand image.
CONTEXT
ACTION
RESULT
EXAMPLE
R-I-S-E
Prompt Example
Specify the [ROLE]
Describe [INPUT]
Ask for [STEPS]
Describe the [EXPECTATION]
Imagine you are a content strategist.
I've gathered detailed information about our target audience, including their interests &common questions related to our industry.
Provide a Step by Step content strategy plan identifying key topicsbased on our audience insights, creating an editorial calendar, and drafting engaging content that aligns with our brand message.
Aim is to increase our blog's monthly visitors by 40% and Enhance our brand's position as a thought leader in our industry.
ROLE
INPUT
STEPS
EXPECTATION

Instruction Framework

1. **Chain of Thought**
   a) A systematic approach that helps AI models break down problems step-by-step.
   b) Usage: Suitable for math questions, logic puzzles, or complex problems that require detailed analysis.
   c) Implementation: Add the phrase "Let's think step-by-step" at the end of your prompt.

Instruction Framework

Example:

- Can you solve this quadratic equation: (x^2 - 5x + 6 = 0)?
  Let's think step-by-step.
- A murderer is sentenced to death. He must choose between three rooms. The first is full of blazing fire, the second is full of armed assassins, and the third is full of lions that haven't eaten for three years. Which room is the safest for him?
  Let's think step-by-step.

Instruction Framework

2. RTF

a) **Role:** Specifies who will perform the given task, which can refer to oneself, another person, or a specific system.

b) **Task:** Specifies what needs to be done, including specific actions or activities expected from the individual or system in the stated role.

c) **Format:** Refers to how the task result should be presented, including the form, style, or structure of the expected output.

Example:

- **As a chef**, I want you to prepare a **recipe** using ingredients like chicken, garlic, and vegetables. Can you provide me with a **step-by-step recipe**?
- **As an employee**, I need to write an **official email requesting leave** from my manager. Can you help me **draft the email**?

Instruction Framework

3. TAG

a) **Task:** Specifies the specific action AI needs to take in response to the prompt.
b) **Action:** Specifies the steps AI needs to take to accomplish the task detailed in the prompt.
c) **Goal:** Specifies the desired outcome or result users expect to achieve through interaction with generative AI.
Example:

Example:

Generate a synopsis for a short film. Based on the information:
Task: Requesting an engaging synopsis for a short film titled "Our Future".
Action: Create main characters, an engaging plot, and the message to be conveyed.
Goal: Entertain the audience and convey an effective message.

Suggestions for website design. Based on the information:
Task: Requesting suggestions for an attractive and user-friendly website design.
Action: Provide examples of successful recent websites and responsive designs.
Goal: Achieve a website with a good user experience.

Instruction Framework

4. BAB

a) **Before:** Sets the context by describing the current situation or starting point before any changes or interventions occur.

b) **After:** Envisions the desired outcome or goal to be achieved through interaction with generative AI.

c) **Bridge:** Connects the before and after states, outlining the steps needed to transition from the initial state to the desired outcome.

Example:

Use the information provided in the before, after, and bridge sections to understand my request and generate a report on "high work stress".

Before: Many employees complain about high work stress and unsatisfactory work-life balance.

After: We want to reduce work stress and improve work-life balance among employees.

Bridge: Steps include: 1) Providing mental health programs, 2) Introducing flexible working hours, 3) Organizing recreational activities for staff.

Instruction Framework

5. CARE

a) **Context:** Provides background information, setting, or conditions relevant to the prompt.
b) **Action:** Specifies the desired actions, tasks, or behaviors AI should perform in response to the prompt.
c) **Result:** Specifies the expected outcome or benefits of AI's response.
d) **Example:** Provides illustrations or incidents to clarify the prompt and guide the understanding of generative AI.

Example:

Use the information provided in the context, action, result, and example sections to understand my request and generate a detailed and relevant response.

Context: Employee productivity is decreasing due to continuous interruptions and lack of focus.
Action: Suggest three ways to improve employee productivity.
Result: We hope to see at least a 15% increase in productivity within a month.
Example: For example, setting undisturbed work hours can help employees focus on their tasks.

Instruction Framework

6. RISE

a) **Role:** Specifies the persona or perspective defining the character, identity, or role AI should take in its response.
b) **Input:** Involves providing relevant information, data, or instructions in generating the text.
c) **Steps:** Outlines the sequence of actions, tasks, or procedures to be followed.
d) **Expectation:** Specifies the desired outcome, goals, or objectives users aim to achieve through interaction with generative AI.

Example:

Use the information provided in the role, input, steps, and expectation sections to generate a report to reduce operational costs.

Role: As a financial expert
Input: Provide information on the company's operating expenses over the past six months.
Steps: 1) Analyze expense data, 2) Identify areas requiring cost reduction, 3) Suggest steps to reduce costs.
Expectation: We want to see a 15% reduction in operating costs within six months.

SORA: Text to Video

THANK YOU

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Questions & Answers