

Essentials of Generative AI, Prompt Engineering, and ChatGPT



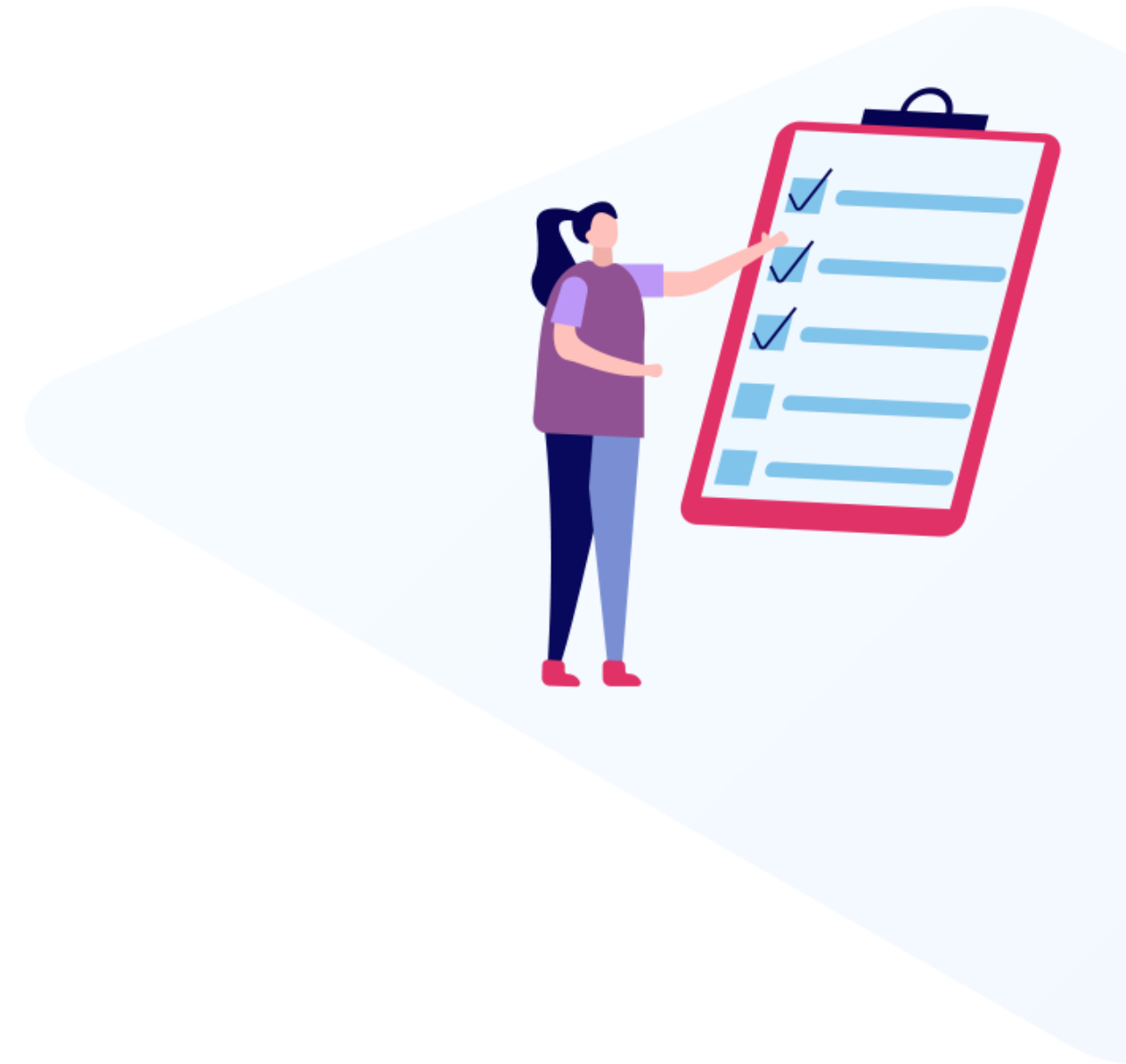
Getting Started with Generative AI



Learning Objectives

By the end of this lesson, you will be able to:

- 👁️ Identify the primary purpose of generative AI
- 👁️ Describe the key differences between generative models and discriminative models
- 👁️ Discuss various real-world applications of generative AI
- 👁️ Understand the capabilities of ChatGPT

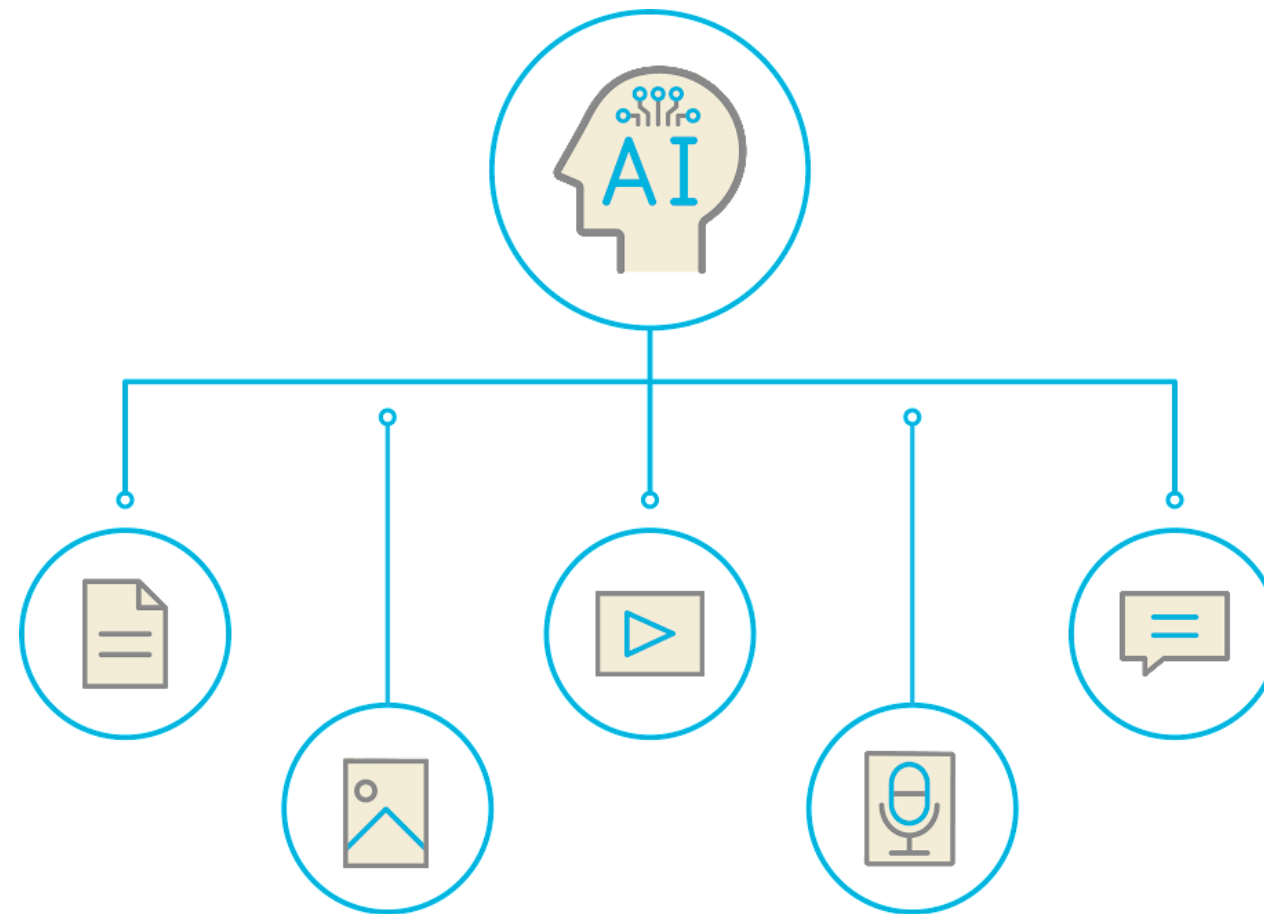




Overview of Generative AI

Generative AI

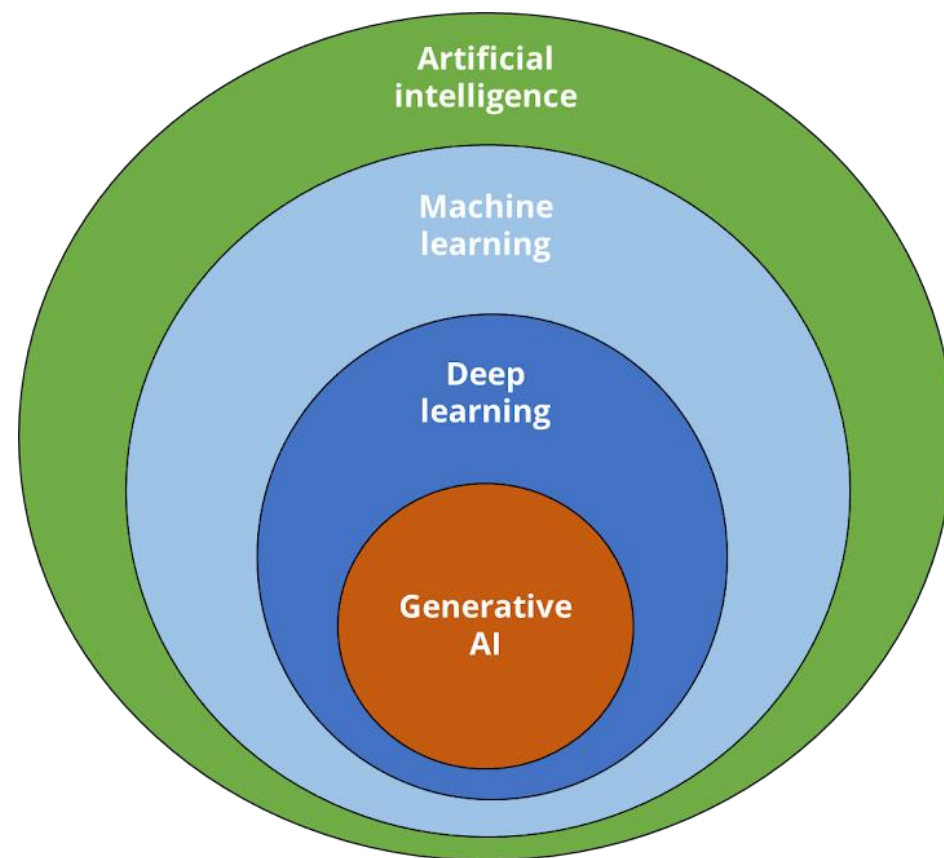
Generative artificial intelligence (GenAI) refers to a category of AI systems that focus on generating new content, such as images, text, music, or other forms of creative output.



These models are designed to generate content that is realistic, innovative, and coherent based on patterns and examples learned from training data.

Generative AI

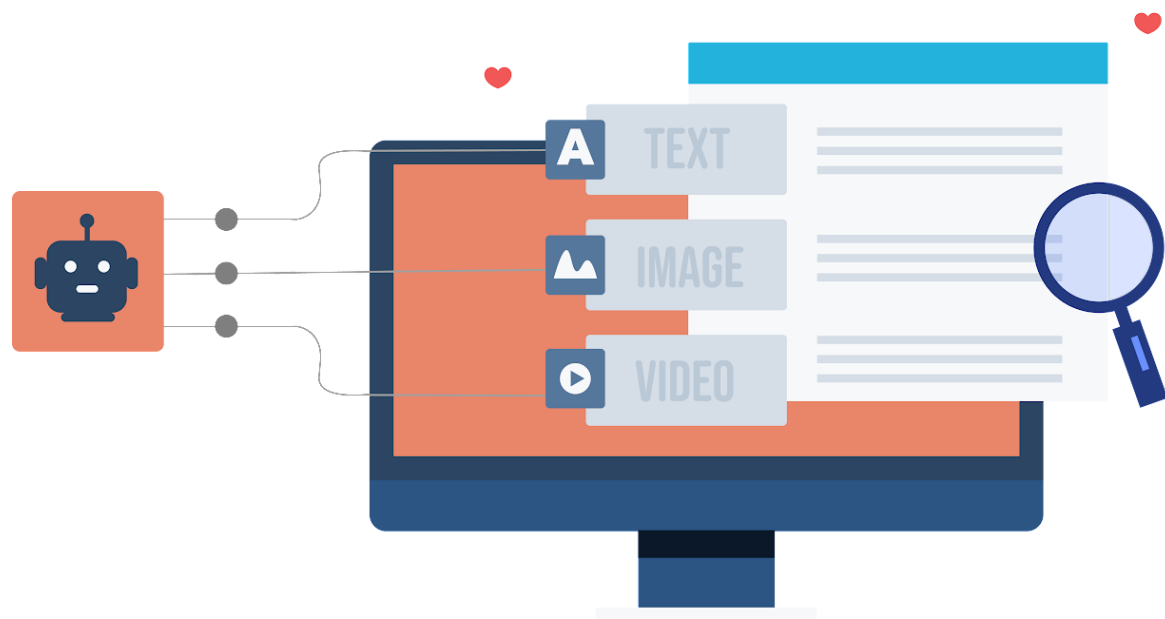
Generative AI (GenAI) is a subset of artificial intelligence that leverages machine learning and deep learning techniques to generate data.



- In many machine learning approaches, the algorithm can benefit from some degree of human-guided instruction, such as feature engineering, to make accurate predictions.
- In contrast, in deep learning, the algorithm can learn how to make an accurate prediction through its own data processing, facilitated by the artificial neural network architecture.

Purpose of Generative AI

Here are the objectives of generative AI:



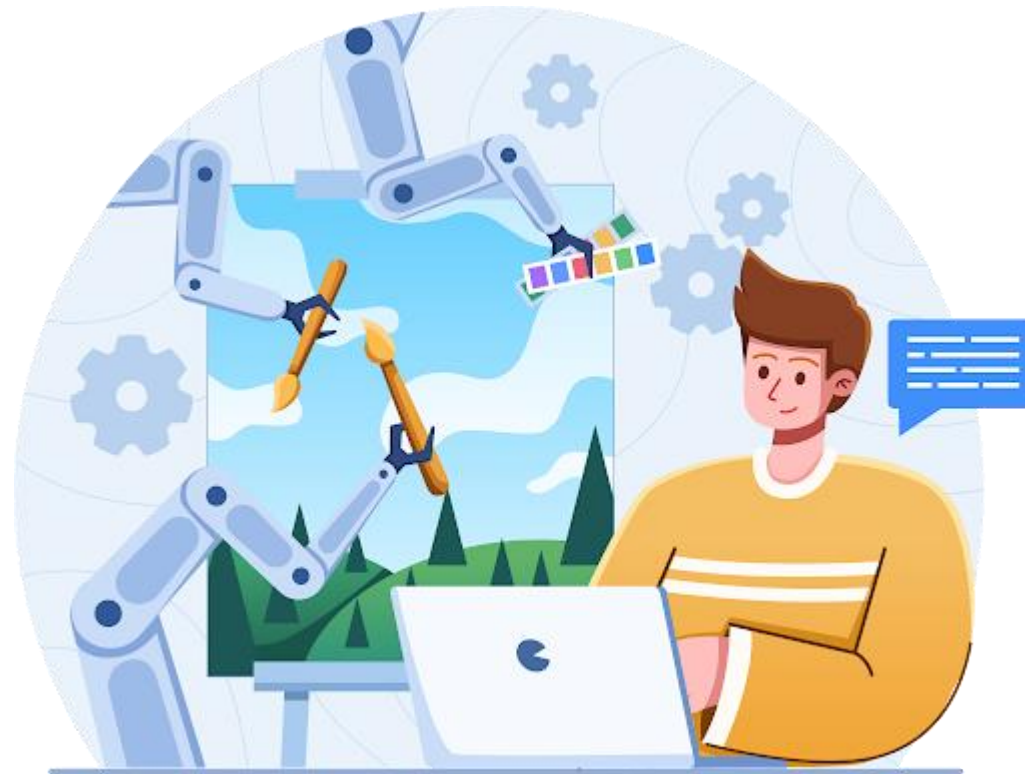
It is designed to independently generate new content by deriving its structure from recognized patterns.

It assists with complex problem-solving by generating numerous potential solutions, thus offering users a wide array of options.

It boosts human creativity by producing unique outcomes, enabling users to discover fresh ideas and possibilities.

Applications of Generative AI

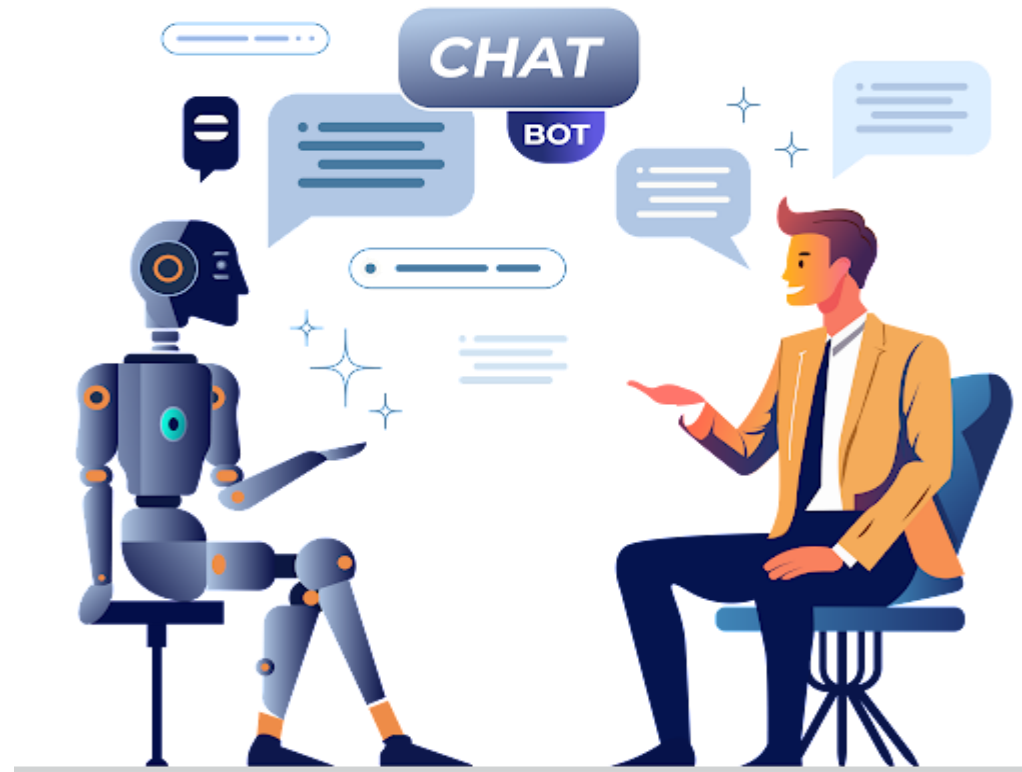
It forms realistic images such as artworks, designs, or even human faces. This technology proves useful in sectors such as graphic design, gaming, and entertainment.



Generating images

Applications of Generative AI

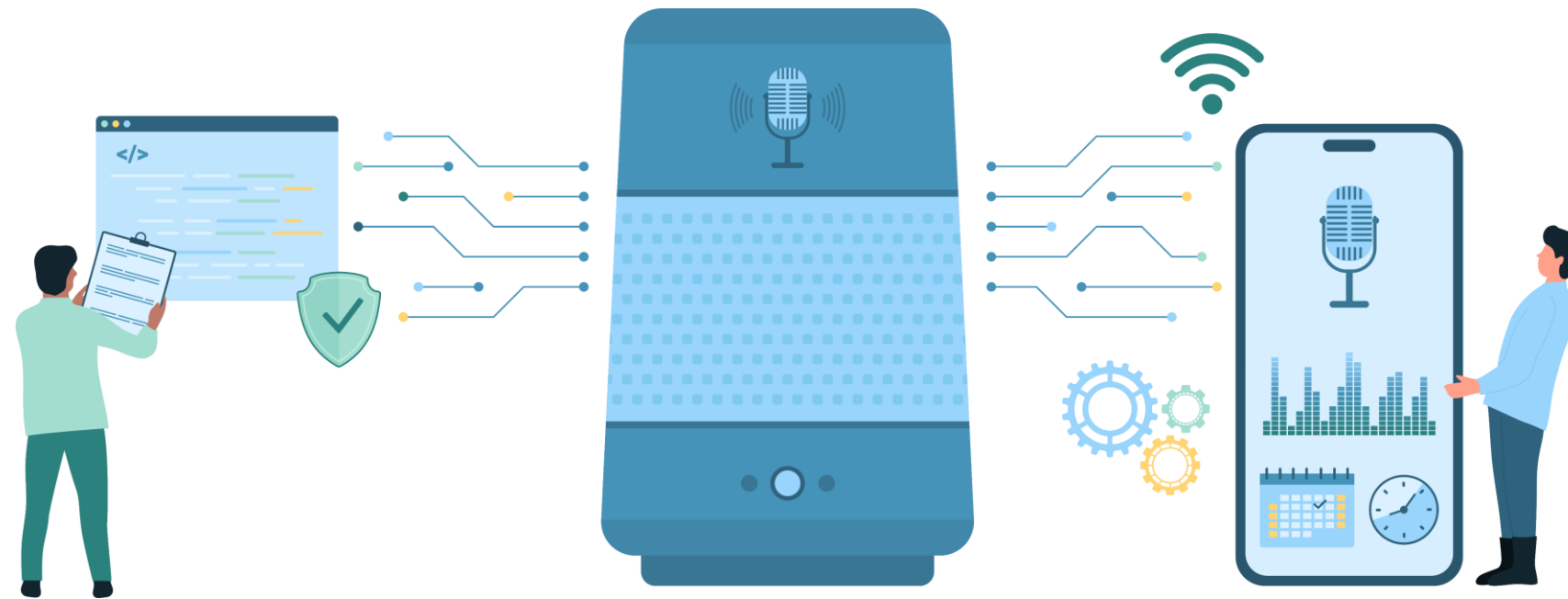
It can craft human-like text, ranging from simple sentences to comprehensive articles, benefiting areas like content creation, copywriting, and programming.



Generating text

Applications of Generative AI

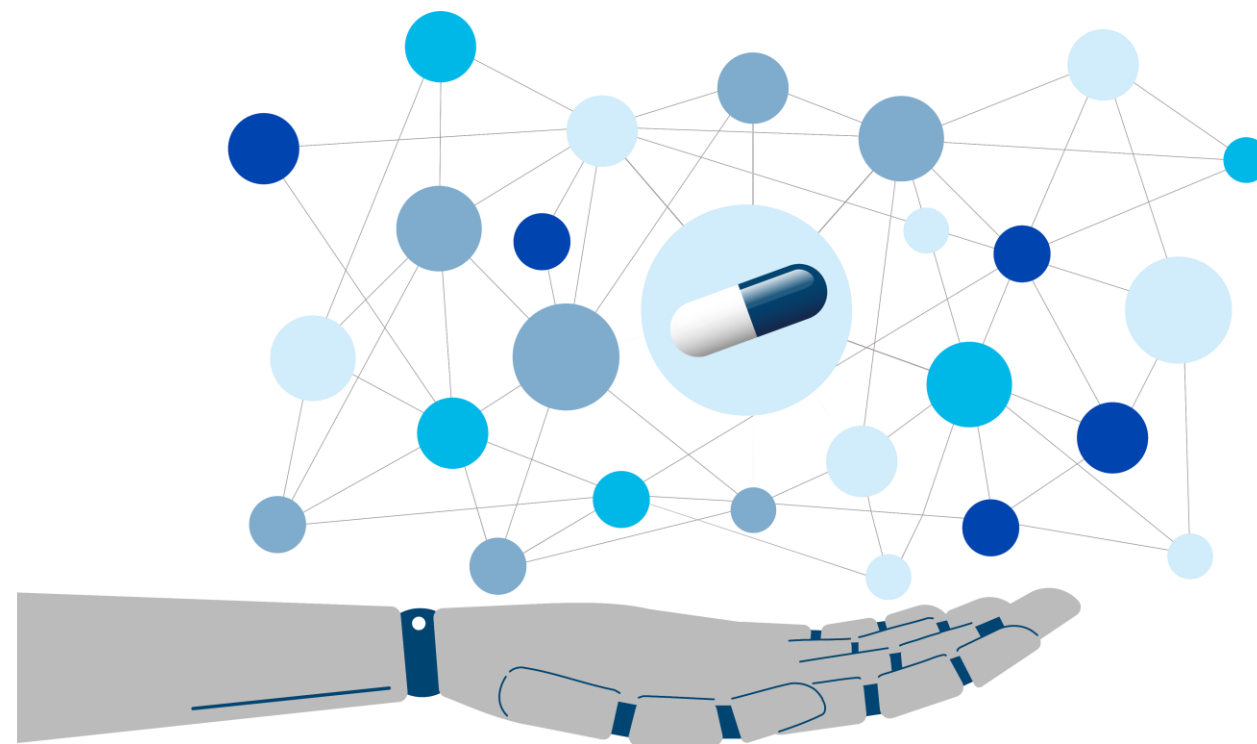
It can compose music or generate new sound effects, finding applications in the music industry, film scoring, and sound design.



Creating music and sound

Applications of Generative AI

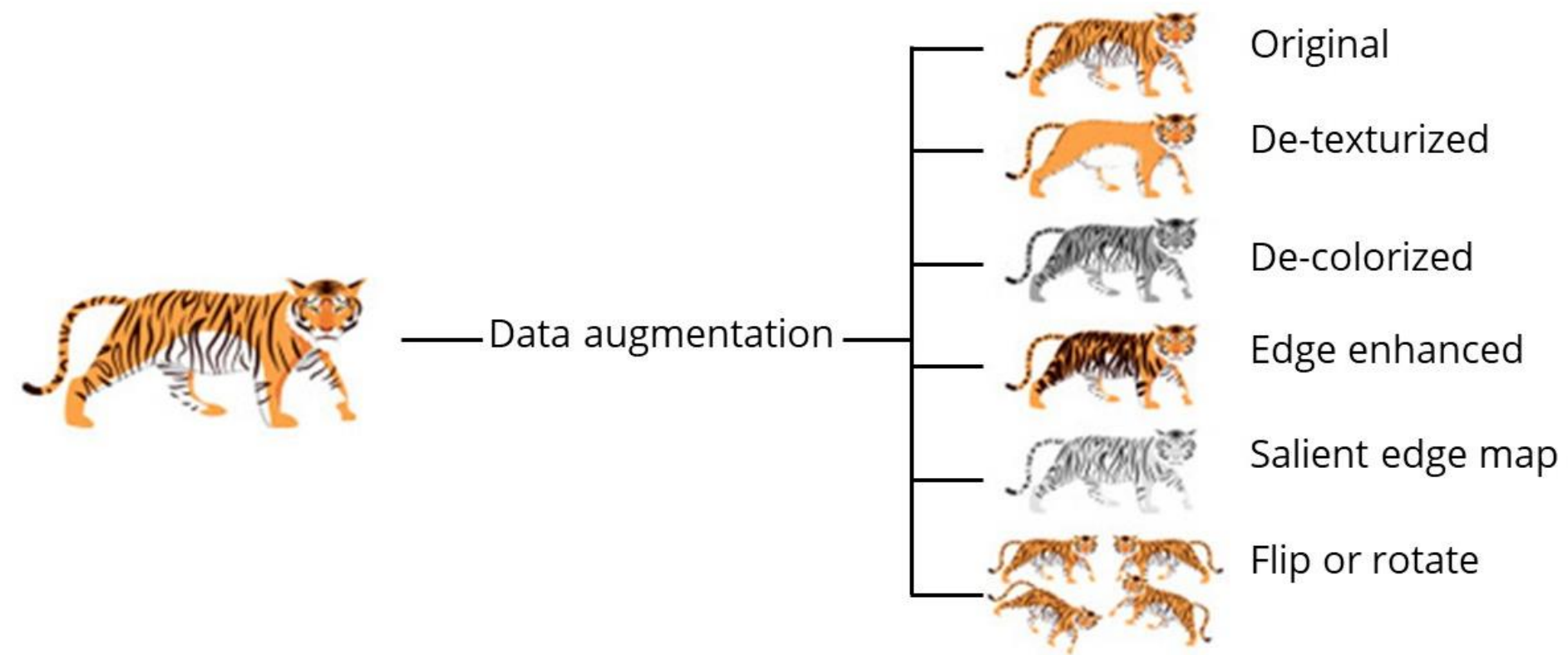
It expedites the pharmaceutical industry by generating molecular structures for new drugs, thus accelerating the discovery process and curbing costs.



Discovering drugs

Applications of Generative AI

It can form additional training data in machine learning, enhancing model performance when the original dataset is small or unbalanced.



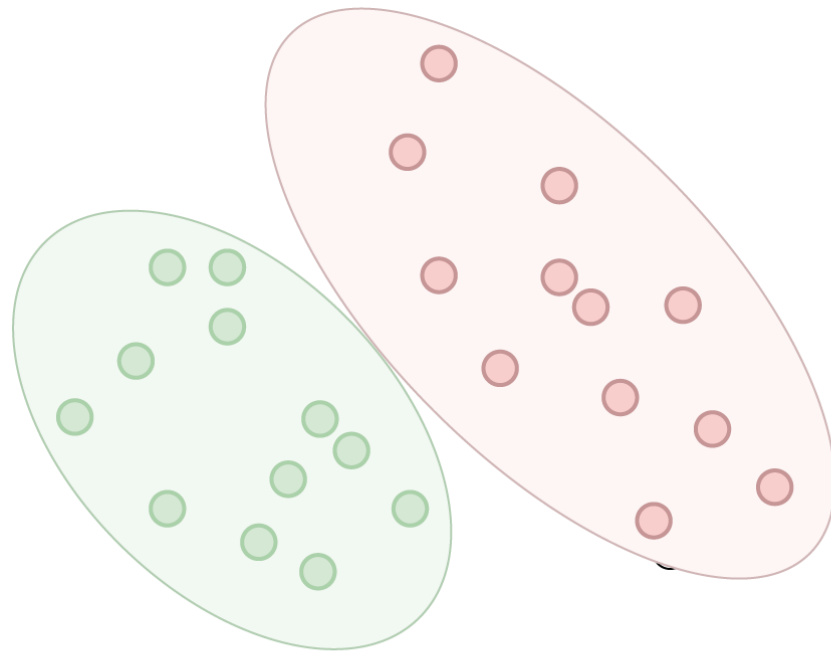
Augmenting data



Generative vs. Discriminative Models

Generative Models

Generative models are AI models that learn data patterns and generate new instances resembling the training data.

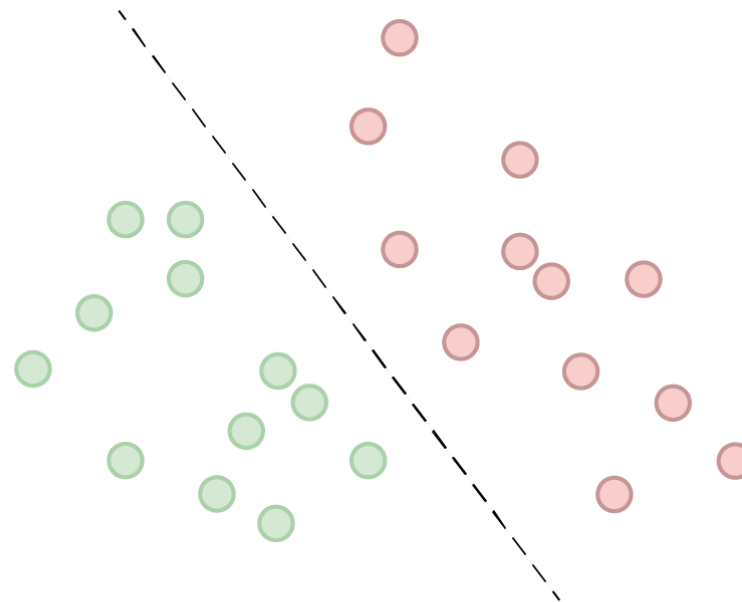


Generative

- Generative models try to mimic the data distribution of the training set.
- They aim to understand and learn the underlying patterns of data in order to generate new and similar instances.

Discriminative Models

Discriminative models, on the other hand, do not attempt to understand or replicate the data distribution; they focus on distinguishing between different classes of data.



Discriminative

These models will classify data based on learned distinctions from the training data.

Generative AI vs. Discriminative Models

The differences between generative models and discriminative models are as follows:

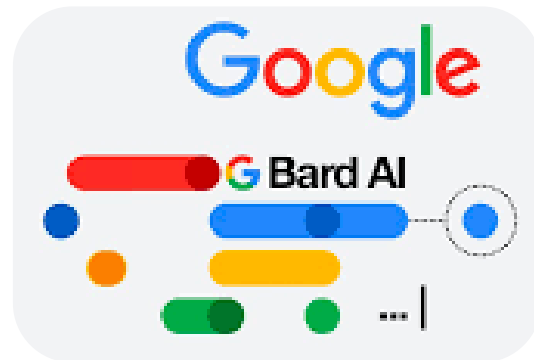
	Generative models	Discriminative models
Goal	Mimic the data distribution of the training set to generate new, similar instances	Distinguish between different classes of data to classify given inputs
Example	Generative adversarial networks (GANs)	Support vector machines (SVM), logistic regression, neural networks
Use cases	Unsupervised learning tasks such as anomaly or novelty detection	Supervised learning tasks like classification and regression
Data understanding	Try to understand and learn the underlying patterns of data	Do not aim to understand the data distribution but try to learn the boundaries between classes



Real-World Applications of GenAI

Real-World Applications of GenAI in Text Generation

Generative AI can generate text for articles, blogs, and social media posts.



- Companies like OpenAI have developed tools like GPT-3 that can write coherent and contextually relevant paragraphs of text.
- Neural networks like Google's Neural Machine Translation can generate text in a different language from the input text, essentially performing translation.

Both of these can assist users in drafting emails by suggesting complete sentences.

Real-World Applications of GenAI in Text Generation

Prompt:

Create a meal plan for 1700 calories. Include ingredients that are easily available in the average grocery store. Keep in mind that I am lactose intolerant.



Sure! Here's a lactose-free 1700-calorie meal plan that includes easily available ingredients from an average grocery store:

Day 1:

- Breakfast: Quinoa Porridge with Almond Milk, Blueberries, and Sliced Almonds
- Snack: Carrot Sticks with Hummus
- Lunch: Grilled Chicken Salad with Mixed Greens, Cucumbers, Tomatoes, Avocado, and Balsamic Vinaigrette
- Snack: Rice Cakes with Peanut Butter
- Dinner: Baked Salmon with Lemon-Dill Sauce, Steamed Broccoli, and Brown Rice

Day 2:

- Breakfast: Smoothie with Spinach, Banana, Almond Milk, Chia Seeds, and Protein Powder
- Snack: Mixed Nuts (almonds, walnuts, cashews)
- Lunch: Turkey and Lettuce Wrap with Avocado and Mustard
- Snack: Sliced Mango

Real-World Applications of GenAI in Text Generation

Follow-up prompt:

Give time reference for the above along with calorie information



Certainly! Here's the time reference for the meal plan along with approximate calorie information for each meal:

Day 1:

- Breakfast (8:00 AM): Quinoa Porridge with Almond Milk, Blueberries, and Sliced Almonds (400 calories)
- Snack (10:30 AM): Carrot Sticks with Hummus (100 calories)
- Lunch (12:30 PM): Grilled Chicken Salad with Mixed Greens, Cucumbers, Tomatoes, Avocado, and Balsamic Vinaigrette (450 calories)
- Snack (3:00 PM): Rice Cakes with Peanut Butter (150 calories)
- Dinner (6:00 PM): Baked Salmon with Lemon-Dill Sauce, Steamed Broccoli, and Brown Rice (600 calories)

Day 2:

- Breakfast (8:00 AM): Smoothie with Spinach, Banana, Almond Milk, Chia Seeds, and Protein Powder (350 calories)
- Snack (10:30 AM): Mixed Nuts (almonds, walnuts, cashews) (200 calories)

Real-World Applications of GenAI in Text Generation

Prompt:

Go through this link <https://www.simplilearn.com/> and summarize it

View other drafts 



1

Simplilearn is a leading online learning platform that provides professional certification courses in various fields such as Artificial Intelligence, Digital Marketing, Cloud Computing, Project Management, and more. It is the world's #1 online Bootcamp and one of the world's leading certification training providers.

Simplilearn offers over 400 courses with 40 plus global accreditations. The courses are taught by over 2000+ expert trainers. Simplilearn has trained over 3,000,000 professionals.


The courses on Simplilearn are designed to help individuals acquire the skills they need to

Real-World Applications of GenAI in Text Generation

Drafts:

You can select different drafts.

View other drafts ^



Draft 1


Simplilearn is a leading online learning platform that provides professional certification courses in


Draft 2

Simplilearn is an online learning platform that provides professional certification courses in

Draft 3

Simplilearn is a leading online learning platform that provides professional certification courses in





1

Simplilearn is a leading online learning platform that provides professional certification courses in various fields such as Artificial Intelligence, Digital Marketing, Cloud Computing, Project Management, and more. It is the world's #1 online Bootcamp and one of the world's leading certification training providers

Real-World Applications of GenAI in Video Generation

Discover revolutionary platforms that transform video creation, providing an extensive range of content possibilities and streamlining production



Synthesia platform can be used to generate a wide range of video content, from corporate training videos to personalized video messages, significantly reducing the time, cost, and complexity of traditional video production methods.



VEED.io is a video editing tool designed for crafting and distributing both brief and extensive videos ideal for social media, podcasts, YouTube, advertisements, and beyond.

Real-World Applications of GenAI in Code Generation

GitHub Copilot and Amazon CodeWhisperer are AI-powered coding assistants. As developers code, these tools provide suggestions for lines or blocks of code directly within the editor.



- GitHub Copilot utilizes machine learning models, particularly Codex, which is a model that was trained on billions of lines of public code.
- It understands the context of the lines in writing and generates suggestions accordingly.



- Amazon CodeWhisperer, powered by machine learning, serves as a real-time code generator.
- It produces automatic recommendations influenced by existing code and comments.

Real-World Applications of GenAI in Code Generation

Prompts:

Write the below commands with # in VSCODE

```
# Ask the user to provide a line of text
# Scan the text for the following mildly offensive words:\
# bloody, damn, dummy
# If you find any, then replace its letters with asterisks \
# except for the first letter in each offensive word
# Print the resulting text
```

```
# Ask the user to provide a line of text.
# Scan the text for the following mildly offensive words: \
# arse, bloody, damn, dummy.
# If you find any, then replace its letters with asterisks \
# except for the first letter in each offensive word.
# Print the resulting text.
def censor():
    text = input("Please enter a line of text: ")
    text = text.replace("arse", "a****")
    text = text.replace("bloody", "b*****")
    text = text.replace("damn", "d****")
    text = text.replace("dummy", "d*****")
    print(text)
```

Real-World Applications of GenAI in Image Generation

It has the capacity to generate unique, creative, and sometimes intricate images based on a text prompt. Here are some applications:



Formerly known as DALL-E Mini, this AI model generates graphics from text inputs and consistently produces nine photos.



Microsoft's Bing Image Creator is integrated within Bing Chat that allows users to generate and search for images based on written descriptions, utilizing OpenAI's DALL-E system.

Real-World Applications of GenAI in Image Generation

Prompt:

Create an image capturing a child playing in a park, illuminated by natural light, and displaying candid expressions



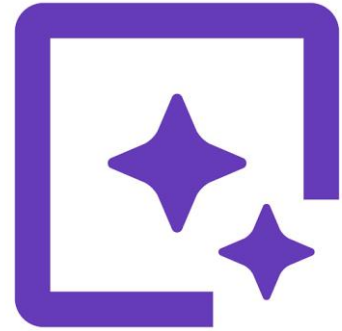
Real-World Applications of GenAI in Image Generation

Prompt:

Create an image of kids playing with robots in a neon-lit city

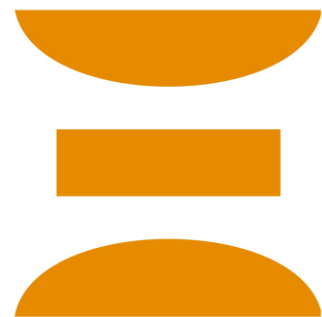


Real-World Applications of GenAI in Image Generation



DeepDream by Google

- It uses generative algorithms to create visually stunning and surreal images by enhancing and modifying existing images.
- It applies deep neural networks to amplify patterns and features in images, resulting in unique and dream-like visuals.



DeepArt by Prisma Labs

- It employs Generative AI to convert photos into art, drawing inspiration from renowned artists and styles.
- Users can upload photos, select from assorted artistic styles, and generate customized, artistic versions of their images.

Real-World Applications of GenAI in Image Generation

StyleGAN by NVIDIA

- It is a generative adversarial network (GAN) developed by researchers at NVIDIA.
- It is an AI model that has been trained to create highly realistic images.

This Person Does Not Exist

- It is a website displaying the capabilities of StyleGAN.
- It produces a lifelike, artificial human face with every page visit or refresh.

Real-World Applications of GenAI in Music Generation



- Magenta, a Google project, combines AI and musical creativity.
- It showcases generative models capable of composing melodies, harmonies, and complete music pieces across diverse styles and genres.



- AlVA uses generative AI to create original music compositions.
- They have trained their AI in a multitude of music genres, and it can generate music for movies, video games, commercials, and more.

Real-World Applications of GenAI



- Baidu, a search engine, known as the Google of China, has made significant strides in artificial intelligence research.
- The company focuses on generative models, contributing to advancements in the field.
- Baidu's research in speech synthesis, natural language processing, and image generation has been groundbreaking and noteworthy.



- Salesforce has developed an AI-powered tool called **Einstein** that is capable of predictive insights and recommendations.
- They have also done research in the field of generative AI, particularly in text generation and natural language processing.

Real-World Applications of GenAI



- Adobe, a prominent software company, seamlessly integrates AI and machine learning into its products.
- Their proprietary technology, **Sensei**, demonstrates generative capabilities. It powers features such as content autofill in Photoshop.
- Smart tagging functionalities in the Adobe Experience Manager are also driven by Sensei.
- Adobe's use of generative AI in these features showcases practical and innovative applications.



Introduction to ChatGPT

ChatGPT

It is an AI chatbot developed by OpenAI designed to answer questions and generate human-like text based on the prompts it receives.

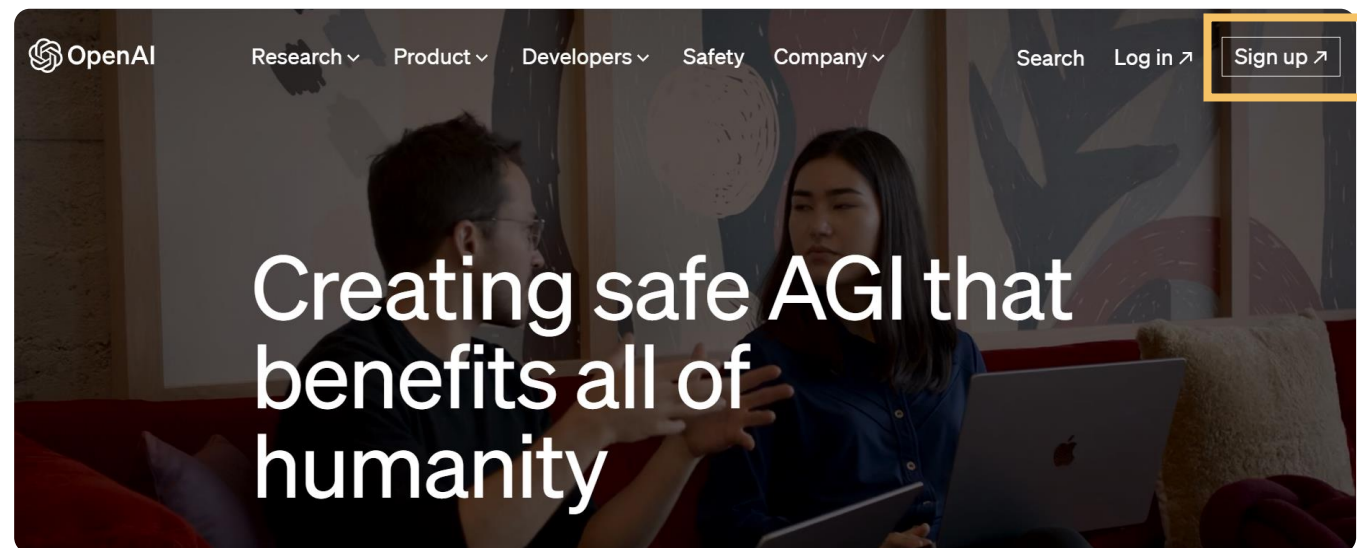




Exploring ChatGPT

Creating an OpenAI Account

Here is the step-by-step process for signing up for an OpenAI account:



Step 1: Visit the OpenAI website; open a web browser and navigate to the OpenAI website (<https://www.openai.com/>)

Step 2: Click on **Sign up** and initiate the account creation process

Creating an OpenAI Account

Create your account

Note that phone verification may be required for signup. Your number will only be used to verify your identity for security purposes.

Continue

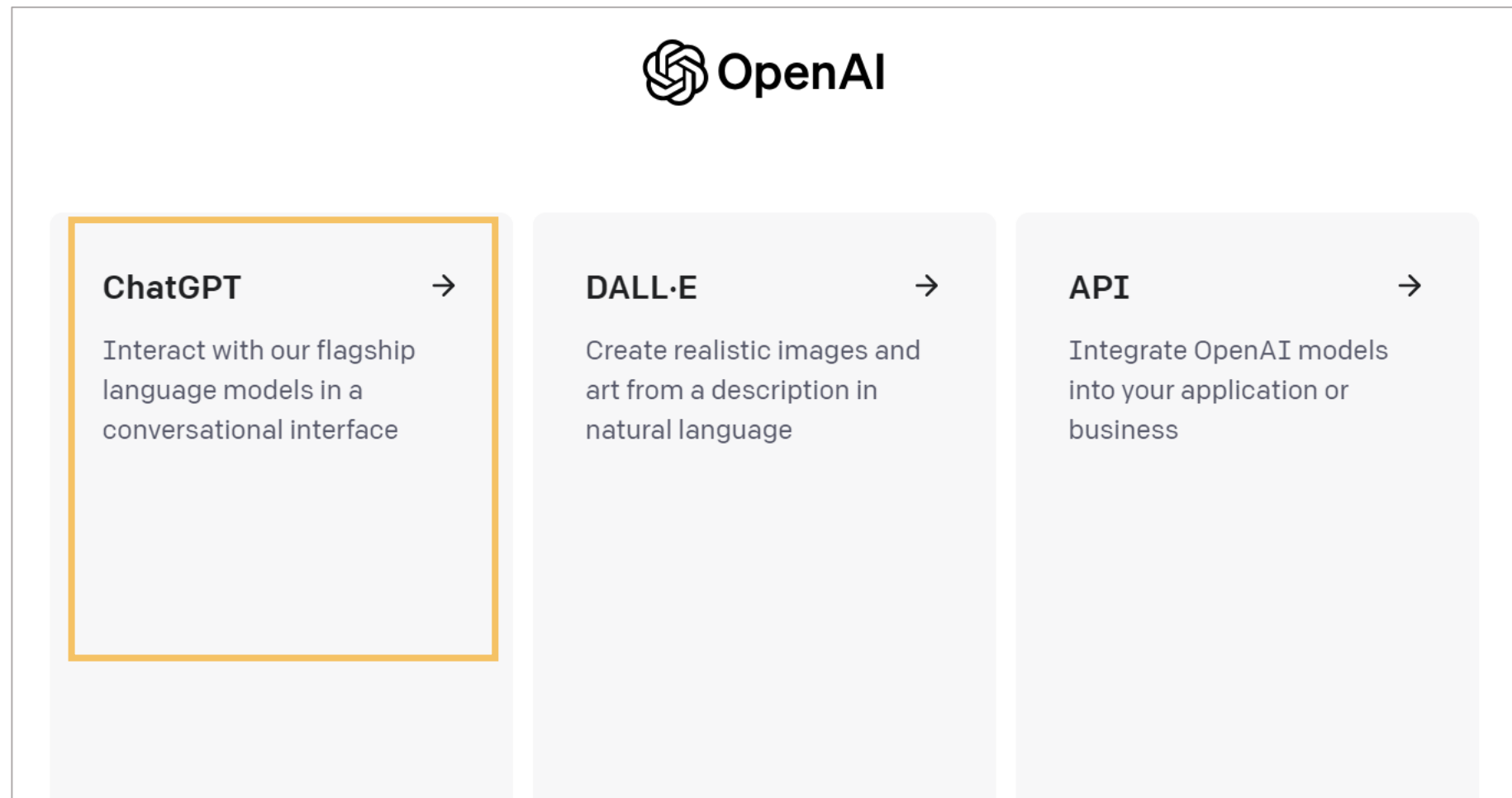
Already have an account? [Log in](#)

Step 3: Provide the necessary information in the sign-up form, which includes name, email address, and preferred password

Step 4: Complete any necessary verification steps, such as confirming your email or providing requested information, to validate your account

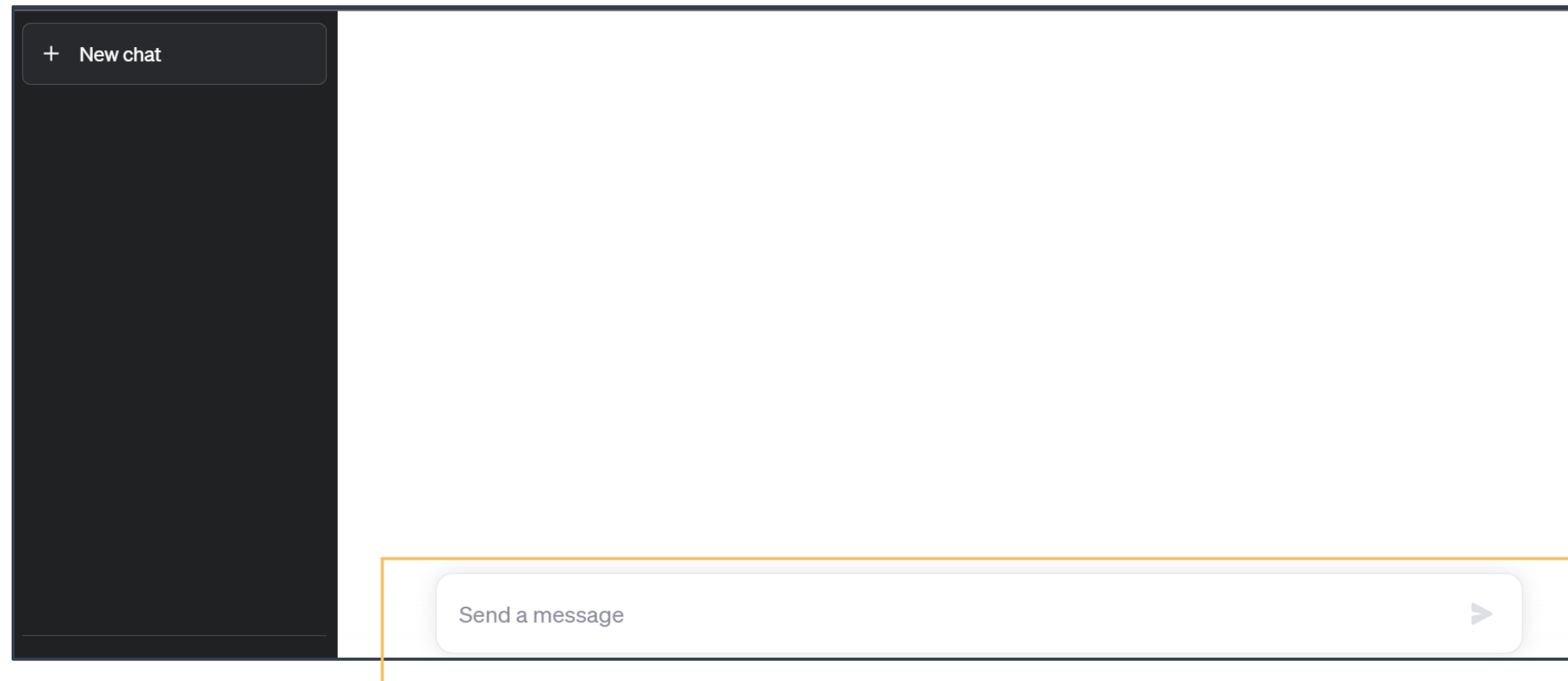
Creating an OpenAI Account

Step 5: Select ChatGPT from the options



Accessing the ChatGPT Interface

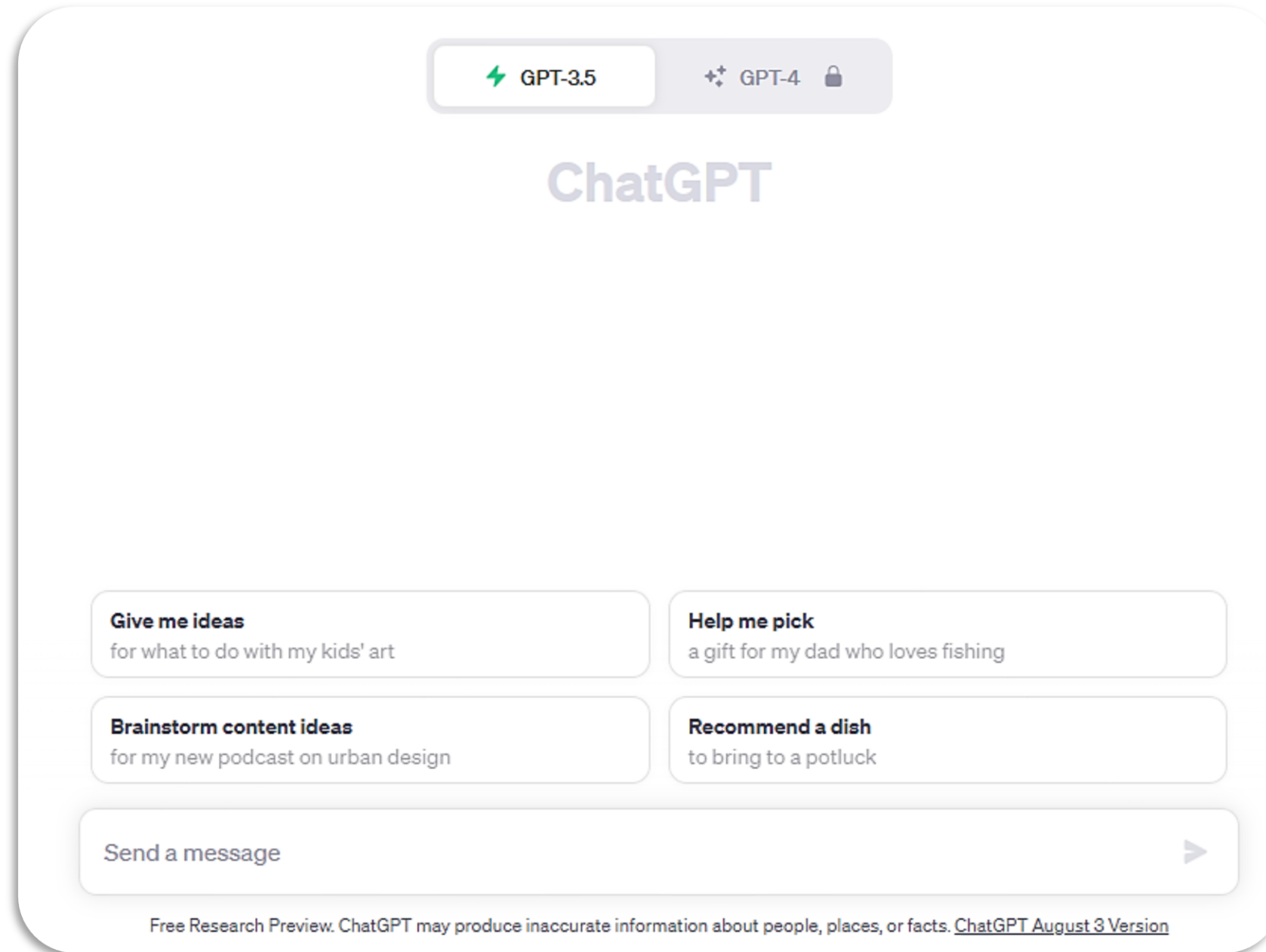
Step 6: Get started with ChatGPT



Submit the crafted message here

Engaging in a Conversation with ChatGPT

Once logged into the platform, users can engage with the AI language model.



The screenshot displays the ChatGPT web interface. At the top, there are two buttons for selecting the AI model: 'GPT-3.5' (active, with a green lightning bolt icon) and 'GPT-4' (disabled, with a grey lightning bolt icon and a lock icon). Below these is the 'ChatGPT' logo. The main area contains four example prompts in rounded rectangular boxes, arranged in a 2x2 grid:

- Give me ideas**
for what to do with my kids' art
- Help me pick**
a gift for my dad who loves fishing
- Brainstorm content ideas**
for my new podcast on urban design
- Recommend a dish**
to bring to a potluck

At the bottom is a text input field with the placeholder 'Send a message' and a right-pointing arrow button. Below the input field is a small disclaimer: 'Free Research Preview. ChatGPT may produce inaccurate information about people, places, or facts. [ChatGPT August 3 Version](#)'.

Engaging in a Conversation with ChatGPT

Feel free to pose any question to ChatGPT, and it will strive to deliver the most accurate response.



Engaging in a conversation with ChatGPT



Of course! I'm here to chat with you. What topic would you like to discuss today? Or is there a question or problem you'd like help with?



Engaging in a Conversation with ChatGPT

It's possible to have a dialog with ChatGPT or even seek its viewpoint on various topics.

Can you explain what a black hole is in simpler terms?



Absolutely, I'd be happy to explain black holes in simpler terms.



A black hole is like a cosmic vacuum cleaner with an appetite that can never be satisfied. But instead of sucking up dust, it pulls in anything that comes too close, including stars, planets, and even light.

You might think of it as a very hungry invisible spot in space. It's invisible because it doesn't let light escape, and light is what allows us to see things. It's like the strongest trap you can imagine - once something gets in, it can never get out.

The reason it has such a strong pull is due to its incredibly dense core, known as a singularity. Imagine taking the Earth, squishing it down to the size of a small marble but still keeping its whole weight. That's sort of like how dense a black hole is.

Surrounding the black hole is a boundary called the event horizon, which is the point of no return. If anything crosses this boundary, it will inevitably fall into the black hole.

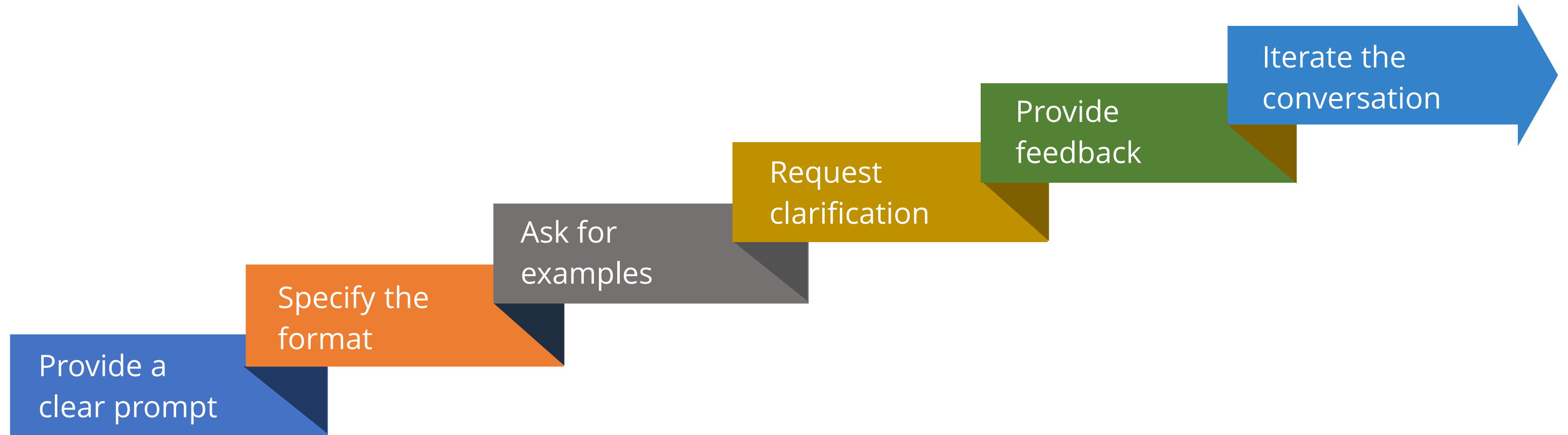
Black holes are fascinating to scientists because they challenge our understanding of physics, particularly the relationship between gravity and space-time.



Generating Content with ChatGPT

Generating Content with ChatGPT: Steps

Content generation with ChatGPT involves providing a prompt or question and receiving a response from the AI model.



Outlining a Document with ChatGPT

ChatGPT generates an outline for the given topic, which includes main points and subpoints.

Generate an outline for the following:



Machine learning is an umbrella term used to solve problems for which the development of algorithms by human programmers would be cost-prohibitive. Instead, these problems are solved by assisting machines in discovering their own algorithms.

The created outline can serve as a roadmap for your writing, making the process more organized and efficient.

Outlining a Document with ChatGPT

ChatGPT can create a simple plan or outline for the writing.



- This approach can apply to any type of writing, such as essays or blogs.
- An outline assists in structuring one's thoughts, leading to clear and logical writing.

Crafting an E-mail Using ChatGPT

This involves utilizing the AI model to generate and structure email content.

Act as a Sales Head and write an email to a customer explaining a BI dashboard for Manufacturing process.

The above example shows the prompt for generating an email from a sales head to a customer explaining a BI dashboard for the manufacturing process.

Crafting an E-mail Using ChatGPT

Here is the generated E-mail:

Subject: Introducing our Powerful BI Dashboard for Optimizing Manufacturing Processes

Dear [Customer's Name],

I hope this email finds you well. I am writing to introduce you to an exciting solution that can significantly enhance your manufacturing processes and drive operational efficiency. Our state-of-the-art Business Intelligence (BI) Dashboard specifically tailored for the manufacturing industry is designed to provide you with actionable insights and empower you to make data-driven decisions.

In today's competitive market, staying ahead of the curve is crucial, and our BI Dashboard offers an invaluable tool to achieve that. By leveraging advanced analytics and visualizations, our solution transforms raw manufacturing data into meaningful information, enabling you to identify trends, detect inefficiencies, and optimize your operations like never before.

Here are some key features and benefits of our BI Dashboard:

1. **Real-time Monitoring:** Gain instant access to real-time data on production metrics, machine performance, inventory levels, and more. Monitor your manufacturing processes from anywhere, anytime, allowing you to make timely adjustments and maximize productivity.
2. **Customizable Visualizations:** Our intuitive dashboard provides customizable charts, graphs, and KPIs that can be tailored to your specific manufacturing needs. Visualize data in a way that makes sense to you and your team, facilitating quick and accurate decision-making.
3. **Performance Analysis:** Dive deep into your manufacturing data and analyze performance across various metrics such as cycle time, downtime, quality, and yield. Identify bottlenecks, pinpoint areas for improvement, and implement data-backed strategies to increase operational efficiency.
4. **Predictive Analytics:** Leverage the power of machine learning algorithms integrated into our dashboard to forecast demand, anticipate maintenance needs, and optimize your production schedules. Proactively address issues before they arise, reducing downtime and costs.
5. **Collaboration and Reporting:** Foster collaboration among different teams and departments by sharing relevant data, insights, and reports within the dashboard. Generate comprehensive reports with a few clicks, simplifying communication and enabling cross-functional decision-making.

We understand that every manufacturing operation is unique, and our BI Dashboard can be customized to align with your specific requirements. Our team of experienced professionals

Creating a Resume or CV with ChatGPT

ChatGPT can assist in creating a resume.

Please generate a professional resume or CV for a software engineer with at least 5 years of experience. Include sections for personal information, summary/profile, work experience, skills, education, and any additional relevant sections you deem necessary. The resume should highlight the candidate's technical skills, accomplishments, and demonstrate their ability to contribute to a software engineering team. Please make the resume concise, well-structured, and visually appealing.

It can structure a resume by generating detailed descriptions of skills and experiences and composing a professional summary.

Creating a Resume or CV with ChatGPT

Here is the generated resume.

Summary

Highly skilled software engineer with over 5 years of experience in developing and implementing cutting-edge software solutions. Strong expertise in full-stack development, with a focus on backend development and database management. Proven track record of successfully delivering projects on time and exceeding client expectations. Dedicated team player with excellent problem-solving and communication skills.

Work Experience

Software Engineer | XYZ Tech Solutions

Anytown, USA

2018 - Present

- Collaborated with cross-functional teams to design, develop, and implement scalable and efficient software solutions.
- Led the development of a web-based application that streamlined internal processes, resulting in a 30% increase in productivity.
- Designed and implemented a RESTful API for a client-facing mobile application, improving user experience and increasing customer satisfaction.

Software Developer | ABC Software Solutions

Anytown, USA

2015 - 2018

- Developed and maintained enterprise-level software applications using Java, Spring, and Hibernate frameworks.
- Collaborated with product managers and UI/UX designers to translate requirements into functional and user-friendly software solutions.
- Implemented database schemas and optimized query performance for efficient data retrieval.
- Contributed to the integration of third-party APIs and services, enhancing application functionality and expanding business capabilities.

Skills

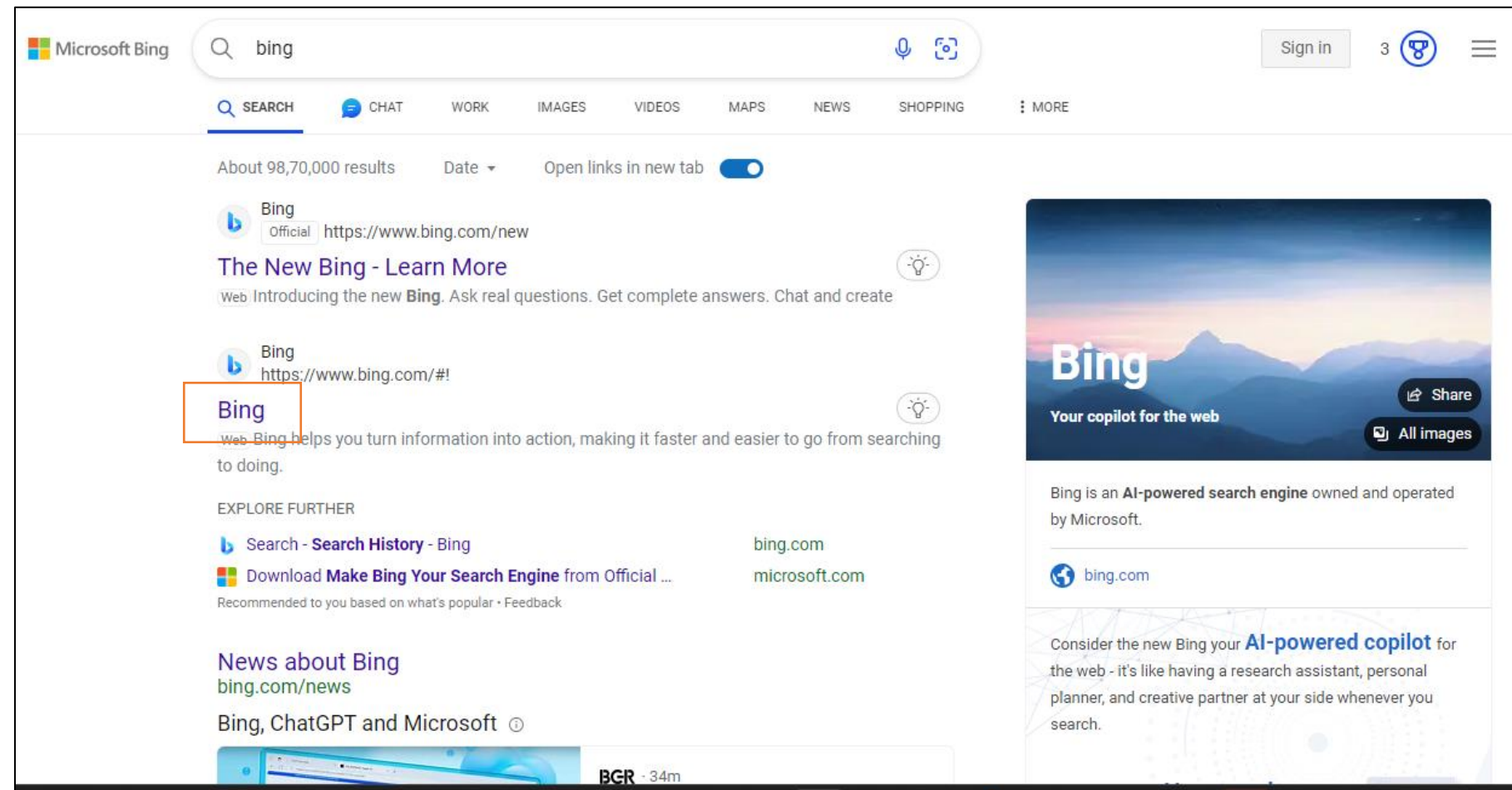
- Programming Languages: Java, Python, JavaScript
- Web Development: HTML, CSS, JavaScript, React, Node.js
- Backend Development: Spring Framework, Hibernate, RESTful APIs, SQL
- Database Management: MySQL, MongoDB
- Version Control: Git, SVN
- Agile Methodologies: Scrum, Kanban
- Problem Solving



Image Generation Through Bing (Powered by DALL-E)

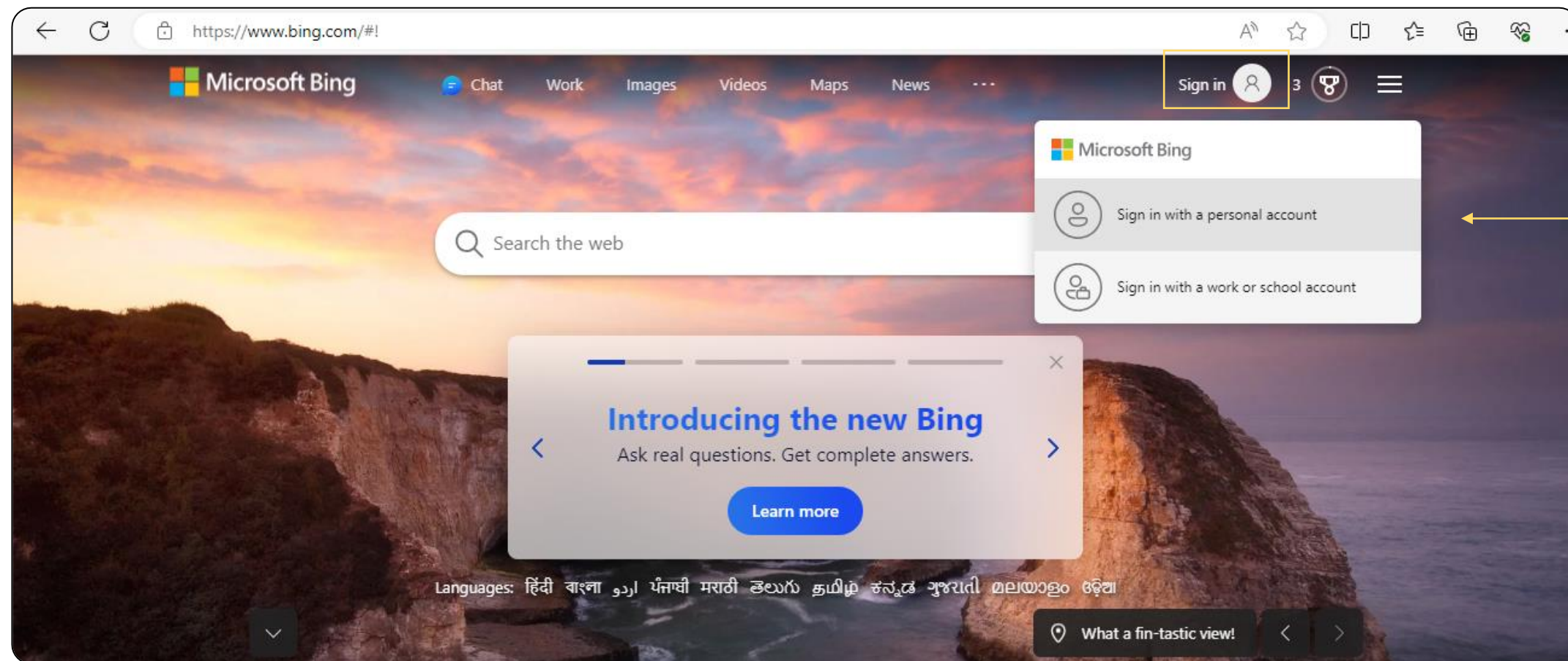
Creating a Bing Account

Open Internet Explorer and enter **Bing** in the search bar. Click on the highlighted portion.



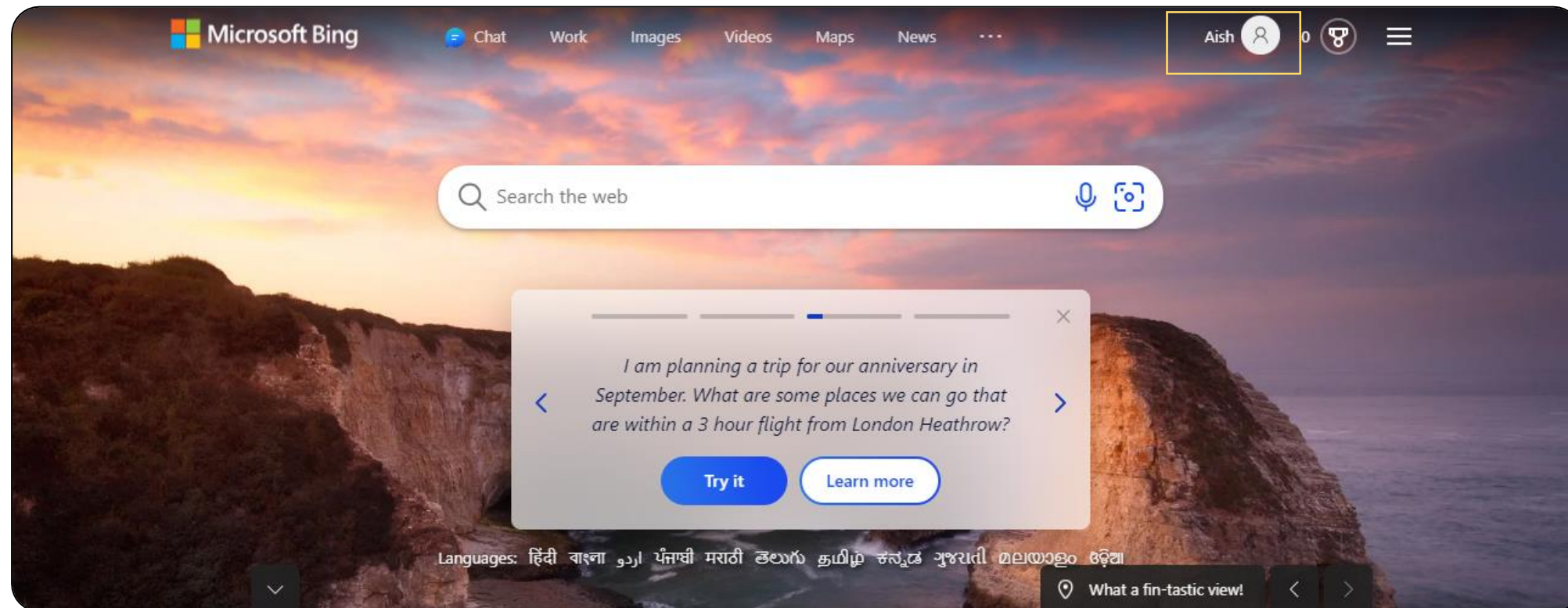
Creating a Bing Account

The Bing login interface will appear as shown below; log in using your personal account, as indicated in the highlighted section.



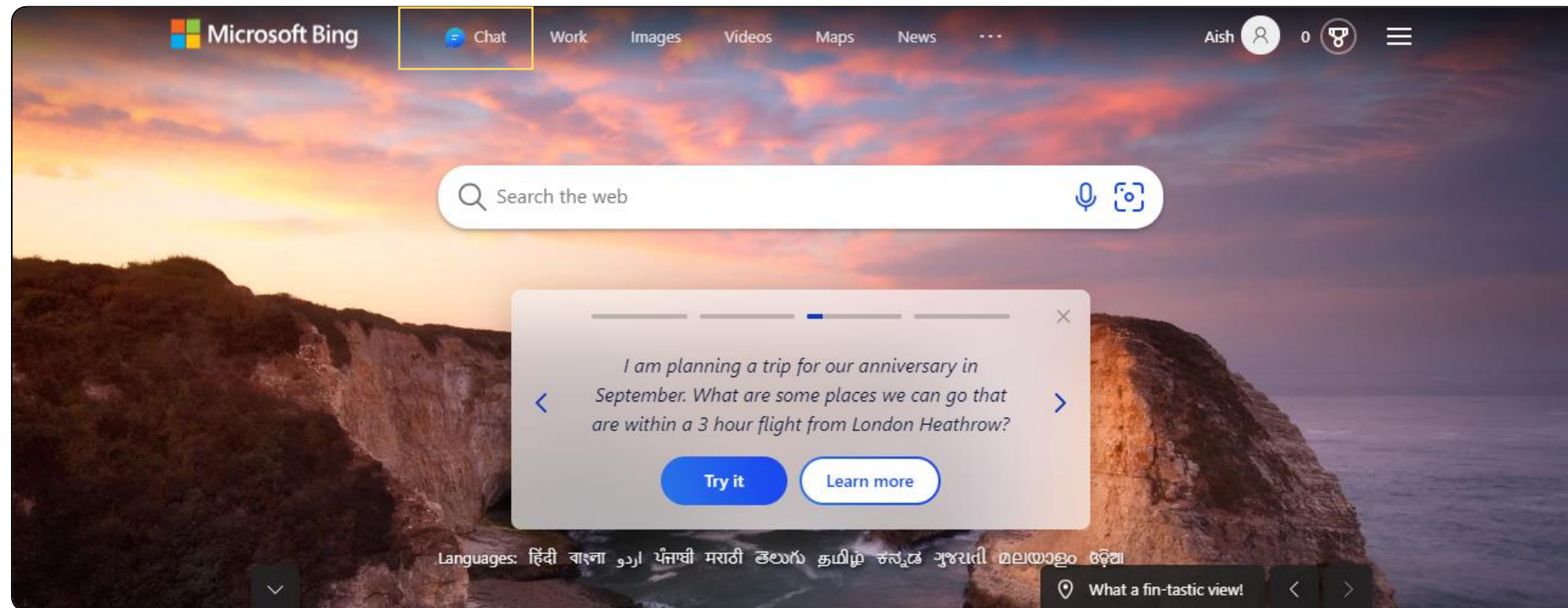
Creating a Bing Account

Follow the registration instructions. Once completed, you'll see your username displayed at the top right corner as highlighted below:



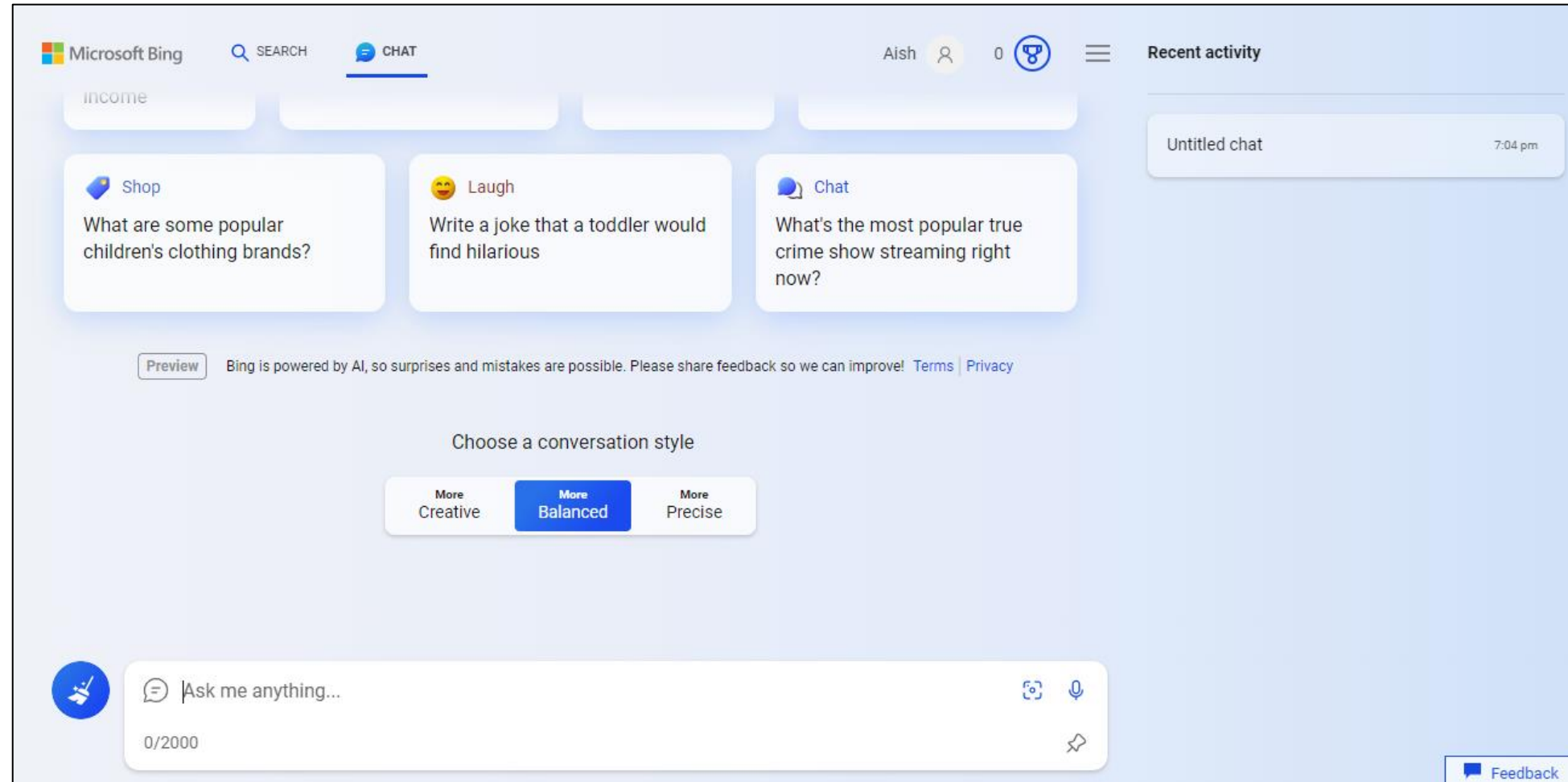
Creating a Bing Account

Select the chat option as pointed below in the image:



Accessing the Bing Interface

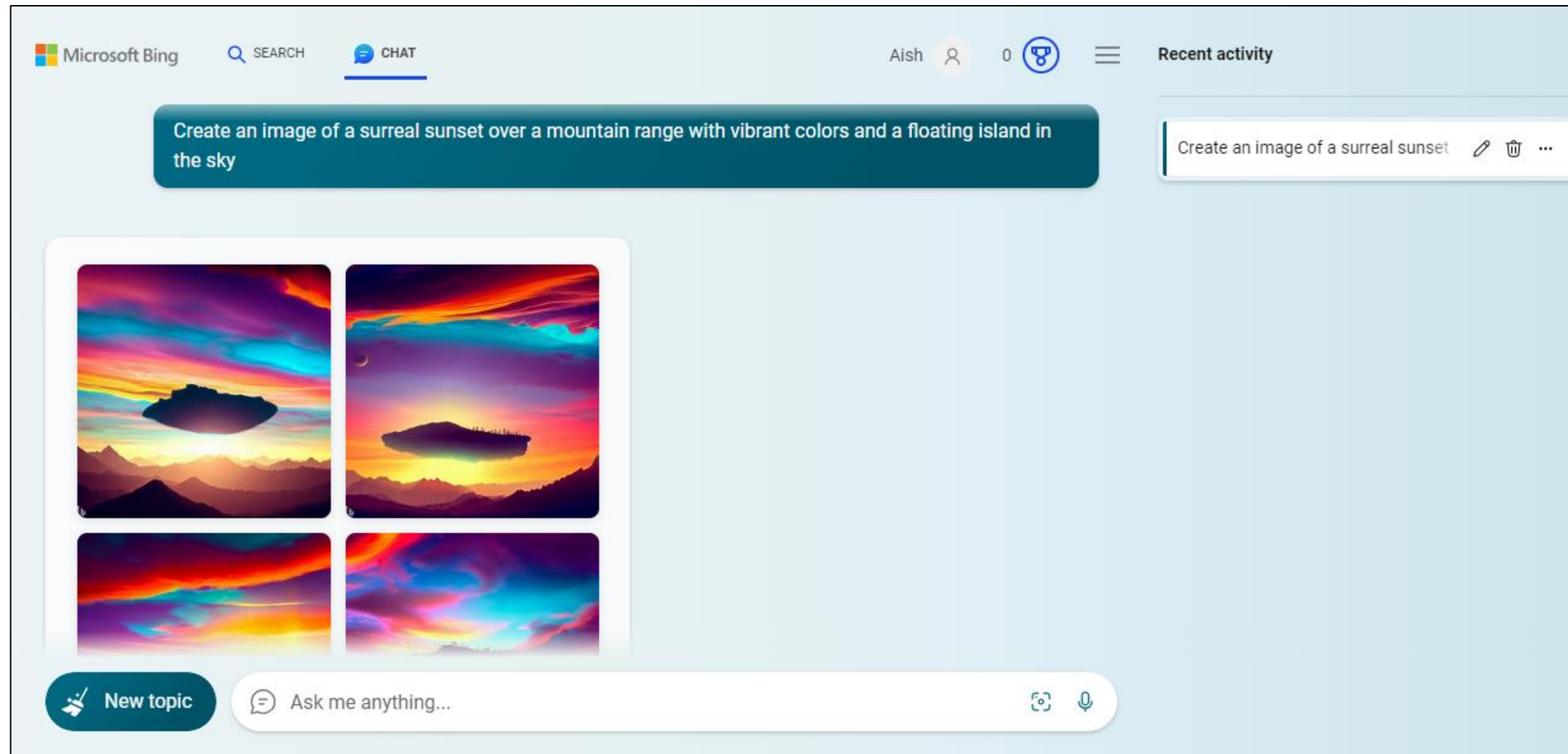
The interface for Bing chat will then be displayed; you can start chatting with it.



Accessing the Bing Interface

Paste the Prompt in the chat:

Create an image of a surreal sunset over a mountain range with vibrant colors and a floating island in the sky



Note: Bing chat is powered by DALL-E, a GenAI tool that converts text to images.



Group Activity

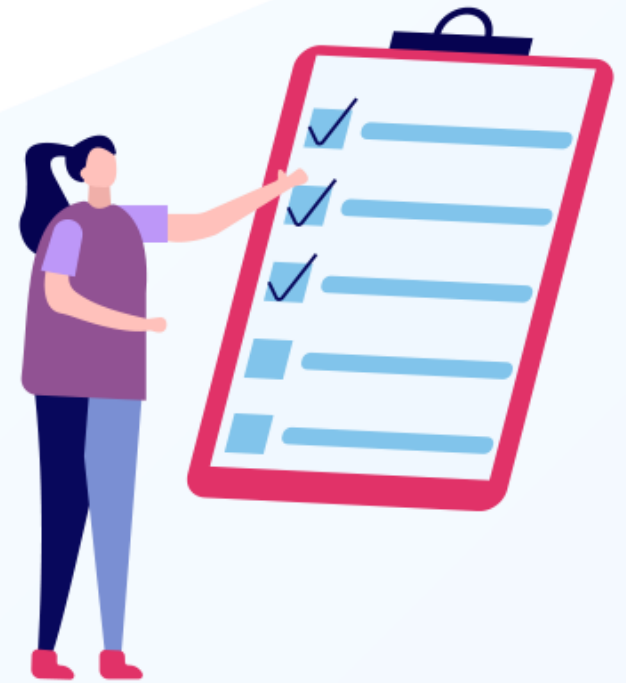
Group Activity: Gladiator Vision Through Bing

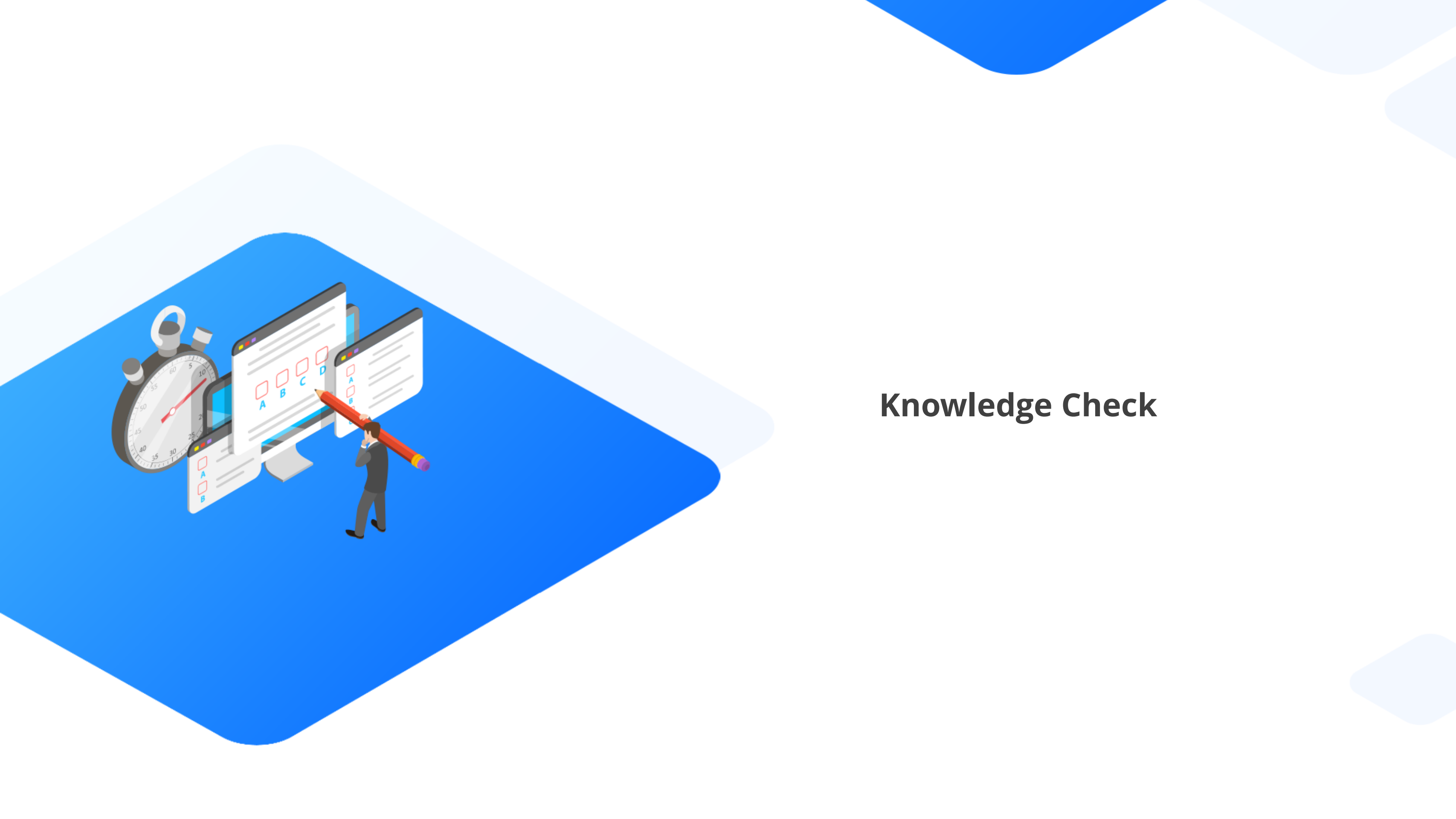
1. Get into your respective breakout rooms.
2. Visualize and discuss your Gladiator's appearance and stance with your group.
3. Draft a Bing prompt that best describes your imagined Gladiator.
4. Use the Bing platform to turn your prompt into an image.
5. Analyze the generated image with your group.
6. Come back to the main Zoom room to present your image and the chosen prompt.
7. Discuss the images in a class and see how each group's Gladiator differs.

Remember: Your aim is to see how your descriptive prompts influence the AI's visual output.

Key Takeaways

- Generative artificial intelligence (GenAI) refers to a category of AI systems that focus on generating new content, such as images, text, music, or other forms of creative output.
- Generative models and discriminative models are two distinct approaches within the field of artificial intelligence.
- Synthesia is a technology company that specializes in artificial intelligence (AI) and synthetic media.
- OpenAI has created several iterations of the Generative Pretrained Transformer (GPT) series, which have proven to be revolutionary in the field of generative AI.





Knowledge Check

Knowledge Check

1

Which of the following defines Generative AI?

- A. An AI model that can only classify and analyze input data without creating any new content
- B. A type of AI that utilizes adversarial networks to classify images
- C. A branch of AI that involves models capable of generating new content or data that is like the input data they were trained on
- D. An AI model that can only analyze and respond to natural language input without creating any new content



Knowledge Check

1

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The correct answer is **C**

Generative AI is a branch of AI that involves models capable of generating new content or data that is similar to the input data they were trained on.

Knowledge Check

2

What is the difference between generative AI and discriminative AI?

- A. Generative AI creates new content, while discriminative AI classifies existing content.
- B. Generative AI is more accurate than discriminative AI.
- C. Generative AI is more efficient than discriminative AI.
- D. All of the above



Knowledge Check

2

What is the difference between generative AI and discriminative AI?

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- B. Generative AI is more accurate than discriminative AI.
- C. Generative AI is more efficient than discriminative AI.
- D. All of the above

The correct answer is **A**

Generative AI creates new content, while discriminative AI classifies existing content.





Thank You!