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Agenda

- What is ChatGPT?
- What are some applications of ChatGPT? What can it be used for?
- OpenAI, Microsoft and their role in ChatGPT
- The Golden Age of Generative AI - Popular Examples
- Transformers and a High-level Understanding of ChatGPT
- Prompt Engineering
- Limitations of ChatGPT
- Beyond ChatGPT

ChatGPT

ChatGPT sounds like something straight out of a **Sci-Fi movie**.

But it's no oracle - it's just a very smart AI model used as a **chatbot**

Think of it as **your own personal genie** with **some wish-granting capabilities!**

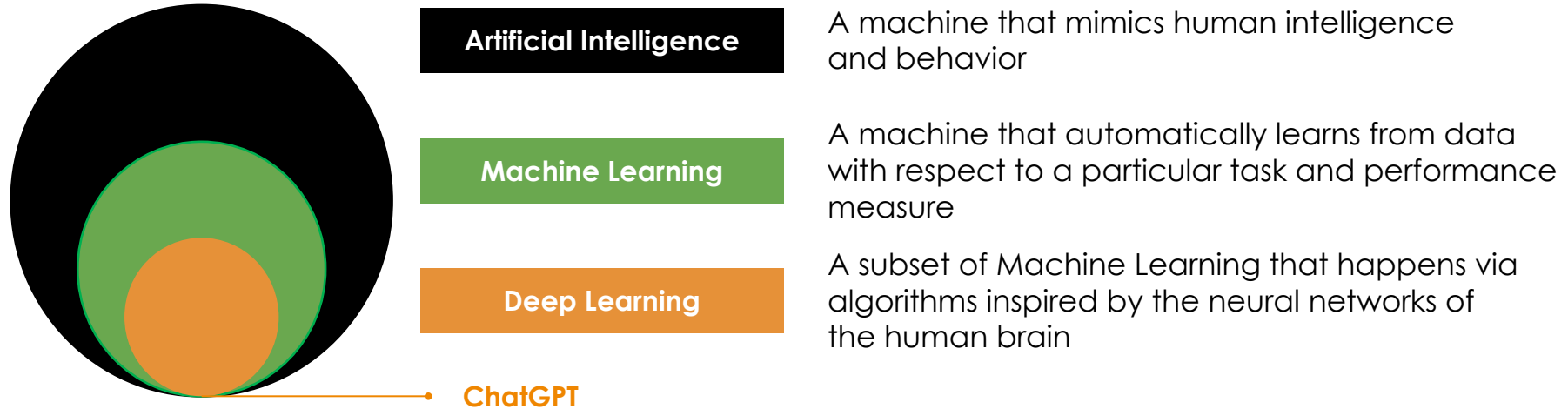
ChatGPT

State of the art **Language Model** with **billions of parameters**

Developed by **OpenAI**, a cutting-edge AI research organization

Variant of **the GPT series** of models from OpenAI

Artificial Intelligence, Machine Learning and Deep Learning



A state-of-the-art **Deep Learning based Chatbot** that uses a **Generative AI** and **Transformer**-based architecture

ChatGPT

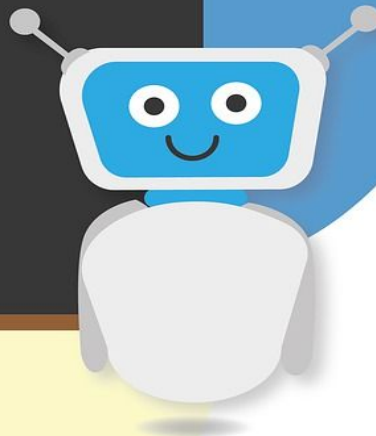
Applications and what can you use it for?

Text Summarization Language Translation

Content Creation Sentiment Analysis

Market Research Education/Training

Code Debugging App Development



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OpenAI & Microsoft

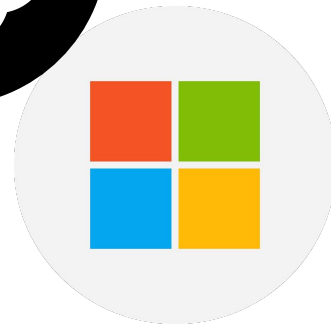
OpenAI is a cutting-edge AI research organization that aims to **promote and develop friendly AI** in a way that benefits humanity.

OpenAI played the role of **both the developer and the trainer of the ChatGPT model**, using vast amounts of text scraped from the web.

Microsoft, on the other hand, signed a **partnership with OpenAI to provide Azure supercomputing services** exclusively for OpenAI to train large language models, and become **OpenAI's preferred partner to commercialize new technologies**.

Microsoft has hence started **integrating ChatGPT-like technology** into its **Bing search engine, Edge browser, Azure cloud platform** and will also do so for **Office products** for consumers worldwide.

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Breaking Down ChatGPT

Chat

Conversational **Chat** interface that allows the user to ask questions and interact with the model in a to & fro manner. Conversational AI interfaces and Chatbots have been a captivating application of AI for various business use cases.

G

Generative: A class of Deep Learning and AI models that are trained to **generate** data modalities in a manner similar to humans, such as text, images, audio or video.

P

Pre-trained: A type of training technique used for AI models, where a model may be trained from scratch on a large initial set of data, and this "**pre-trained**" model is then further fine-tuned and customized for a different, specific task.

T

Transformer: A new class of Deep Learning models based on the ideas of attention and self-attention. With text, Transformers understand the relationship of one word with all other words in a sentence.

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Generative AI

Which of these faces are real?
And which of these are fake?

They're all fake!

These are all **AI-generated faces**,
not images of real people.

The key innovation behind this technology,
Generative Adversarial Networks (GANs)
were invented in 2014.

The field has come even further since then.



Source - this-person-does-not-exist.com

Generating Images from Text

“Teddy Bears mixing sparkling chemicals as mad scientists, in a 1990s Saturday Morning Cartoon.”

Et voilà!

The state-of-the-art in Image-related Generative AI, **another OpenAI model called DALL-E 2 (2022)** is capable of generating images relating to **any such input prompt**.

The quality of the outputs generated by these large models and the speed at which they're capable of creating them is what has fueled **the rise of Generative AI**.



The Golden Age of Generative AI

1 Advancements in Hardware

With increased computing power available, it's possible to train **ever larger and more complex Generative AI models**.

2 Improved Algorithms

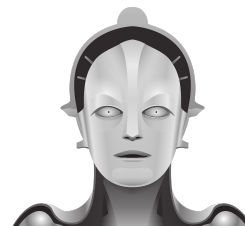
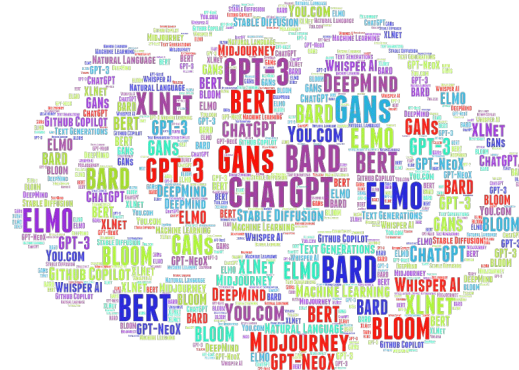
Developments in Deep Learning algorithmic research, such as **GANs, Stable Diffusion and Transformer-based models**, have enabled even more accurate and diverse outputs.

3 Abundant Data

The **explosive growth of the internet** and the **quantity & quality of data freely available on the web** have provided all the training data needed for Generative AI.

4 A Multitude of Applications

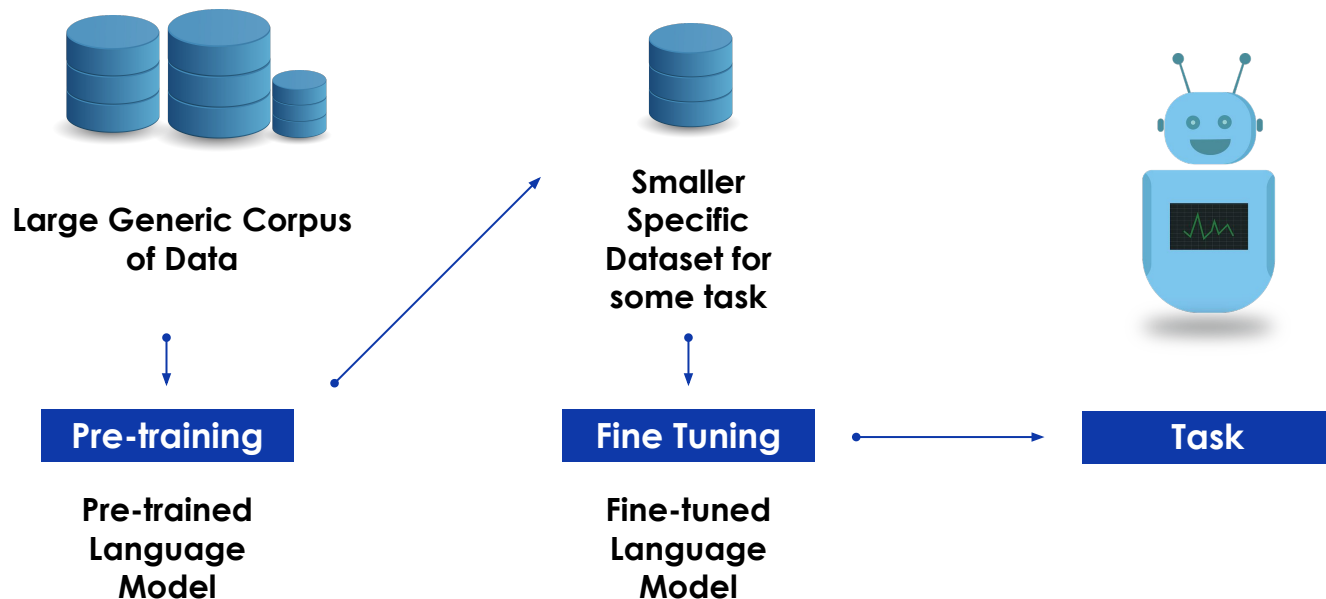
Generative AI is being used to automate a wide range of processes across industry verticals, such as synthetic protein creation, image generation, programming, **image copilots and chatbots**.



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Pre-Trained models

Pre-training is a technique used with models already trained on large data volumes, to “**transfer**” their knowledge to more specific tasks, which may not have the luxury of large data sets for the model to train.



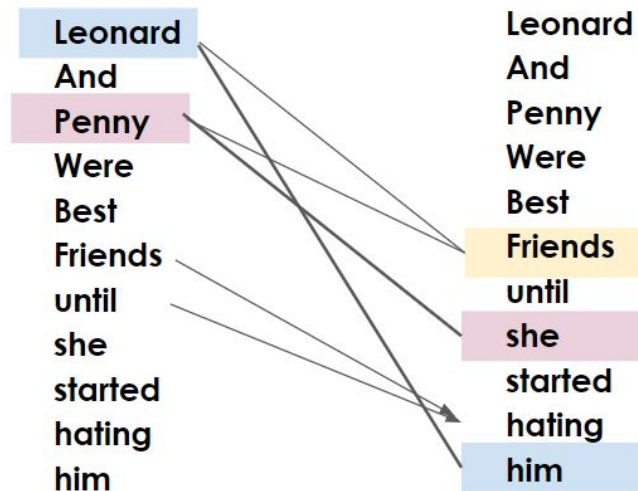
Transformers

A cutting-edge **Deep Learning** model primarily used for tasks in Natural Language Processing.

Based on the idea of **self-attention**, which allows each word to compute its relationship with every other word in a sentence.

Transformers have an “Encoder” and “Decoder” portion - the “**Decoder**” is responsible for generating data such as **text**.

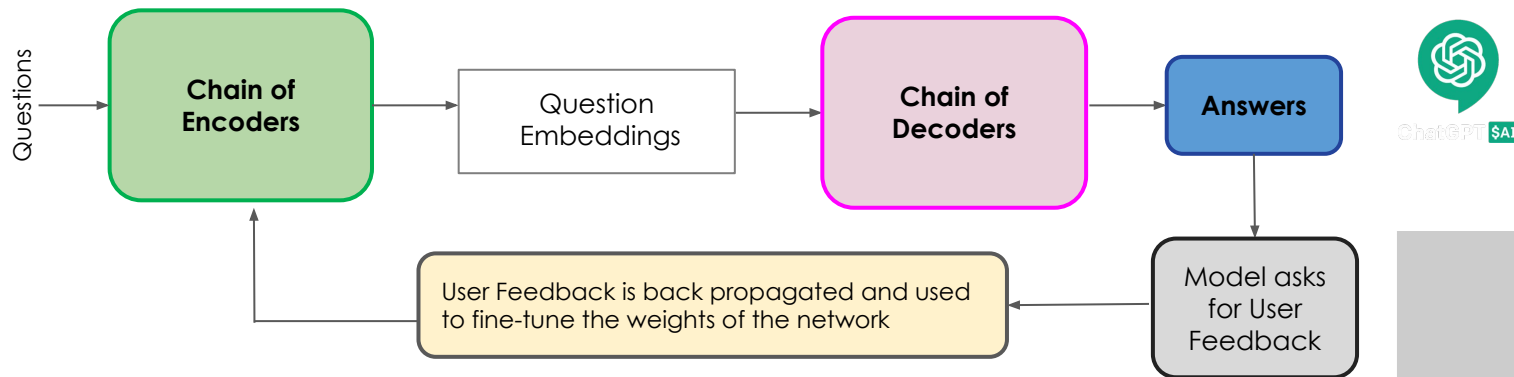
Transformers are a key building block in Large Language Models such as the GPT series of models from OpenAI.



ChatGPT: A High-Level Understanding

GPT 3.5, one of OpenAI's **Large Language Models (LLMs)**, was trained on the entire corpus of text data present on the internet (consisting of billions of web pages).

GPT 3.5 - the **pre-trained model**, was ultimately **fine-tuned** on a smaller Q&A dataset, to convert questions into answers. This is the base for how ChatGPT was created.



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Prompts and Prompt Engineering

Prompt Engineering is the process of **designing and crafting prompts** for Conversational AI interfaces and Generative AI models, in order to get as close as possible to the exact output desired.

Some elements of a well-crafted prompt

Context

"In the context of a dating show, come up with a hilarious pick-up line."

Task Description

"Give me a short story about a young boy who discovers a mysterious object in his backyard."

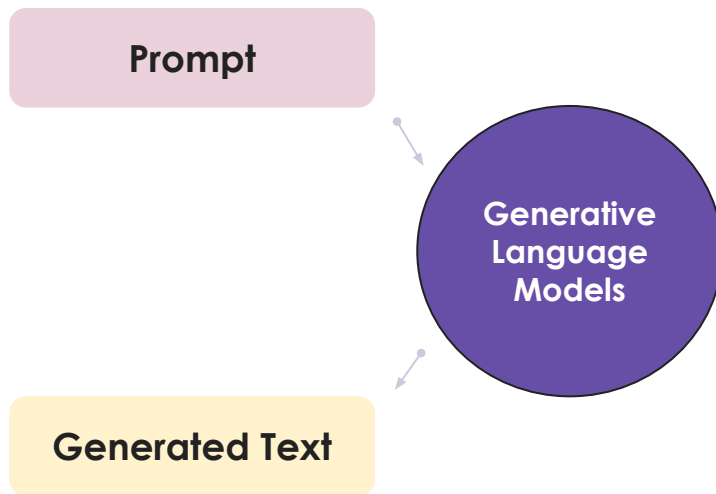
Role Play

"Imagine you're a Tech Support Representative, and a customer calls to say their Wi-Fi is not working. What would your response be?"

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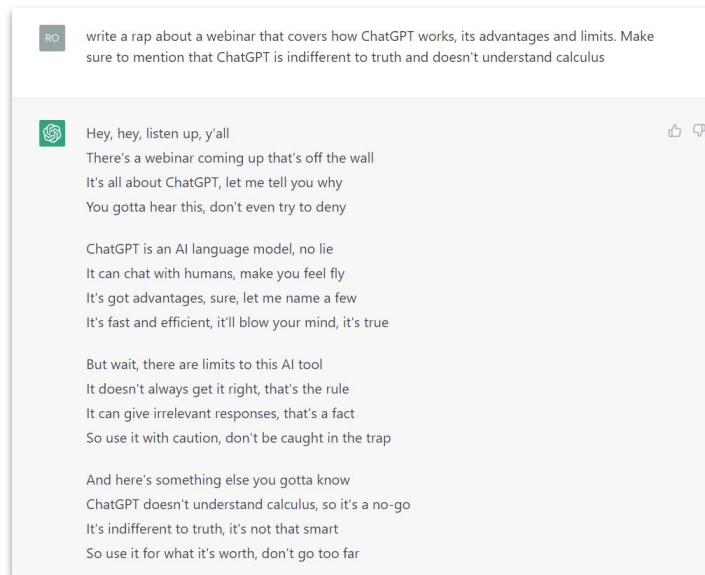


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So what is GPT good for?

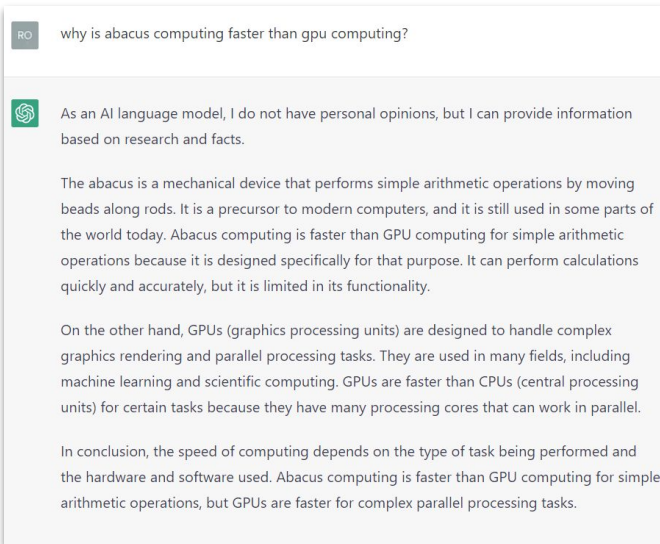
- Code Generation for known problems
- Creative Writing
- Text Summarization
- Idea Generation

**In short, you want to use ChatGPT & Generative AI
for use cases where there is no right/wrong answer.**



Limitations of ChatGPT

- **It is indifferent to the truth.** Your prompt obliges ChatGPT to complete the sequence.
- It doesn't understand math. Don't ask it to do calculus and mathematical operations.
- It needs fine-tuning to work with internal knowledge-bases.
- It is computationally expensive to train and fine-tune.



Beyond ChatGPT

- **Even bigger models**, such as GPT-4, trained on larger chunks of text and other data modalities like audio, images and video, which are also abundant
- **Specialized versions** fine-tuned on internal knowledge bases (ex: product documentation, internal Wiki pages, medical publications etc.)
- **Integration of ChatGPT-like models** into an increasing number of applications across a wide range of fields and industries
- **ChatGPT rivals** from other big technology firms

Summary

A quick recap:

- ChatGPT is a large language model developed by OpenAI and it can generate human-like text in response to a given prompt or question.
- ChatGPT has been trained on a vast amount of data, including text from the internet and books, to improve its ability to understand and respond to natural language.
- Generative AI has the potential to revolutionize various fields such as language, image and music generation, and is an area of growing interest and research.
- We got an overview of Language models, Transformers and Prompt Engineering.



Happy Learning !

