



Collaborate With AIs

Introduction to Prompt Engineering for {Learning, Writing, Coding, and Designing} with AIs



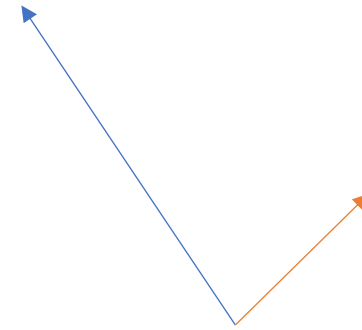
Language Model (LM)

Model that predicts next token

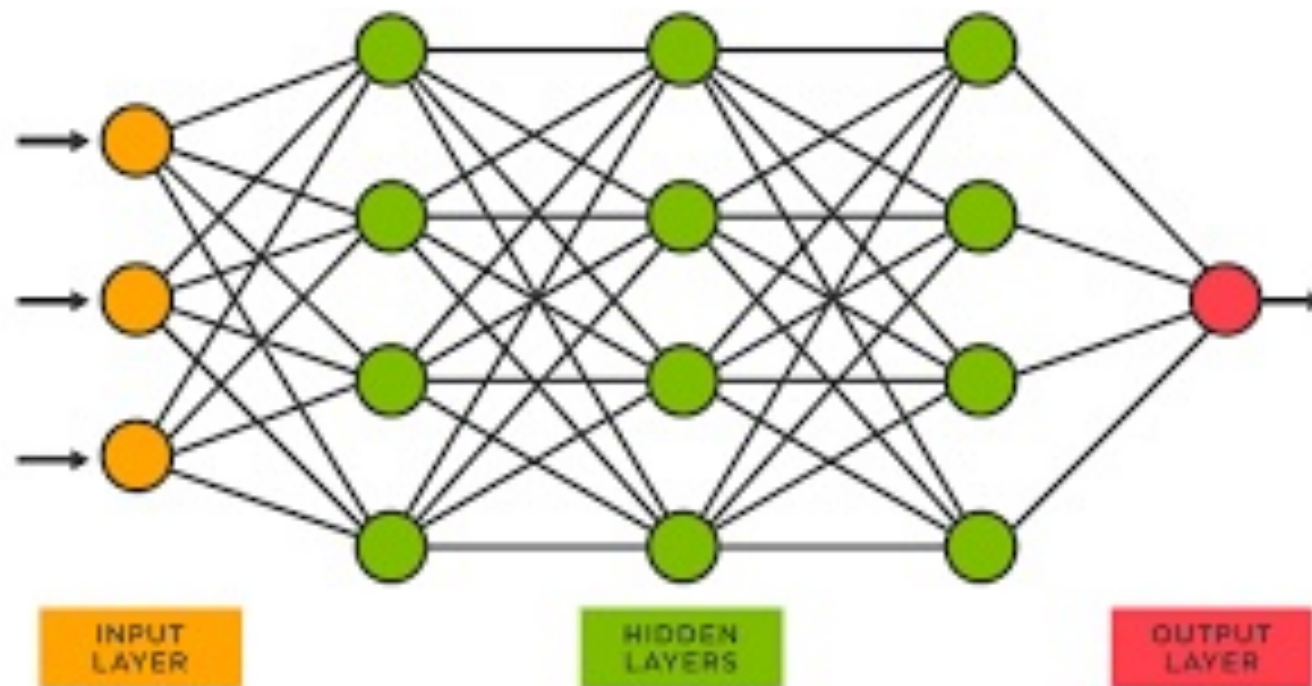
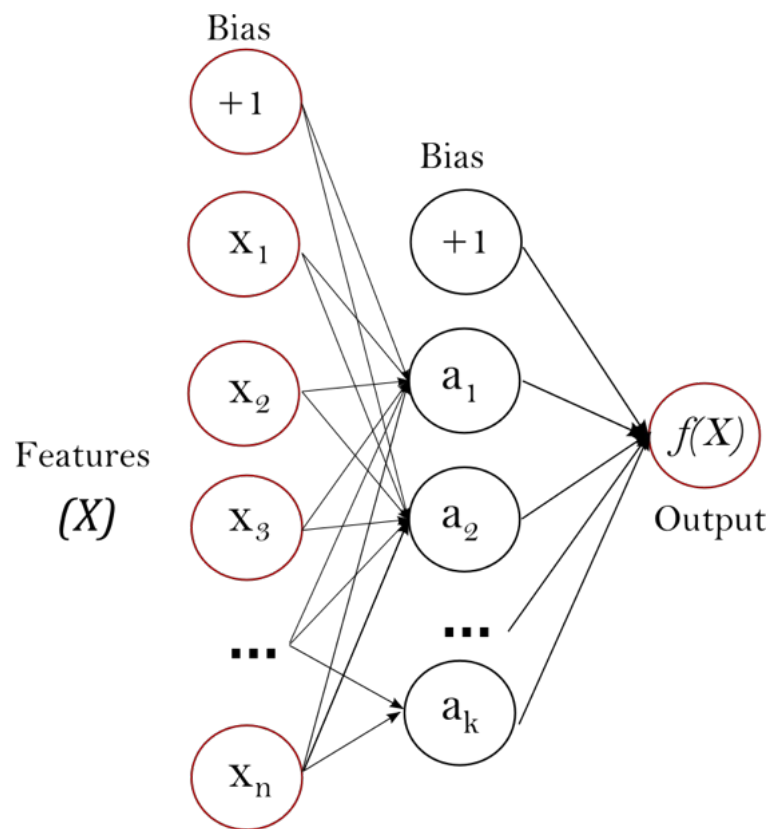
Token: Word/Subword \Rightarrow Number: Vector

Word/Subword \rightarrow Embedding/Token

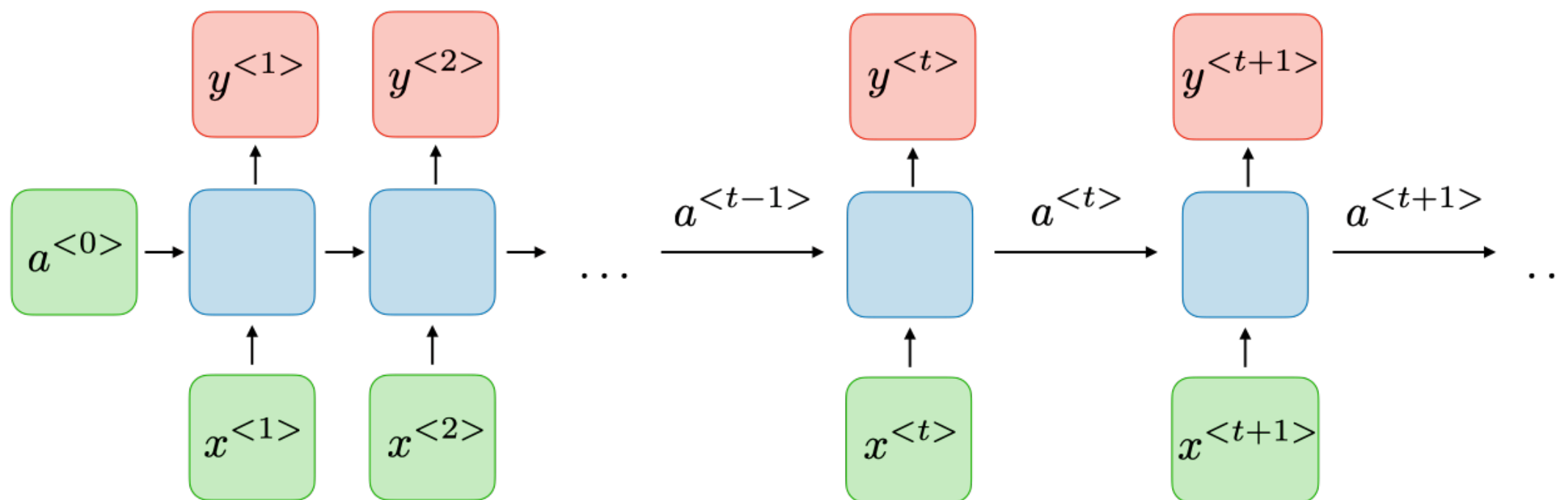
Model = Function \rightarrow Computable: work with Number



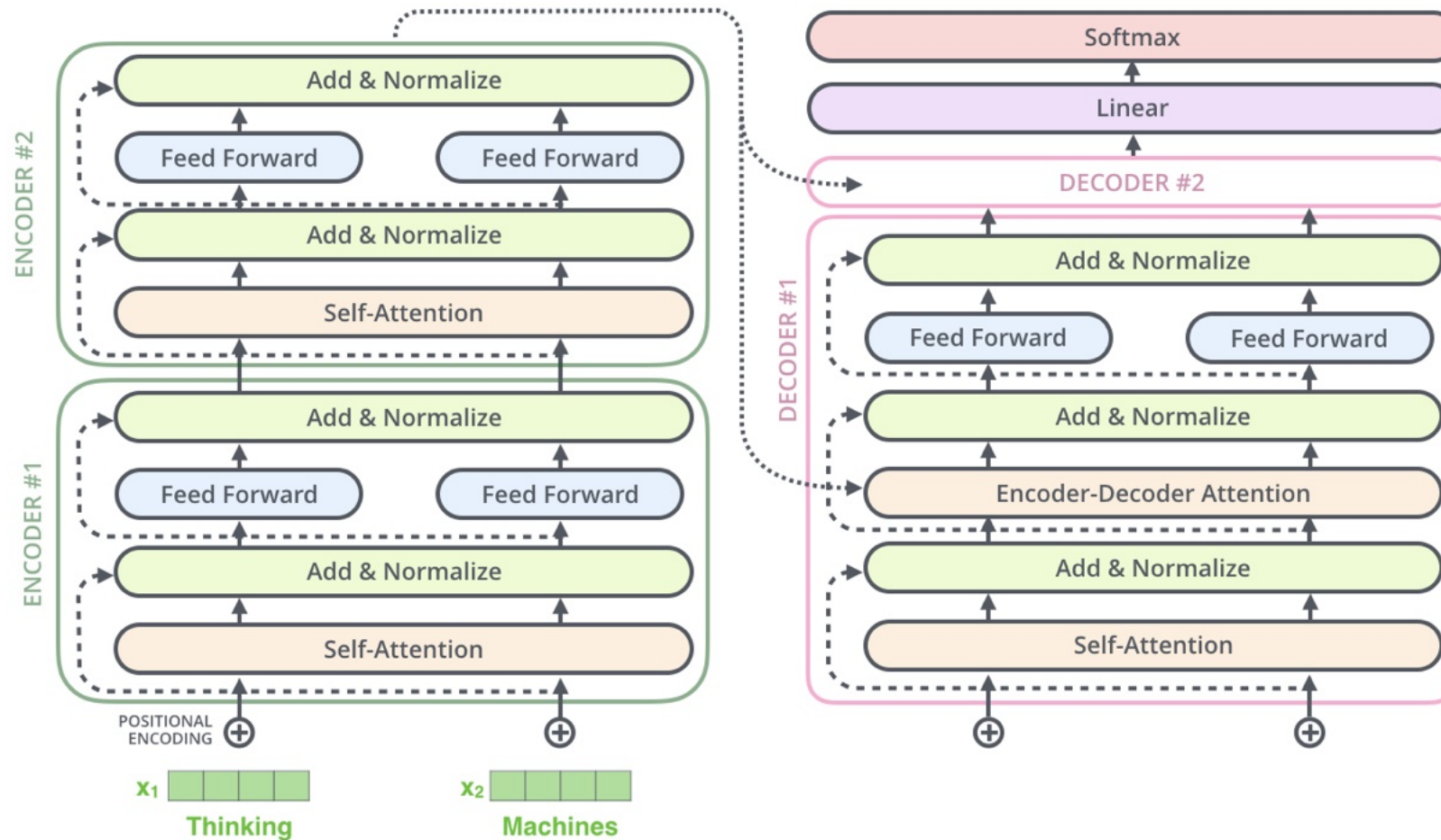
Neural Network



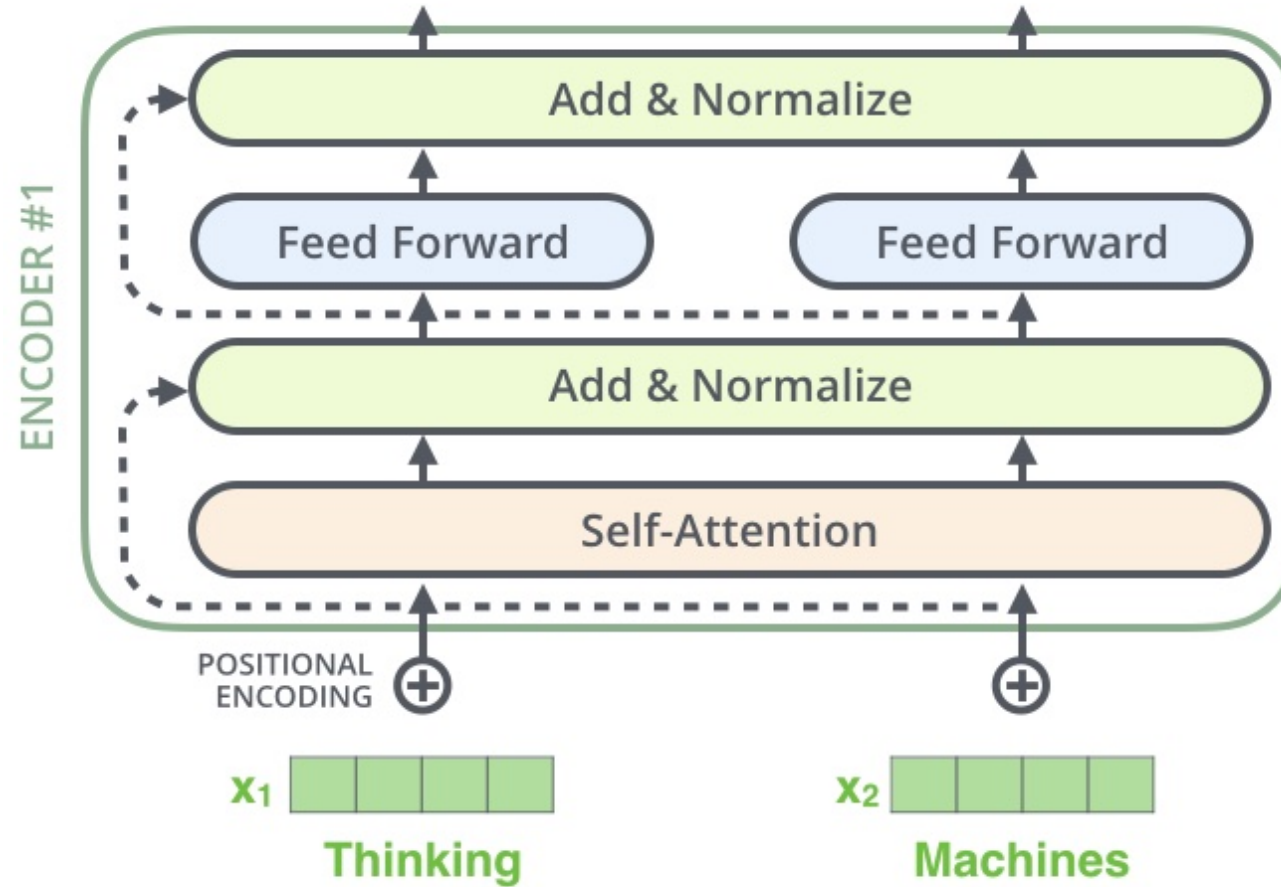
Long Time Ago: RNN



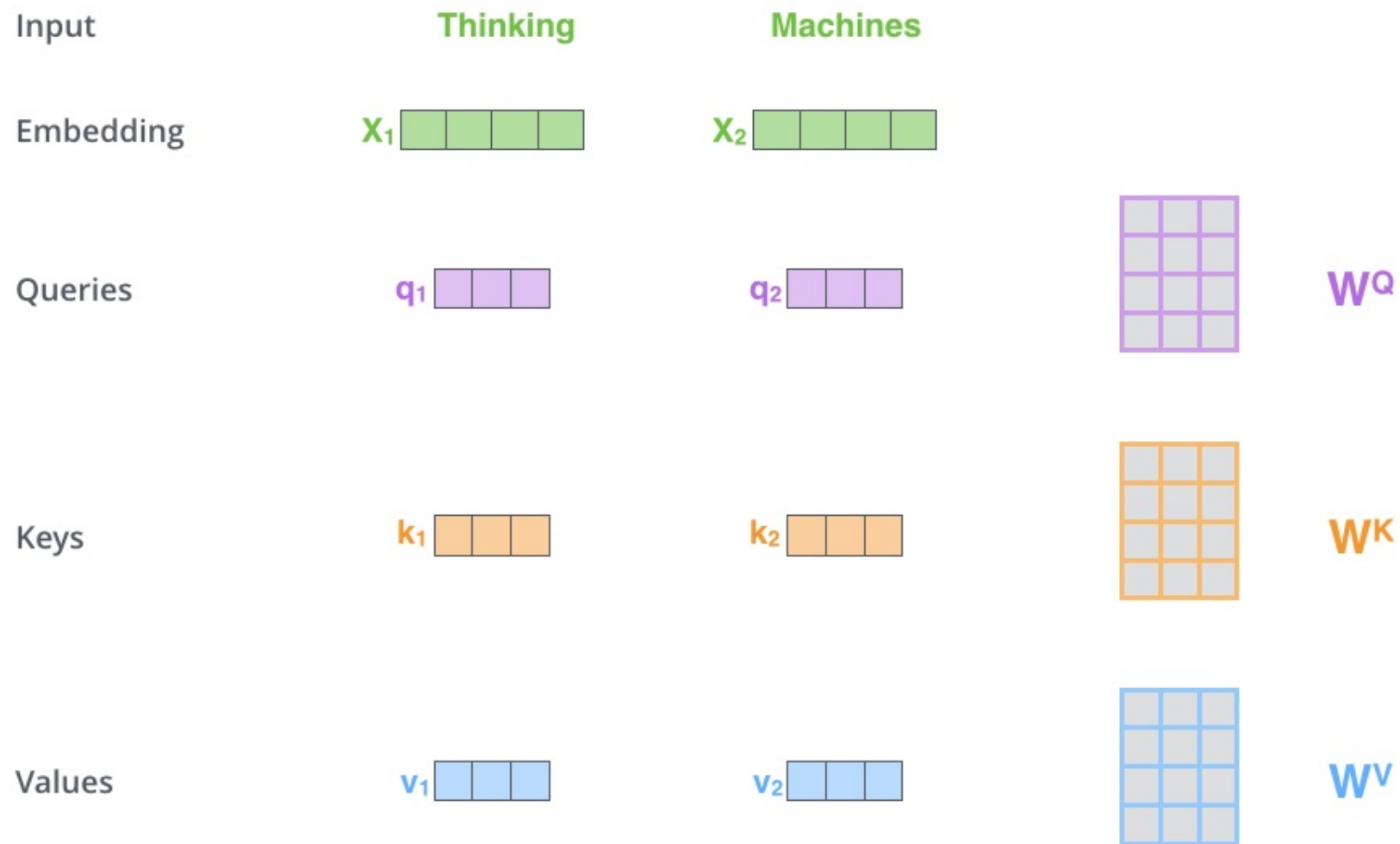
Transformer: Encoder + Decoder



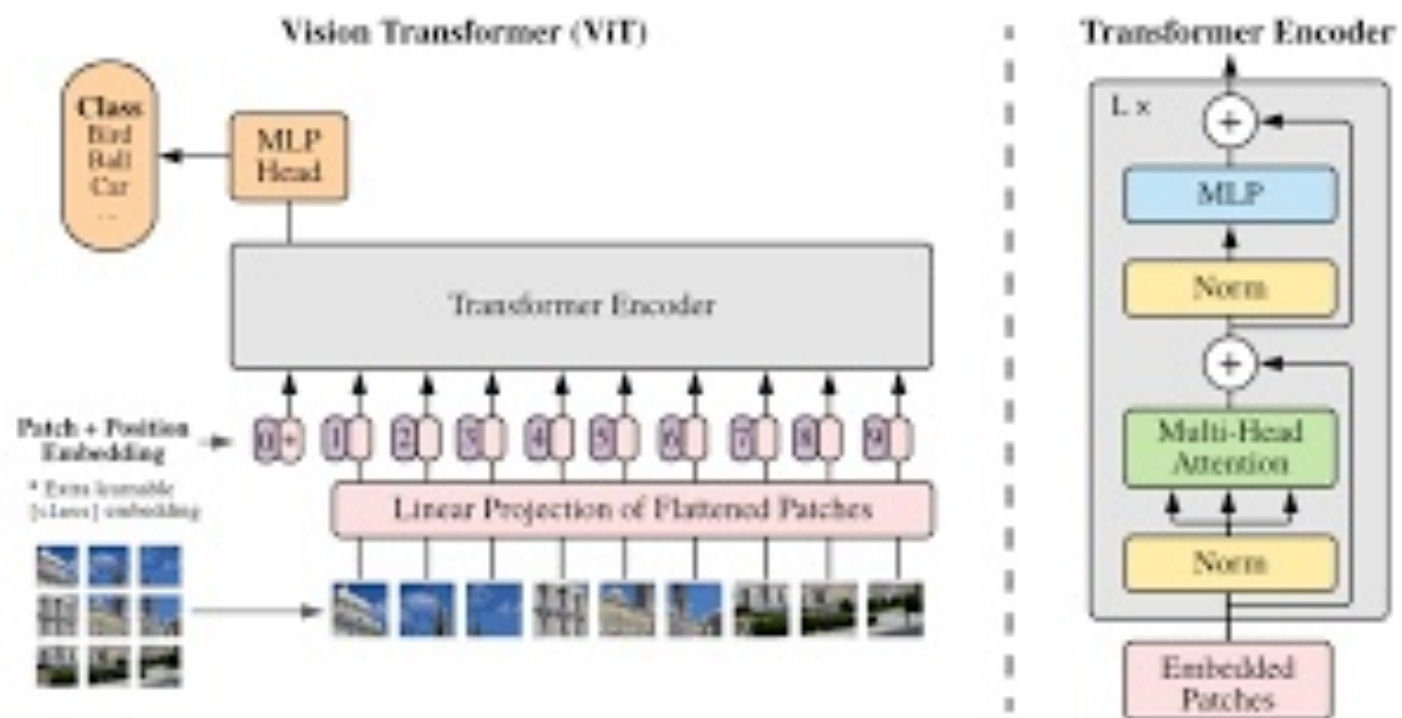
Transformer



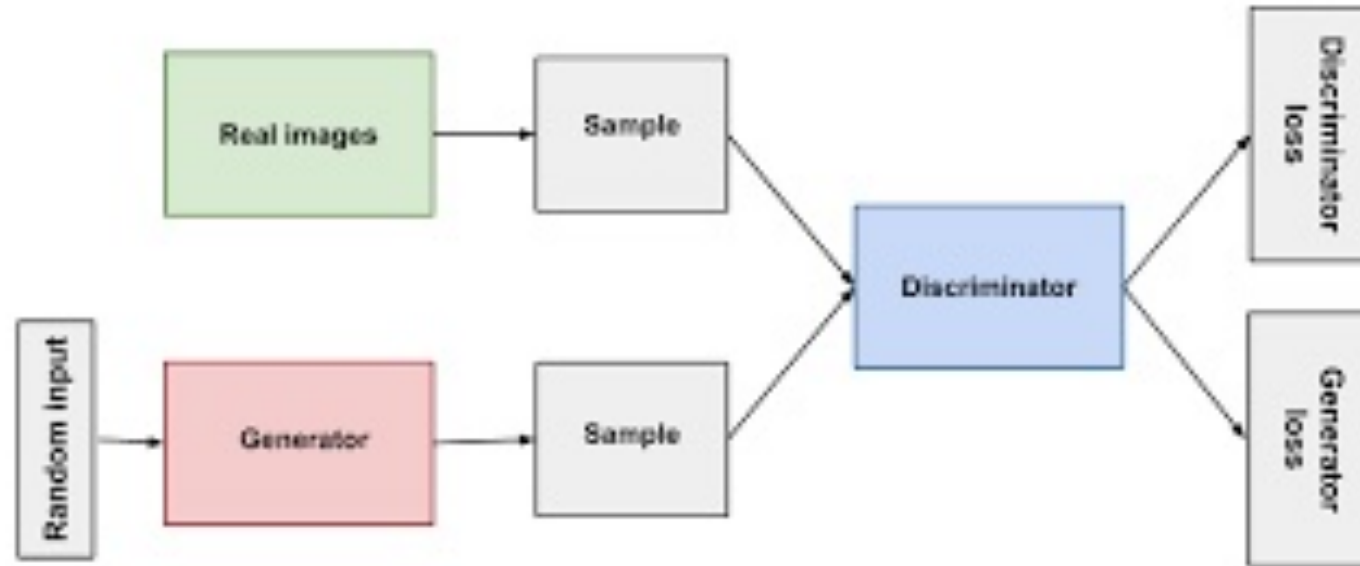
Intuition: Query Key Value



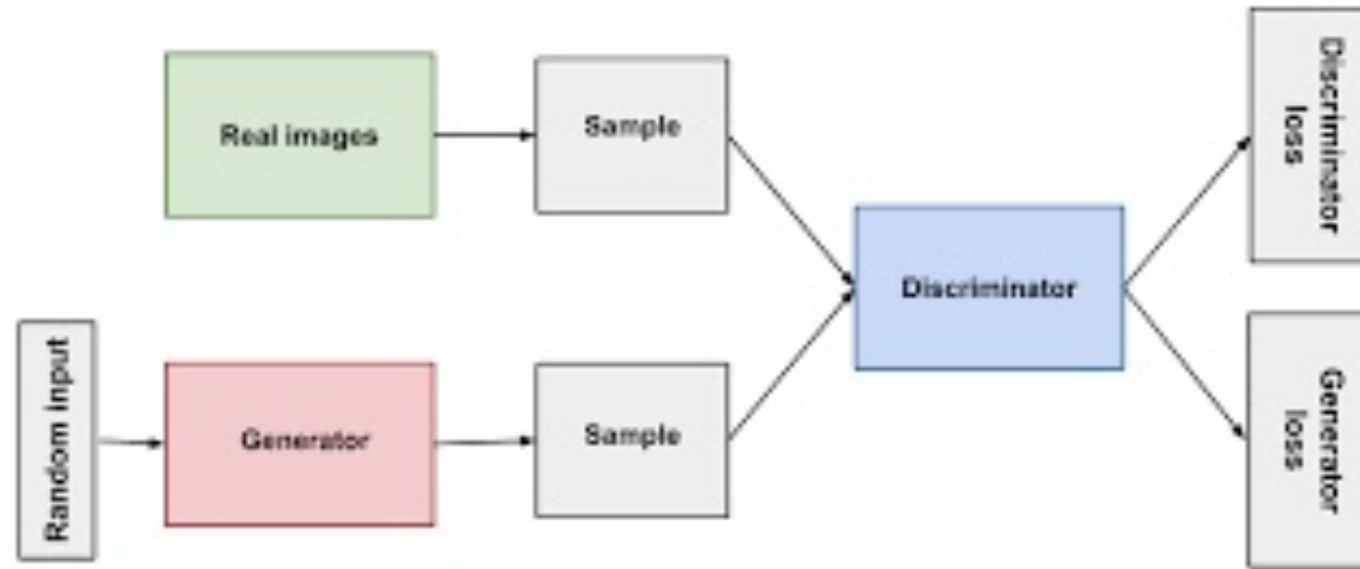
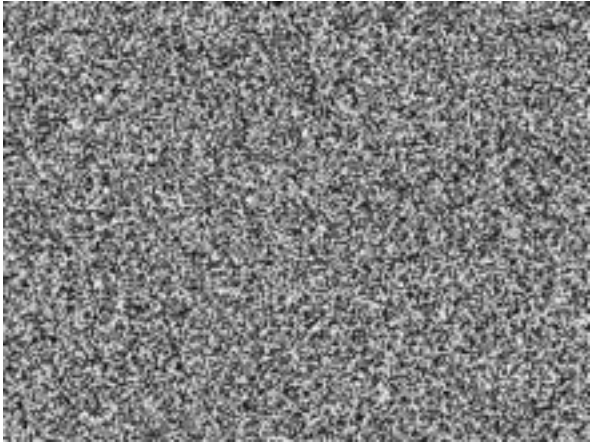
Line 1: Other modalities



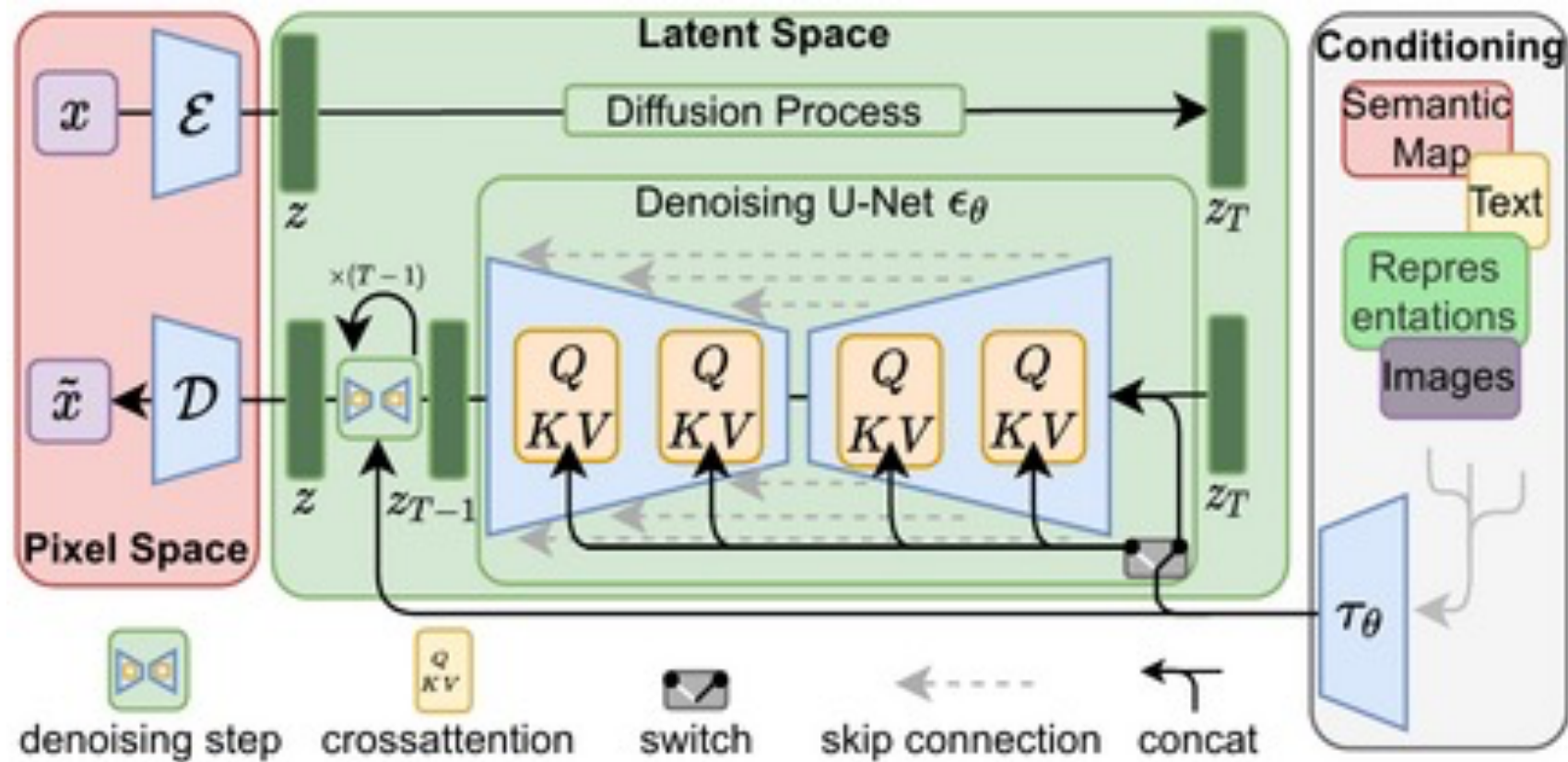
Aside: Image Generation



Aside: CGAN

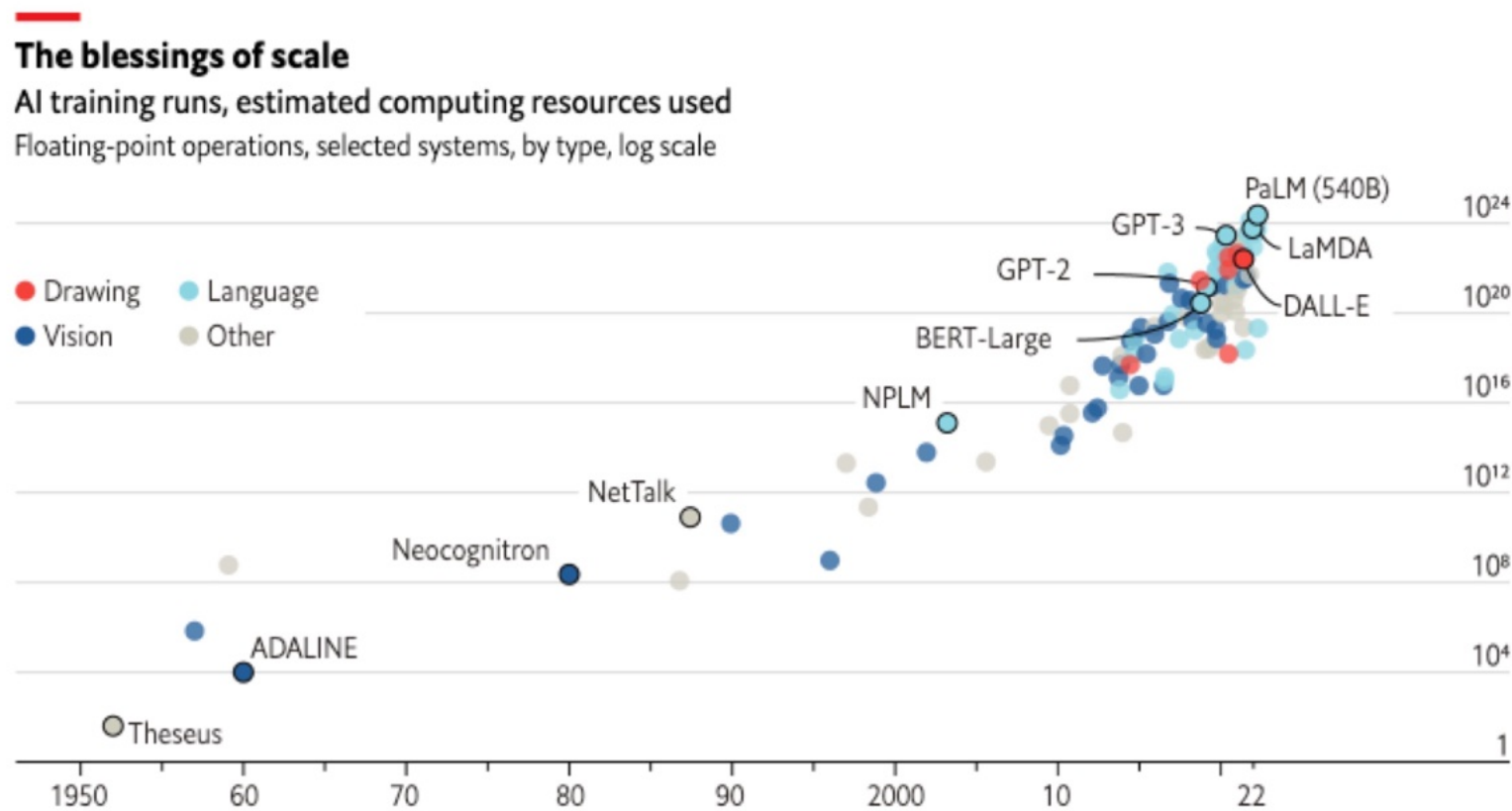


Stable Diffusion



Line 2: Scaling Law

More data to the model -> Model must be bigger



Sources: "Compute trends across three eras of machine learning", by J. Sevilla et al., arXiv, 2022; Our World in Data

Large Language Model (LLMs)

Emergent Abilities

- In-context learning -> perform unseen tasks during inferencing

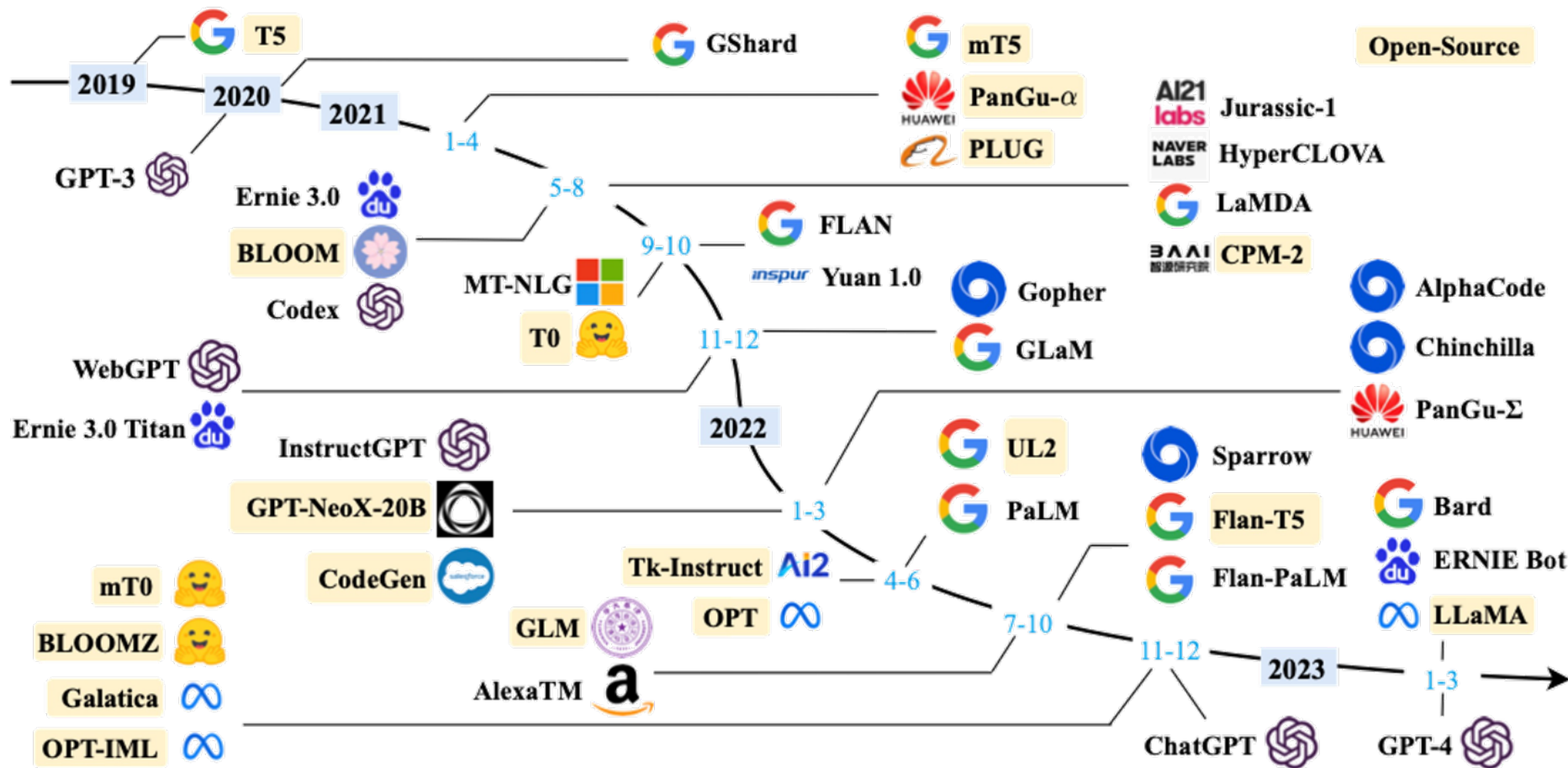
650 tasks

500M parameters+

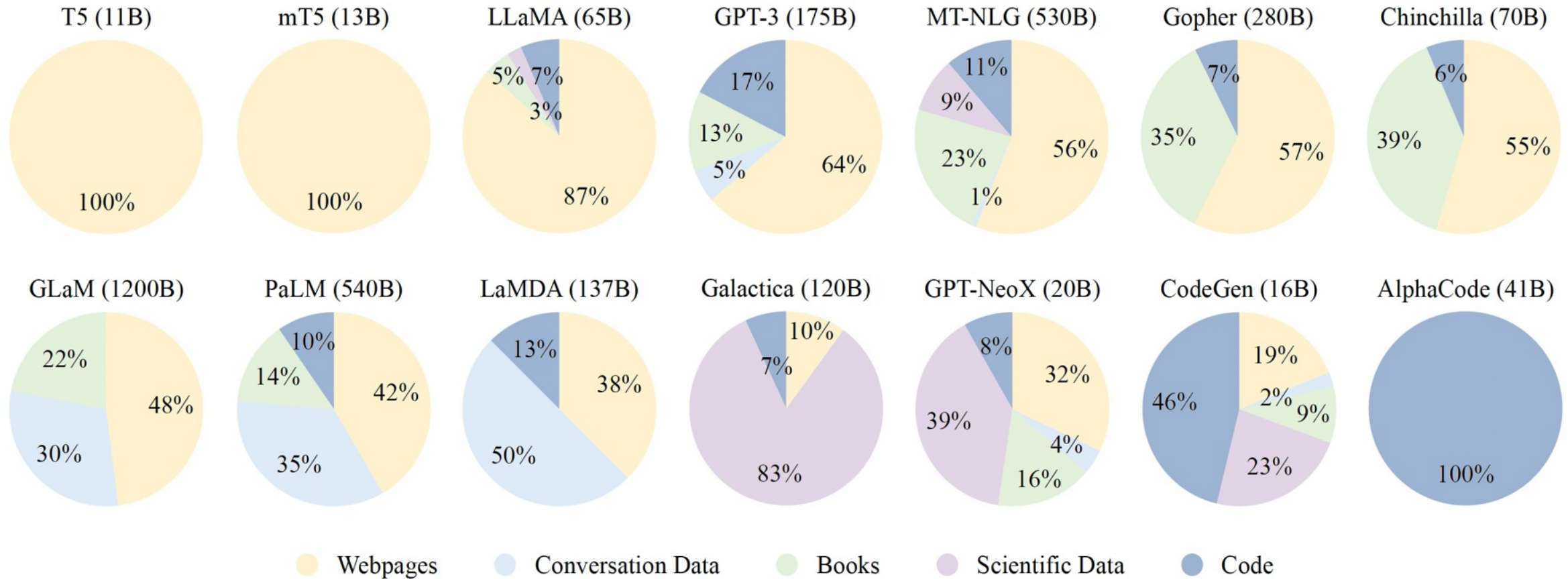
PaLM 540B paramters

GPT-3.5 175B parameters

We Are In The Age of AIs Boom



Every LLM is different!



Model Card

Prompt Engineering Is A New Google Skills

Prompt Engineering: ways to **interact** with LLMs to get **desired** results

- Giving instruction (zero-shot prompting)
- Role prompting

Learn more: <https://learnprompting.org>

Giving Instructions: General Tips

- Write **clear** instructions
- Be **explicit** about the desired output (*in some cases*)
- Explicitly state what is **not desired**
- Give more **context!**
- Begin with **verb**
- **Try a lot!** Even a small change can have a big impact

Example: ChatGPT

Generate an email to a Professor to let him know that I am sick and cannot present in the next week.

Example: ChatGPT

Generate a polite email to a Professor to let him know that I am sick and cannot present in the next week.

Verb | Modifier? | Output | Context

Example: ChatGPT

Subject: Unable to present in next week's class

Dear Professor [Name],

I hope this email finds you well. I am writing to let you know that unfortunately, I am not feeling well and will not be able to present in next week's class as scheduled. I apologize for any inconvenience this may cause and I would like to assure you that I am taking all the necessary measures to recover as soon as possible.

I am disappointed that I will not be able to present my work as planned, but I am confident that my classmates will do an excellent job in my absence. If there are any assignments or materials that I can complete remotely, I would be happy to do so.

I will keep you informed of my recovery and availability to return to class. Thank you for your understanding and support during this time.

Sincerely,

[Your Name]

Give Context via **Role**

Instead of explicitly stating all the context, giving a **role** to a LLM can help a lot

Example: ChatGPT

You are a copywriter for Apple. Write 5 copies for the new iPhone.

Example: ChatGPT

You are a **copywriter for Apple**. Write **5 copies** for the new iPhone.

Role | **Output** | **Context**

Example: ChatGPT

1. The new iPhone is here, and it's better than ever. With its sleek design, advanced camera, and lightning-fast processing speed, it's the perfect phone for anyone who demands the best.
2. Upgrade your life with the new iPhone. With features like Face ID, wireless charging, and a stunning OLED display, it's the ultimate smartphone experience.
3. The new iPhone is more than just a phone. It's a powerful tool for creativity, productivity, and staying connected with the people you care about. Get yours today and discover what's possible.
4. With the new iPhone, you'll never miss a moment. Its cutting-edge camera technology and advanced image processing make it easy to capture stunning photos and videos, no matter where you are.
5. Say hello to the future with the new iPhone. Featuring the latest technology and a stunning design, it's the ultimate smartphone for anyone who wants to stay ahead of the curve. Get yours today and experience the next generation of mobile computing.

Zero-shot Prompting

Few-shot Prompting

Give examples to LLMs

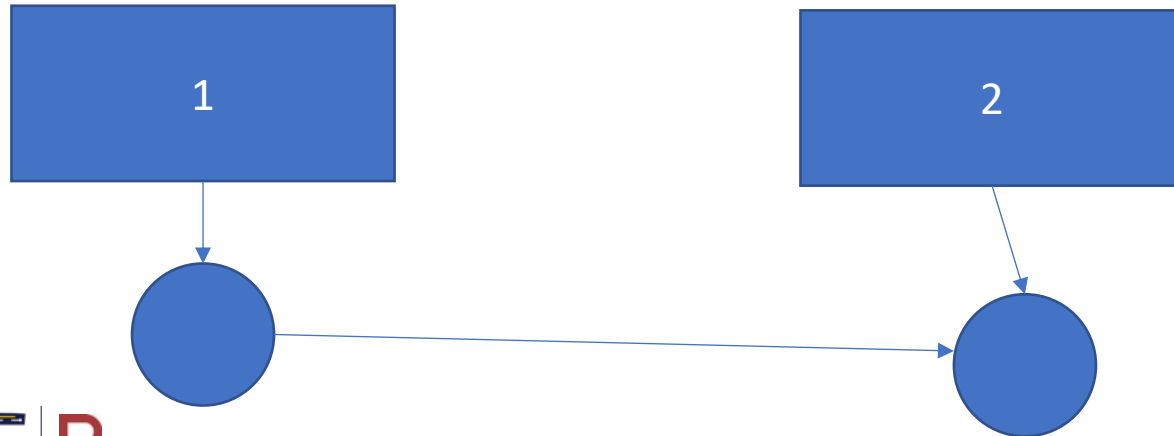
Generated Knowledge Prompting

Chain-of-Thought Prompting

Zero-shot Chain-of-Thought Prompting

Self-consistency

Least to Most Prompting



Priming Prompt

First prompt will influence the rest of the conversation

Applications

Coding

- PoC
- Fixing bugs
- Explain
- Convert to another language

Writing

- Email
- Report
- Blog

Brainstorming

Explain

Quizz

How I Learn With AIs

Typeset.io

Typeset.io: A Companion for Reading Papers

The screenshot displays the Typeset.io web interface. At the top, there's a navigation bar with the SCISPACE logo, a search bar, and a Chrome Extension button. The main content area shows a paper titled "A Generalist Agent" by Scott Reed et al., published in Transactions on Machine Learning Research (11/2022). The abstract describes a multi-modal, multi-task, multi-embodiment generalist policy. Below the abstract is a diagram illustrating the Gato model's architecture, showing a central transformer block connected to various input and output modalities like images, text, and actions. On the right side, a Copilot chat window is open, showing a conversation where the user asks "Explain Abstract of this paper in 2 lines" and the Copilot provides a concise summary. The chat also shows a follow-up question: "How the authors train the model" and another: "What is the model used in the paper".

Alternatives

I acknowledge that ChatGPT API or ChatGPT with plugins and Bing may be able to complete this task as well.

How I Write With AIs

ChatGPT



Common Prompts That I Used

Correct grammatical errors and improve it.

{Text}

Paraphrase the following {sentences, paragraphs}.

{Text}

Suggest alternatives for each [BLANK].

{Text containing [BLANK]s}

How I Code With AIs

GitHub Copilot | ChatGPT

GitHub Copilot: Free for Students!

```
ts sentiments.ts  write_sql.go  parse_expenses.py  addresses.rb

1 #!/usr/bin/env ts-node
2
3 import { fetch } from "fetch-h2";
4
5 / |
6
7
8
9
10
11
12
13
14
15
16
17
```

Common Prompts That I Used

Fix and explain bugs in the following code snippet.

```

{Code}

```

Convert the following {Language#1} code snippet into {Langugue#2}.

```

{Code}

```

How I Design With AIs

Stable Diffusion | Image Creator | DALL-E 2



Stable Diffusion: Hard to Give a Good Results

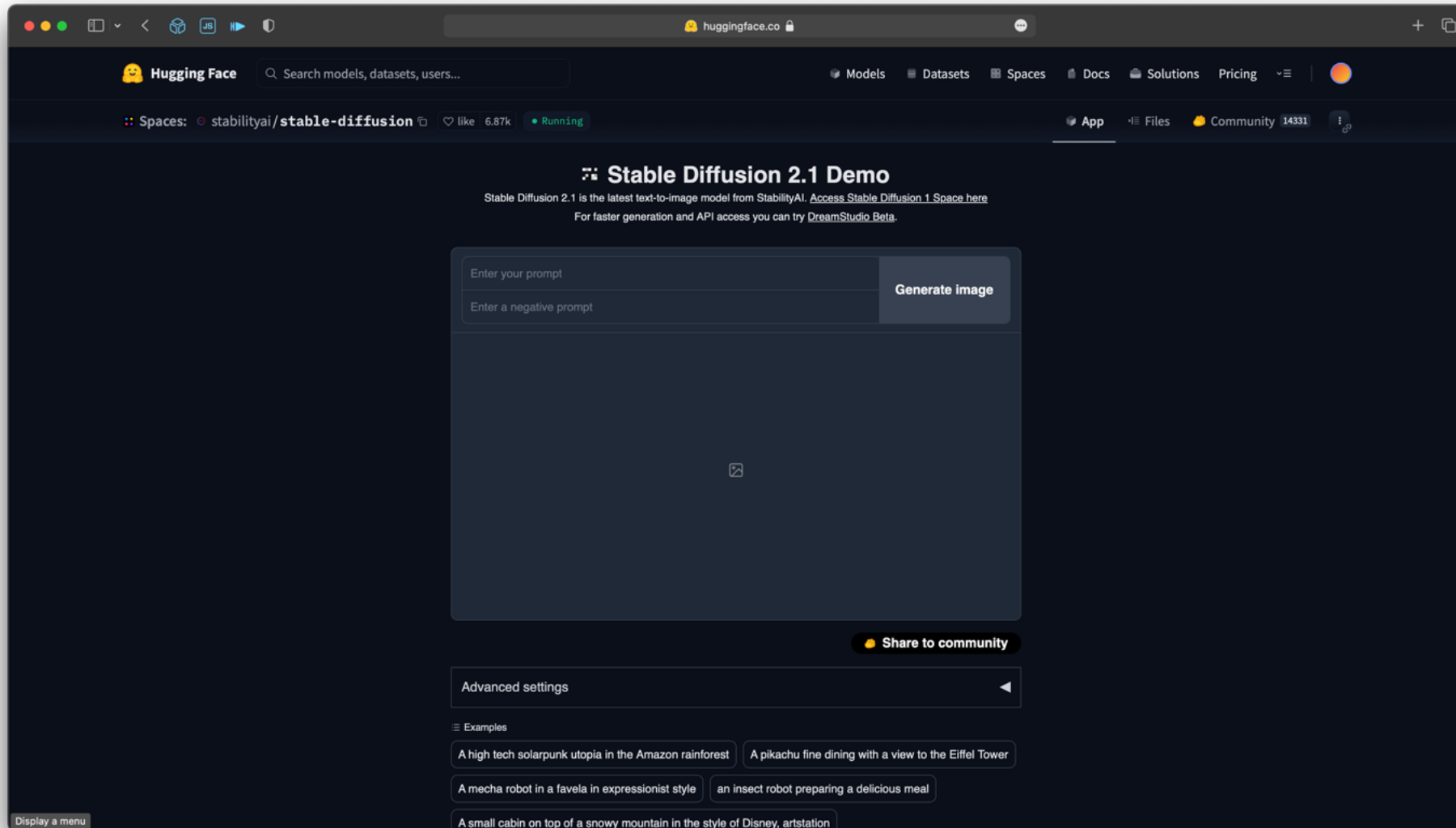
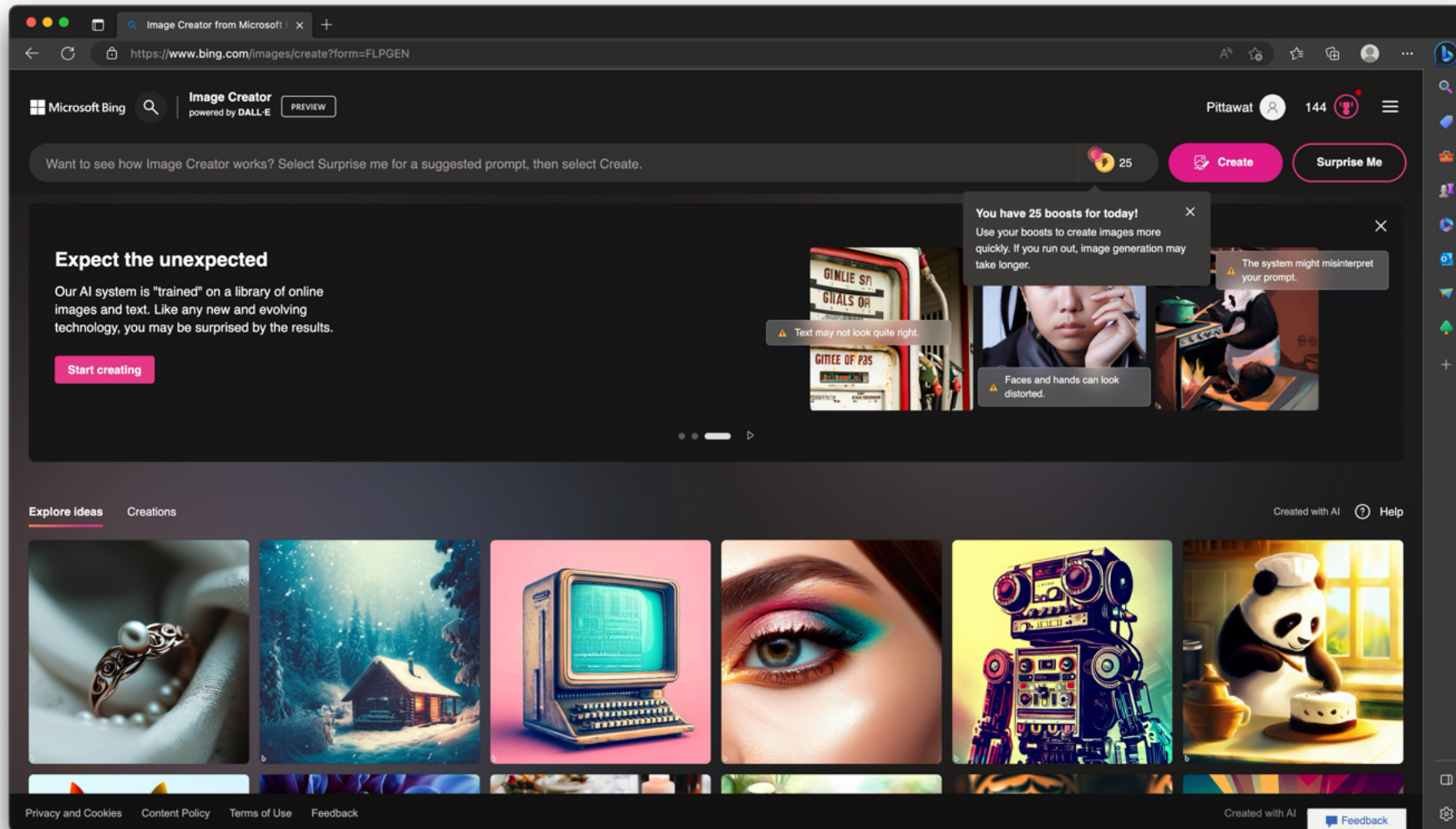
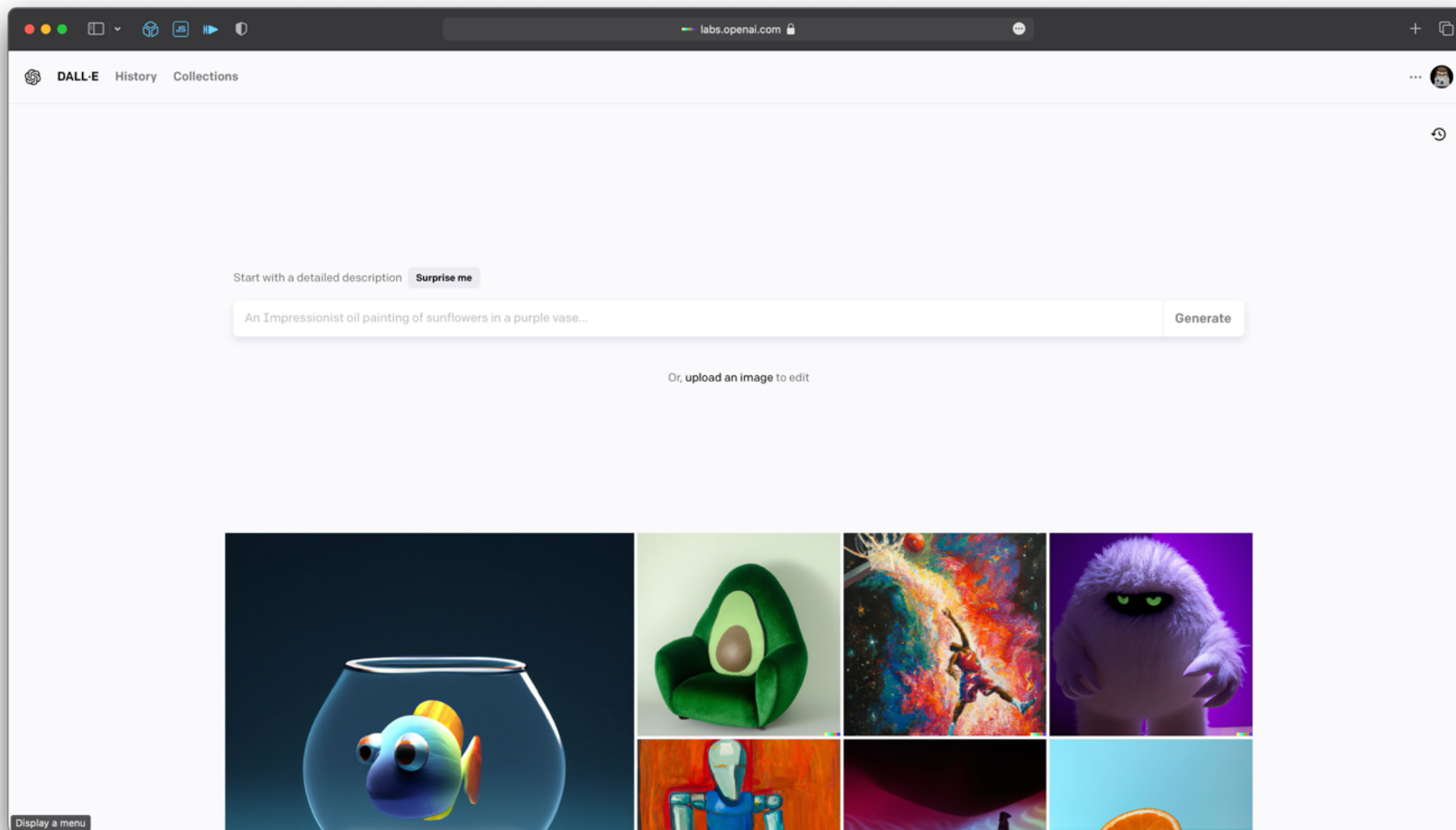


Image Creator (Bing AI)



DALL-E 2: SOTA!?



Example of Prompt and Images

A professional company logo in logotype style with three letters I, C, and E. The logo has a futuristic vibe and represents the objective of the lab about game and artificial intelligence.



Example of Prompt and Images

A professional company logo in logotype style with three letters I, C, and E. The logo has a futuristic vibe and represents the objective of the lab about game and artificial intelligence. **A logo has a part of game controller and the electrical wires.**



Example of Prompt and Images

A professional company logo in logotype style with three letters I, C, and E. **ICE stands for Intelligence Computing Entertainment.** The logo has a futuristic vibe and represents the objective of the lab about game and artificial intelligence. A logo has a part of game controller and the electrical wires. The logo is in blue on a white background.



My Real Workspace on Figma

