

# Introduction

## INTERMEDIATE CHATGPT



Alex Banks  
Founder & Educator

# ChatGPT's explosive growth



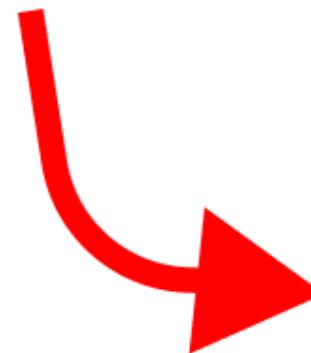
When was ChatGPT released?

 ChatGPT, developed by OpenAI, was initially released as a prototype in November 2022. It quickly gained attention for its conversational abilities and wide-ranging applicability in generating text-based responses.

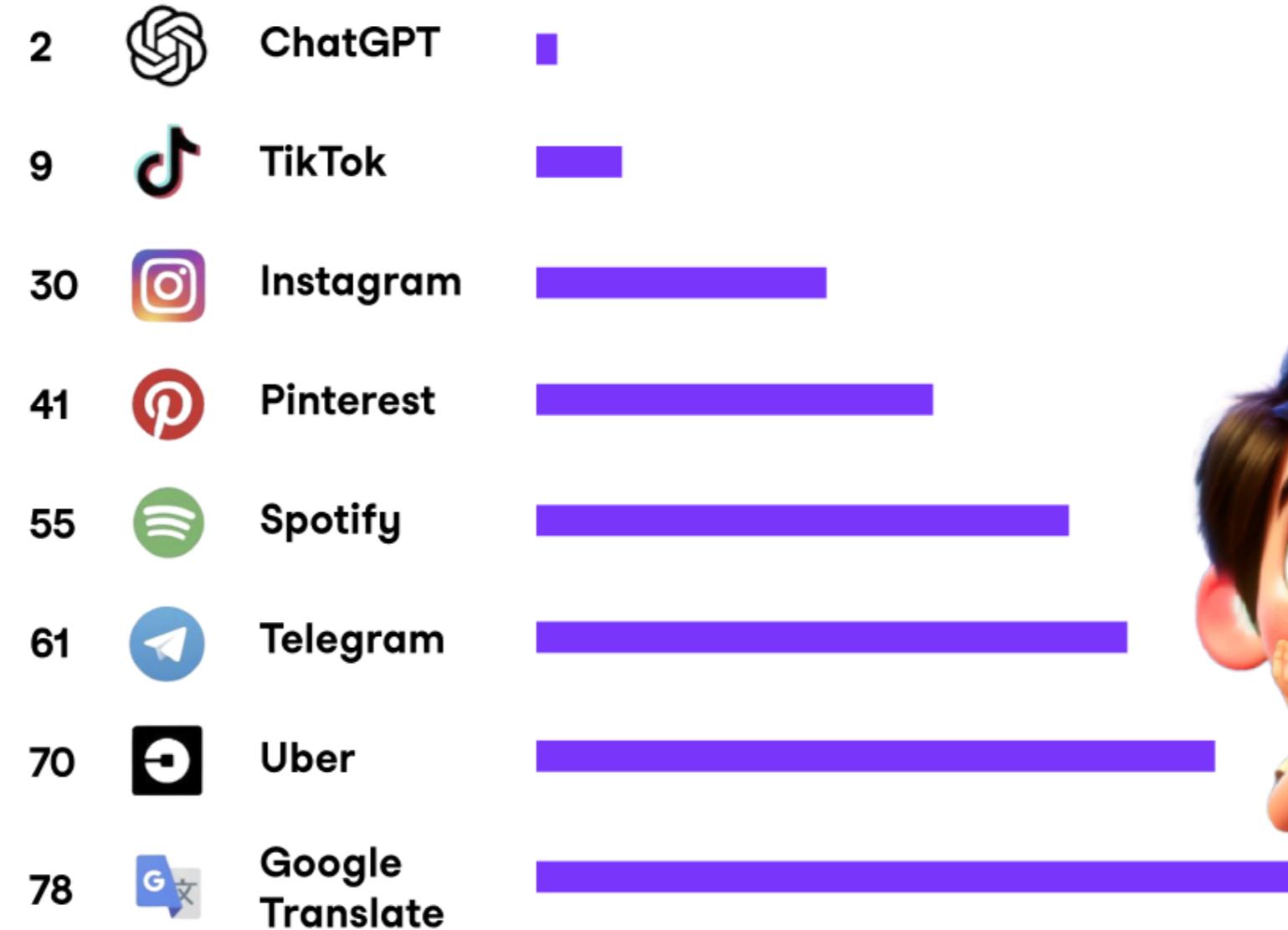
**5 days → 1M users**

<sup>1</sup> Images created using DALLE-3

# ChatGPT's explosive growth



Months to hit 100M users



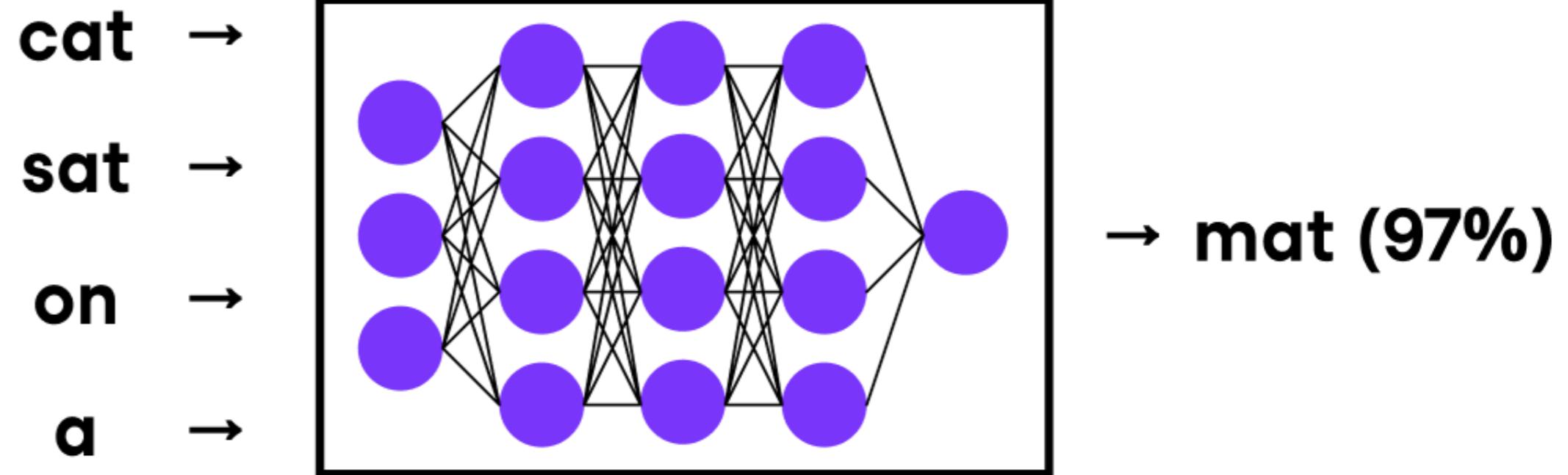
# ChatGPT's explosive growth



## Large Language Models

# A primer on Large Language Models (LLMs)

**Neural network — predicts the next word in a sequence**



# A primer on Large Language Models (LLMs)

## Next token prediction

Jamie likes to eat → **pizza**

Jamie likes to eat → **salad**

Jamie likes to eat → **oatmeal**

Jamie likes to eat → **eggs**



## Masked language modeling

Sasha → **loves** → football

Sasha → **hates** → football

Sasha → **enjoys** → football

Sasha → **avoids** → football

# The dawn of AI: Recurrent models

**Process data sequentially**



**Uses hidden states**

**Vanishing gradient problem**

# Groundbreaking architecture: The transformer

Weighs the significance of words

Attention mechanisms



Process inputs simultaneously

# Welcome to Intermediate ChatGPT!

Alex Banks



# Welcome to Intermediate ChatGPT

💡 Chapter 1: Technology behind ChatGPT



# Welcome to Intermediate ChatGPT

- 💡 Chapter 1: Technology behind ChatGPT
- Chapter 2: Prompt strategies



# Welcome to Intermediate ChatGPT

- 💡 Chapter 1: Technology behind ChatGPT
- Chapter 2: Prompt strategies
- Chapter 3: Advanced functions



# **Let's practice!**

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# Tokenization and Transformers

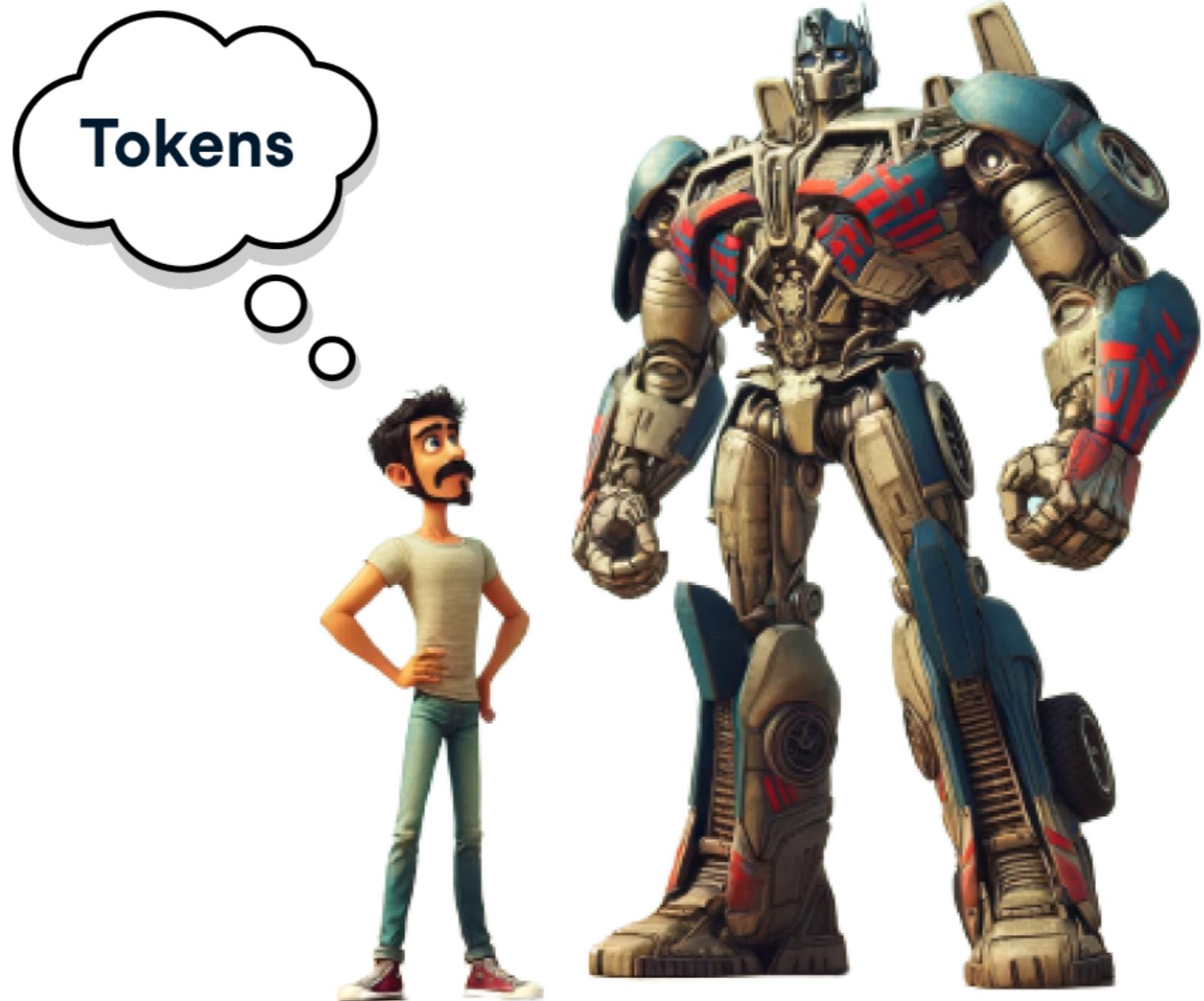
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# Tokenization



# Tokenization



Tokens	Characters
5	13
I'll be back.	

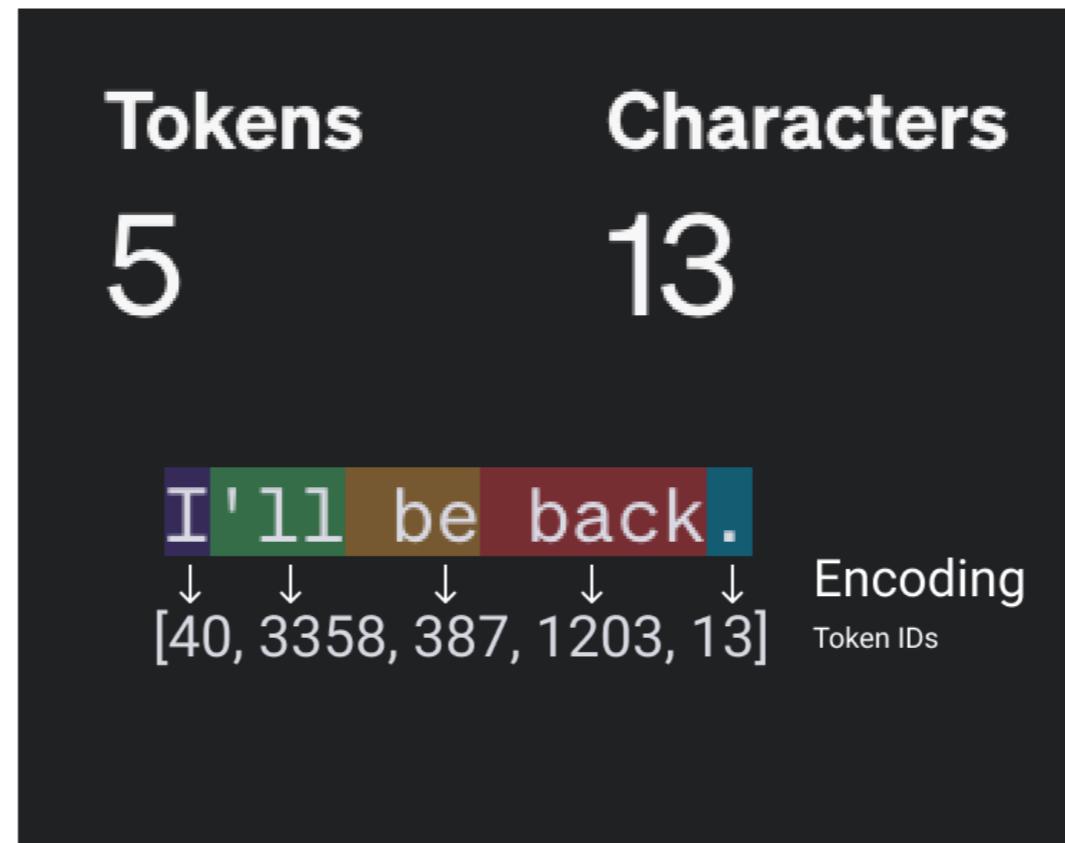
# Encoding



Tokens	Characters
5	13
I'll be back.	Encoding

[40, 3358, 387, 1203, 13]

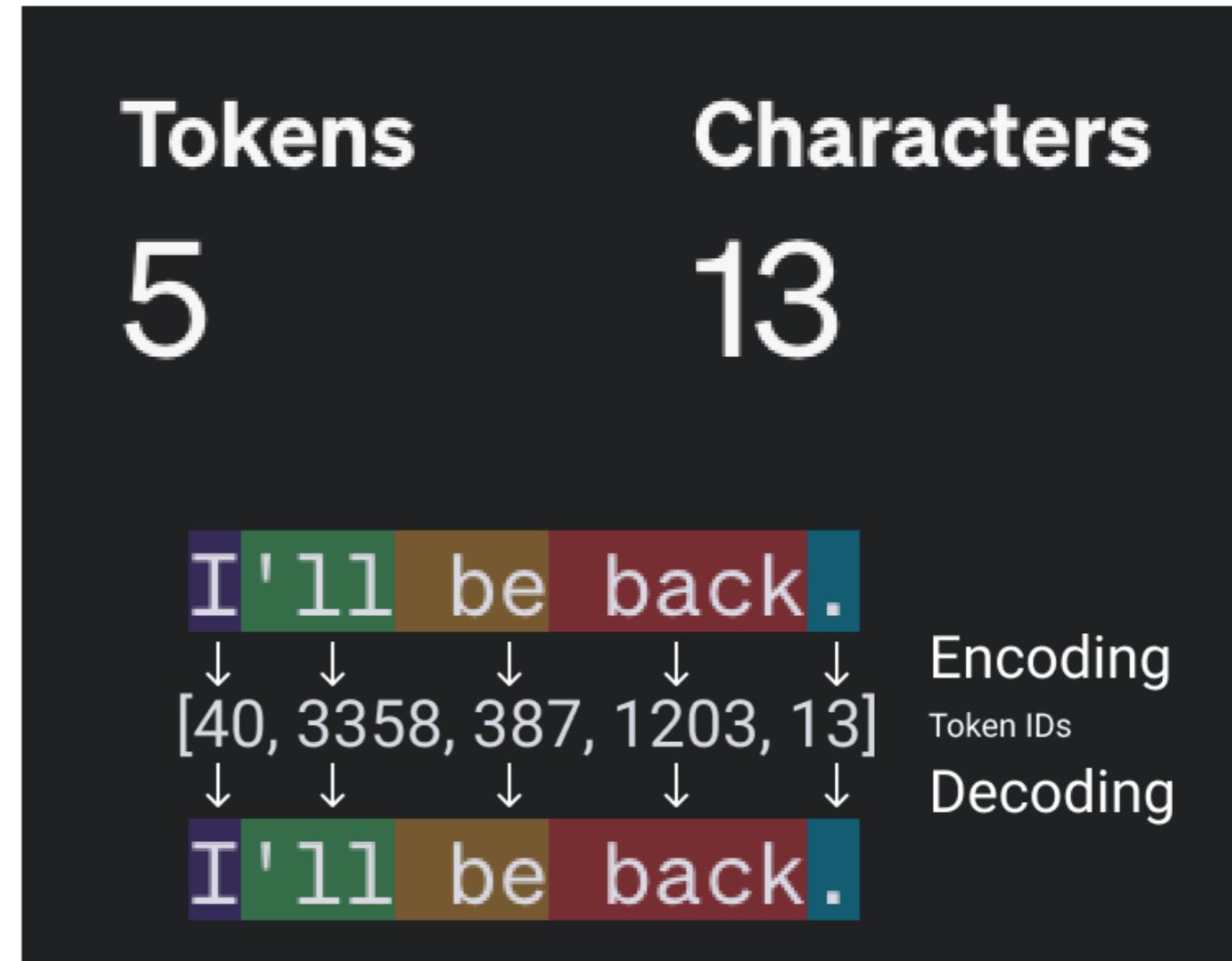
# Vectorization



Token IDs  
↓  
Embedding  
↓  
Vectors

A vertical flow diagram showing the progression from Token IDs to Embedding to Vectors, indicated by downward arrows.

# Decoding



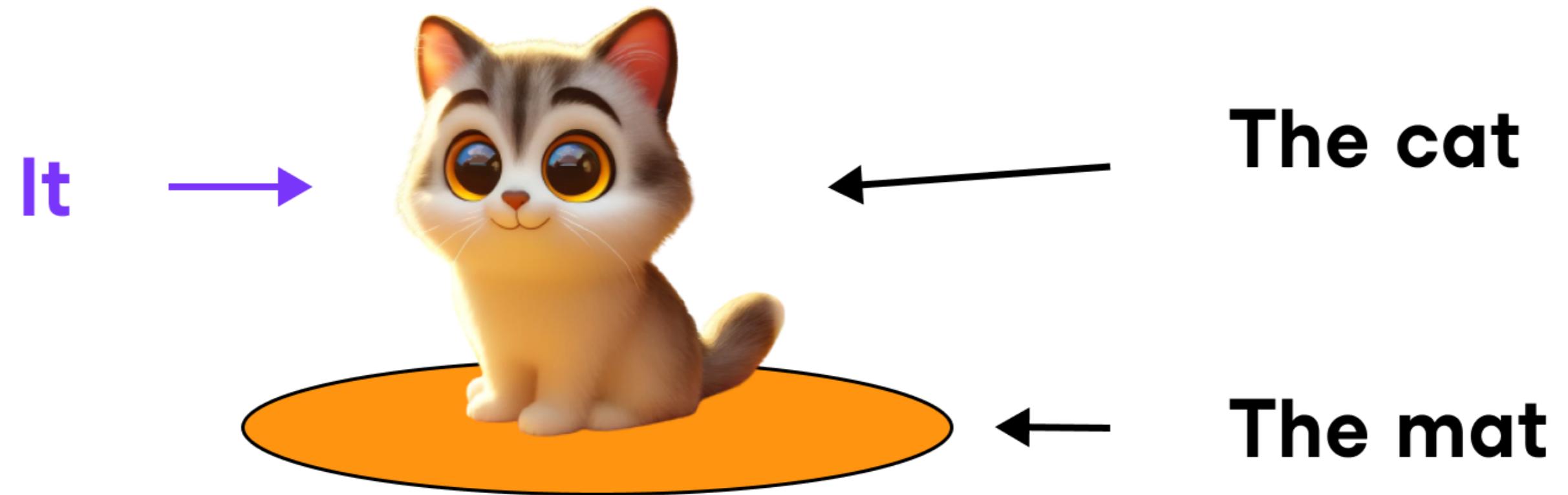
# Self-attention

Input



Output

# Self-attention



**“The cat sat on the mat because it was tired.”**

# Token relationships

“it” → “the cat”  
“it” → “sat”  
“tired” → “the cat”



**High  
attention  
score**

# Contextual understanding

What's 'it'?

'It' is the cat!



“The cat sat on the mat because **it** was tired.”

# **Let's practice!**

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# GPT models and training LLMs

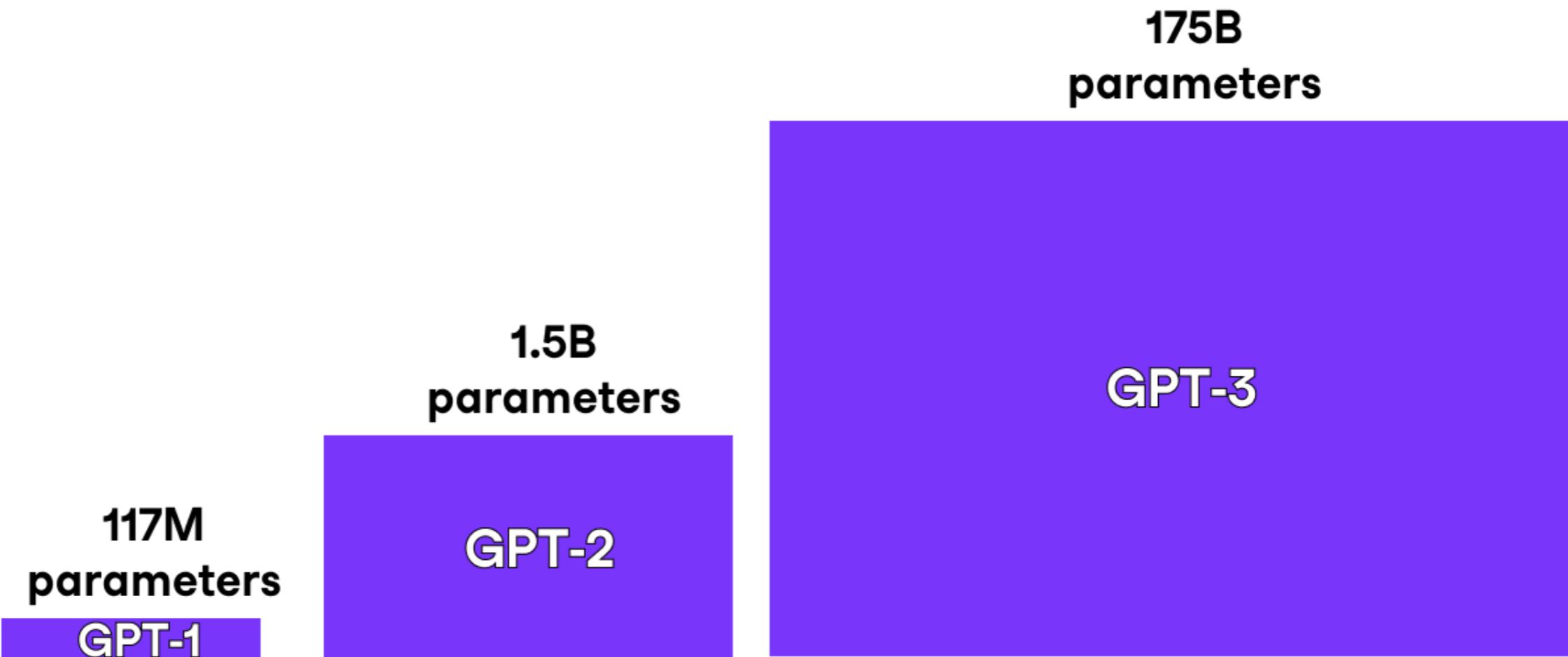
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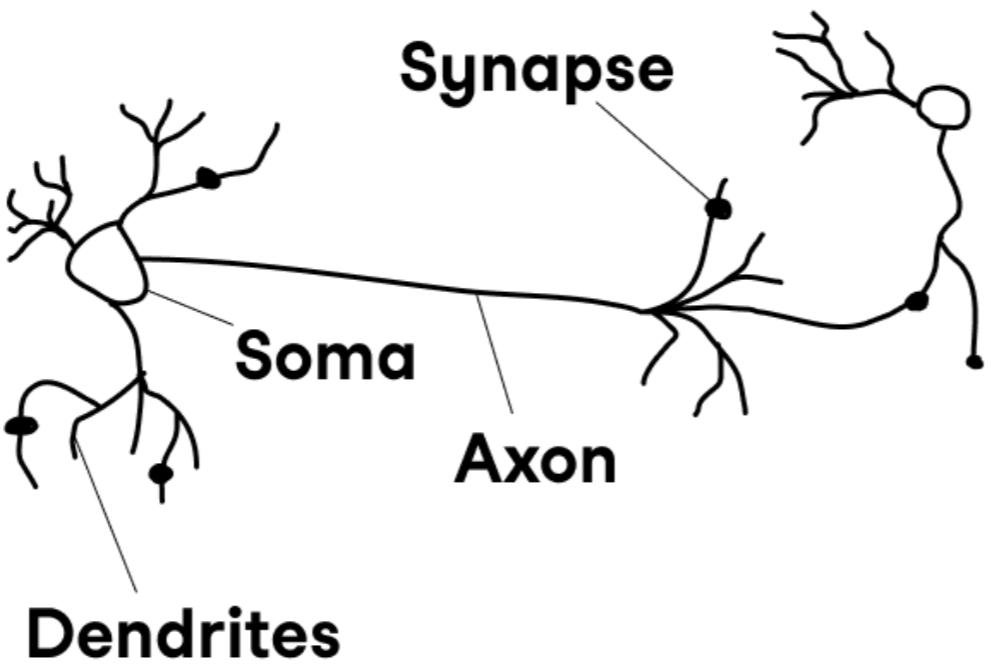
# The genesis of GPT



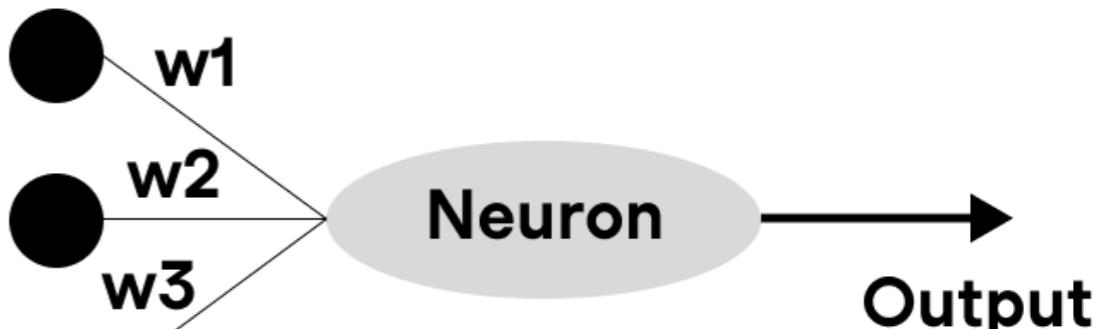
# The genesis of GPT



Biological Neural Network



Artificial Neural Network

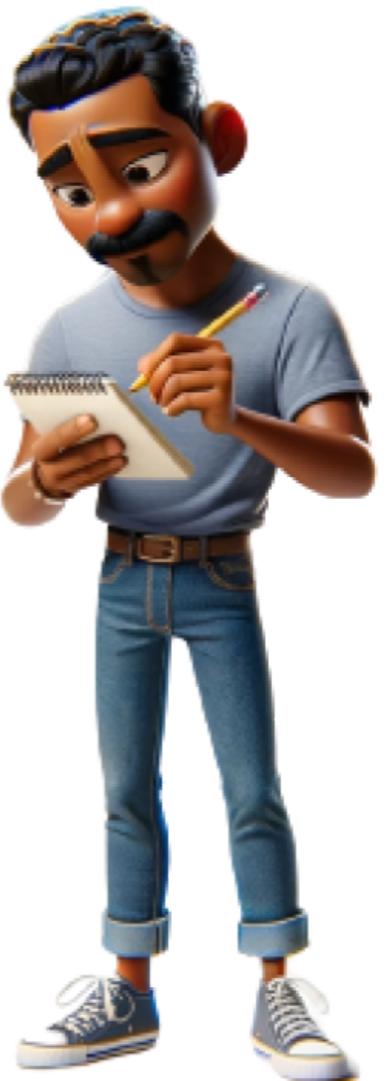


# Breaking down GPT



**Generative  
Pre-trained  
Transformer** → **GPT**

# Generative





**Pre-trained**

# Transformer





# ChatGPT



# How do we train LLMs?



**\$10M → \$100M+**

# Step 1 - Pre-training

Large quantities of low-quality internet data



every  
~year

## Stage 1: Pretraining

1. Download ~10TB of text.
2. Get a cluster of ~6,000 GPUs.
3. Compress the text into a neural network, pay ~\$2M, wait ~12 days.
4. Obtain **base model**.

Model	Release Date	Number of Parameters	Training Dataset Size
GPT-1	2018	117M	8 million web pages
GPT-2	2019	1.5B	40GB of web text
GPT-3	2020	175B	570GB of web text

# Step 2 - Fine-tuning

Low quantities of high-quality conversational data

- Written by people
- ~100K conversations

<user>

Can you explain the importance of doing things that don't scale early on in a startup's lifetime. Provide a clear example.

</user>

<assistant>

In the early stages of a startup, doing things that don't scale is crucial for several reasons: 1. Understanding Customer Needs: Engaging directly with your customers helps you understand their needs, preferences, and pain points deeply. This insight is vital for refining your product and ensuring it solves real problems...

</assistant>

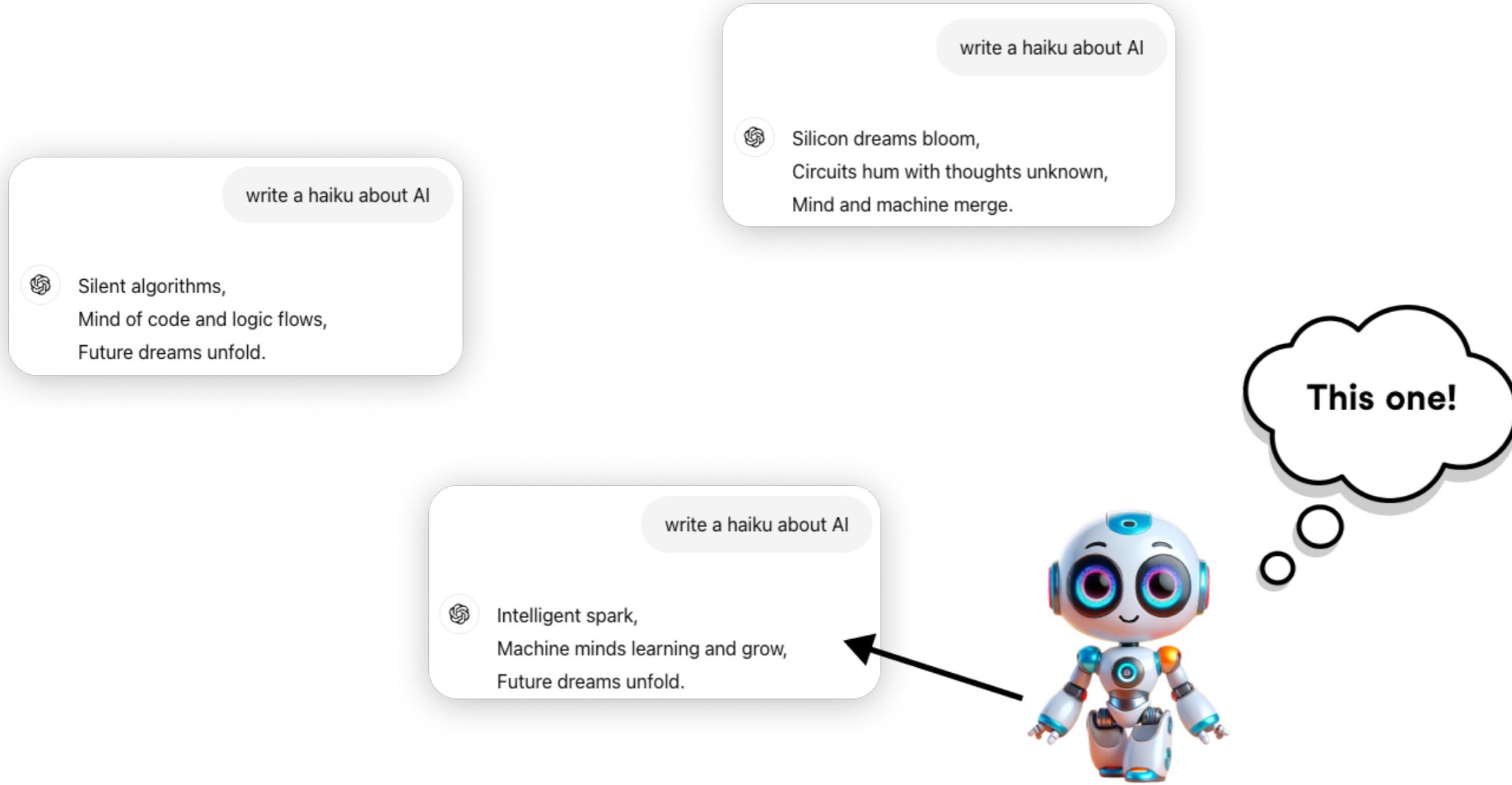


# Step 3 - RLHF

RLHF = Reinforcement Learning from Human Feedback



# The role of AI in crafting comparison labels



# The role of AI in crafting comparison labels

Labeling is a human-machine collaboration



# **Let's practice!**

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