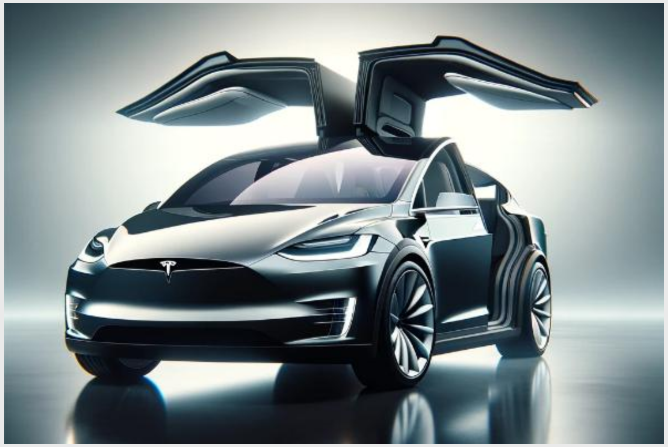
AI Image Analysis

Image Classification

- What is in this image?
  1. Cat
  2. Car
  3. Castle
  4. Corn



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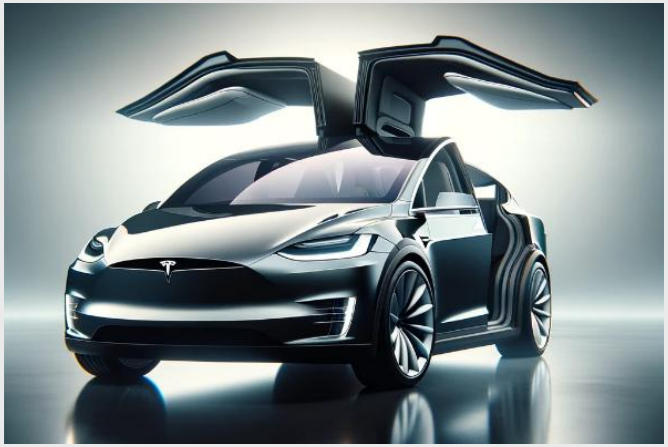


- What features of the image led you to your answer?

Image Features

- Image features are geometric in nature
  - Edges
  - Shapes

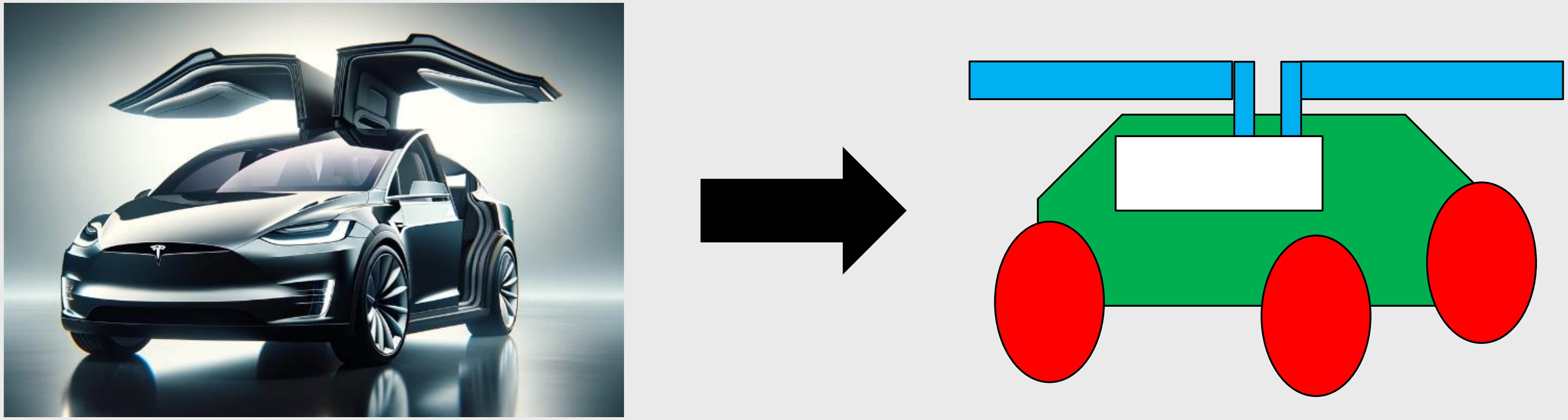
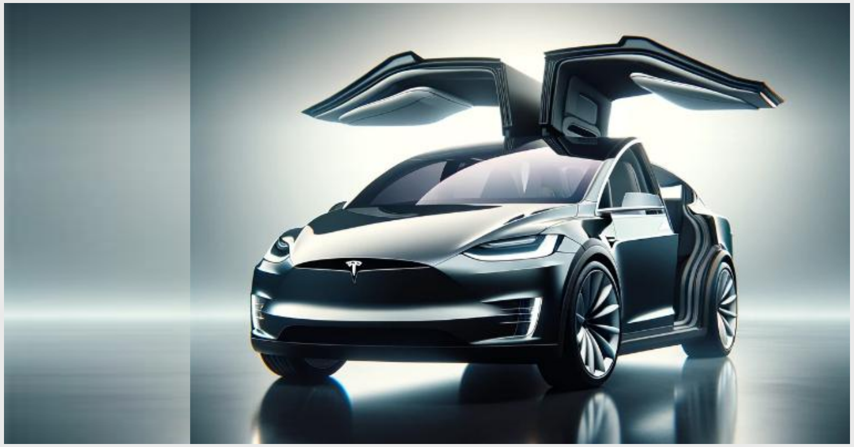
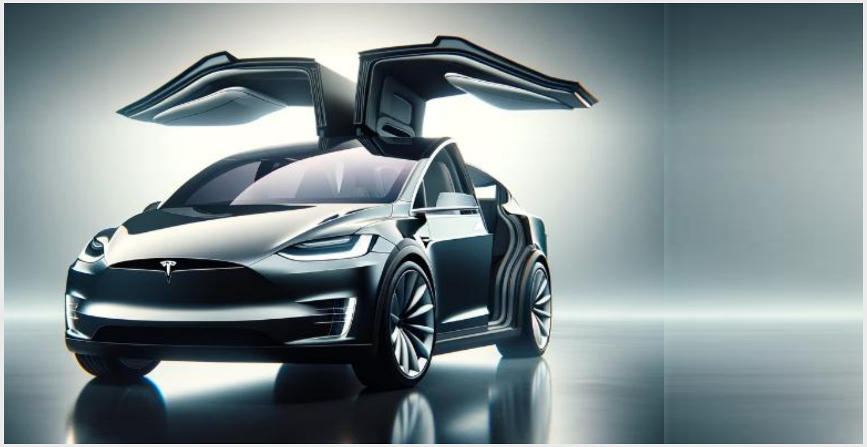


Image Features

- **Absolute position not so important**
  - **If you move the car, it is still a car**



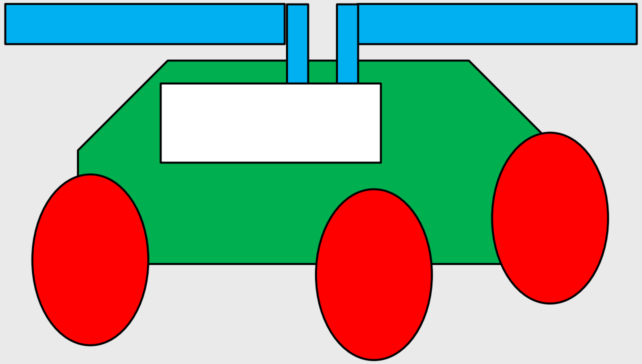
Car



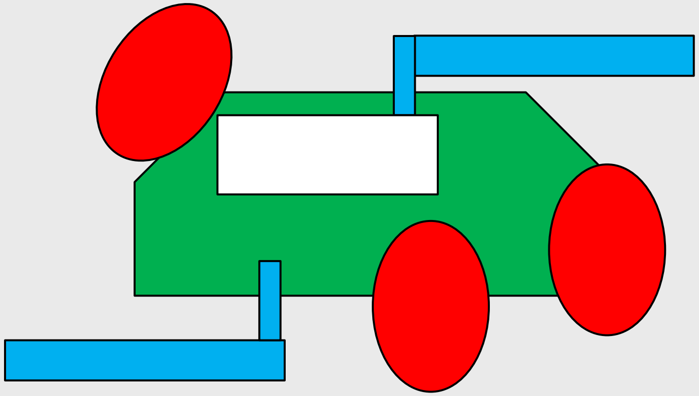
Car

Image Features

- Relative position of features is important
  - Wheels below car body
  - Headlights on front of body



Car



Not a Car

Learning Image Features

- Image features
  - Edges
  - Shapes built from edges
  - Combinations of shapes
  - Deeper hierarchy of combinations of shapes

    Combinations of combinations of … shapes
  - Translation invariant

    Doesn’t matter where in the image the object is

- We need to learn what these features and their combinations are for different object categories

- Solution: Neural Networks

Neural Networks and Image Analysis

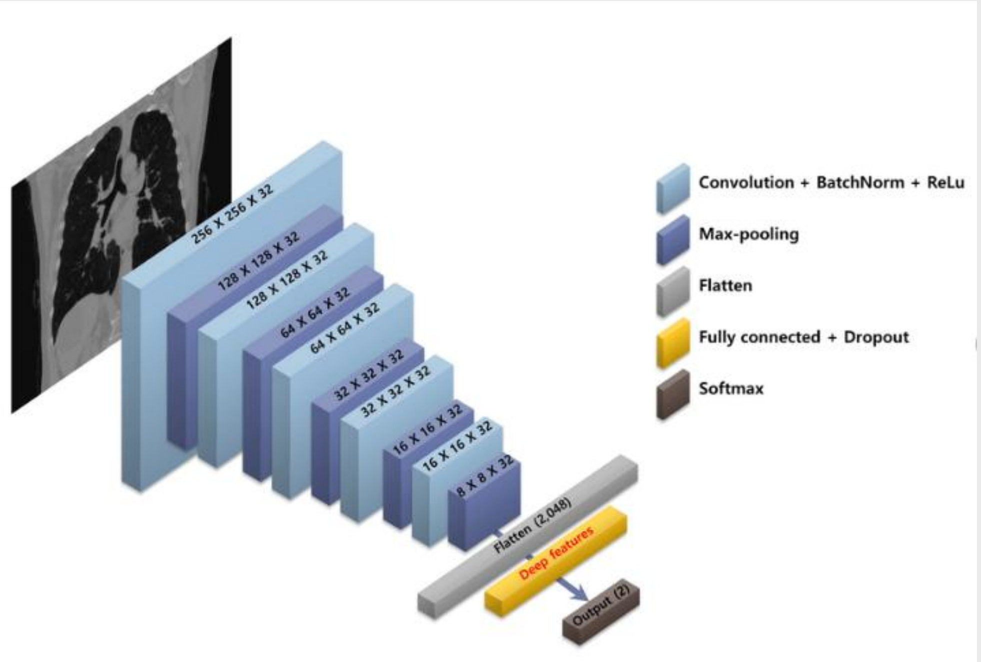
- Neural networks began to be used for image analysis in the early 1990’s

- Main architecture – convolutional network

- Convolution is an operation to find patterns in an image

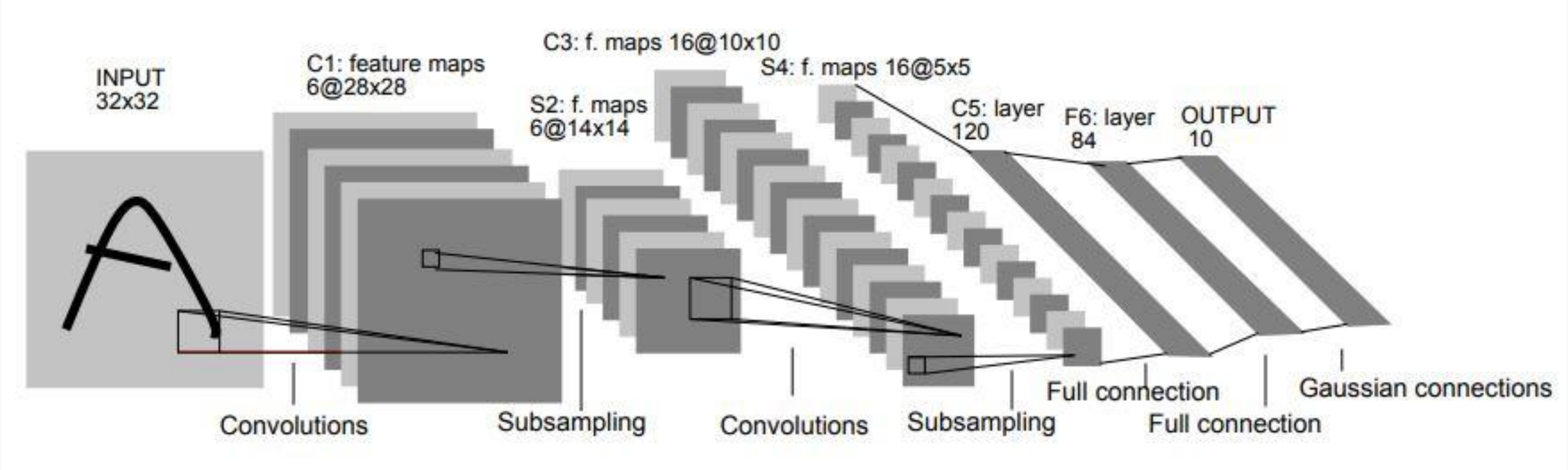
Convolutional Network

- **A convolutional neural network is many layers of convolution and max pooling**
  - **Convolution – find patterns (also called features)**
  - **Max pooling – shrink the image and keep pattern information**
- **Learns many features to understand the image**
- **Deep networks let you learn combinations of features**
- **Last few fully connected layers classify the image based on the features**



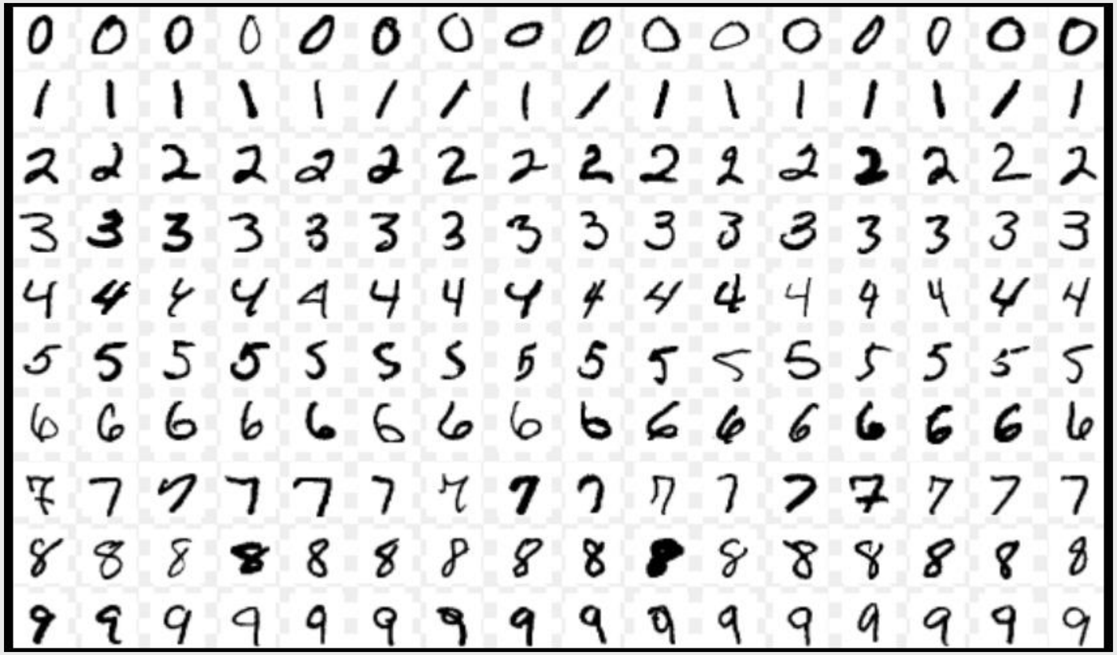
First Useful Convolutional Network

- **1989 – Yann LeCunn proposes convolutional networks for reading handwritten digits**
- **1998 – demonstrated practical applications of convolutional network, called it LeNet**



MNIST Database

- MNIST (Modified National Institute of Standards and Technology) database – 160,00 images of handwritten digits
- Created in 1994
- One of the first standardized image datasets for training and testing neural networks



Going Deeper

- **People found that deep convolutional networks performed better**
- **People also found that deeper networks were harder to train**
  - **Deep here meant 10 – 20 layers**

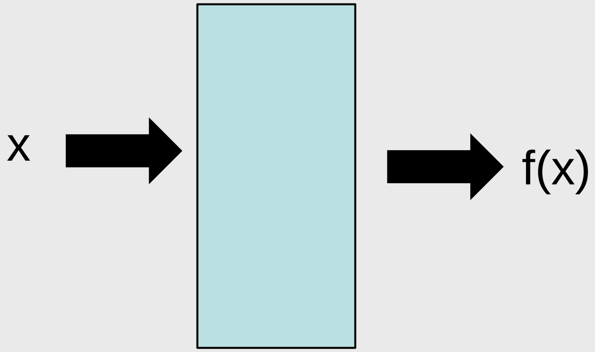
Going Deeper

- People found that deep convolutional networks performed better
- People also found that deeper networks were harder to train
  - Deep here meant 10 – 20 layers

- ResNet is developed in 2015 to allow for training of deep networks
  - ResNet had 152 layers!

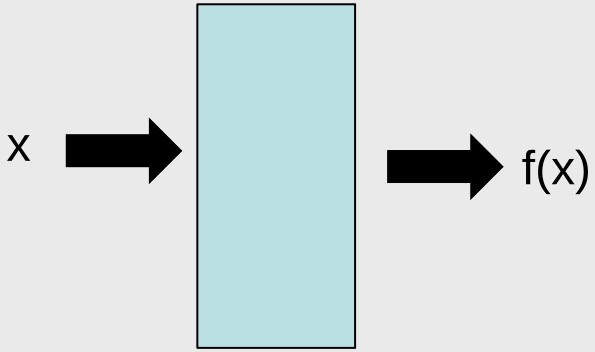
ResNet

- **Normal layer takes in x and outputs f(x)**

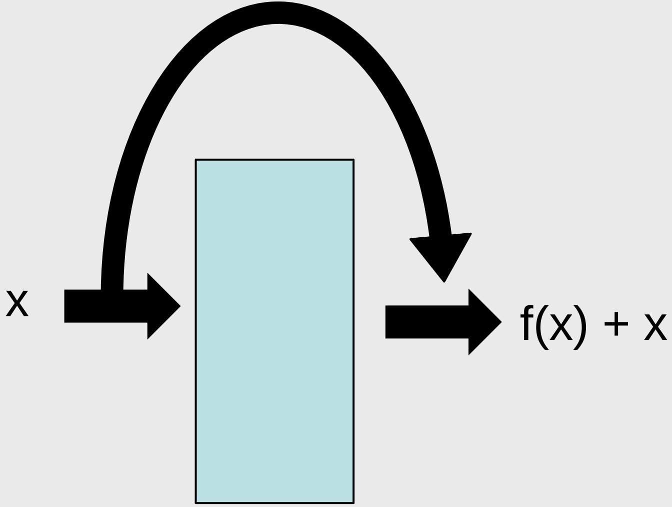


ResNet

- **Normal layer takes in x and outputs f(x)**

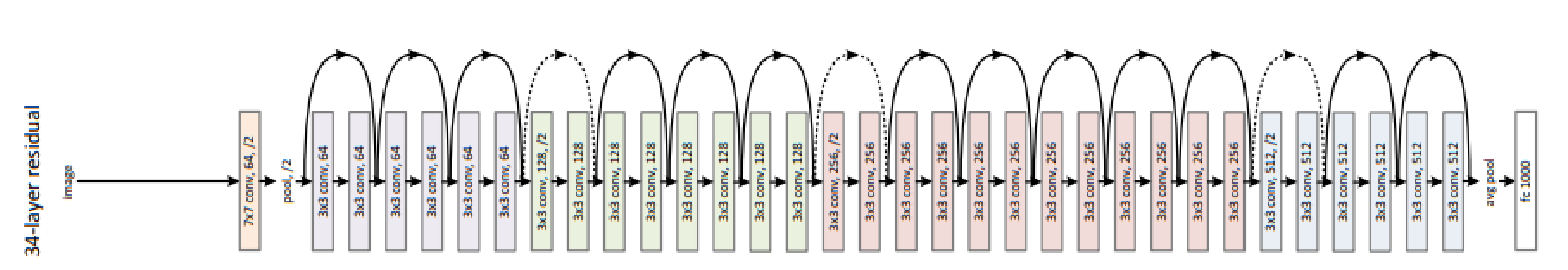


- **ResNet layer takes in x and outputs f(x)+x**



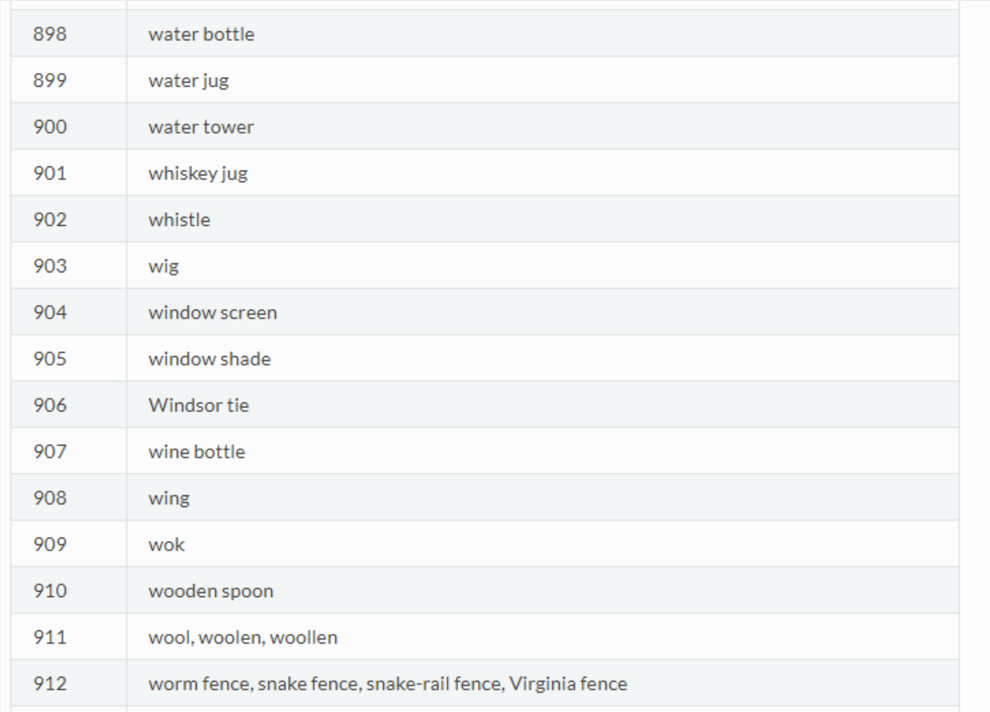
ResNet

- Outputting f(x) + x lets the model see the impact of each parameter on output
- This improves training process
- Allows for very very deep networks



ImageNet

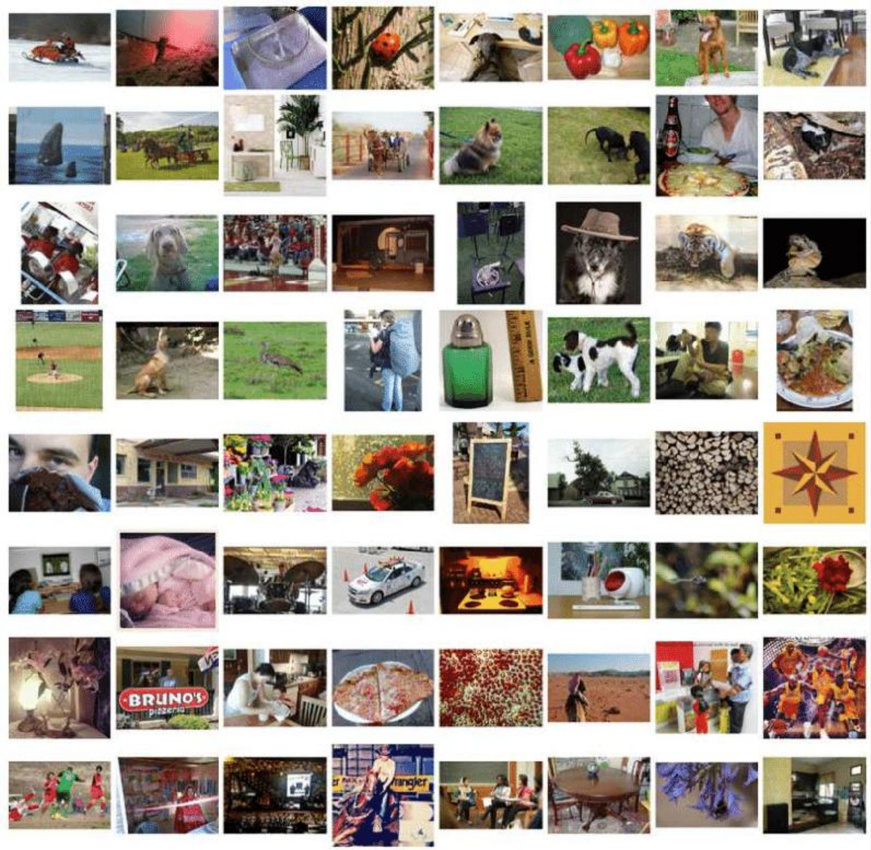
- ImageNet is a dataset of labeled images used in computer vision
  - – 14 million images
  - – 20,000 categories
- Example categories



898	water bottle
899	water jug
900	water tower
901	whiskey jug
902	whistle
903	wig
904	window screen
905	window shade
906	Windsor tie
907	wine bottle
908	wing
909	wok
910	wooden spoon
911	wool, woolen, woollen
912	worm fence, snake fence, snake-rail fence, Virginia fence

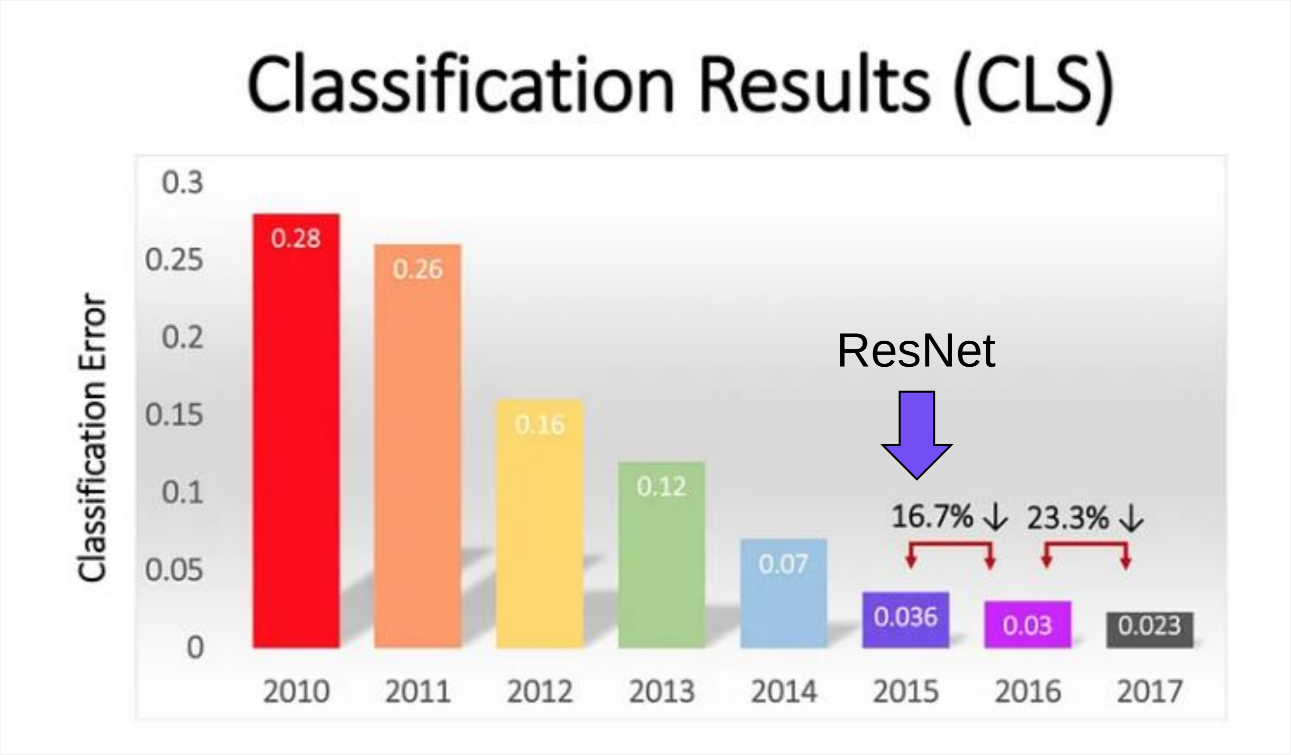
ImageNet Challenge

- ImageNet Large Scale Visual Recognition Challenge
- Started in 2010
- Need to identify images in 1000 categories



ImageNet Leaderboard

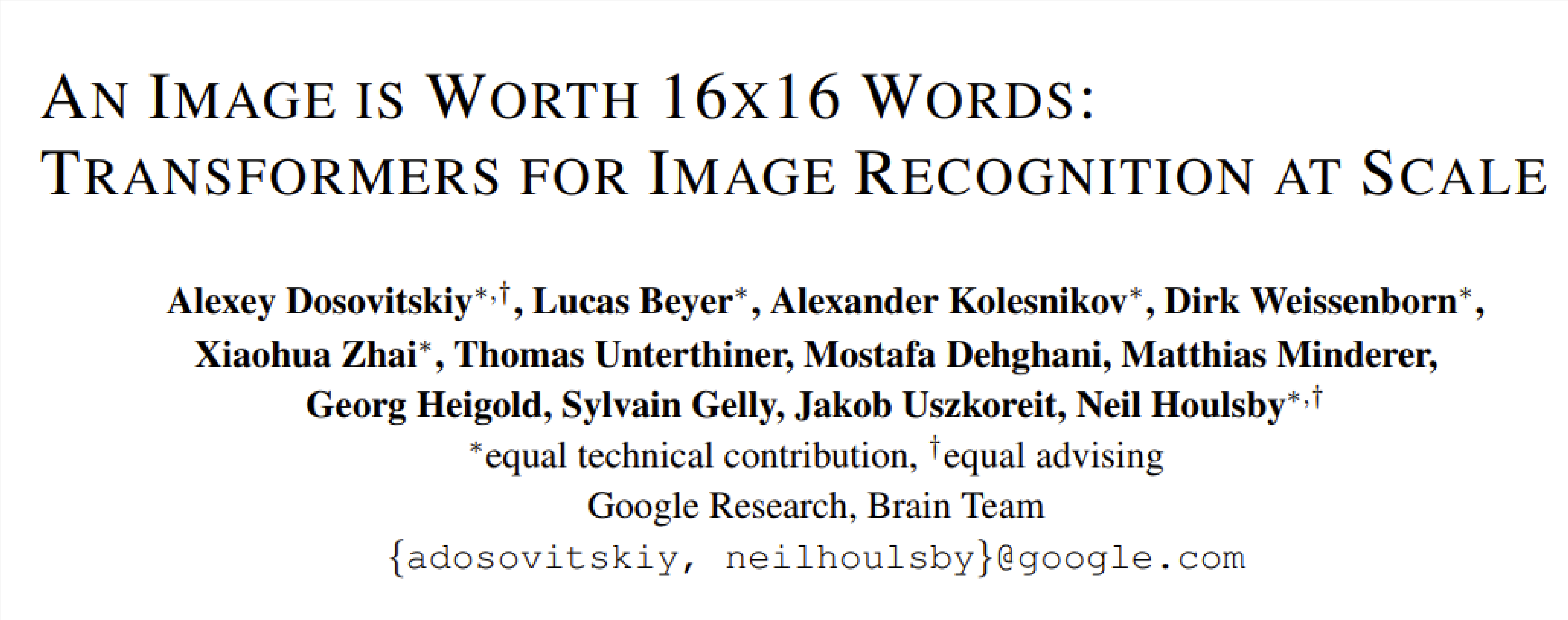
- **ResNet provided a breakthrough improvement in ImageNet score**



Transformers

Vision Transformers

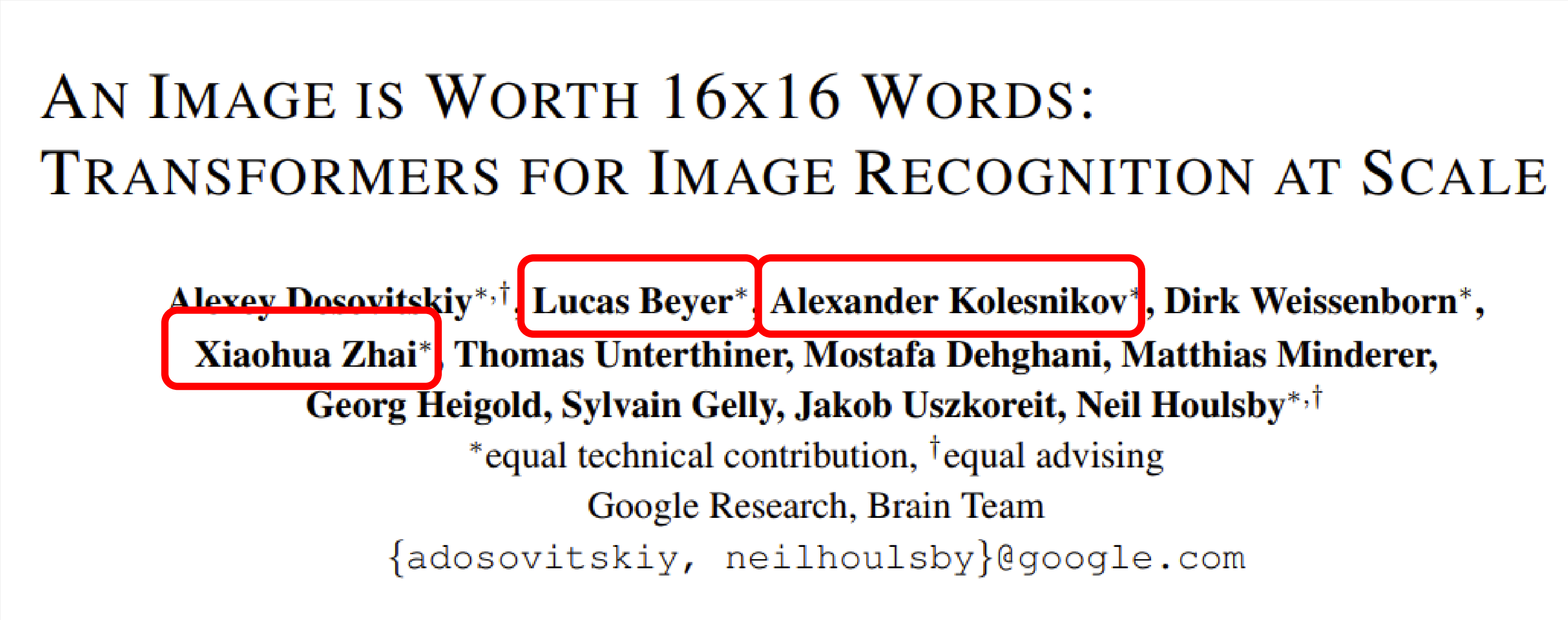
Vision Transformers



AN IMAGE IS WORTH 16X16 WORDS: TRANSFORMERS FOR IMAGE RECOGNITION AT SCALE

Alexey Dosovitskiy[*,†], Lucas Beyer[*], Alexander Kolesnikov[*], Dirk Weissenborn[*],
Xiaohua Zhai[*], Thomas Unterthiner, Mostafa Dehghani, Matthias Minderer,
Georg Heigold, Sylvain Gelly, Jakob Uszkoreit, Neil Houlsby[*,†]
[*]equal technical contribution, [†]equal advising
Google Research, Brain Team
`{adosovitskiy, neilhoulsby}@google.com`

Vision Transformers



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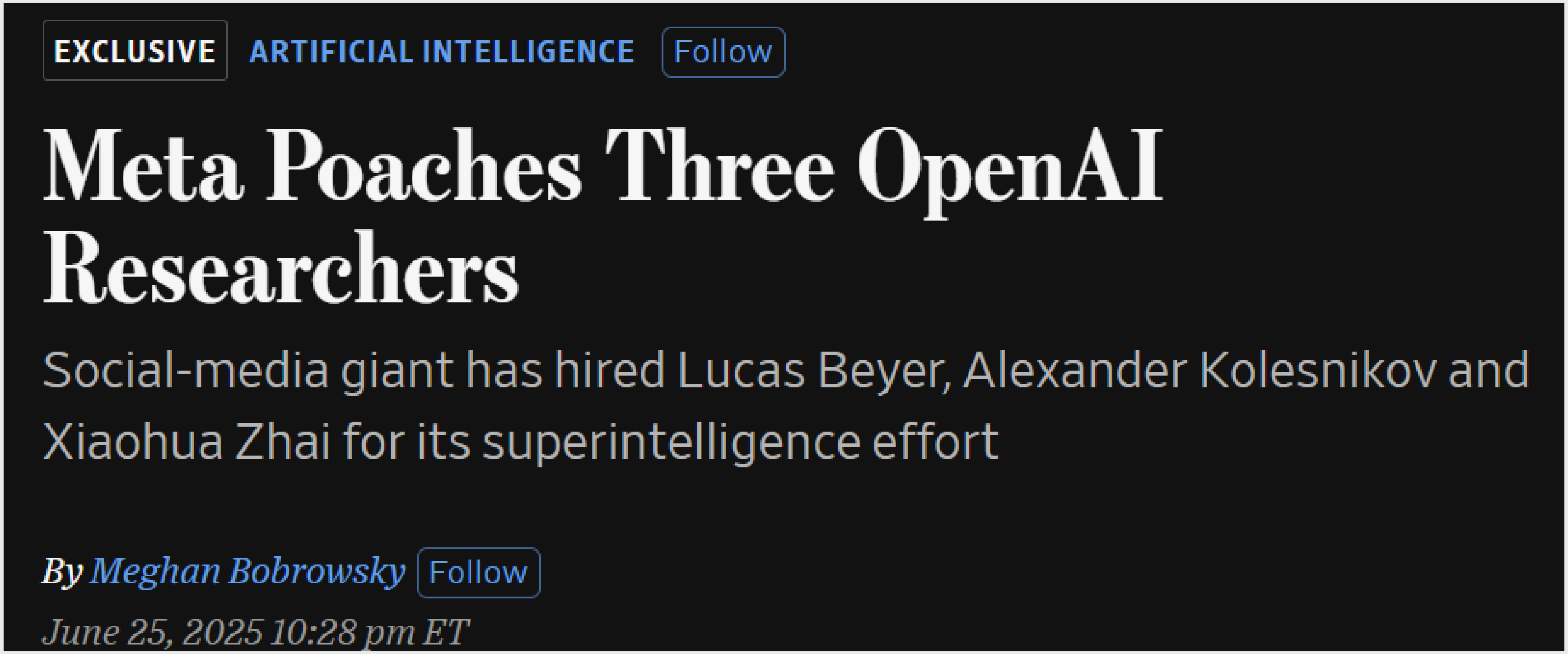
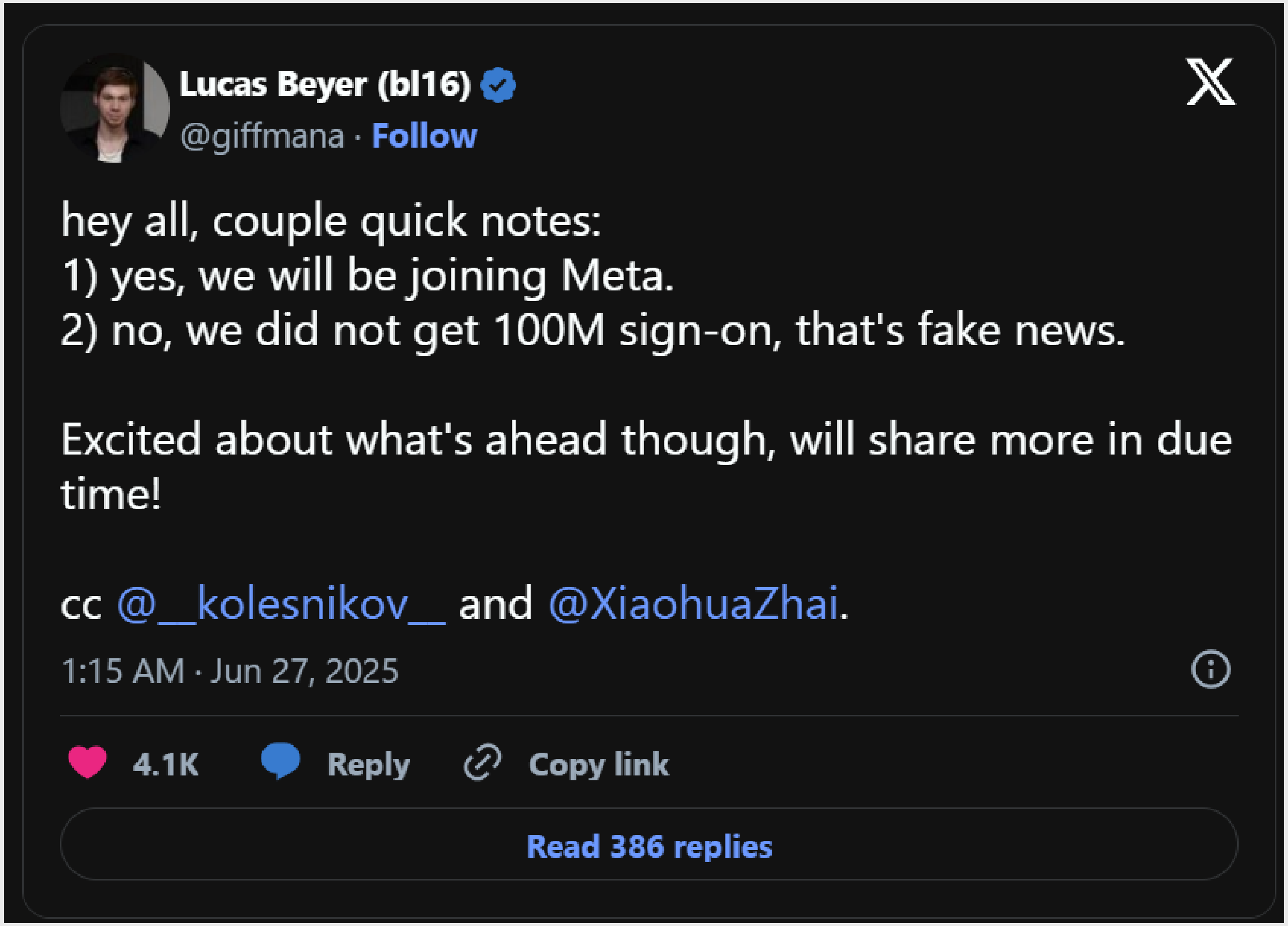


Meta Poaches Three OpenAI Researchers

Social-media giant has hired Lucas Beyer, Alexander Kolesnikov and Xiaohua Zhai for its superintelligence effort

By Meghan Bobrowsky

June 25, 2025 10:28 pm ET



Lucas Beyer (bl16)
@giffmana · **Follow**

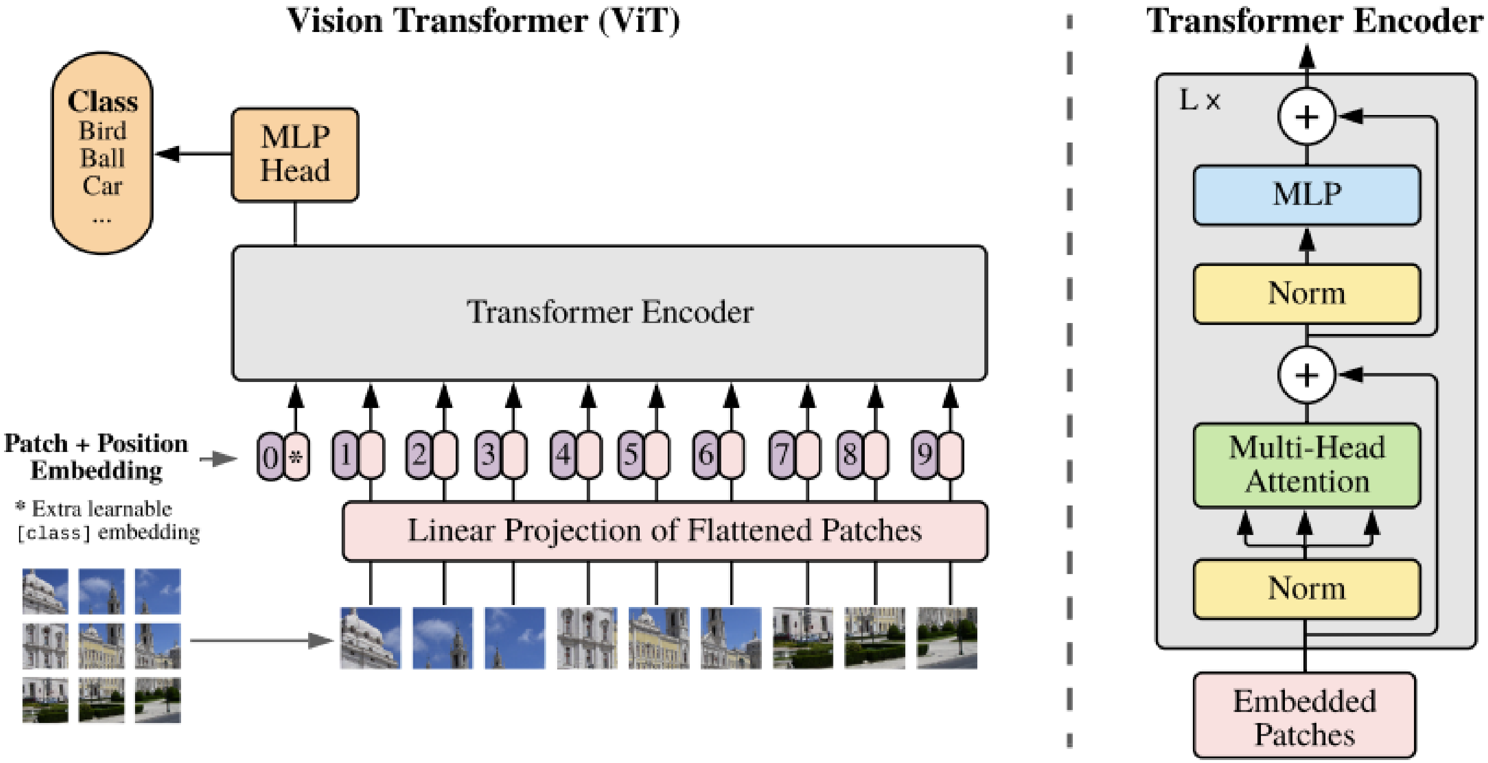
hey all, couple quick notes:
1) yes, we will be joining Meta.
2) no, we did not get 100M sign-on, that's fake news.

Excited about what's ahead though, will share more in due time!

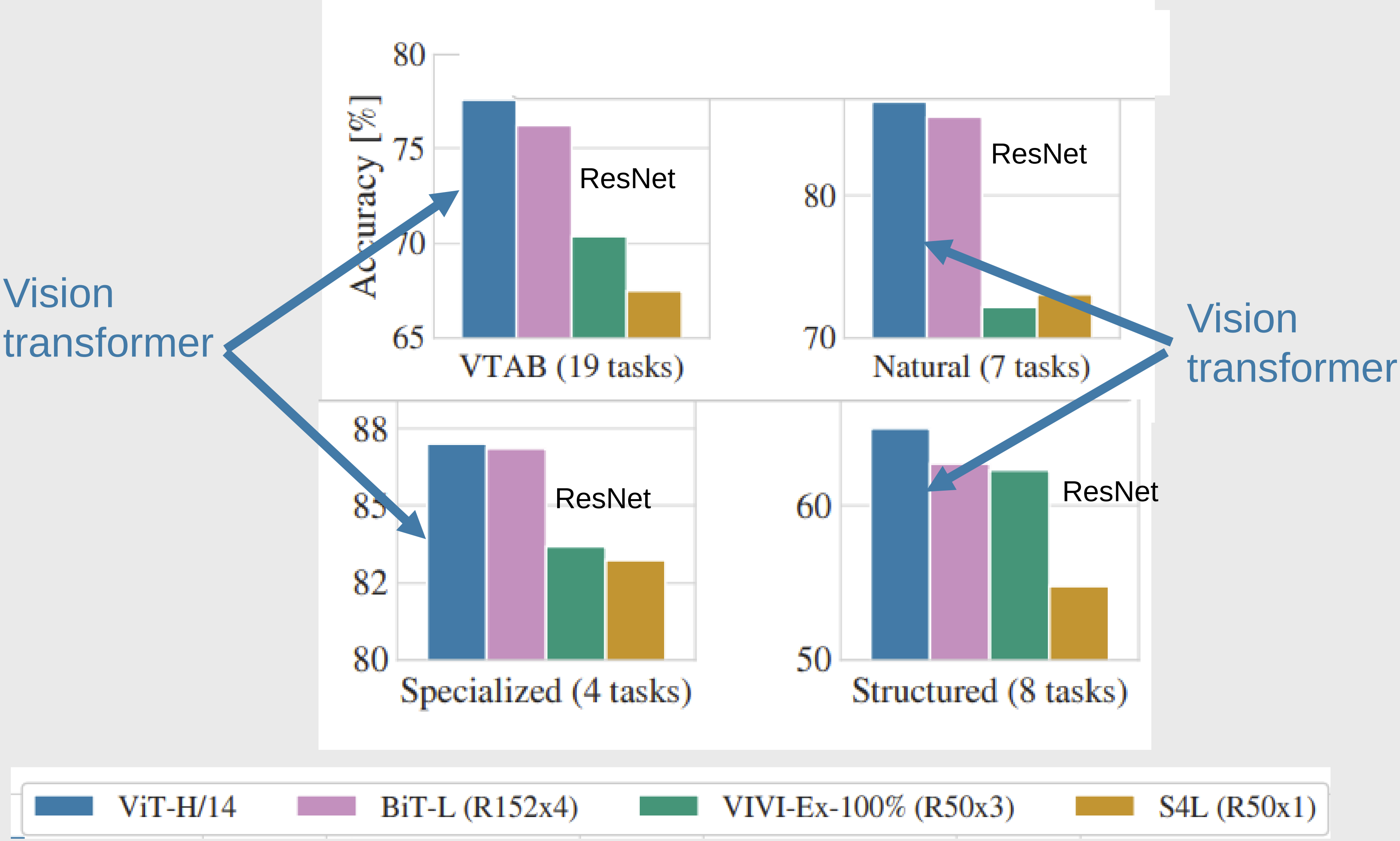
cc @__kolesnikov__ and @XiaohuaZhai.

1:15 AM · Jun 27, 2025

Vision Transformer Architecture

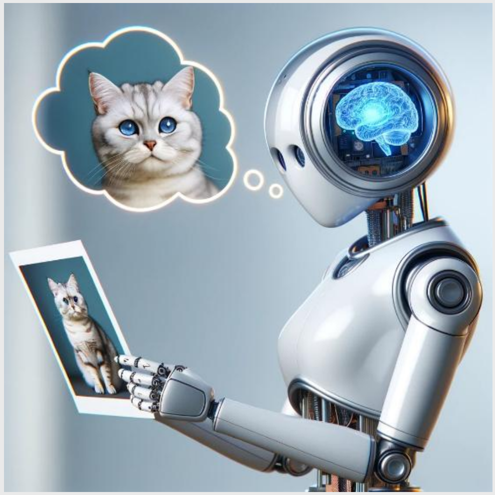


Vision Transformer Performance



Mapping Image to Text

- ResNet and Vision Transformers are good for image classification



- What if we want to write text that describes an image?

Predictive Learning

- **Predictive Learning**
  - **Predict image category**
  - **Traditional training method for neural network classifiers**

- **Learning Question: What is this?**

Dog

Predictive Learning Challenges

- **If categories are broad, predictive learning can be effective**

Cat

Cat

Cat

Predictive Learning Challenges

- **If categories are narrow, predictive learning can be ineffective**

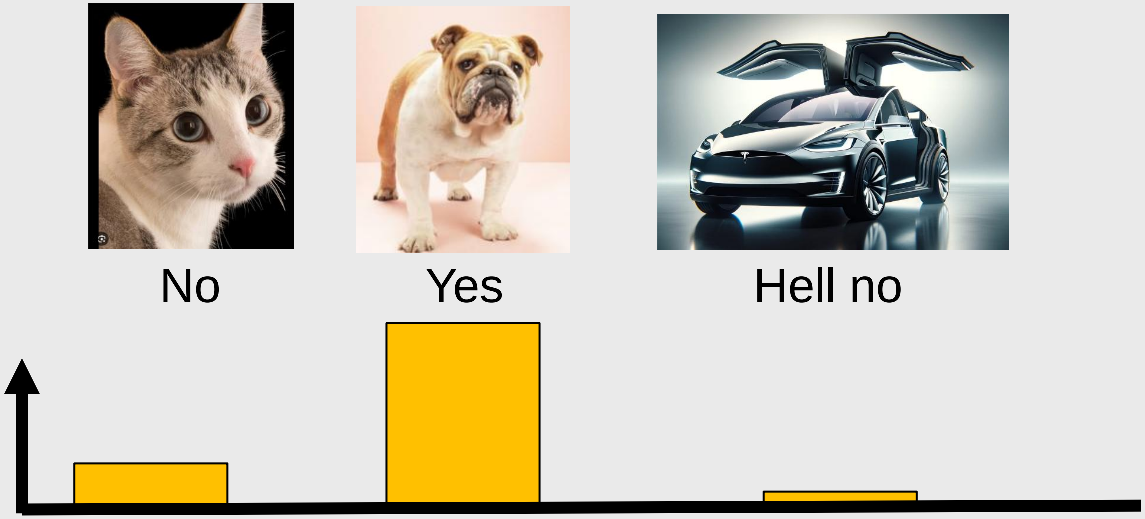
The image captures a close-up of a cat with a white and grey marked face, large expressive eyes, and a soft coat, set against a dark background, with a visible copyright symbol.

The image depicts an orange and white cat mid-meow or hiss, with one eye partially closed, against a blurred background.

The image shows an illustration of an orange, grumpy-looking cat standing upright with exaggerated features, including large eyes and a pout.

Contrastive Learning

- **Contrastive learning**
  - **Multiple choice question**
  - **Lets one learn to contrast categories**
  - **Useful if categories are very narrow**
- **Learning Question: Which image is A cute dog with a droopy face in front of a pink wall?**



CLIP

- Contrastive Language-Image Pre-Training (CLIP) is a model developed by OpenAI in 2021 that maps images to text

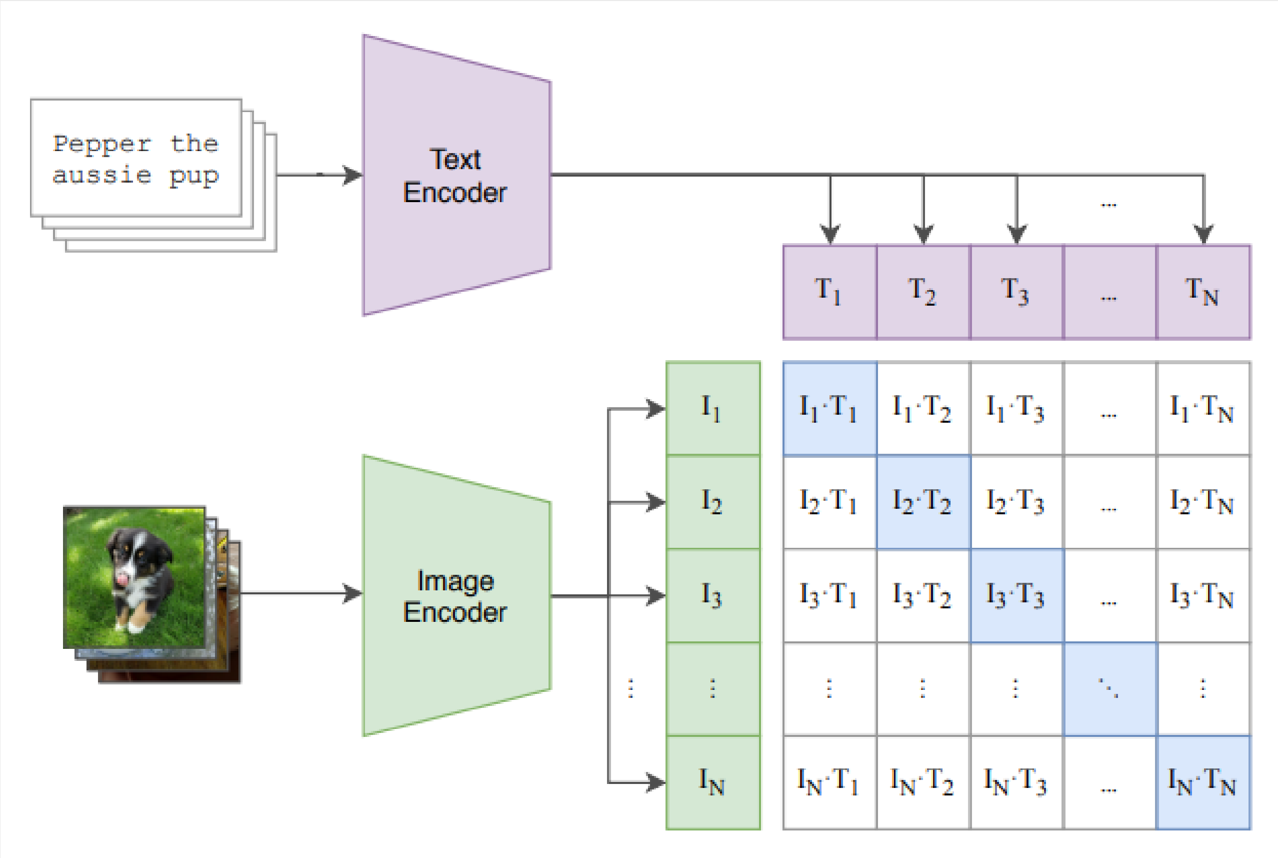
- Combines text transformers with convolutional nets or vision transformers

- Allows an AI to describe an image in words

- Key idea: Contrastive Learning

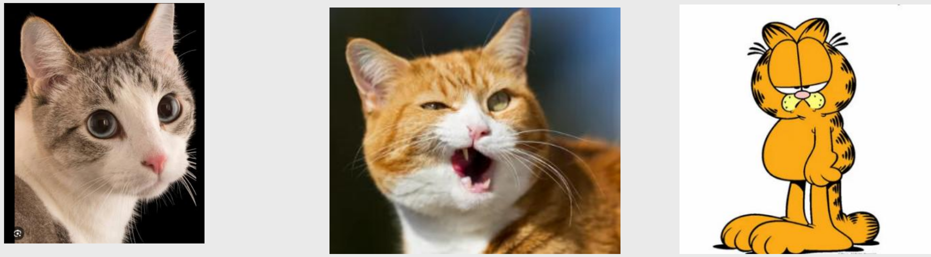
CLIP Training

- **Text encoder (transformer) and image encoder (vision transformer) jointly trained so the embedding vectors they make point in the same direction**



	T_1	T_2	T_3	...	T_N
I_1	$I_1 \cdot T_1$	$I_1 \cdot T_2$	$I_1 \cdot T_3$	...	$I_1 \cdot T_N$
I_2	$I_2 \cdot T_1$	$I_2 \cdot T_2$	$I_2 \cdot T_3$	...	$I_2 \cdot T_N$
I_3	$I_3 \cdot T_1$	$I_3 \cdot T_2$	$I_3 \cdot T_3$	...	$I_3 \cdot T_N$
⋮	⋮	⋮	⋮	⋱	⋮
I_N	$I_N \cdot T_1$	$I_N \cdot T_2$	$I_N \cdot T_3$	...	$I_N \cdot T_N$

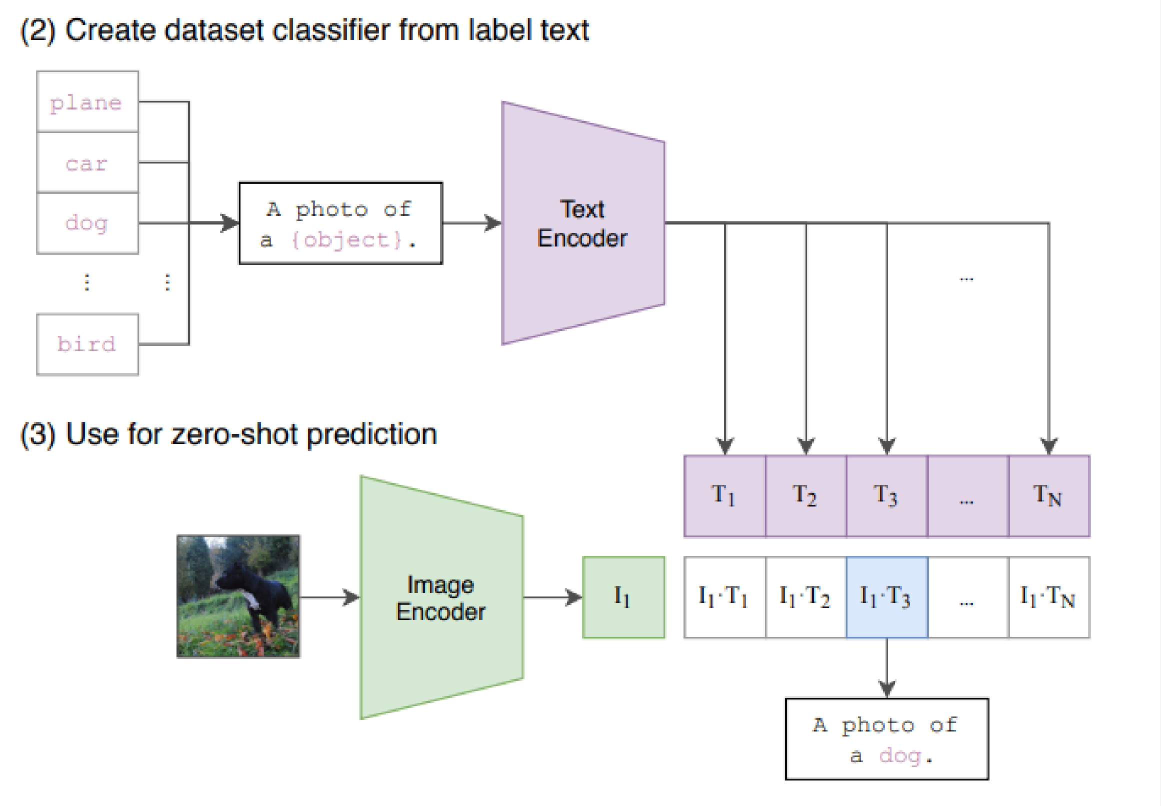
Contrastive Learning in CLIP



The image captures a close-up of a cat with a white and grey marked face, large expressive eyes, and a soft coat, set against a dark background, with a visible copyright symbol.	0.9	0.6	0.3
The image depicts an orange and white cat mid-meow or hiss, with one eye partially closed, against a blurred background.	0.5	0.9	0.8
The image shows an illustration of an orange, grumpy-looking cat standing upright with exaggerated features, including large eyes and a pout.	0.6	0.7	0.9

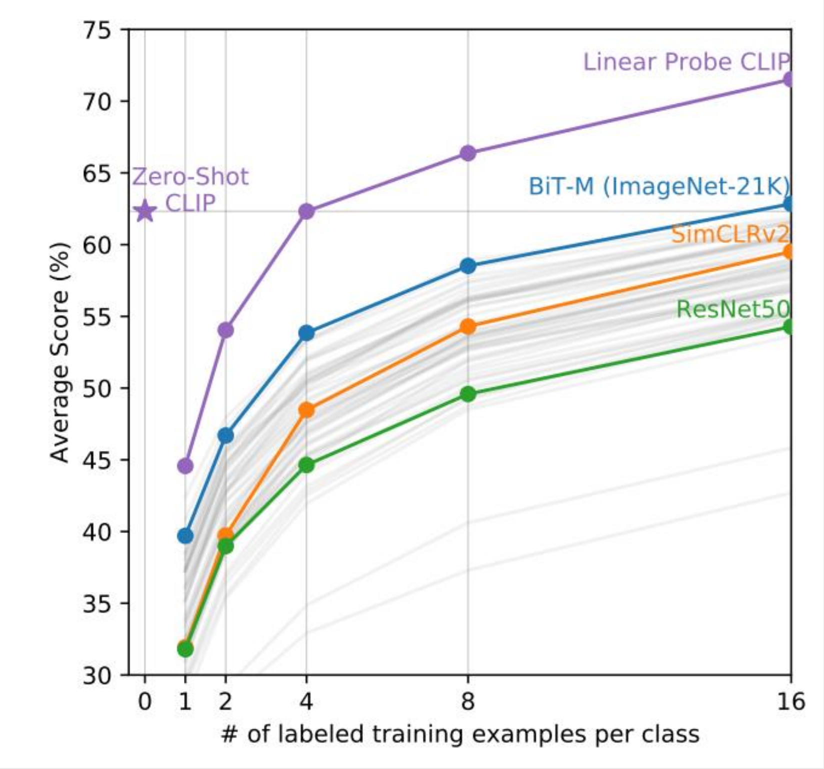
CLIP Prediction

- **After trained, CLIP can guess the best caption for an image from a list of captions**



CLIP Zero-Shot Classification

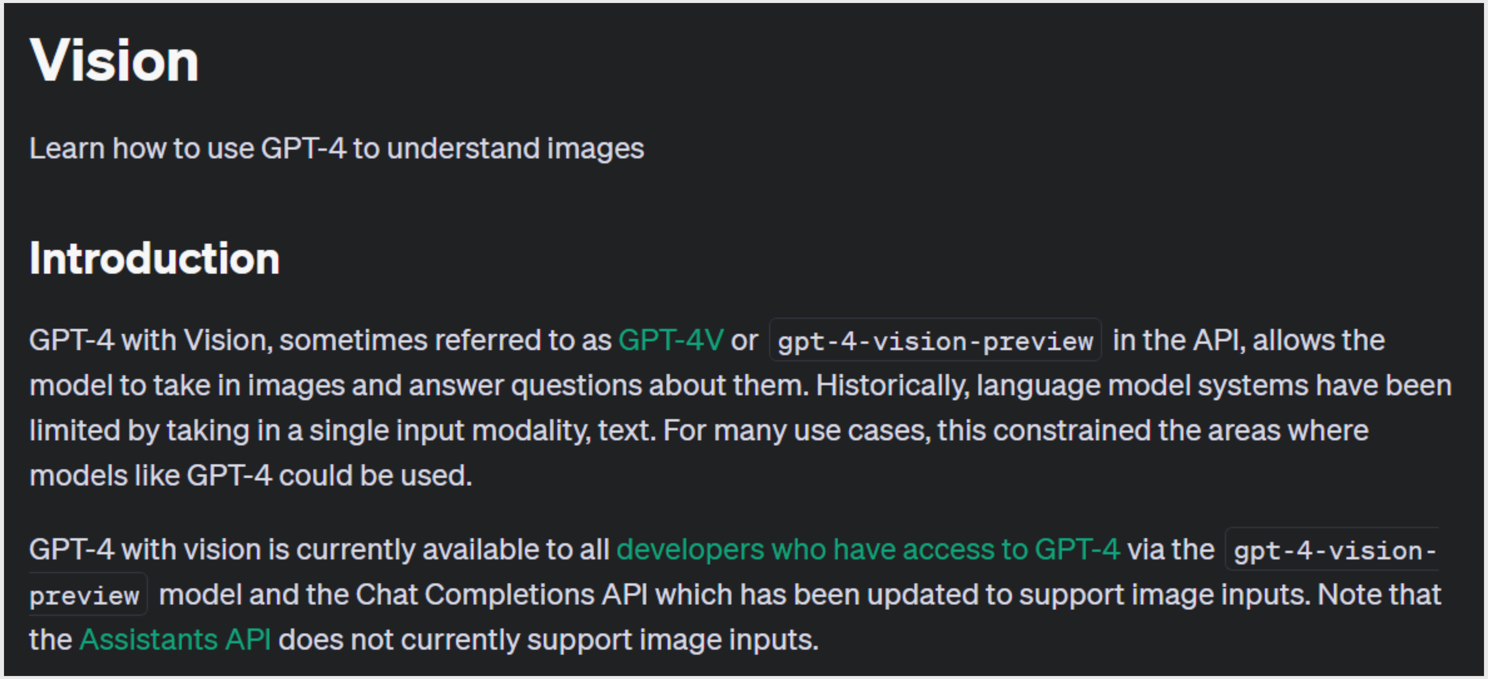
- CLIP performs zero-shot learning of images classes
  - “A photo of a {label}”
- Competitive with trained classifiers based on best ImageNet models



GPT-4 With Vision

- GPT-4o lets you generate a text from an image + text prompt
  - Used to be called GPT-4V (Vision)

- CLIP is likely the underlying model for the GPT-4o



Vision

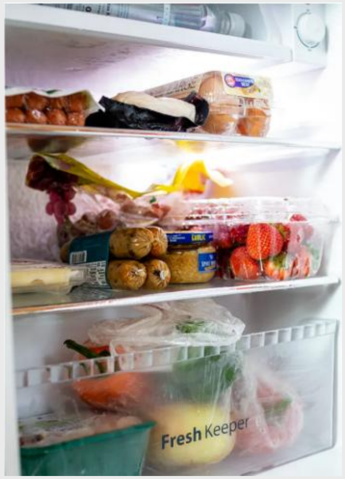
Learn how to use GPT-4 to understand images

Introduction

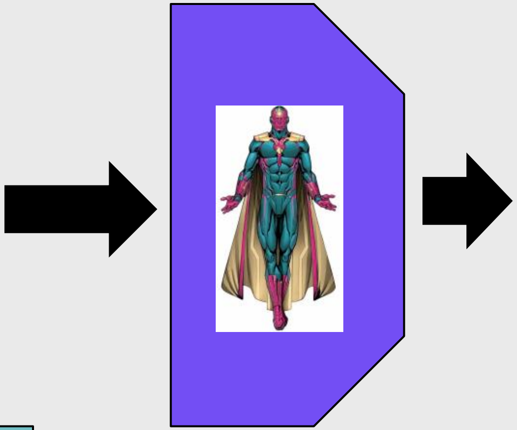
GPT-4 with Vision, sometimes referred to as GPT-4V or `gpt-4-vision-preview` in the API, allows the model to take in images and answer questions about them. Historically, language model systems have been limited by taking in a single input modality, text. For many use cases, this constrained the areas where models like GPT-4 could be used.

GPT-4 with vision is currently available to all developers who have access to GPT-4 via the `gpt-4-vision-preview` model and the Chat Completions API which has been updated to support image inputs. Note that the Assistants API does not currently support image inputs.

GPT-4o



please list each food item in this image.



In the image, I can see several food items stored in a refrigerator. From top to bottom, here are the visible items:

1. Eggs – a carton of large eggs is partially visible on the top shelf.
2. Strawberries – there's a plastic clamshell container of strawberries on the middle shelf.
3. Grapes – to the left of the strawberries, there are red grapes, some of which are falling out of an open bag.
4. Minced garlic – a jar of minced garlic labeled "GARLIC" is underneath the strawberries.
5. Potatoes – below the jar of garlic, there is a small bag of potatoes.
6. Cheese – on the middle shelf, in front of the potatoes, there appears to be a block of cheese.

I can also see the upper edges of some items in bins or drawers labeled "Fresh Keeper," which suggests the presence of fresh produce such as fruits or vegetables. However, the actual contents are obscured, and specifics cannot be determined from the visible portions.

GPT-4o

make me a recipe with the following ingredients from my fridge:
In the image, I can see several food items stored in a refrigerator. From top to bottom, here are the visible items:

1. Eggs – a carton of large eggs is partially visible on the top shelf.
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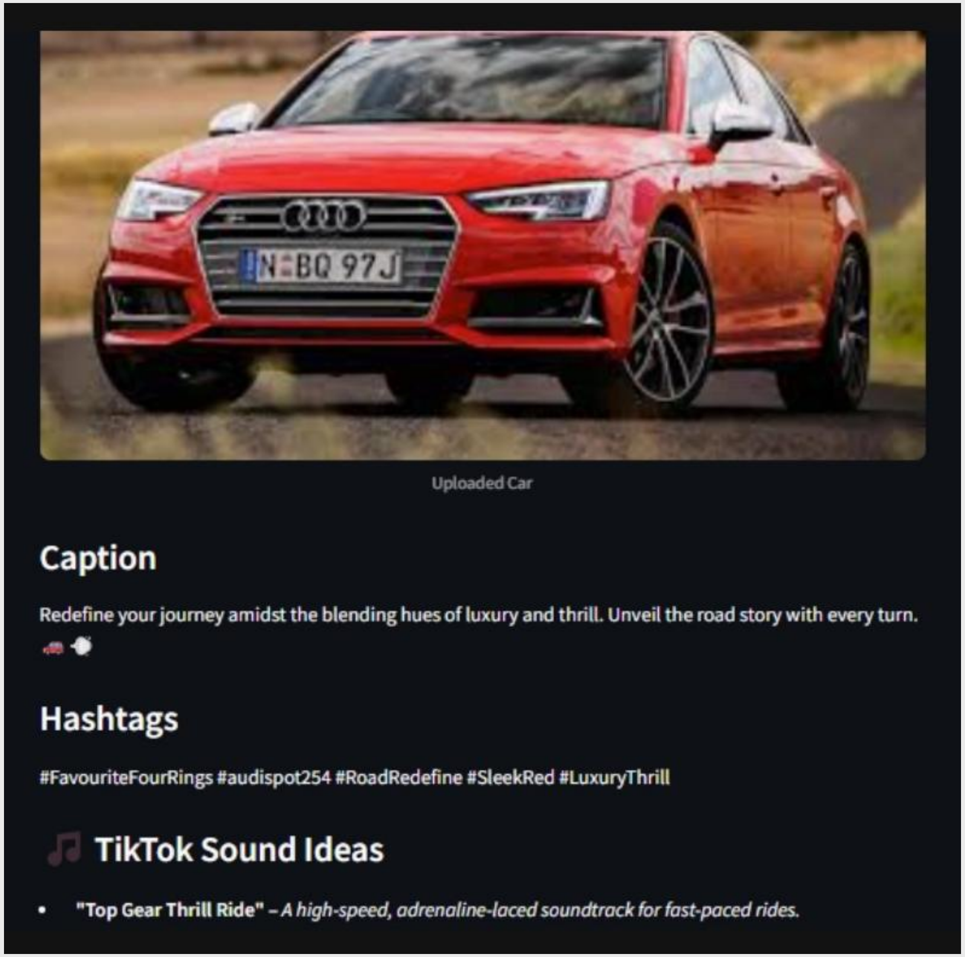
Based on the ingredients you've listed, you can prepare a delicious dish called: "Oven-Baked Herbed Potato Rosti with Cheese and Garlic, Served with a Fresh Fruit Salad". Here's how you can make it:
'Ingredients:\n' +
'1. Potatoes - 3 large\n' +
'2. Cheese (Preferably Cheddar) - 1 cup, grated\n' +
'3. Minced garlic - 2 tablespoons\n' +
'4. Eggs - 2\n' +
'5. Red grapes - a handful\n' +
'6. Strawberries - a handful\n' +
'7. Apples - 1\n' +
'8. Carrots - 1 (for salad freshness and crunch)\n' +
'9. Salt and pepper to taste\n' +
'10. Assumed herbs - dried oregano, dried rosemary (if available)\n'
'Instructions:\n' +
'Oven-Baked Herbed Potato Rosti\n' +
'1. Preheat your oven to 200°C (400°F). \n' +
'2. Peel and grate the potatoes, then squeeze out the extra moisture. \n' +
'3. Mix the grated potatoes with the minced garlic, grated cheese, a teaspoon each of dried oregano and rosemary if available, salt, and pepper in a bowl. Add the eggs and mix everything together until well combined.\n'
'4. Press the potato mixture into a greased baking dish or a cast-iron skillet and bake it in the oven for about 30-40 minutes until the top is golden brown and crispy.\n’ +

Image Caption Generator



Uploaded Car

Caption

Redefine your journey amidst the blending hues of luxury and thrill. Unveil the road story with every turn. 🚗💨

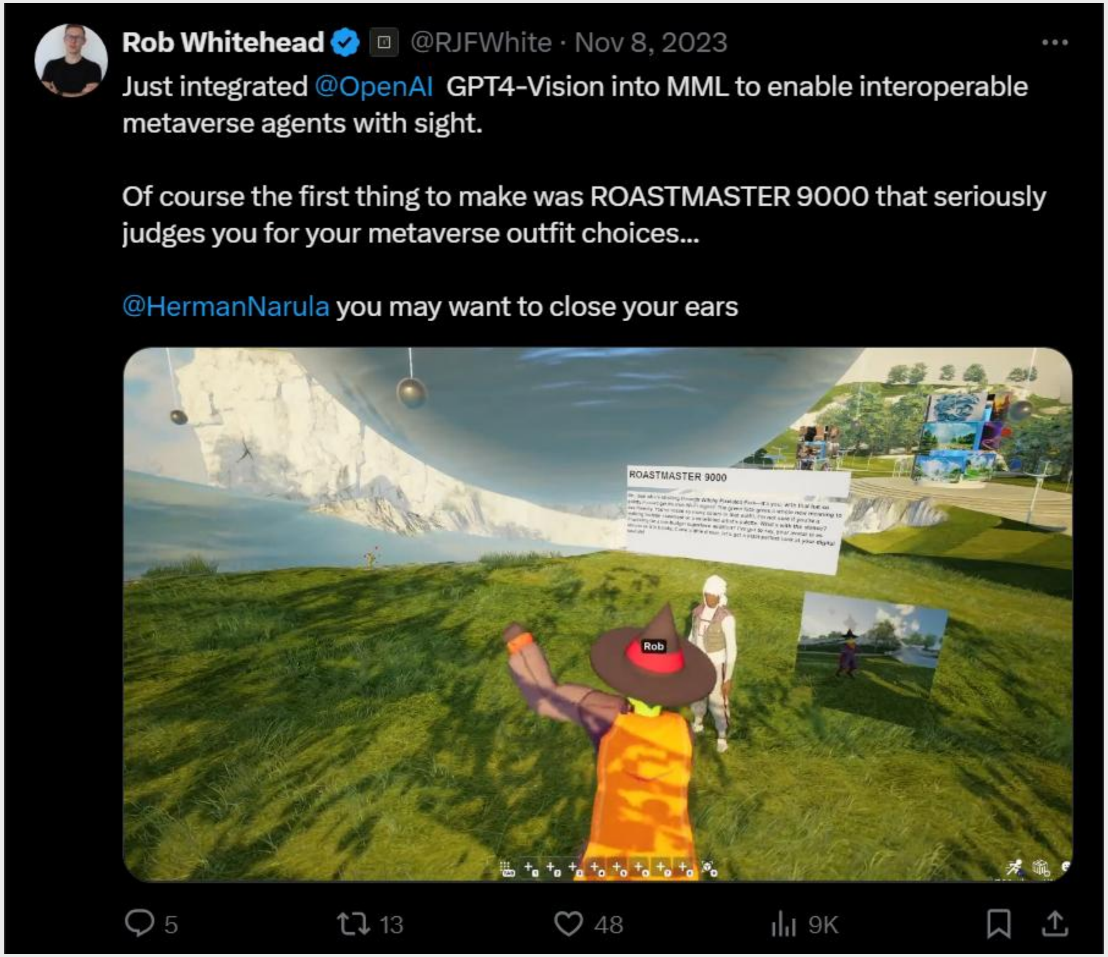
Hashtags

#FavouriteFourRings #audispot254 #RoadRedefine #SleekRed #LuxuryThrill

🎵 TikTok Sound Ideas

- **"Top Gear Thrill Ride"** – *A high-speed, adrenaline-laced soundtrack for fast-paced rides.*

GPT-4o for Gaming



Rob Whitehead @RJFWhite · Nov 8, 2023

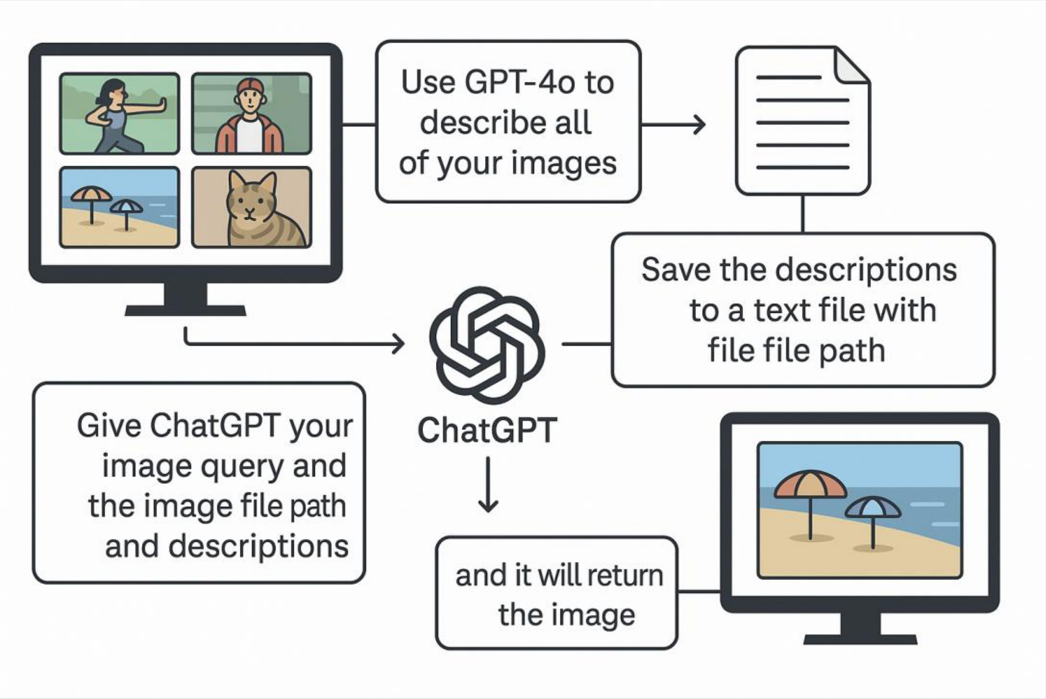
Just integrated @OpenAI GPT4-Vision into MML to enable interoperable metaverse agents with sight.

Of course the first thing to make was ROASTMASTER 9000 that seriously judges you for your metaverse outfit choices...

@HermanNarula you may want to close your ears

Searchable Image Database

- Use GPT-4o to describe all of your images
- Save the description to a text file with the file path
- Give ChatGPT your image query and the image file paths and descriptions and it will return the image



Use GPT-4o to describe all of your images

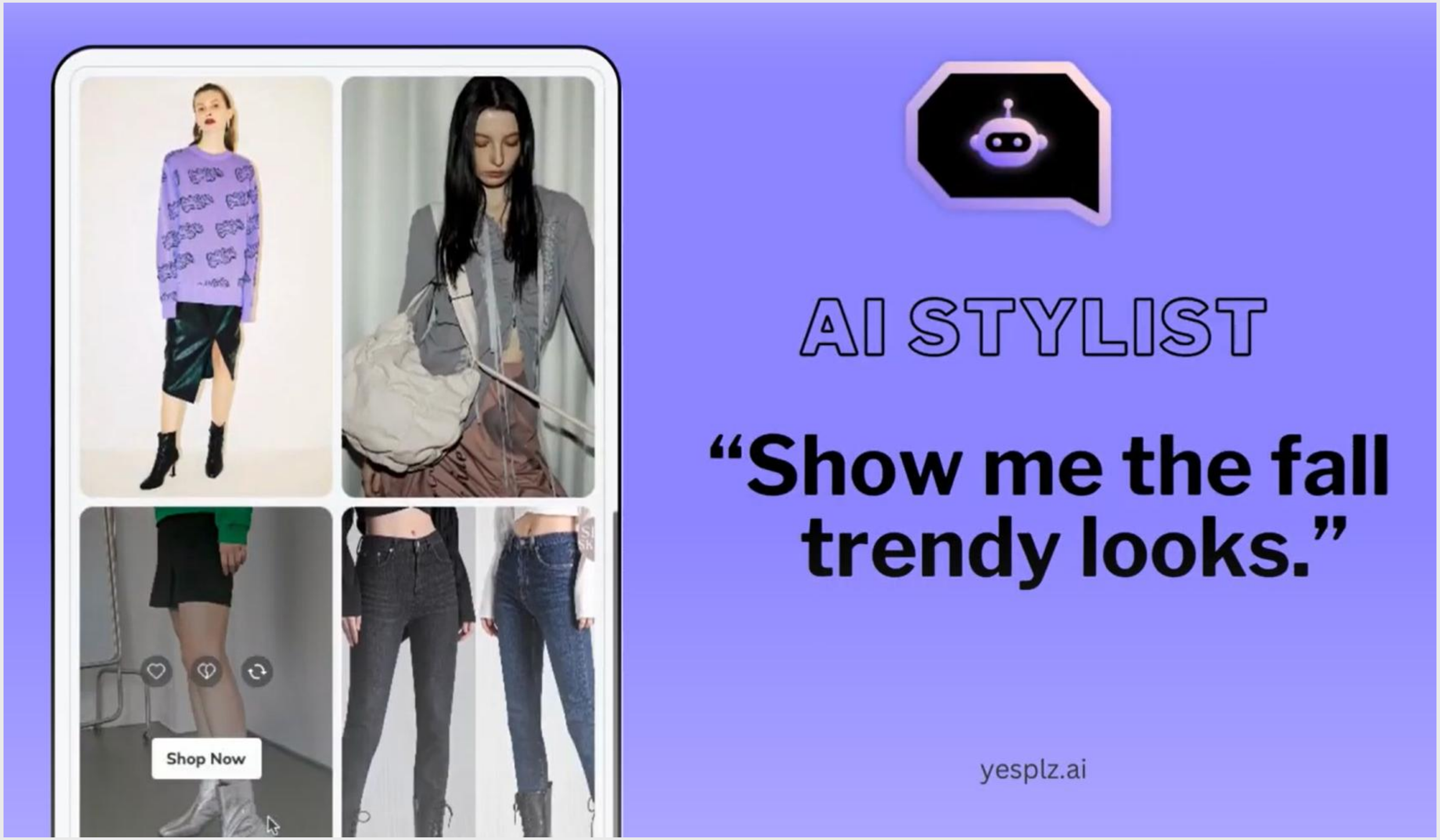
Save the descriptions to a text file with file file path

ChatGPT

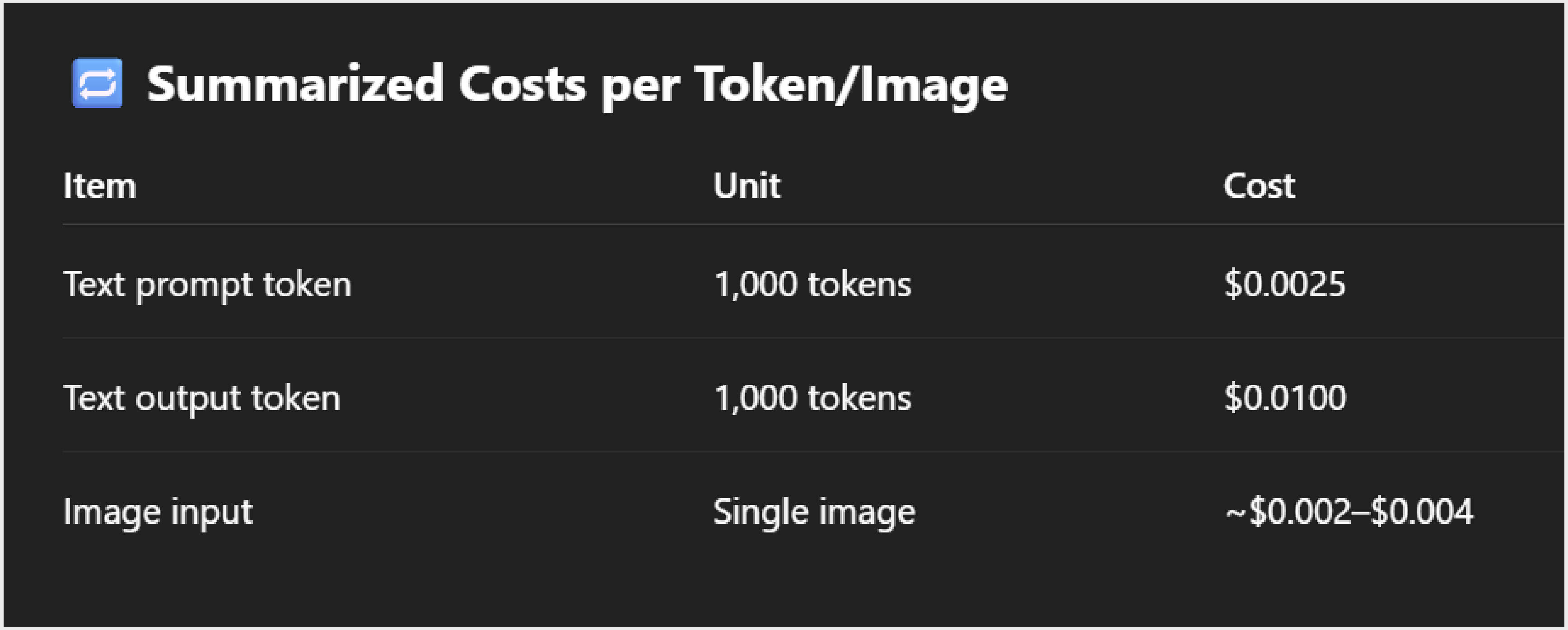
Give ChatGPT your image query and the image file path and descriptions

and it will return the image

AI Fashion Stylist



GPT-4o Pricing



🔁 Summarized Costs per Token/Image

Item	Unit	Cost
Text prompt token	1,000 tokens	$0.0025
Text output token	1,000 tokens	$0.0100
Image input	Single image	~$0.002–$0.004

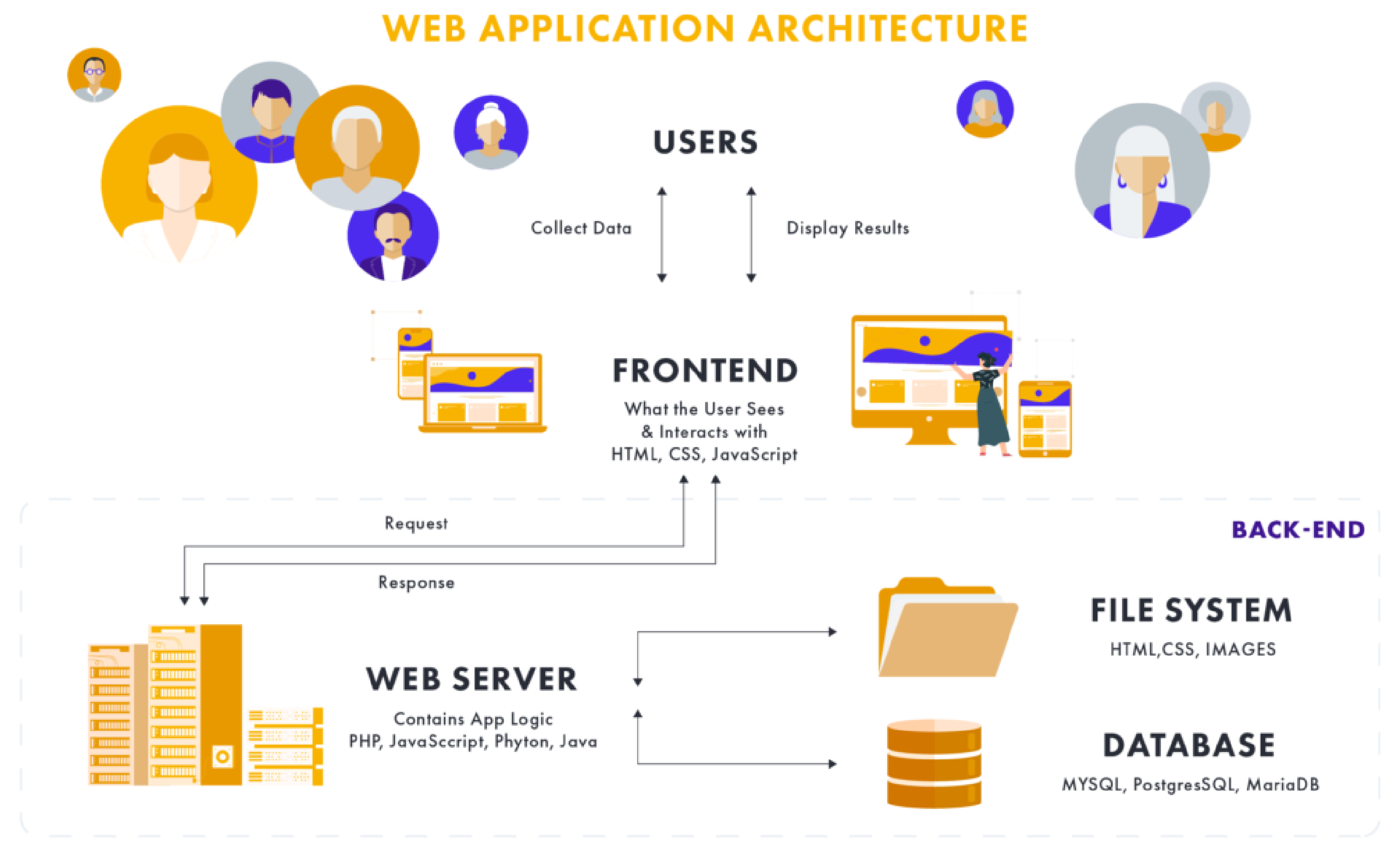
Building Apps with AI

Building Apps with AI

- We can make apps that do cool things with generative AI
  - Caption images, video narrations, behavioral profiles, conversational agents

- We can also use generative AI to build these apps
  - Detailed coding knowledge not necessary
  - But we need to know the general structure and elements of an app

App Structure



https://www.evertop.pl/en/frontend-vs-backend/

Types of Apps

- **Web apps**
  - Run in a web browser
  - Written in HTML, CSS, Javascript, Python
  - Built with frameworks like Streamlit or Flask
  - We will build web apps in this class because they are simple and easy to deploy

- **Mobile apps**
  - Run on a mobile phone
  - Written in Swift (iOS) or Kotlin (Android)
  - Frameworks like React Native or Flutter
  - Require more work to deploy, but not too hard with AI once you have a web version working

Web App Frameworks

- **Web app framework - a pre-built collection of tools, libraries, and structure that simplifies the development of web applications.**

- **Allow one to handle common tasks**
  - **Routing (e.g., URLs directing to different pages)**
  - **Handling user requests (e.g., submitting forms, clicking buttons)**
  - **Interacting with databases (e.g., storing user data)**
  - **Rendering front-end elements (e.g., displaying content on the webpage)**

- **Why use a framework?**
  - **Saves time – no need to build everything from scratch**
  - **Provides structure – organizes code better**
  - **Handles complex tasks – security, authentication, etc.**

Python Based Web App Frameworks

- **We will be using Python based frameworks to build web apps in class**

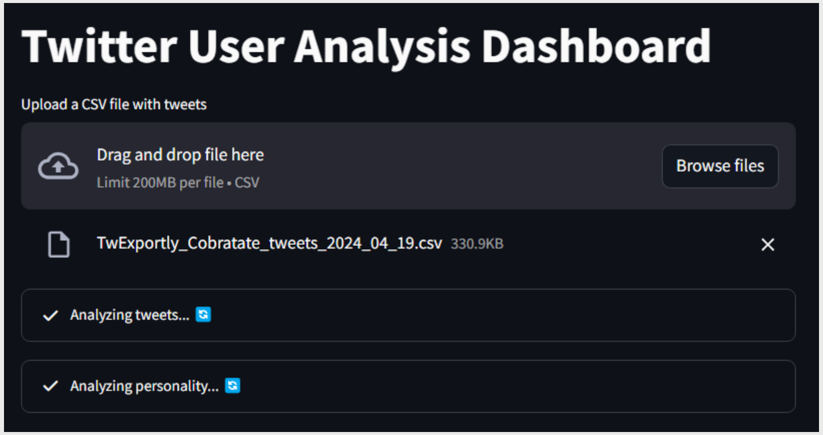
Streamlit

- **Pros**
  - **Easy to get started**
  - **No need to write frontend code (everything is Python)**
  - **Default front end looks good**

- **Cons**
  - **Not flexible**
  - **Front end appearance is a pain to edit**

- **This week we will use Streamlit to get started**

Example Streamlit App



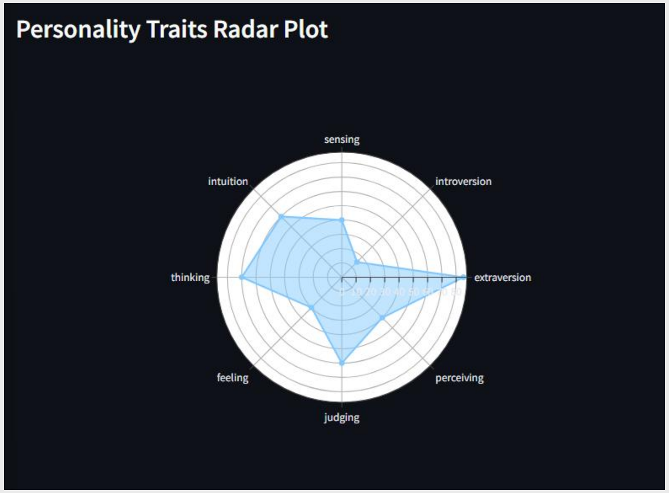
Twitter User Analysis Dashboard

Upload a CSV file with tweets

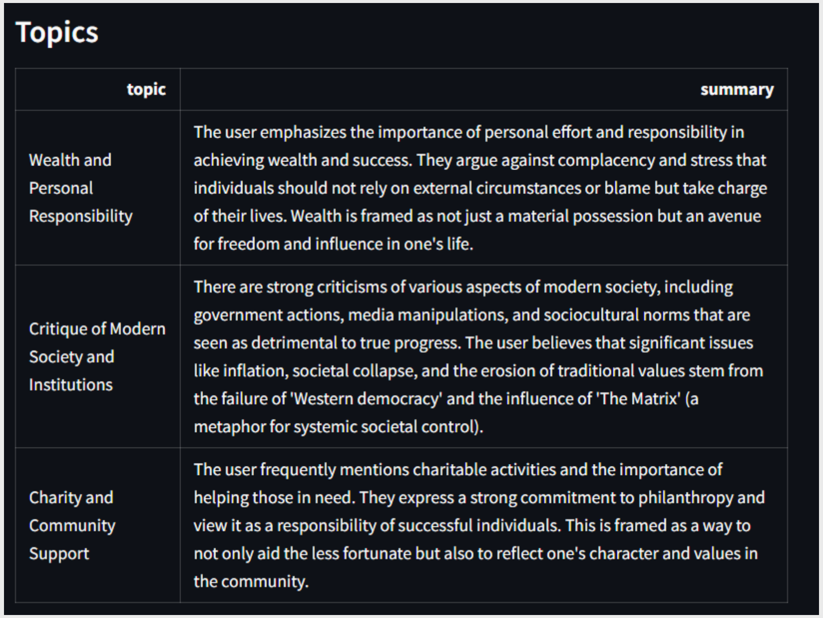
TwExportly_Cobratate_tweets_2024_04_19.csv 330.9KB

✓ Analyzing tweets... 🔄

✓ Analyzing personality... 🔄

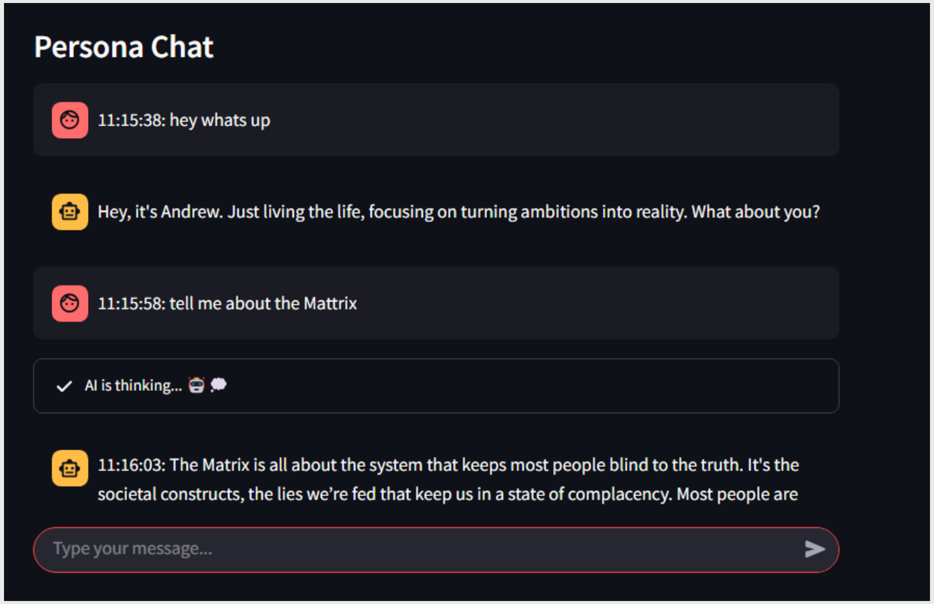


Personality Traits Radar Plot



Topics

topic	summary
Wealth and Personal Responsibility	The user emphasizes the importance of personal effort and responsibility in achieving wealth and success. They argue against complacency and stress that individuals should not rely on external circumstances or blame but take charge of their lives. Wealth is framed as not just a material possession but an avenue for freedom and influence in one's life.
Critique of Modern Society and Institutions	There are strong criticisms of various aspects of modern society, including government actions, media manipulations, and sociocultural norms that are seen as detrimental to true progress. The user believes that significant issues like inflation, societal collapse, and the erosion of traditional values stem from the failure of 'Western democracy' and the influence of 'The Matrix' (a metaphor for systemic societal control).
Charity and Community Support	The user frequently mentions charitable activities and the importance of helping those in need. They express a strong commitment to philanthropy and view it as a responsibility of successful individuals. This is framed as a way to not only aid the less fortunate but also to reflect one's character and values in the community.



Persona Chat

11:15:38: hey whats up

Hey, it's Andrew. Just living the life, focusing on turning ambitions into reality. What about you?

11:15:58: tell me about the Mattrix

✓ AI is thinking... 🤖 💭

11:16:03: The Matrix is all about the system that keeps most people blind to the truth. It's the societal constructs, the lies we're fed that keep us in a state of complacency. Most people are

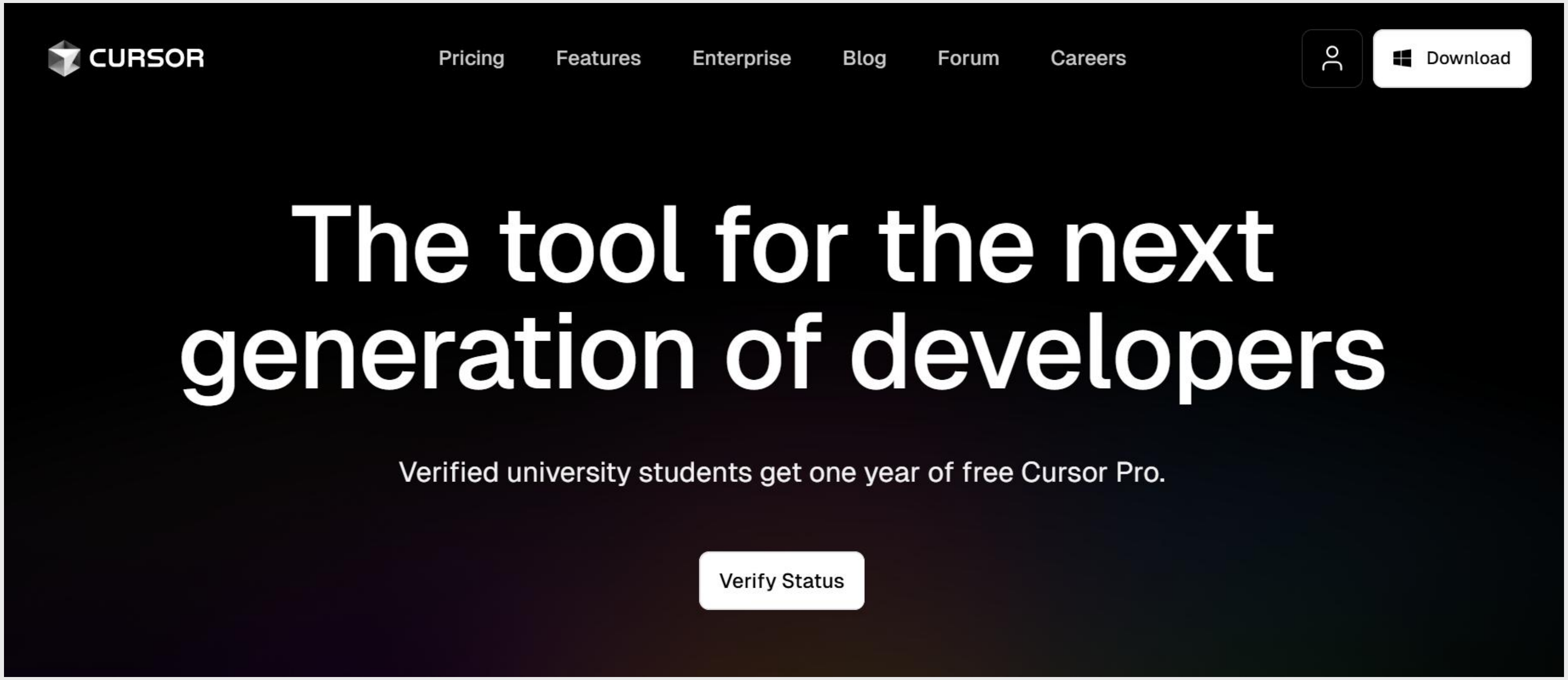
App Maker, App Maker, Make Me an App

- Today there are many AI-powered app makers
  - Require (almost) zero coding knowledge
  - Cost money $$$ (minimum $20 per month, but can go higher depending on use)
  - Provide an AI agent you tell what app to build, and it builds it, fixes errors, and lets you test it
- These app makers are basically an LLM inside a nice wrapper

bolt
Prompt, run, edit, and deploy full-stack web apps.
How can Bolt help you today?

Cursor

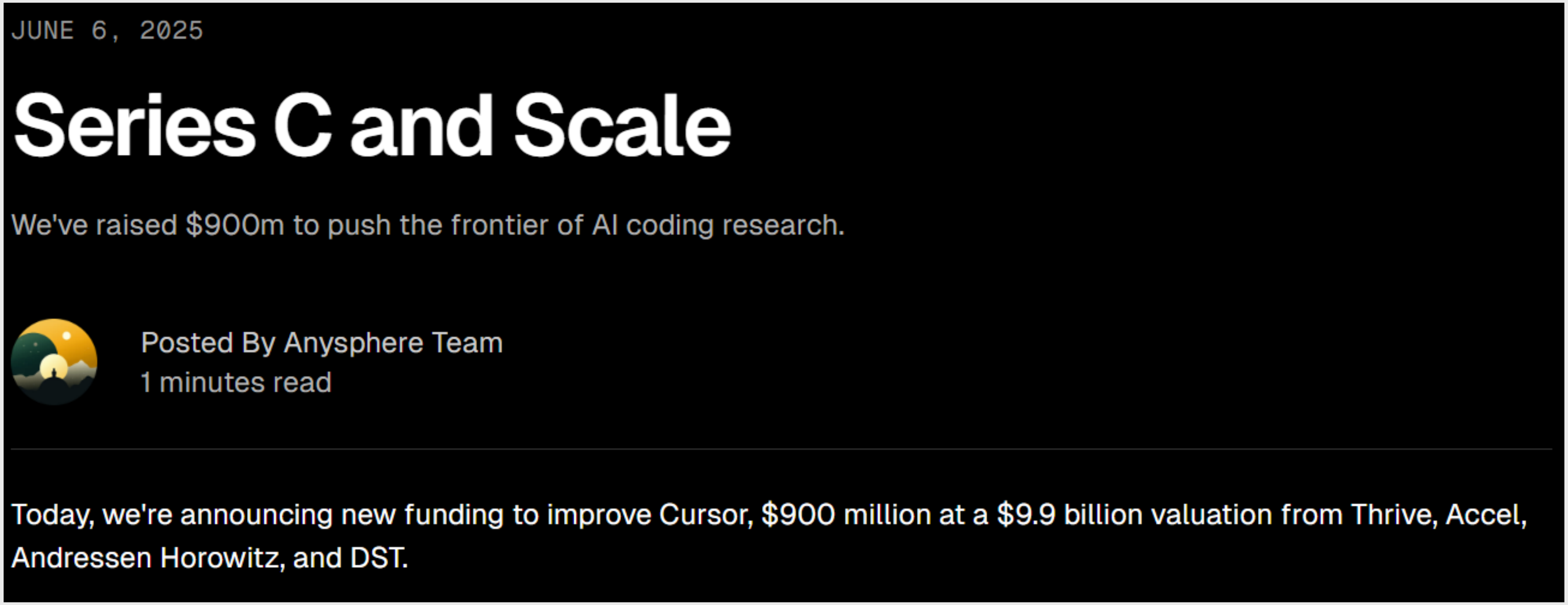
- **We will build apps in Cursor**
  - **Free for students for one year (need a .edu email address)**



The tool for the next generation of developers

Verified university students get one year of free Cursor Pro.

Cursor Growth



JUNE 6, 2025

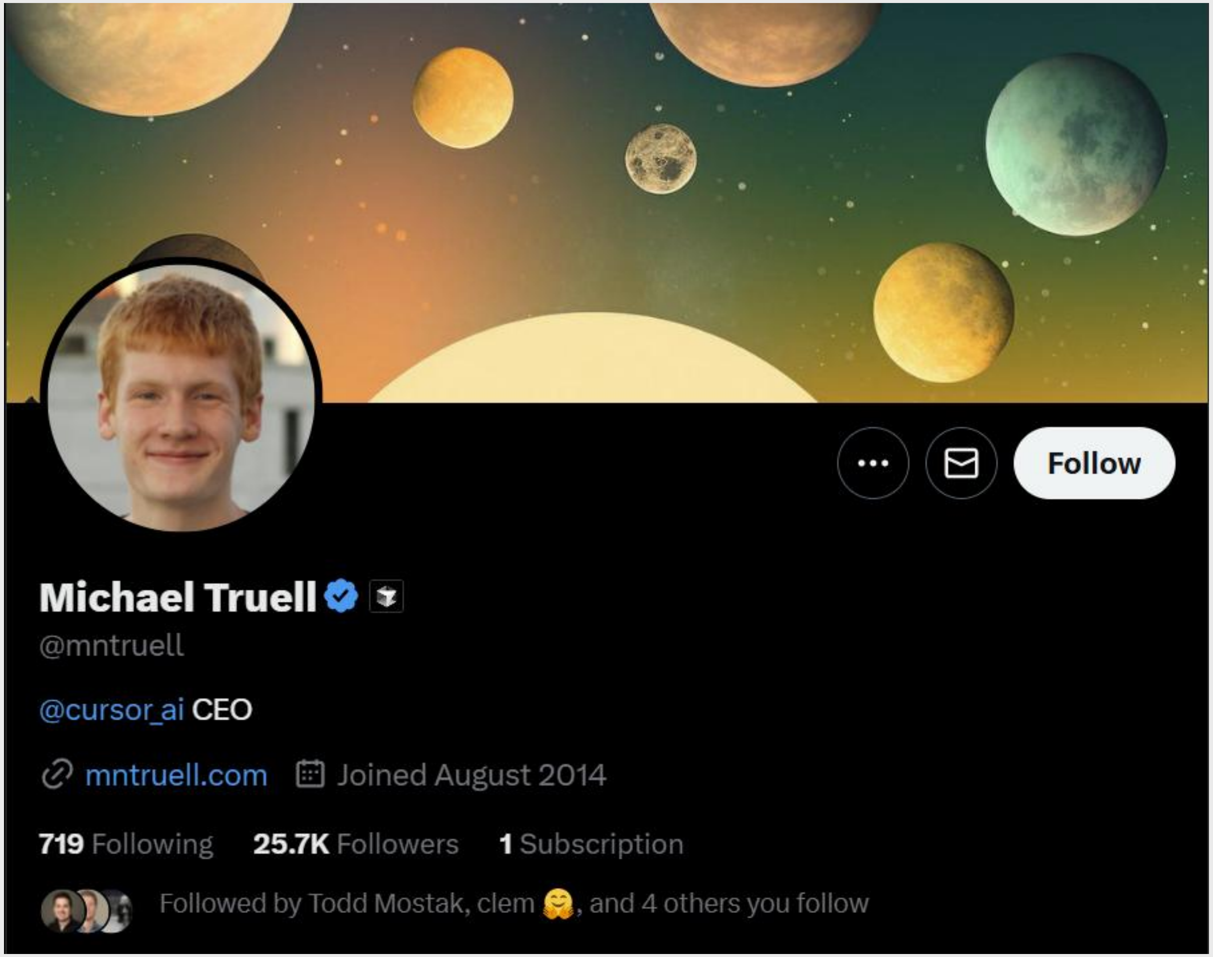
Series C and Scale

We've raised $900m to push the frontier of AI coding research.

Posted By Anysphere Team
1 minutes read

Today, we're announcing new funding to improve Cursor, $900 million at a $9.9 billion valuation from Thrive, Accel, Andressen Horowitz, and DST.

Cursor Founder



Michael Truell

@mntruell

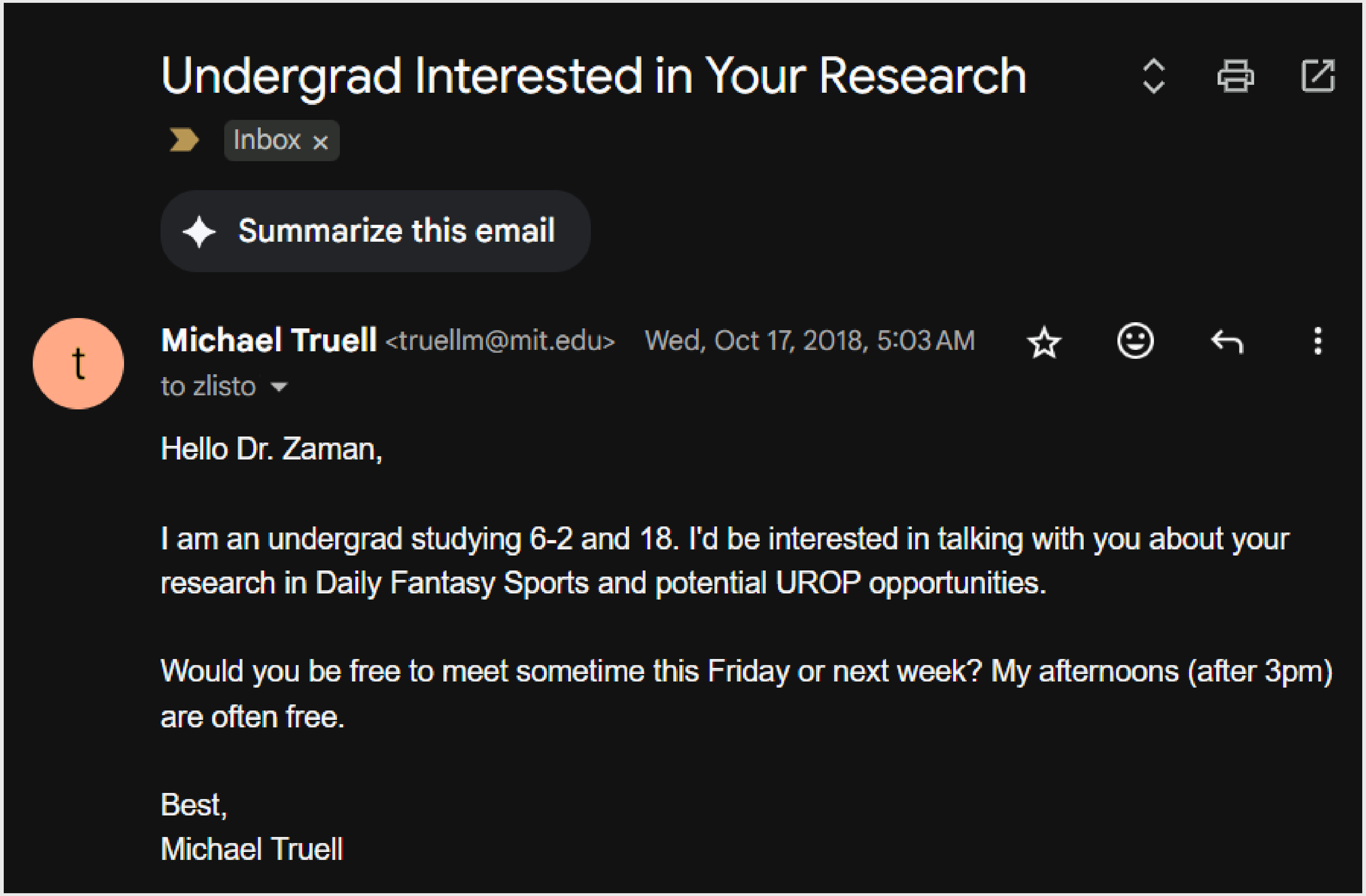
@cursor_ai CEO

mntruell.com Joined August 2014

719 Following 25.7K Followers 1 Subscription

Followed by Todd Mostak, clem 🤗, and 4 others you follow

Before He Founded Cursor



Undergrad Interested in Your Research

Michael Truell <truellm@mit.edu> Wed, Oct 17, 2018, 5:03 AM

to zlisto

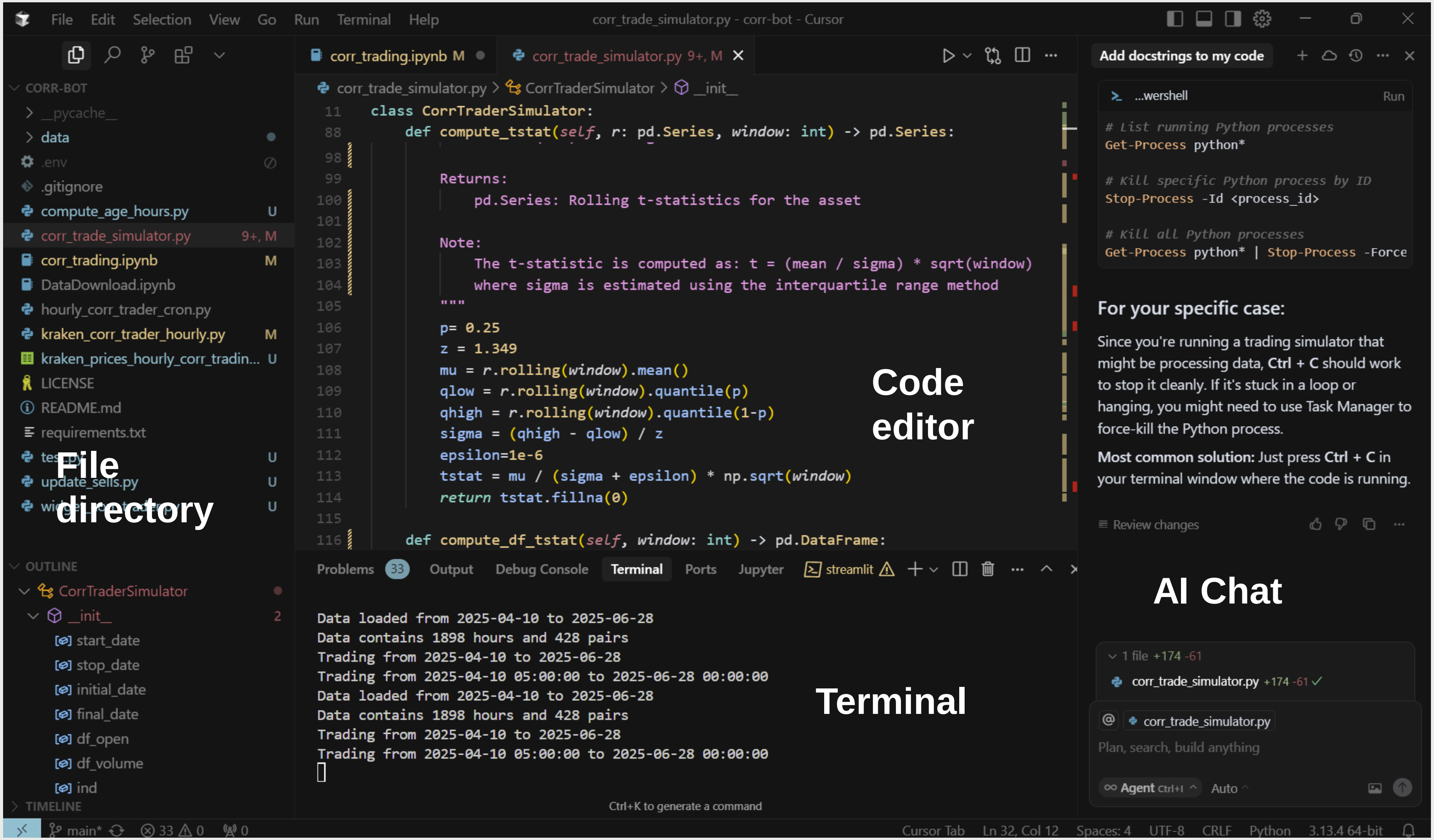
Hello Dr. Zaman,

I am an undergrad studying 6-2 and 18. I'd be interested in talking with you about your research in Daily Fantasy Sports and potential UROP opportunities.

Would you be free to meet sometime this Friday or next week? My afternoons (after 3pm) are often free.

Best,
Michael Truell

Cursor Interface


File Edit Selection View Go Run Terminal Help
corr_trade_simulator.py - corr-bot - Cursor
CORR-BOT
__pycache__
data
.env
.gitignore
compute_age_hours.py U
corr_trade_simulator.py 9+, M
corr_trading.ipynb M
DataDownload.ipynb
hourly_corr_trader_cron.py
kraken_corr_trader_hourly.py M
kraken_prices_hourly_corr_tradin... U
LICENSE
README.md
requirements.txt
test.py U
update_sells.py U
OUTLINE
CorrTraderSimulator
__init__ 2
start_date
stop_date
initial_date
final_date
df_open
df_volume
ind
TIMELINE
corr_trading.ipynb M
corr_trade_simulator.py 9+, M
corr_trade_simulator.py > CorrTraderSimulator > __init__
Problems 33
Output
Debug Console
Terminal
Ports
Jupyter
streamlit
Ctrl+K to generate a command
Add docstrings to my code
...wershell
Run
Review changes
1 file +174 -61
corr_trade_simulator.py +174 -61 ✓
@ corr_trade_simulator.py
Plan, search, build anything
Agent Ctrl+I
Auto
main* ⓧ 33 ⚠ 0 0
Cursor Tab Ln 32, Col 12 Spaces: 4 UTF-8 CRLF Python 3.13.4 64-bit

File directory

Code editor

Terminal

AI Chat

```python
class CorrTraderSimulator:
    def compute_tstat(self, r: pd.Series, window: int) -> pd.Series:

        Returns:
            pd.Series: Rolling t-statistics for the asset

        Note:
            The t-statistic is computed as: t = (mean / sigma) * sqrt(window)
            where sigma is estimated using the interquartile range method
        """
        p= 0.25
        z = 1.349
        mu = r.rolling(window).mean()
        qlow = r.rolling(window).quantile(p)
        qhigh = r.rolling(window).quantile(1-p)
        sigma = (qhigh - qlow) / z
        epsilon=1e-6
        tstat = mu / (sigma + epsilon) * np.sqrt(window)
        return tstat.fillna(0)

    def compute_df_tstat(self, window: int) -> pd.DataFrame:
```

```
Data loaded from 2025-04-10 to 2025-06-28
Data contains 1898 hours and 428 pairs
Trading from 2025-04-10 to 2025-06-28
Trading from 2025-04-10 05:00:00 to 2025-06-28 00:00:00
Data loaded from 2025-04-10 to 2025-06-28
Data contains 1898 hours and 428 pairs
Trading from 2025-04-10 to 2025-06-28
Trading from 2025-04-10 05:00:00 to 2025-06-28 00:00:00
```

```powershell
# List running Python processes
Get-Process python*

# Kill specific Python process by ID
Stop-Process -Id <process_id>

# Kill all Python processes
Get-Process python* | Stop-Process -Force
```

For your specific case:

Since you're running a trading simulator that might be processing data, **Ctrl + C** should work to stop it cleanly. If it's stuck in a loop or hanging, you might need to use Task Manager to force-kill the Python process.

Most common solution: Just press **Ctrl + C** in your terminal window where the code is running.

Cursor Installation

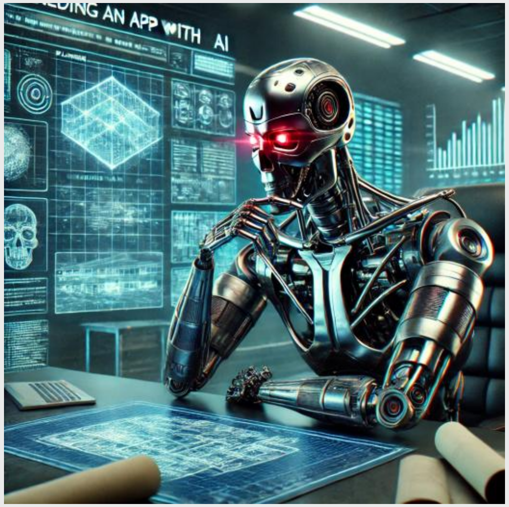
- Steps for setting up Cursor for making Python based apps
  1. Sign up for Cursor with your .edu email address
  2. Download and install Cursor
  3. Download and install Python
  4. Connect Cursor to Python- Cursor needs to know where your Python is on your computer
- Detailed instructions on course website on Instructions page

APP MAKER APP MAKER MAKE ME AN APP

Building an App with AI: Planning

- The key to making good apps with AI is to plan ahead of time what you want in the app
  - The more detail and structure you include, the better the AI will be at writing the app code

- Detailed text description of the app
  - What it does or the user experience with the app
  - What framework you want to use
  - What data you will have
  - What custom functions you need (or already have) and what their inputs and outputs are
  - What the frontend looks like



Top Tweets App

- **Let’s make an app where I can upload a file of tweets and then display the top engaging tweets in a table**

- **AI prompt:** App maker app maker, make me an app. I would like to make a Streamlit app to analyze tweets. The tweets are in a csv file with columns text, favorite_count, view_count. I want to drag the file into the webpage. Then it will be loaded into a dataframe df. Then I want to calculate a new column engagement which is favorite_count/view_count. Then I want to rank the tweets by engagement in descending order. Then I want to display the tweet text and engagement in a nice table that I can scroll up and down. I want the highest engagement tweet on top. Each time I upload a new csv file, recompute everything. I want the app to be titled “Top Tweets. Also include requirements file.

Custom Functions

- To make things simpler, you can write custom functions that process the data, and have the main app code call these functions
  - For instance, the AI may not know you already have a nice GenAI class that does AI stuff for you (but if you put it in your app folder, Cursor will find it and figure it out)

- Put the functions in a file called utils.py

- When telling the AI to use the function, tell it that it is in the utils.py file, its name, its inputs, and its outputs

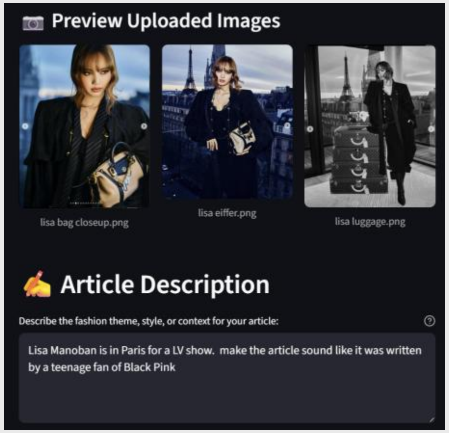
Fashion Blog Generator App

- Let’s make an app where I can upload an image and then have the AI write a fashion blog about it

- AI AI prompt: Let’s make an app where I can upload a set of images, give a text description, and then have the AI write a fashion blog about it. the app should be in streamlit. i have a function get_article_html(image_paths, text_description) that takes a list of image paths and the text description and returns HTML of the artcile. the funciton in in my utils.py file. write a prompt i can give the AI to tell it how to make it. add in details about buttons, flow, etc. Include a requirements file.

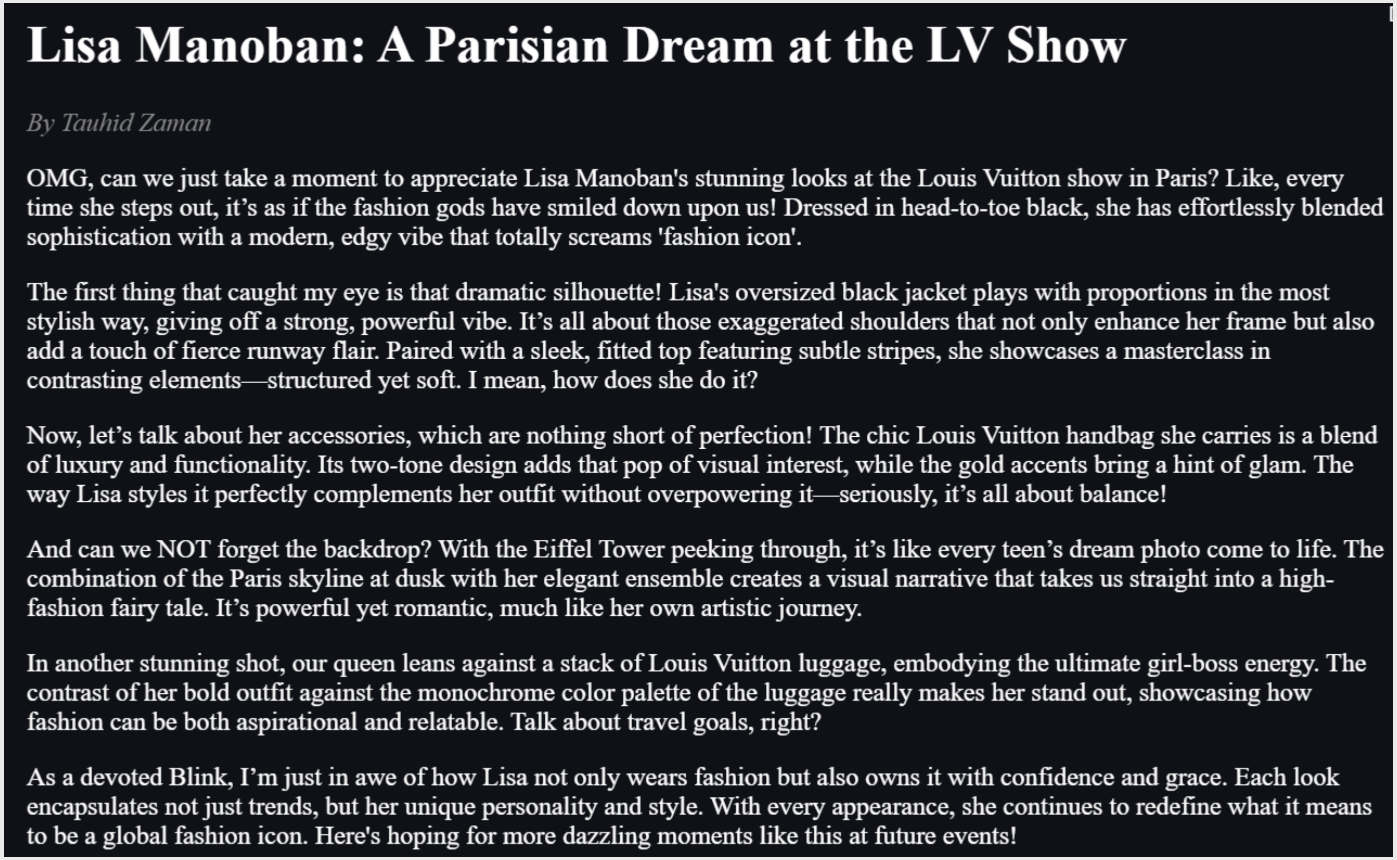
- Give this prompt to ChatGPT to get a nicer prompt to give to Cursor

Fashion Blog Generator App



Describe the fashion theme, style, or context for your article:

Lisa Manoban is in Paris for a LV show. make the article sound like it was written by a teenage fan of Black Pink



Lisa Manoban: A Parisian Dream at the LV Show

By Tauhid Zaman

OMG, can we just take a moment to appreciate Lisa Manoban's stunning looks at the Louis Vuitton show in Paris? Like, every time she steps out, it’s as if the fashion gods have smiled down upon us! Dressed in head-to-toe black, she has effortlessly blended sophistication with a modern, edgy vibe that totally screams 'fashion icon'.

The first thing that caught my eye is that dramatic silhouette! Lisa's oversized black jacket plays with proportions in the most stylish way, giving off a strong, powerful vibe. It’s all about those exaggerated shoulders that not only enhance her frame but also add a touch of fierce runway flair. Paired with a sleek, fitted top featuring subtle stripes, she showcases a masterclass in contrasting elements—structured yet soft. I mean, how does she do it?

Now, let’s talk about her accessories, which are nothing short of perfection! The chic Louis Vuitton handbag she carries is a blend of luxury and functionality. Its two-tone design adds that pop of visual interest, while the gold accents bring a hint of glam. The way Lisa styles it perfectly complements her outfit without overpowering it—seriously, it’s all about balance!

And can we NOT forget the backdrop? With the Eiffel Tower peeking through, it’s like every teen’s dream photo come to life. The combination of the Paris skyline at dusk with her elegant ensemble creates a visual narrative that takes us straight into a high-fashion fairy tale. It’s powerful yet romantic, much like her own artistic journey.

In another stunning shot, our queen leans against a stack of Louis Vuitton luggage, embodying the ultimate girl-boss energy. The contrast of her bold outfit against the monochrome color palette of the luggage really makes her stand out, showcasing how fashion can be both aspirational and relatable. Talk about travel goals, right?

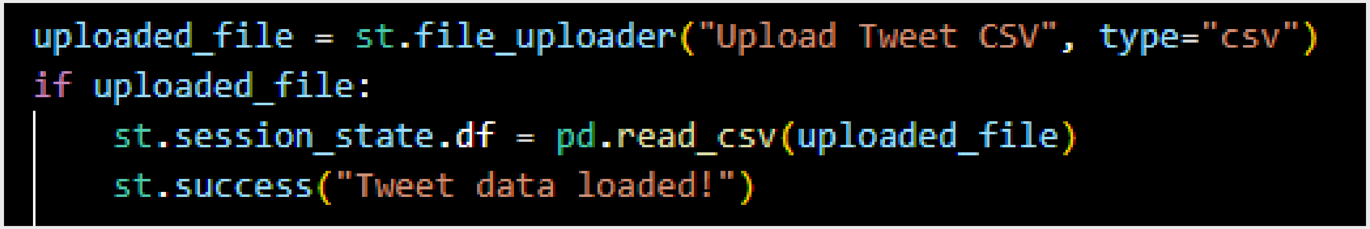
As a devoted Blink, I’m just in awe of how Lisa not only wears fashion but also owns it with confidence and grace. Each look encapsulates not just trends, but her unique personality and style. With every appearance, she continues to redefine what it means to be a global fashion icon. Here's hoping for more dazzling moments like this at future events!

Muti-Page Apps

- Pages - more complex apps will have multiple pages where different tasks occur
  - Tell the AI what pages you want and what they are called
  - Tell the AI what tasks occur on each page, functions called, data needed, etc.

Muti-Page Apps

- **Pages - more complex apps will have multiple pages where different tasks occur**
  - **Tell the AI what pages you want and what they are called**
  - **Tell the AI what tasks occur on each page, functions called, data needed, etc.**
- **State variables**
  - **If certain data or function outputs are used on multiple pages, you can save them to “state variables” in Streamlit**
  - **Eliminates need to redo slow computations (like calling up an AI to write lengthy HTML)**
  - **Syntax: st.session_state.variable_name = variable**



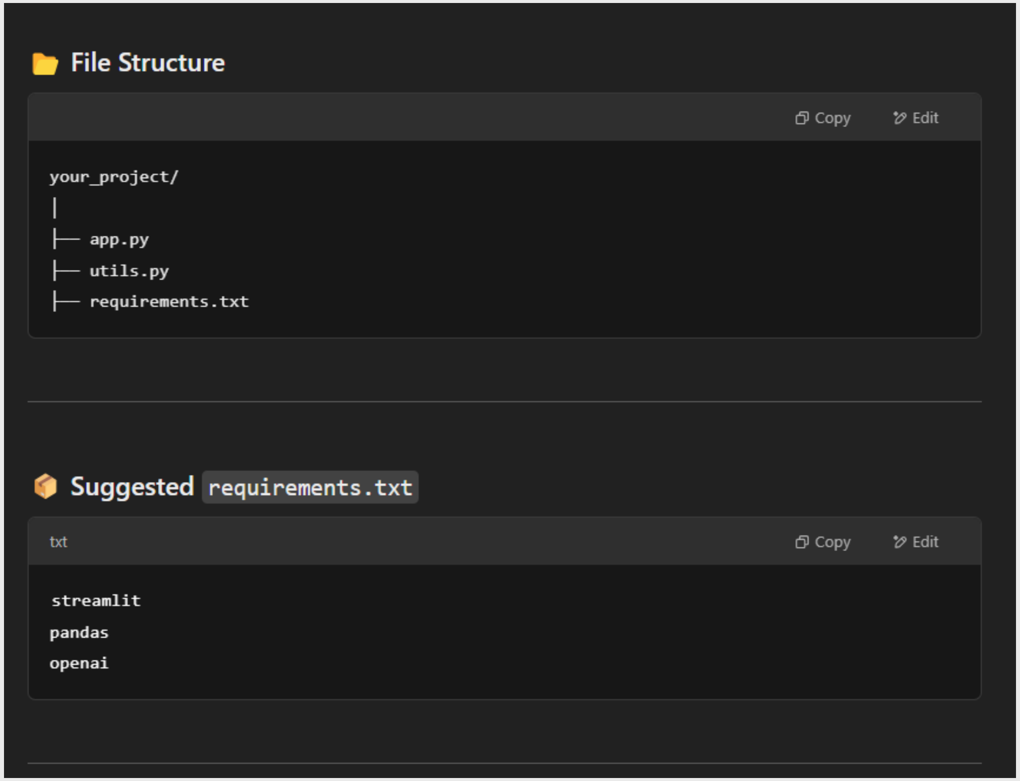
```
uploaded_file = st.file_uploader("Upload Tweet CSV", type="csv")
if uploaded_file:
    st.session_state.df = pd.read_csv(uploaded_file)
    st.success("Tweet data loaded!")
```

Fashion Blog + Item Description Generator App

- Let’s add a page to my fashion blog app where I can get detailed descriptions of the fashion items in the image. I want to be able to choose a pic I uploaded from a list of small icons, and when I click it, the file path is put in a list image_paths and sent to a function describe_fashion_items(image_paths) in my utils.py file. The function returns the fashion items as a nice HTML table you can display.

Requirements File

- A good app has a requirements.txt file with the packages that need to be installed
- The AI can write this for you based on the code



📁 File Structure

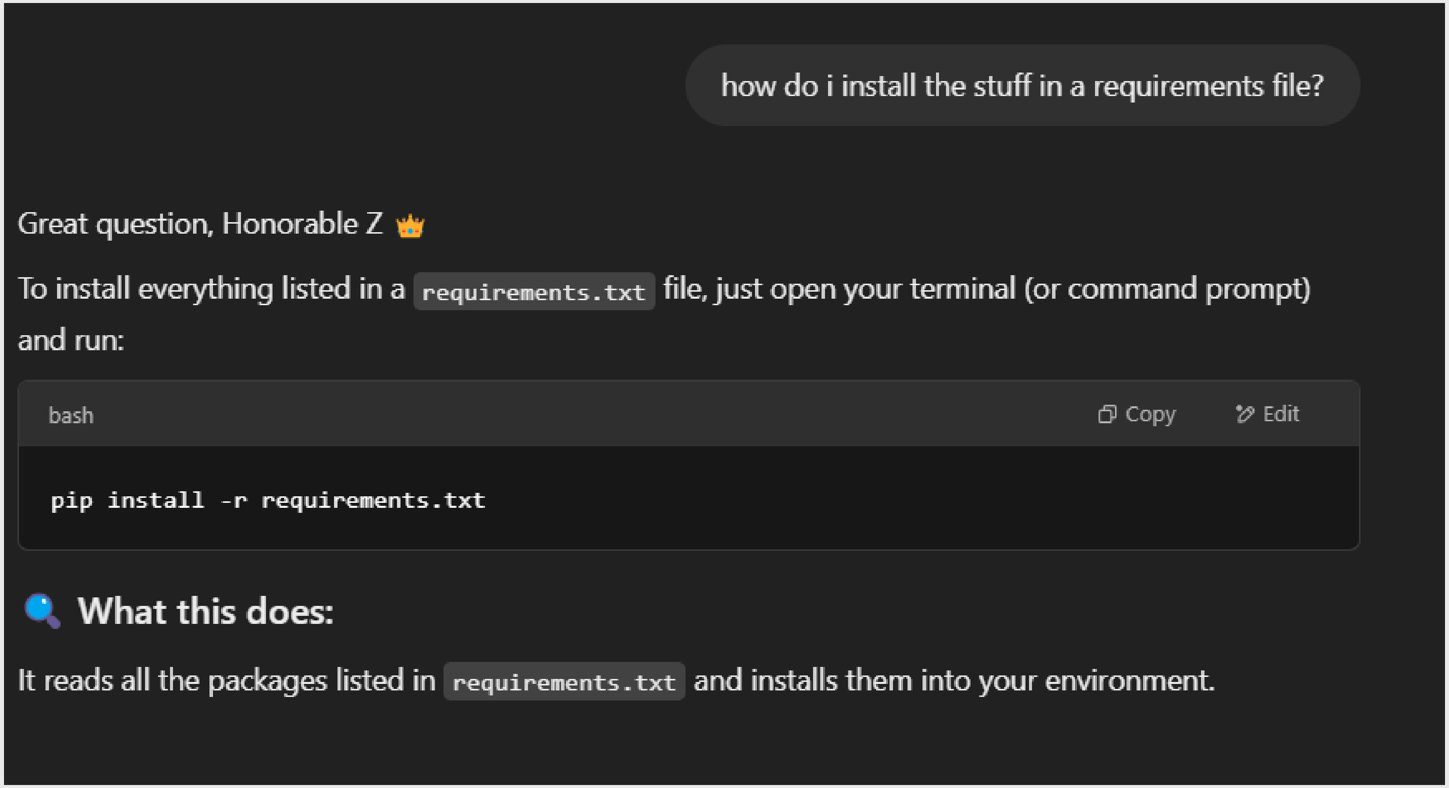
```
your_project/
|
├── app.py
├── utils.py
├── requirements.txt
```

📦 Suggested `requirements.txt`

```txt
streamlit
pandas
openai
```

Installing Packages

- **The AI can even tell you how to install these packages, or do it for you**



how do i install the stuff in a requirements file?

Great question, Honorable Z 👑

To install everything listed in a `requirements.txt` file, just open your terminal (or command prompt) and run:

```bash
pip install -r requirements.txt
```

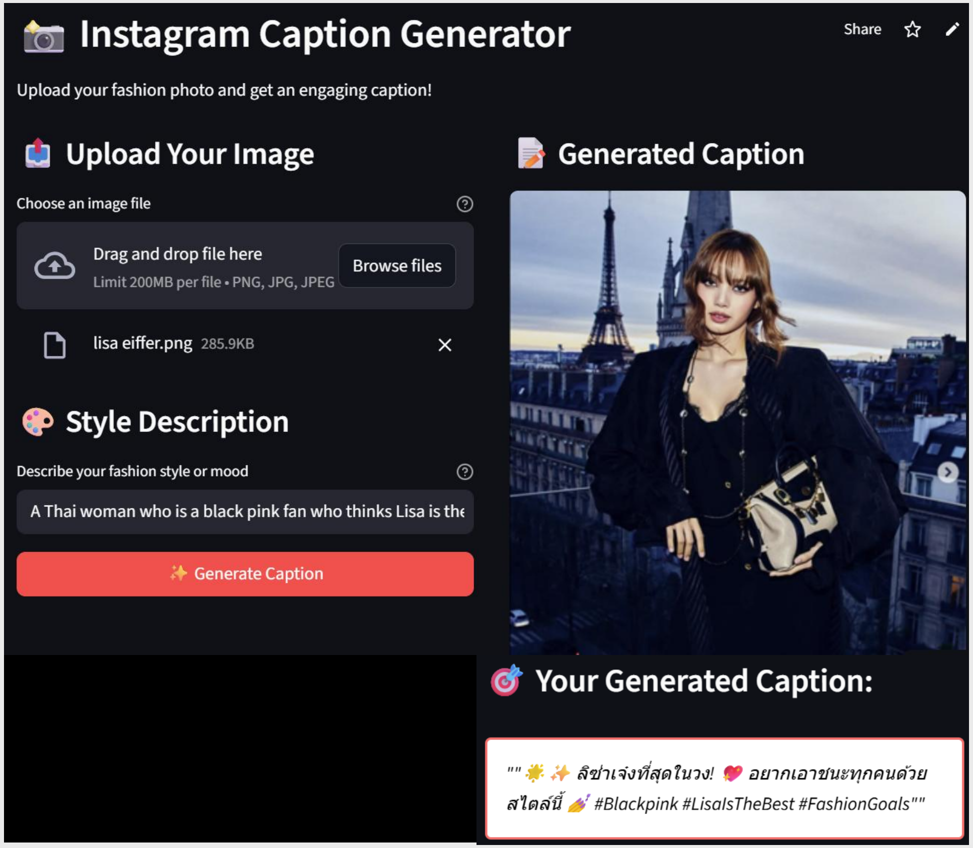
🔍 What this does:

It reads all the packages listed in `requirements.txt` and installs them into your environment.

Coding Session

- In our coding session we will build an image captioning web app using AI and Streamlit

- App will be built in Cursor



📸 Instagram Caption Generator

Upload your fashion photo and get an engaging caption!

📤 Upload Your Image

Choose an image file

Drag and drop file here
Limit 200MB per file • PNG, JPG, JPEG

lisa eiffer.png 285.9KB

🎨 Style Description

Describe your fashion style or mood

A Thai woman who is a black pink fan who thinks Lisa is the

📝 Generated Caption

🎯 Your Generated Caption:

""🌟 ✨ ลิซ่าเจ๋งที่สุดในวง! 💖 อยากเอาชนะทุกคนด้วยสไตล์นี้ 💅 #Blackpink #LisaIsTheBest #FashionGoals""