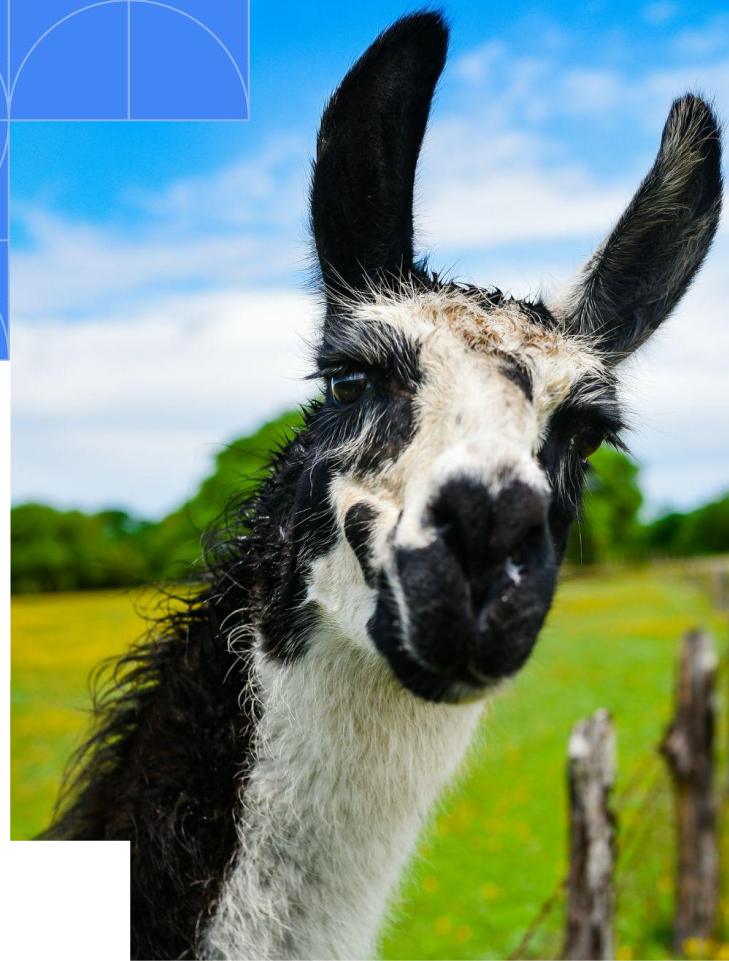


# Build with AI

## Intro to AI + Gemini 101

 Google Developer Groups



# Who am I?

ChengCheng Tan

- BA Linguistics & CS, **UCLA**
- MS CS HCI, **Stanford**
- **LLM + AI Safety**  
FAR AI Communications  
AISafety.info + chatbot
- Google WTM Ambassador

\* DISCLAIMER ideas presented here are my own



temperature Reinforcement frontier  
RLHF AI Learning models  
Pretrained Supervised video  
Learning Deep  
Gemini Generative AI Learning  
Claude vision Neural Networks  
GPT LLM tokens Multimodal  
API prompts Conversation Finetuned  
keys SDK Intruaction Tuned language NLP

# Build with AI



## Intro to AI



# AI Map

- Artificial Intelligence (AI)
- Machine Learning (ML)
- DeepLearning
- Generative AI (GenAI)



# AI Map

## **Artificial Intelligence (AI)**

Create machines that can perform tasks with human-like abilities: reasoning, learning & problem-solving.

# AI Map

AI

GOFAI

Expert Systems

Planning Systems

Fuzzy Logic

**Machine Learning (ML)**

Learn patterns from data,  
without explicit programming.

# AI Map

AI

ML

Decision Trees

Random Forests

Gradient Boost

Naive Bayes

SVM

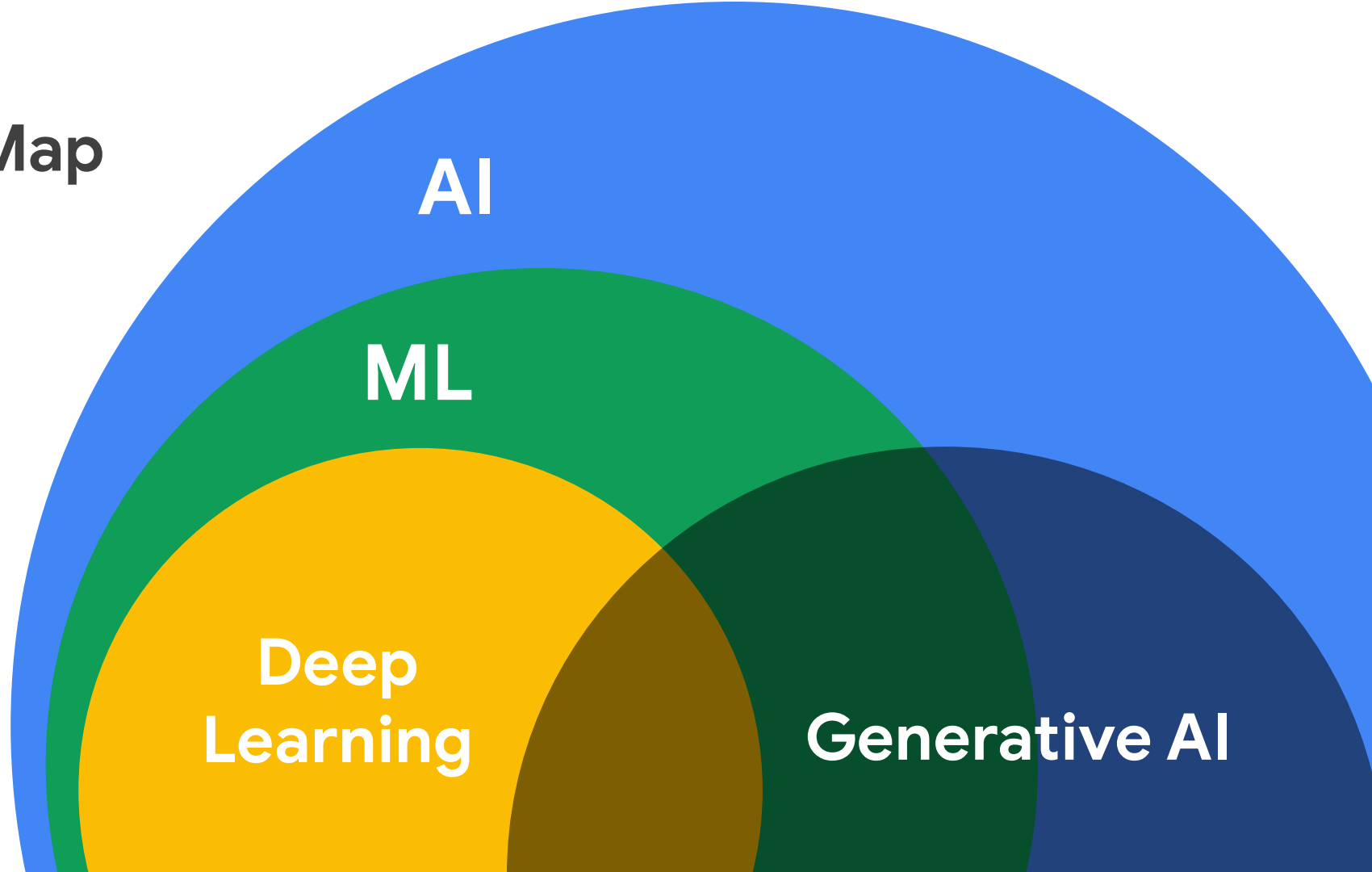
KNN

**Deep Learning**

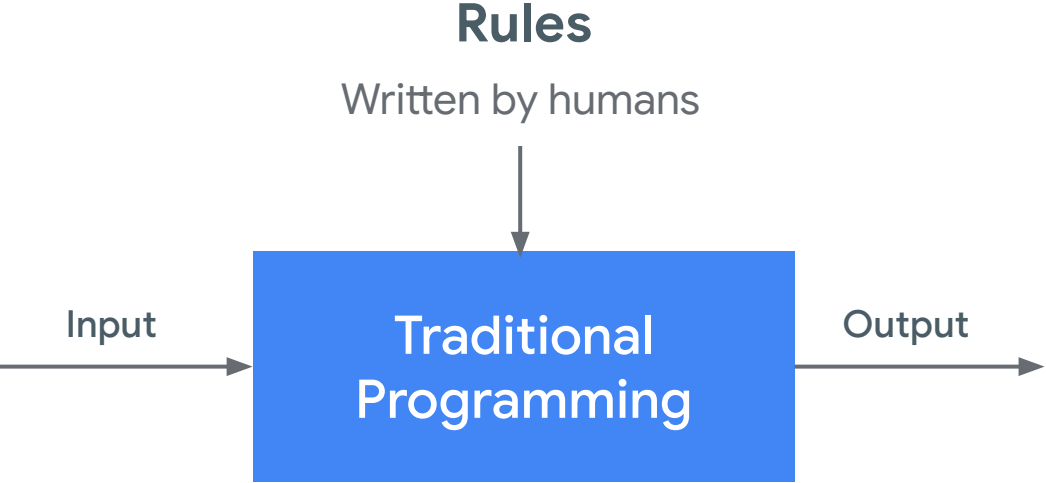
Complex patterns with  
neural networks.



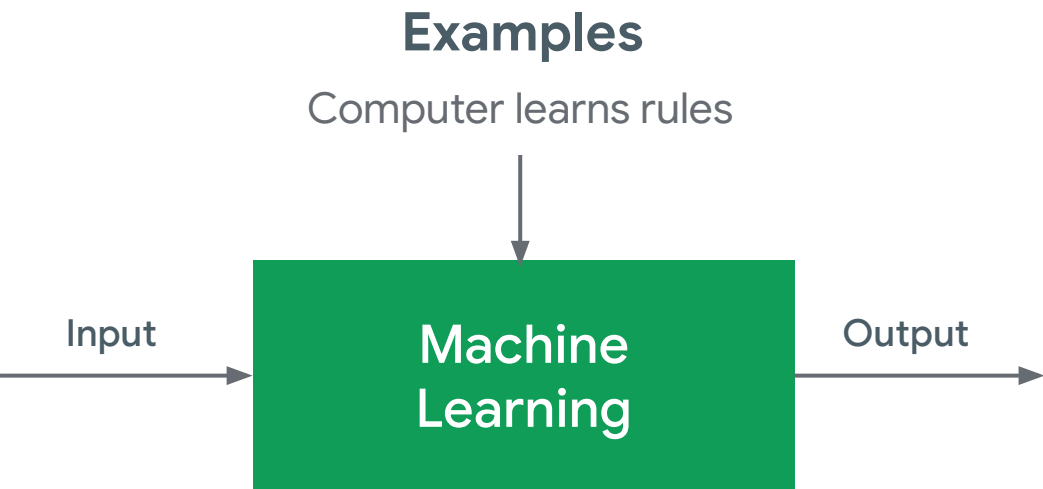
**AI Map**



# Old GOFAI Way



# New ML Way







● Iris **sentosa**



petal

sepal

● Iris **versicolor**



petal

sepal

● Iris **virginica**



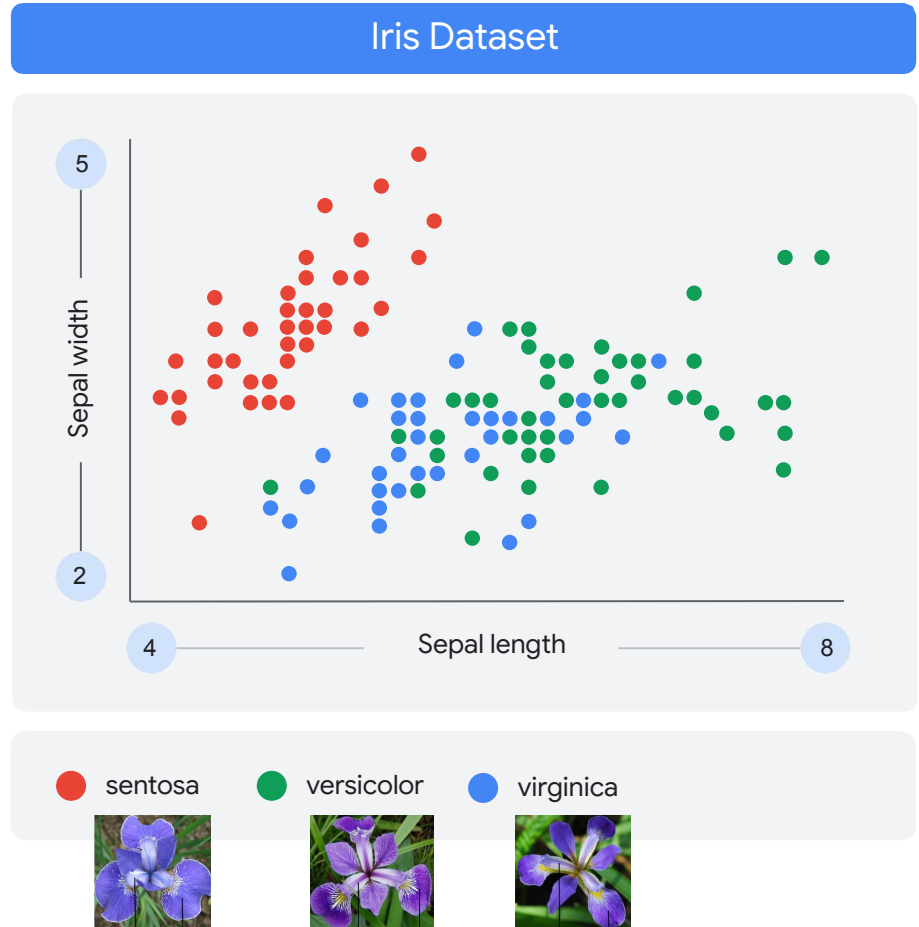
petal

sepal

# Supervised Learning

The data is **already labeled**

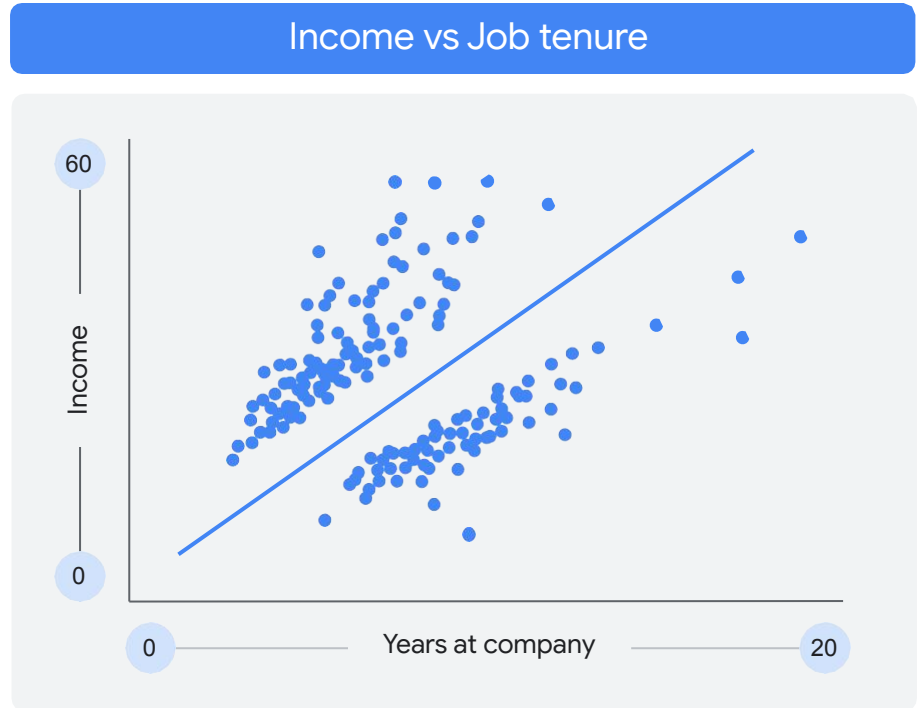
Learn from past examples  
to predict future values.



# Unsupervised Learning

The data is **not labeled**

Look at raw data to see  
if it naturally falls in groups.



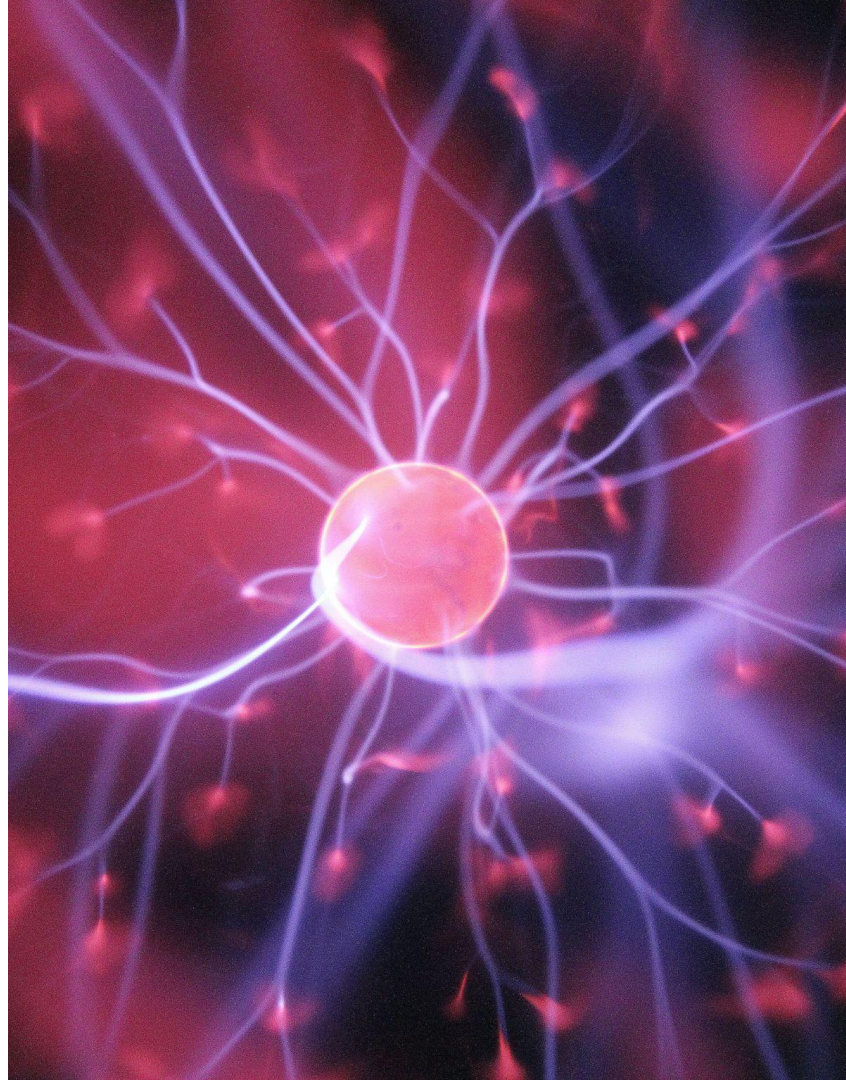
Example Model: Clustering

Is this employee on the “fast-track” or not?

# Neural Networks

Artificial neural networks (ANN) are inspired by connections in the [human brain](#).

Can have one or more hidden layers.

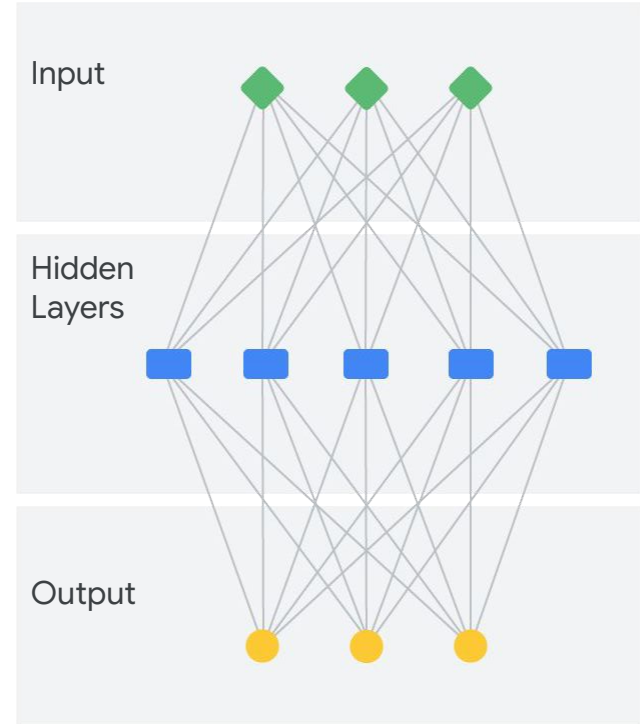




# Neural Networks

Artificial neural networks (ANN) are inspired by connections in the [human brain](#).

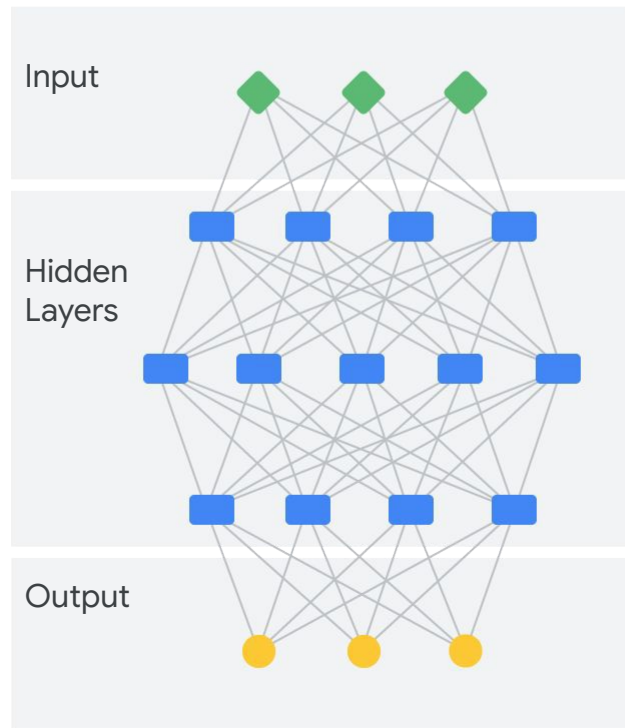
Can have one or more hidden layers.  
Each node is a neuron or parameter.



# Deep Learning

A **deep** neural network (DNN)  
with **multiple hidden layers**

Large foundational models have  
billions of neurons or parameters.



# AI Model Types



Discriminative

Simple Output



Generative

Complex Output

# Generative AI (GenAI)

AI that **generates content** for you.



Text



Code



Image



Speech



Video



3D

# Why now?

## Converging Forces

- Data
- Algorithms
- GPU Compute





# How does it work?



Language Models

Next word prediction



Image Generation

Denoising images



# Understanding the Excitement

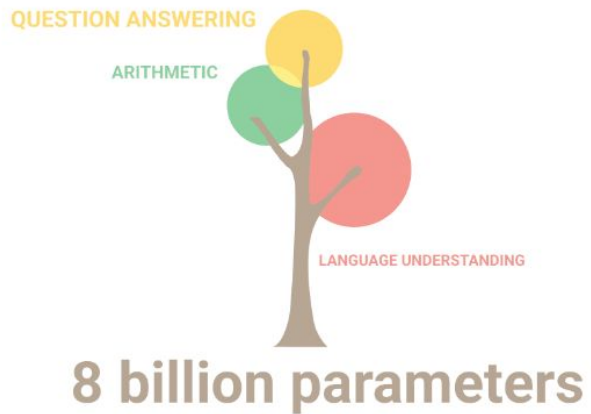


Narrow  
Specialists

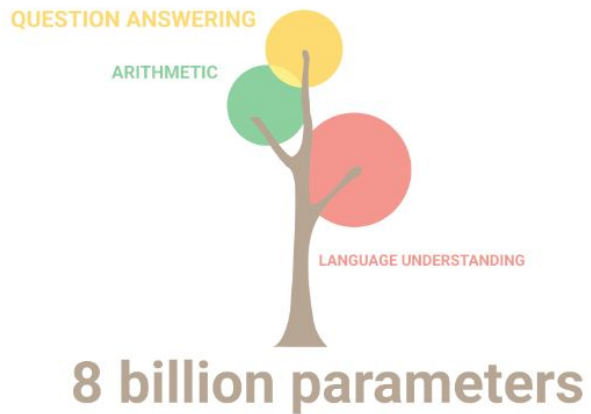


General  
Artificial General Intelligence (AGI)

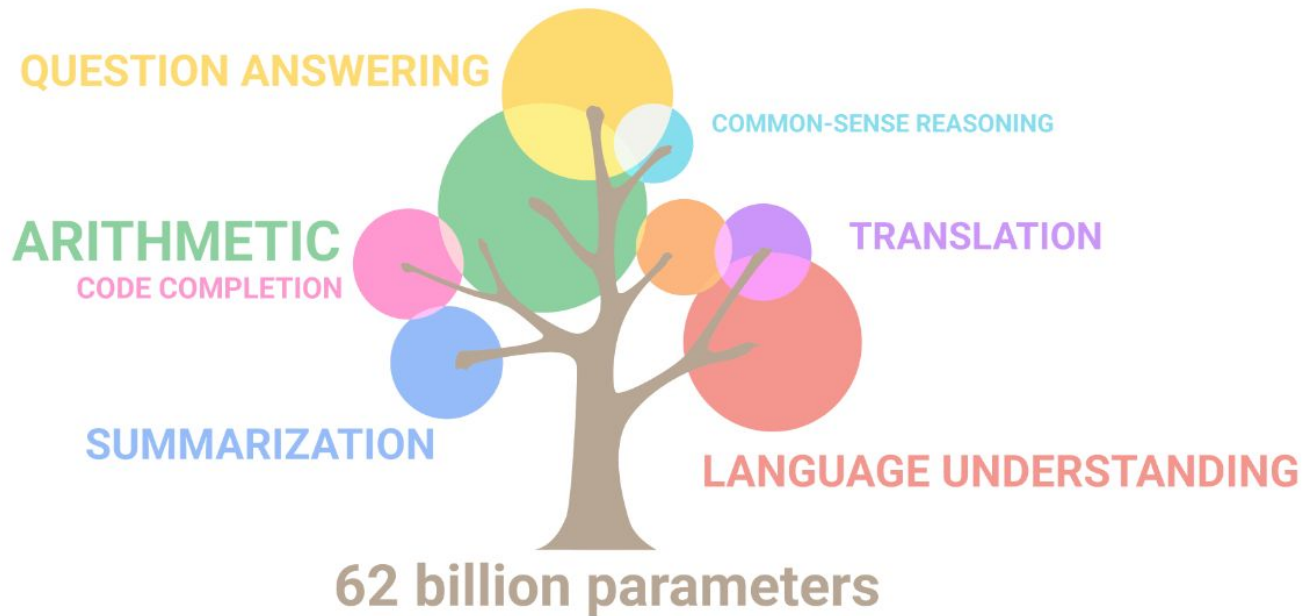
# Emergent Abilities



# Emergent Abilities



# Emergent Abilities



# Pre-trained Base

Generalist

VS

# Fine-tuned Models

Specialists



# RLHF:

Reinforcement Learning  
from Human Feedback

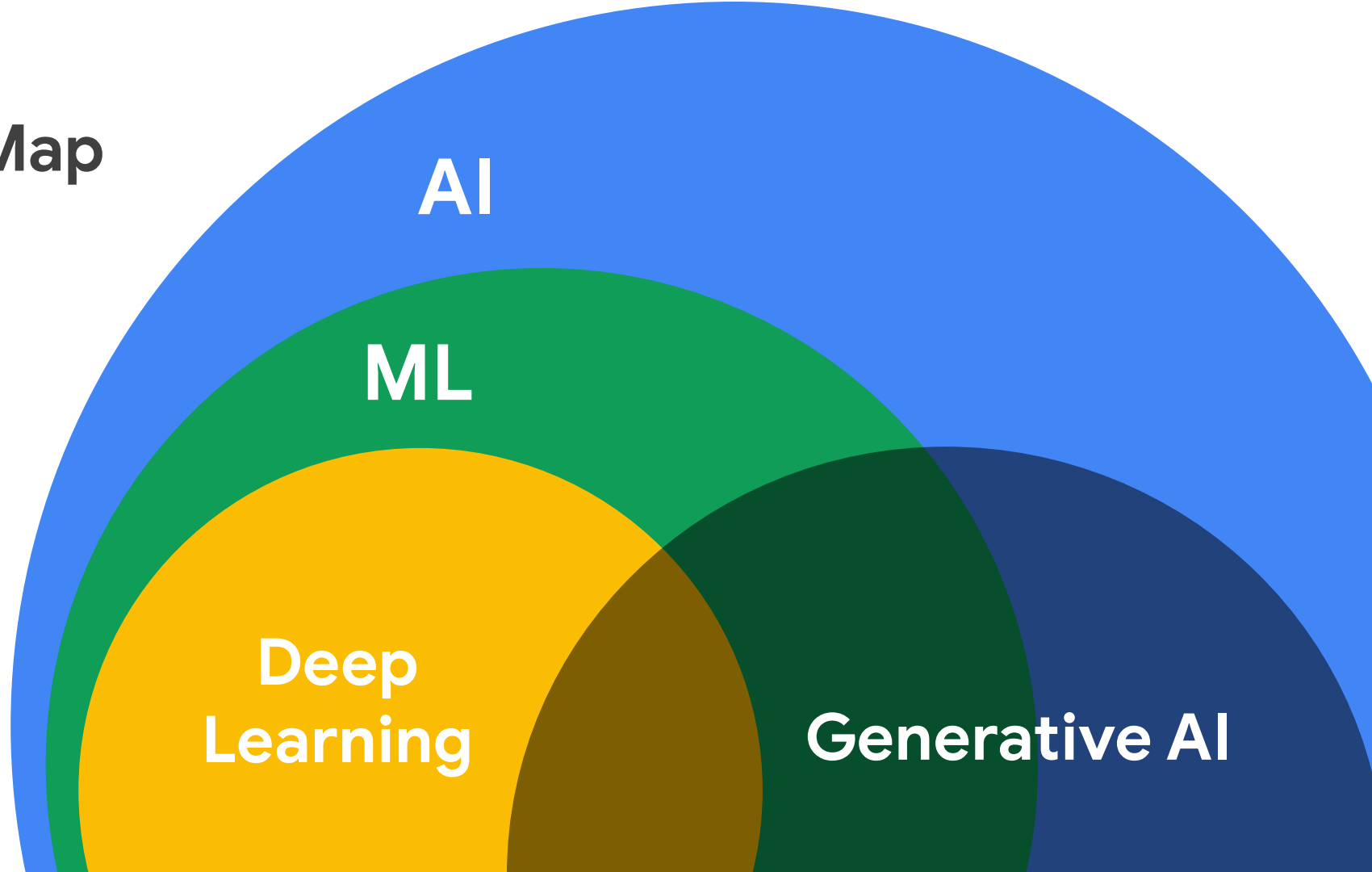
Fine-tuned

- **Follow Instructions**
- **Conversations**





**AI Map**



**AI**

**ML**

**Deep  
Learning**

**Generative AI**

# Build with AI



## Gemini 101

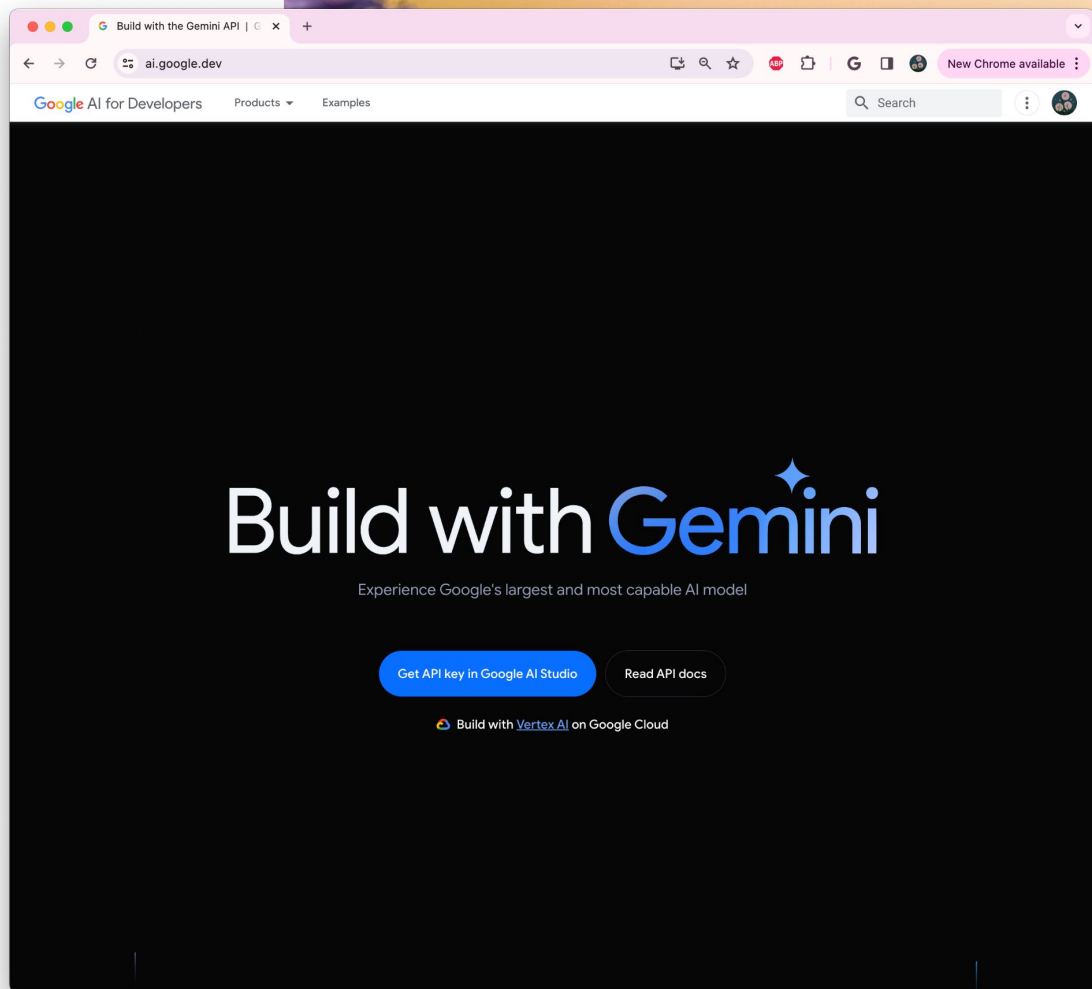
# Gemini

Generalized Multimodal  
Intelligence Network

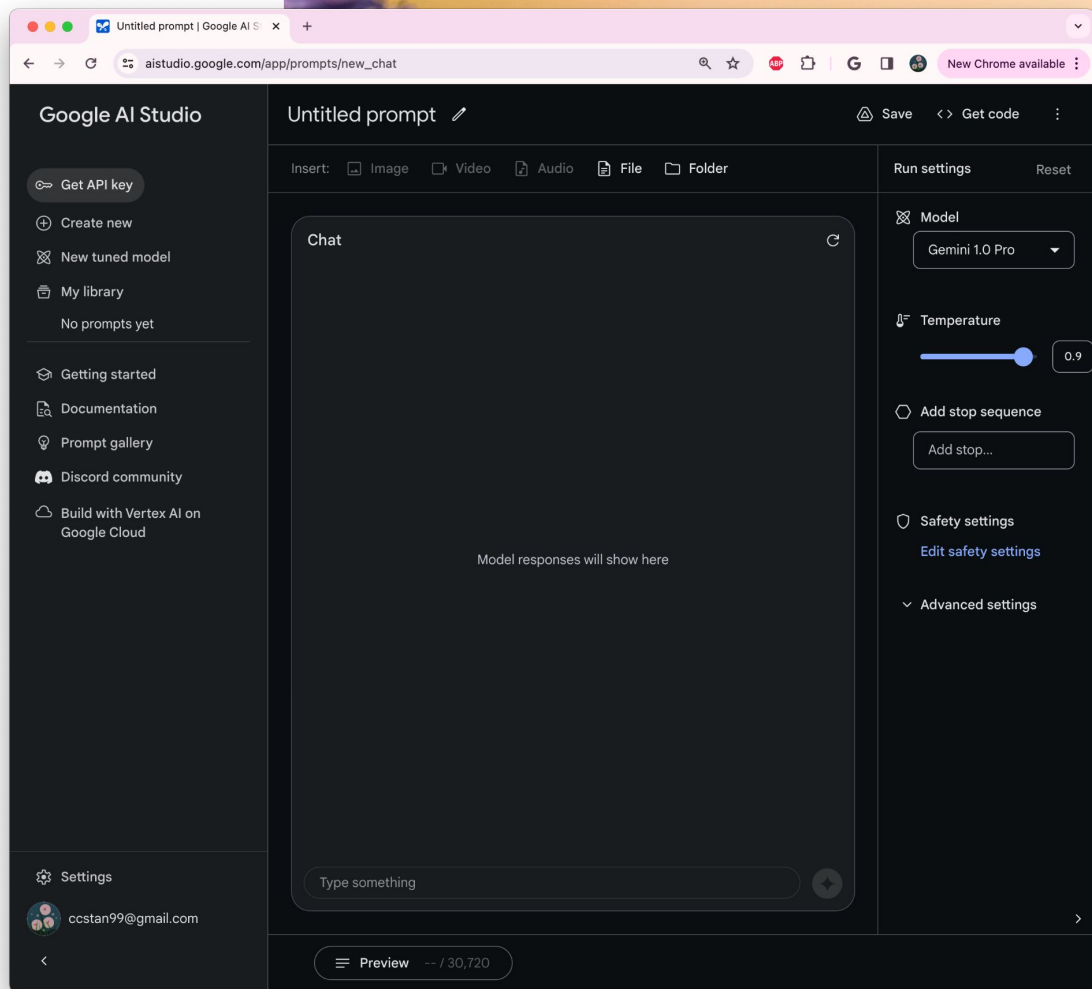


# Build with Gemini

[ai.google.dev](https://ai.google.dev)



# Prototyping with Google AI Studio



Google AI Studio

Untitled prompt

Save <> Get code

Insert: Image Video Audio File Folder

Chat

Model responses will show here

Type something

Run settings Reset

Model Gemini 1.0 Pro

Temperature 0.9

Add stop sequence Add stop...

Safety settings Edit safety settings

Advanced settings

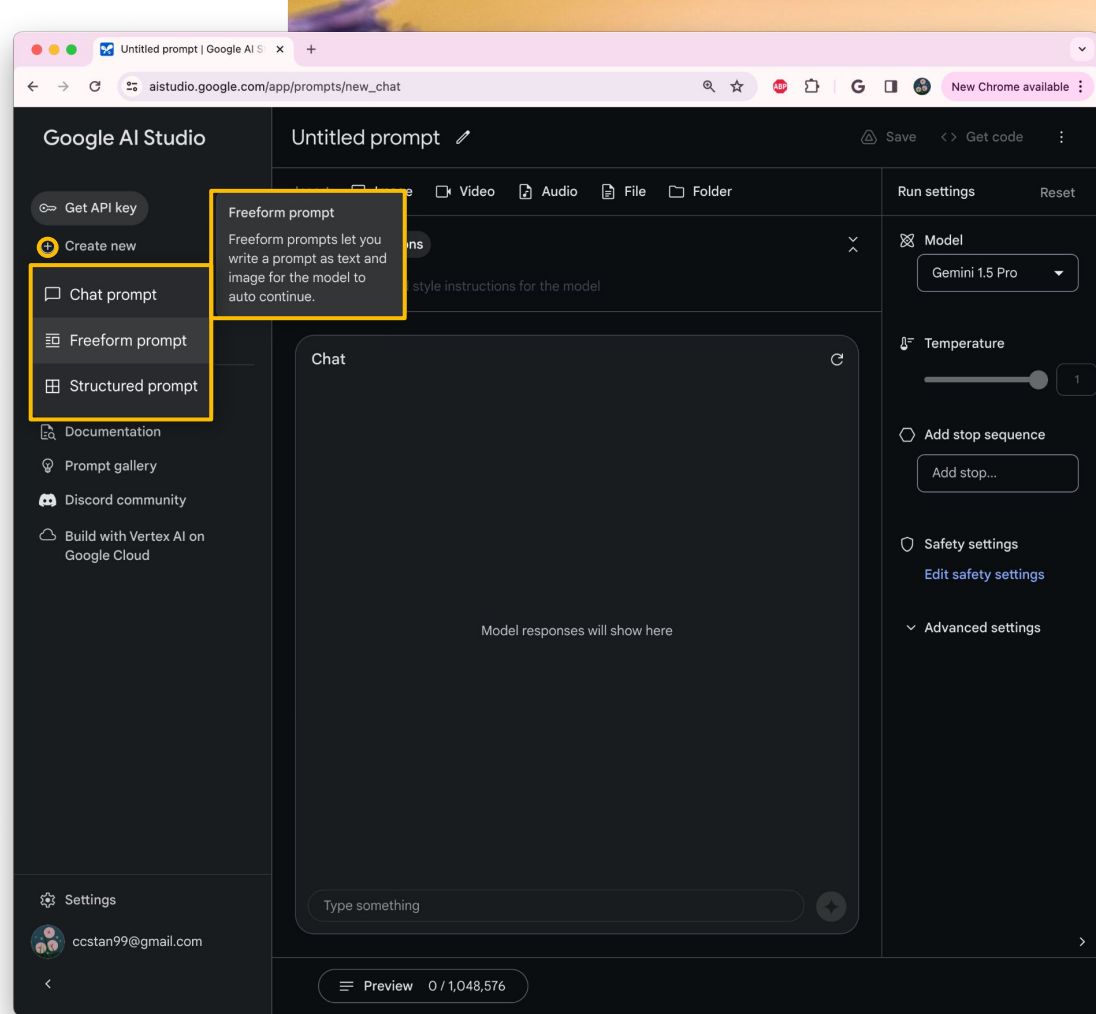
Settings

ccstan99@gmail.com

Preview -- / 30,720

# Create new

- Freeform prompt
- Structured prompt
- Chat prompt

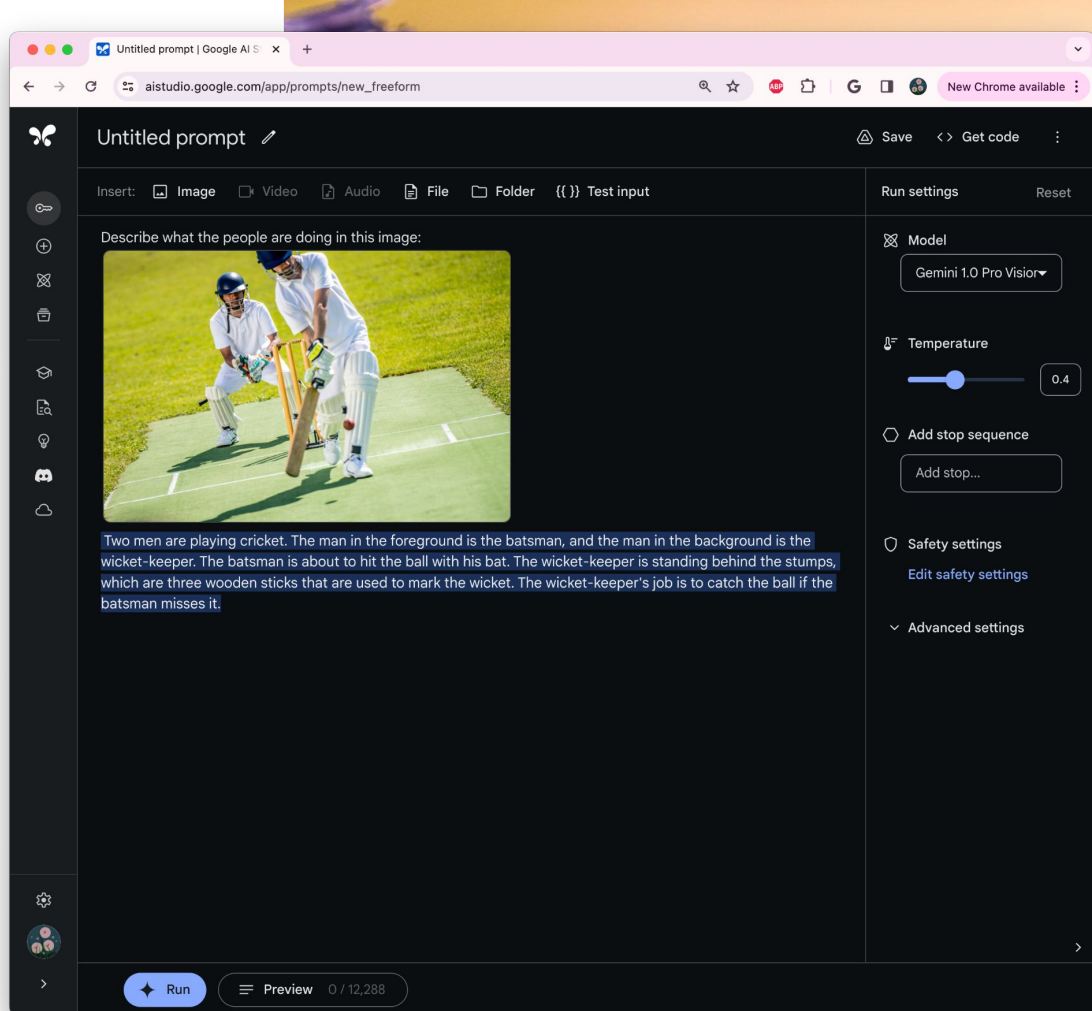




# Freeform Prompt

## Blog post creator

Write a prompt as text and image for the model to auto continue.



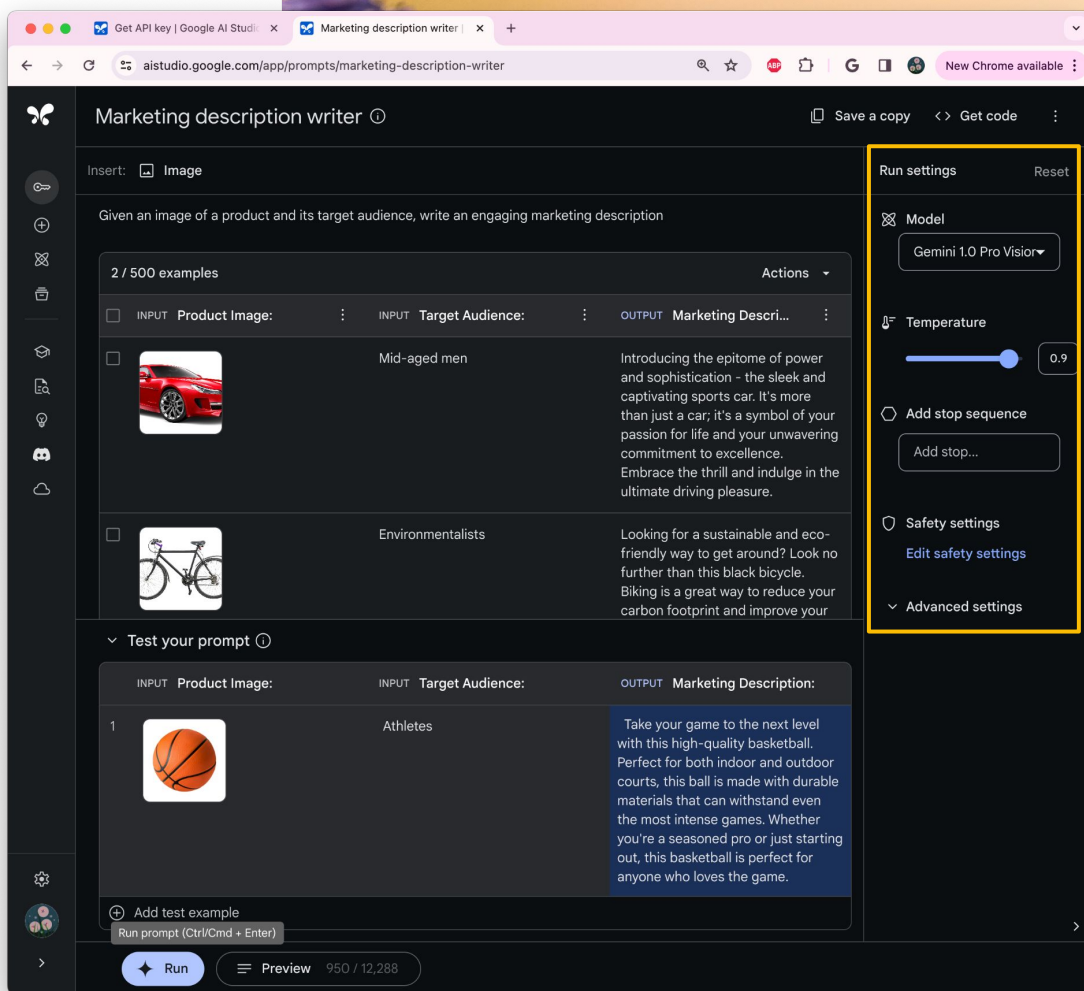
The screenshot displays the Google AI Studio interface for a freeform prompt. The browser address bar shows the URL `aistudio.google.com/app/prompts/new_freeform`. The main workspace is titled "Untitled prompt" and contains the following elements:

- Insert menu:** Includes options for Image, Video, Audio, File, Folder, and Test input.
- Prompt text:** "Describe what the people are doing in this image:"
- Image:** A photograph of two men playing cricket on a green field. One man is in the foreground, ready to bat, while the other is in the background, acting as the wicket-keeper.
- Generated text:** A blue-highlighted paragraph describing the scene: "Two men are playing cricket. The man in the foreground is the batsman, and the man in the background is the wicket-keeper. The batsman is about to hit the ball with his bat. The wicket-keeper is standing behind the stumps, which are three wooden sticks that are used to mark the wicket. The wicket-keeper's job is to catch the ball if the batsman misses it."
- Run settings panel (right):**
  - Model:** Gemini 1.0 Pro Vision
  - Temperature:** 0.4 (adjustable slider)
  - Add stop sequence:** Add stop...
  - Safety settings:** Edit safety settings
  - Advanced settings:** (collapsed)
- Bottom bar:** Includes a "Run" button, a "Preview" button, and a character count "0 / 12,288".


# Structured Prompt

## Marketing description

Table-based interface for more complex model priming and prompting





Marketing description writer


Insert:  Image

Given an image of a product and its target audience, write an engaging marketing description

2 / 500 examples

INPUT	Product Image:	INPUT	Target Audience:	OUTPUT	Marketing Descri...
<input type="checkbox"/>		Mid-aged men			Introducing the epitome of power and sophistication - the sleek and captivating sports car. It's more than just a car; it's a symbol of your passion for life and your unwavering commitment to excellence. Embrace the thrill and indulge in the ultimate driving pleasure.
<input type="checkbox"/>		Environmentalists			Looking for a sustainable and eco-friendly way to get around? Look no further than this black bicycle. Biking is a great way to reduce your carbon footprint and improve your

Test your prompt

INPUT	Product Image:	INPUT	Target Audience:	OUTPUT	Marketing Description:
1		Athletes			Take your game to the next level with this high-quality basketball. Perfect for both indoor and outdoor courts, this ball is made with durable materials that can withstand even the most intense games. Whether you're a seasoned pro or just starting out, this basketball is perfect for anyone who loves the game.

Add test example

Run prompt (Ctrl/Cmd + Enter)

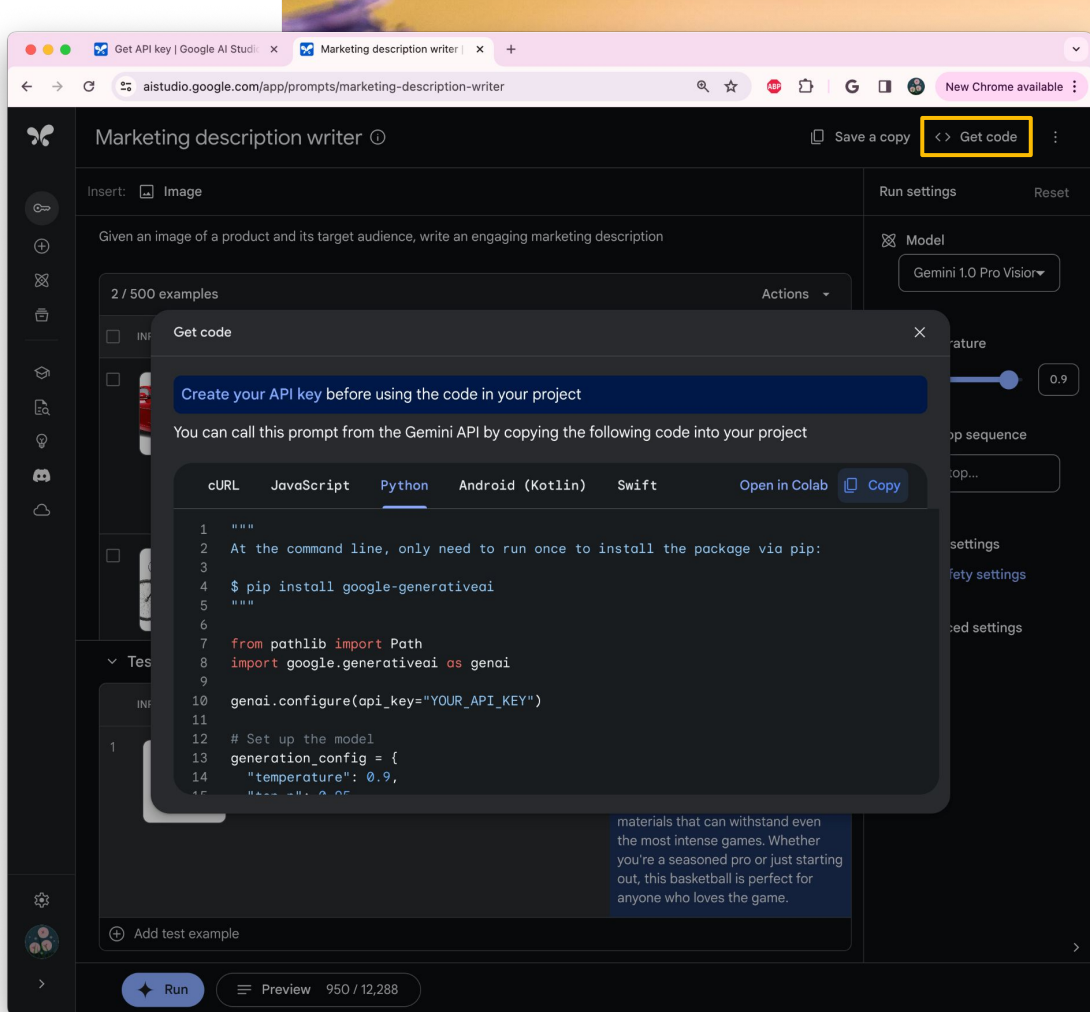
Run settings

- Model: Gemini 1.0 Pro Vision
- Temperature: 0.9
- Add stop sequence: Add stop...
- Safety settings: Edit safety settings
- Advanced settings

Run Preview 950 / 12,288

# Get Code

- Choose Language
- Open in Colab
- Copy to Editor



Marketing description writer

Save a copy **Get code**

Insert: Image

Given an image of a product and its target audience, write an engaging marketing description

2 / 500 examples

Get code

Create your API key before using the code in your project

You can call this prompt from the Gemini API by copying the following code into your project

cURL JavaScript Python Android (Kotlin) Swift Open in Colab Copy

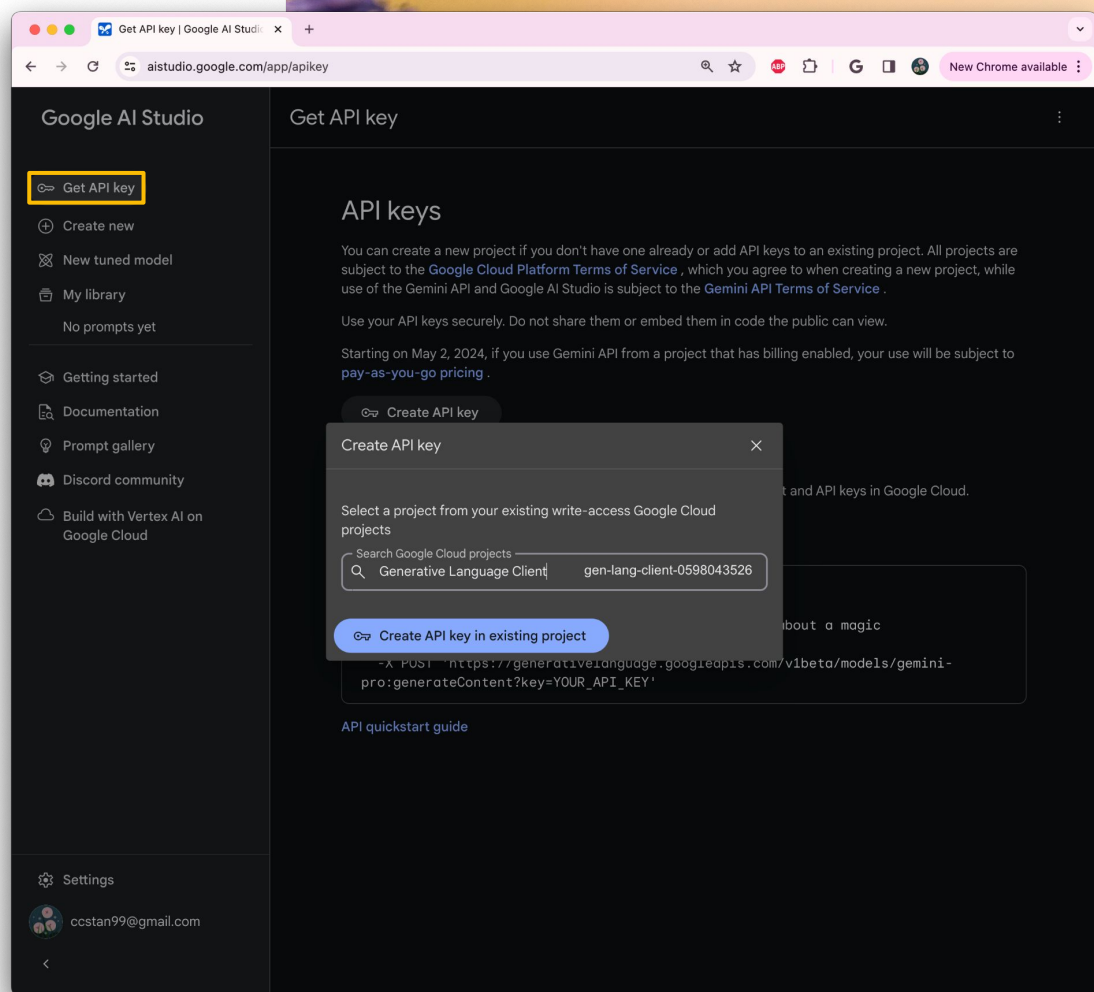
```
1 """
2 At the command line, only need to run once to install the package via pip:
3
4 $ pip install google-generativeai
5 """
6
7 from pathlib import Path
8 import google.generativeai as genai
9
10 genai.configure(api_key="YOUR_API_KEY")
11
12 # Set up the model
13 generation_config = {
14     "temperature": 0.9,
```

materials that can withstand even the most intense games. Whether you're a seasoned pro or just starting out, this basketball is perfect for anyone who loves the game.

Run Preview 950 / 12,288

# Get API Key

## Treat like password



The screenshot shows the Google AI Studio interface in a browser window. The address bar shows the URL `aistudio.google.com/app/apikey`. The main content area is titled "Get API key" and contains instructions on how to create and use API keys. A "Create API key" button is visible, which has triggered a modal dialog box. The dialog box, titled "Create API key", prompts the user to "Select a project from your existing write-access Google Cloud projects". A search bar within the dialog shows the text "Generative Language Client" and "gen-lang-client-0598043526". A blue button labeled "Create API key in existing project" is highlighted. The left sidebar of the AI Studio interface includes navigation options such as "Get API key" (highlighted with a yellow box), "Create new", "New tuned model", "My library", "Getting started", "Documentation", "Prompt gallery", "Discord community", "Build with Vertex AI on Google Cloud", and "Settings". The user's email address, "ccstan99@gmail.com", is visible at the bottom of the sidebar.





# Settings

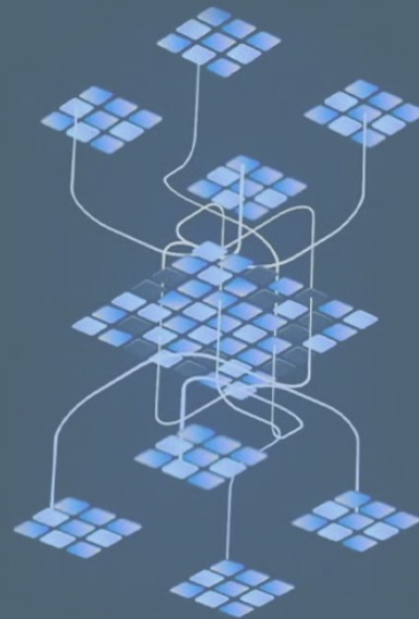
## Model Sizes



Nano



Pro



Ultra

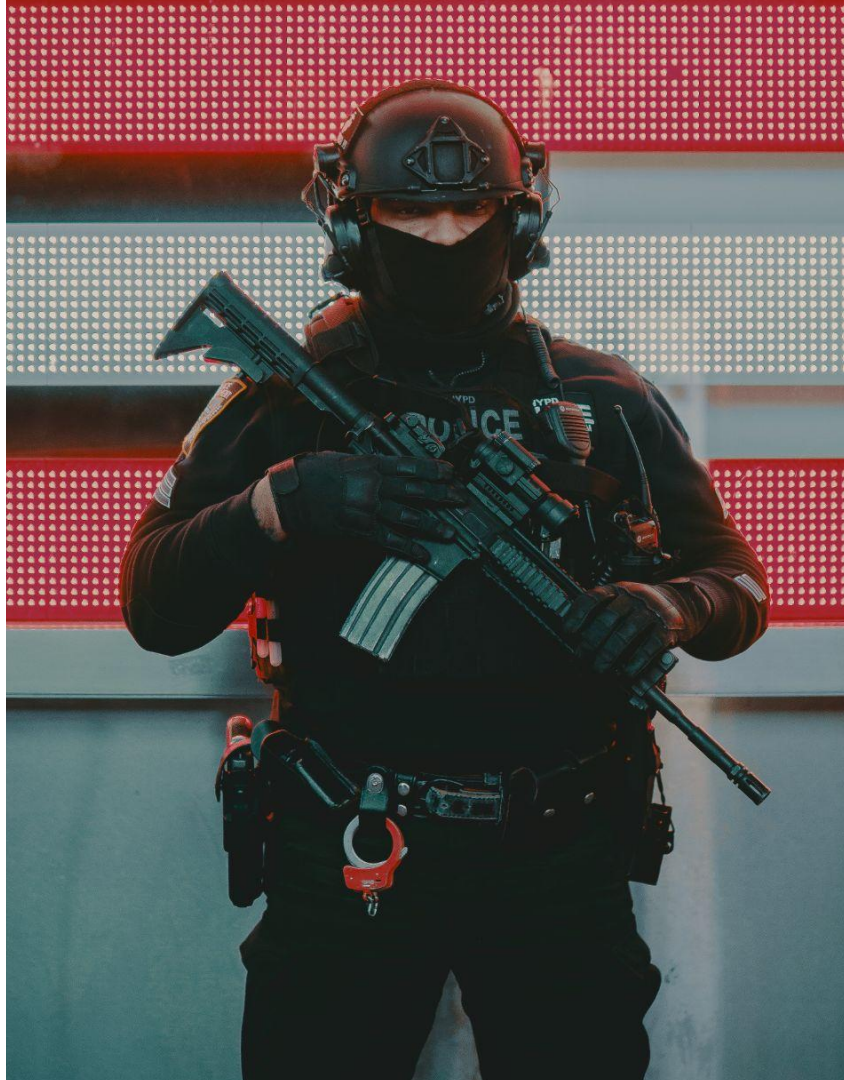


# Settings

## Safety Ratings

### Harm Categories

- Harassment
- Hate Speech
- Sexually Explicit
- Dangerous Content



# Settings

## Safety Ratings

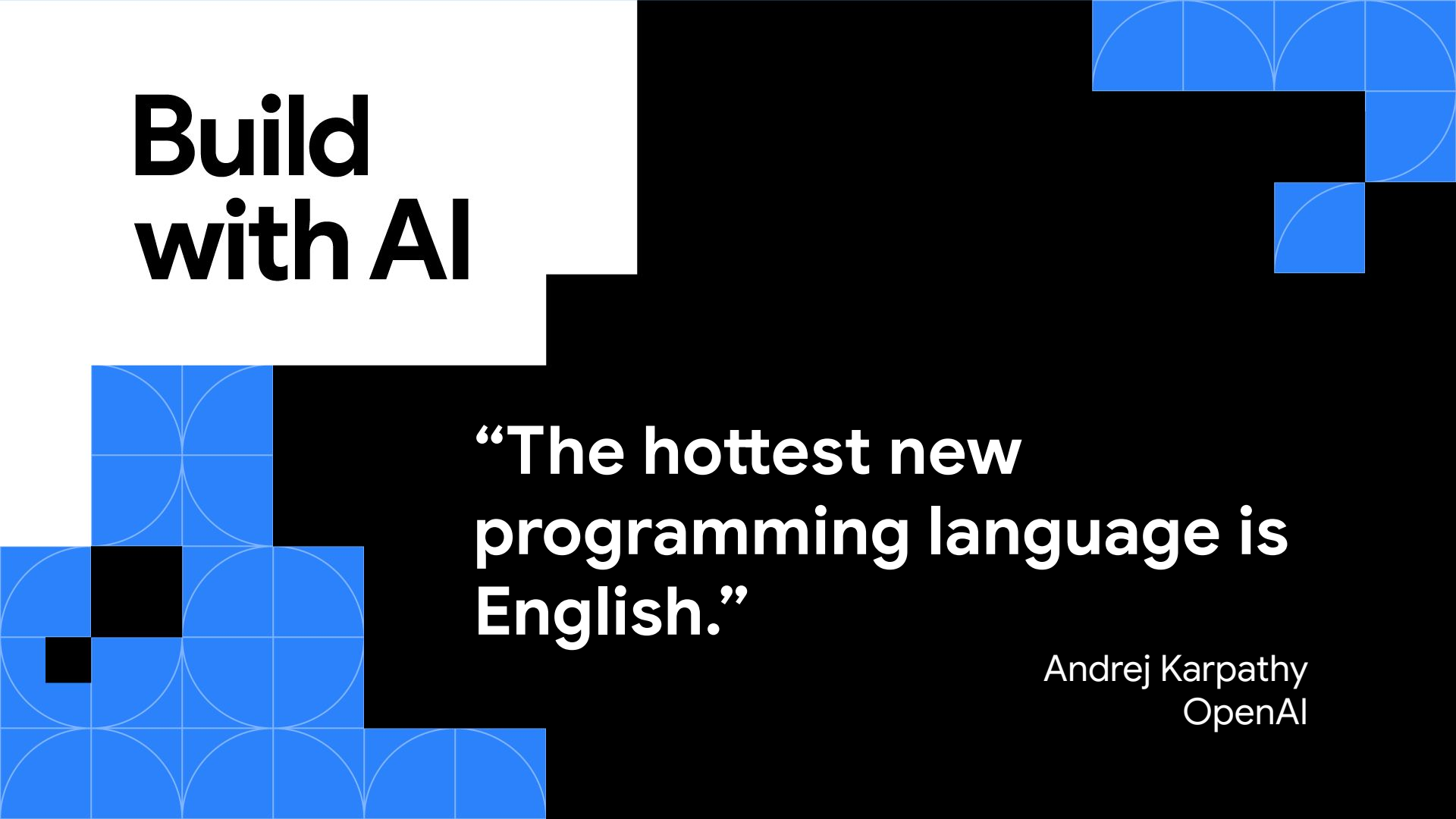
### Harm Categories

- Harassment
- Hate Speech
- Sexually Explicit
- Dangerous Content

### Harm Probabilities

- HIGH
- MEDIUM
- LOW
- NEGLIGIBLE

# Build with AI



**“The hottest new  
programming language is  
English.”**

Andrej Karpathy  
OpenAI

# Prompt Engineering

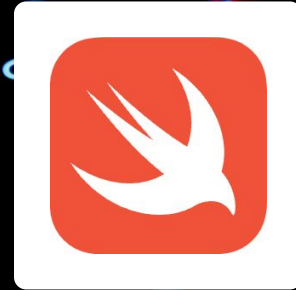
- Clear & Specific Instructions
- Give Examples
- Step by Step



# REST APIs

Client libraries for

- Python
- JavaScript
- Android (Kotlin)
- Swift
- cURL





# Setup

Install & import libraries

```
$ pip install google-generativeai
```

```
import google.generativeai as genai  
genai.configure(api_key="<YOUR API KEY>")
```

# Generate Text

Text only prompt

```
model = genai.GenerativeModel('gemini-pro')

response = model.generate_content("Write a story about a
boy and a backpack.")
print(response.text)
```

# Generate Text

Text and image prompt

```
model = genai.GenerativeModel('gemini-pro-vision')  
img = PIL.Image.open('image.jpg')  
response = model.generate_content(["Write a blog based  
on this photo.", img])  
print(response.text)
```

# Chat Conversations

For interactive applications

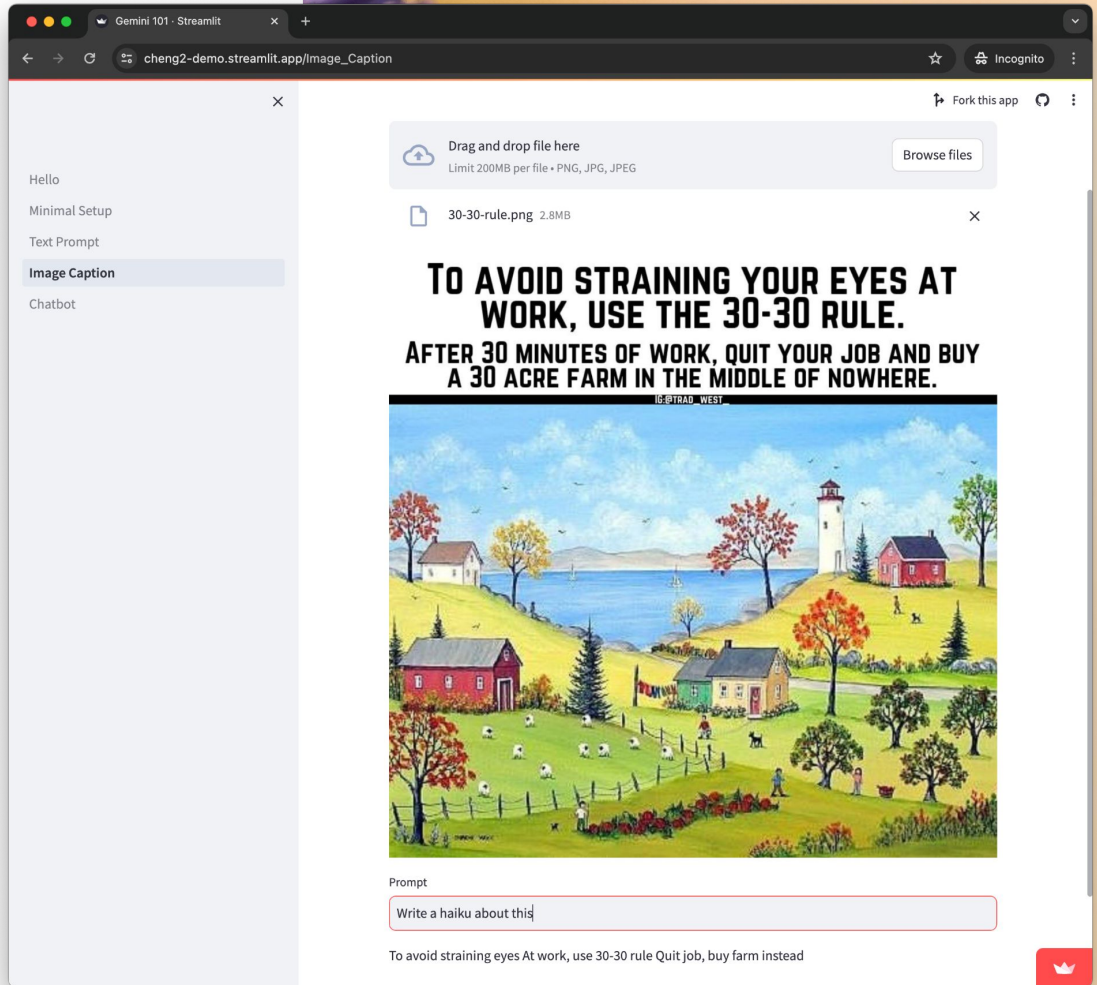
```
model = genai.GenerativeModel('gemini-pro')
chat = model.start_chat(history=[])

response = chat.send_message("Hello, how are you?")
print(response.text)
```

# Demo App

- Text Prompt
- Image Caption
- Chatbot

<https://cheng2-demo.streamlit.app>



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

Browse files

30-30-rule.png 2.8MB

**TO AVOID STRAINING YOUR EYES AT WORK, USE THE 30-30 RULE. AFTER 30 MINUTES OF WORK, QUIT YOUR JOB AND BUY A 30 ACRE FARM IN THE MIDDLE OF NOWHERE.**

IG: @TRAD\_WEST

Prompt

Write a haiku about this

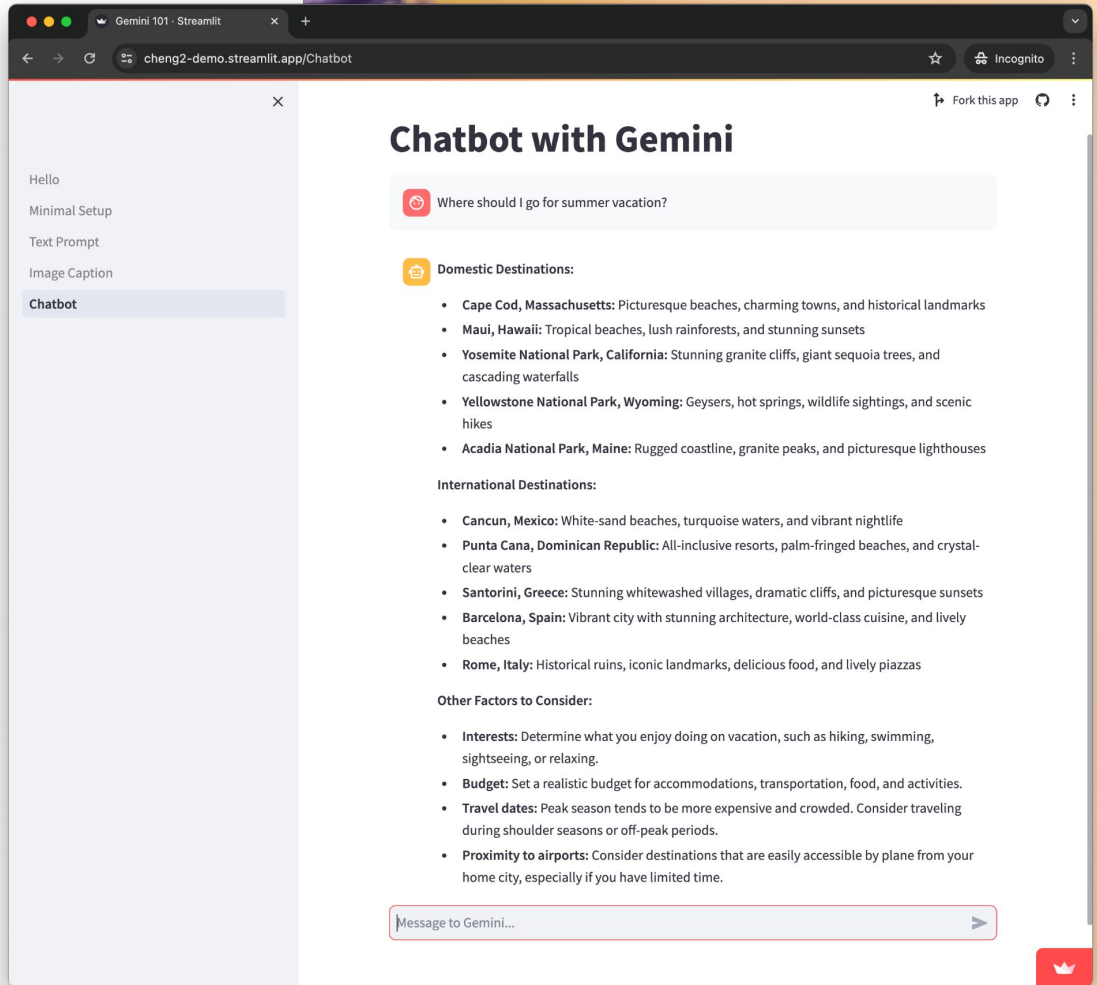
To avoid straining eyes At work, use 30-30 rule Quit job, buy farm instead



# Demo App

- Text Prompt
- Image Caption
- Chatbot

<https://cheng2-demo.streamlit.app>



Chatbot with Gemini

Where should I go for summer vacation?

**Domestic Destinations:**

- **Cape Cod, Massachusetts:** Picturesque beaches, charming towns, and historical landmarks
- **Maui, Hawaii:** Tropical beaches, lush rainforests, and stunning sunsets
- **Yosemite National Park, California:** Stunning granite cliffs, giant sequoia trees, and cascading waterfalls
- **Yellowstone National Park, Wyoming:** Geysers, hot springs, wildlife sightings, and scenic hikes
- **Acadia National Park, Maine:** Rugged coastline, granite peaks, and picturesque lighthouses

**International Destinations:**

- **Cancun, Mexico:** White-sand beaches, turquoise waters, and vibrant nightlife
- **Punta Cana, Dominican Republic:** All-inclusive resorts, palm-fringed beaches, and crystal-clear waters
- **Santorini, Greece:** Stunning whitewashed villages, dramatic cliffs, and picturesque sunsets
- **Barcelona, Spain:** Vibrant city with stunning architecture, world-class cuisine, and lively beaches
- **Rome, Italy:** Historical ruins, iconic landmarks, delicious food, and lively piazzas

**Other Factors to Consider:**

- **Interests:** Determine what you enjoy doing on vacation, such as hiking, swimming, sightseeing, or relaxing.
- **Budget:** Set a realistic budget for accommodations, transportation, food, and activities.
- **Travel dates:** Peak season tends to be more expensive and crowded. Consider traveling during shoulder seasons or off-peak periods.
- **Proximity to airports:** Consider destinations that are easily accessible by plane from your home city, especially if you have limited time.

Message to Gemini...

# Build with AI



## Now Your Turn!

# Progress Tracker

1. Prototyping in Google AI Studio
2. Coding with Python Quickstart
3. Build & Deploy Streamlit App

[bit.ly/cheng2-workshop](https://bit.ly/cheng2-workshop)

The screenshot shows a Google Sheets document titled 'Cheng2 Workshop - Progress Tracker'. The spreadsheet has columns A through Y and rows 1 through 39. The data is organized into sections: 'Prototyping' (rows 6-13), 'Coding' (rows 14-21), and 'Streamlit' (rows 22-32). Each task is followed by a series of checkboxes, with the first two columns (A and B) containing the task names and the subsequent columns (C through Y) containing checkboxes. The 'Prototyping' section includes tasks like 'Google AI Studio', 'Freeform prompt', 'Prompt gallery', 'Structured prompt', 'Get code', and 'API key -- SAVE for later'. The 'Coding' section includes 'Python Quickstart', 'Open colab', 'Setup', 'Add secrets', 'List models', 'Generate text (2)', and 'Chat conversations'. The 'Streamlit' section includes 'Run Demo', 'Fork this app', 'Sign in with GitHub', 'Advance settings + secrets', 'Codespace + Simple Brows', 'Check deployed', 'Edit & test', 'Commit + Sync + Re-deploy', 'Share', and 'App URL'. The spreadsheet is currently displaying row 1, column C.

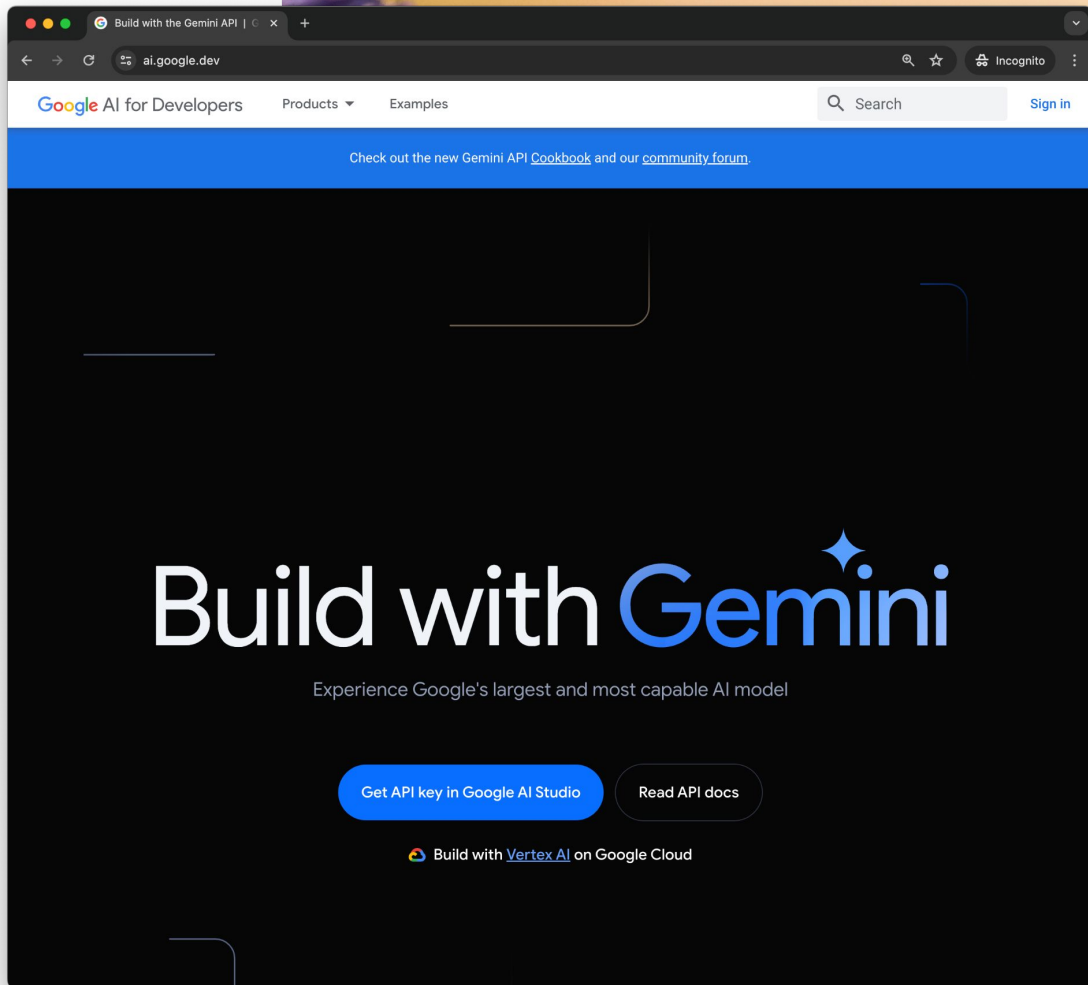
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
1	Name	Cheng	Cheng																						
2	Gmail	cheng;	ccstan																						
3	GitHub ID	cheng;	ccstan																						
4																									
5	<b>Prototyping</b>																								
6	<a href="#">Google AI Studio</a>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Freeform prompt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Prompt gallery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Structured prompt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Get code	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	API key -- SAVE for later	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12																									
13	<b>Coding</b>																								
14	<a href="#">Python Quickstart</a>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Open colab	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	Setup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	Add secrets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	List models	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	Generate text (2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	Chat conversations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21																									
22	<b>Streamlit</b>																								
23	<a href="#">Run Demo</a>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24	Fork this app	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25	Sign in with GitHub	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26	Advance settings + secrets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27	Codespace + Simple Brows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28	Check deployed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29	<a href="#">Edit &amp; test</a>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30	Commit + Sync + Re-deploy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31	<a href="#">Share</a>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32	App URL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33																									
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# Google AI Studio

- Freeform prompt
- Prompt gallery
- Structured prompt
- Get code
- API key

[ai.google.dev](https://ai.google.dev)

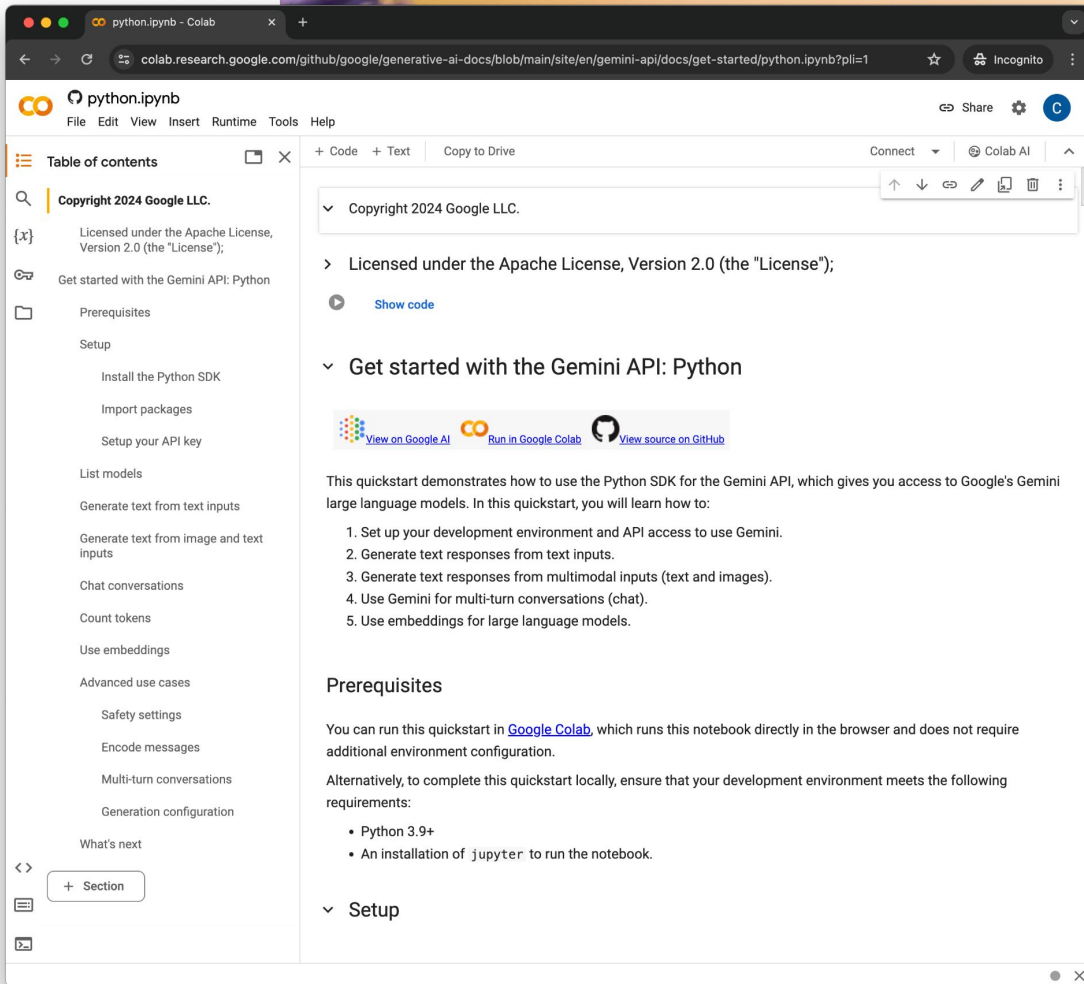
 Google Developer Groups



# Colab Notebook

- Setup
- Add secrets
- List models
- Generate text
- Chat conversations

[ai.google.dev/tutorials/  
python\\_quickstart](https://ai.google.dev/tutorials/python_quickstart)



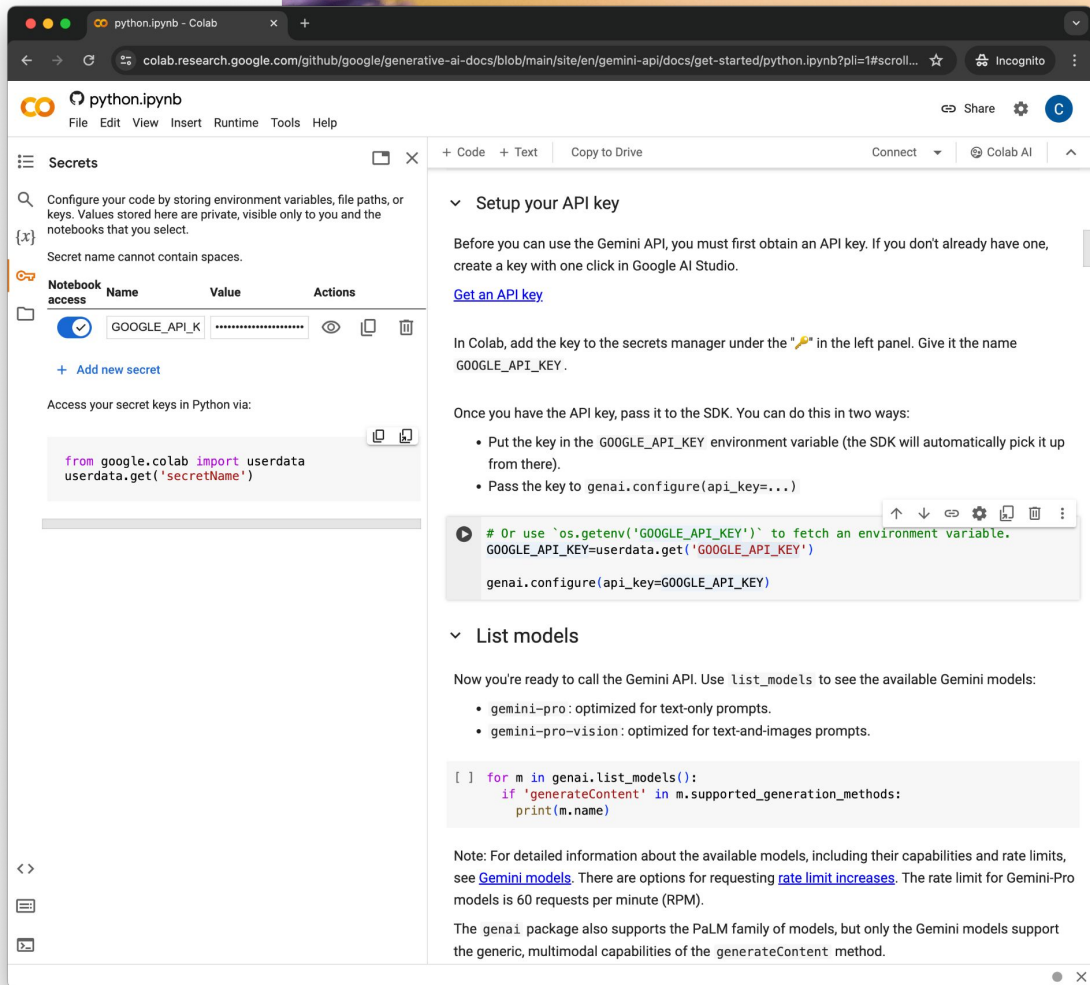
The screenshot shows a web browser window displaying a Google Colab notebook. The browser's address bar shows the URL: `colab.research.google.com/github/google/generative-ai-docs/blob/main/site/en/gemini-api/docs/get-started/python.ipynb?pli=1`. The notebook interface includes a top menu bar with options like File, Edit, View, Insert, Runtime, Tools, and Help. On the left, there is a 'Table of contents' sidebar with a search icon and a list of sections: Copyright 2024 Google LLC., Get started with the Gemini API: Python, Prerequisites, Setup (Install the Python SDK, Import packages, Setup your API key), List models (Generate text from text inputs, Generate text from image and text inputs, Chat conversations, Count tokens, Use embeddings), Advanced use cases (Safety settings, Encode messages, Multi-turn conversations, Generation configuration), and What's next. The main content area shows the 'Copyright 2024 Google LLC.' section, which is expanded to show the license text: 'Licensed under the Apache License, Version 2.0 (the "License");'. Below the license, there is a 'Show code' button. The next section is 'Get started with the Gemini API: Python', which includes three links: 'View on Google AI', 'Run in Google Colab', and 'View source on GitHub'. The main text of this section states: 'This quickstart demonstrates how to use the Python SDK for the Gemini API, which gives you access to Google's Gemini large language models. In this quickstart, you will learn how to:'. A numbered list follows: 1. Set up your development environment and API access to use Gemini. 2. Generate text responses from text inputs. 3. Generate text responses from multimodal inputs (text and images). 4. Use Gemini for multi-turn conversations (chat). 5. Use embeddings for large language models. Below this list is a 'Prerequisites' section with the text: 'You can run this quickstart in [Google Colab](#), which runs this notebook directly in the browser and does not require additional environment configuration. Alternatively, to complete this quickstart locally, ensure that your development environment meets the following requirements:'. A bulleted list follows: • Python 3.9+ • An installation of `jupyter` to run the notebook. The 'Setup' section is partially visible at the bottom.



# Colab Notebook

- Setup
- Add secrets
- List models
- Generate text
- Chat conversations

[ai.google.dev/tutorials/  
python\\_quickstart](https://ai.google.dev/tutorials/python_quickstart)



The screenshot shows a Google Colab notebook interface. The left sidebar contains the 'Secrets' panel, which is used to manage environment variables. It shows a secret named 'GOOGLE\_API\_KEY' with a masked value. Below the secrets list, there is a code block for accessing the secret in Python:

```
from google.colab import userdata
userdata.get('secretName')
```

The main notebook area is divided into sections. The first section is 'Setup your API key', which explains that an API key is required to use the Gemini API and provides a link to 'Get an API key'. It also includes instructions on how to add the key to the secrets manager and how to pass it to the SDK. The second section is 'List models', which shows the code for listing the available Gemini models:

```
[ ] for m in genai.list_models():
    if 'generateContent' in m.supported_generation_methods:
        print(m.name)
```

The interface also shows a 'Code' editor with a comment and code for fetching the API key from an environment variable:

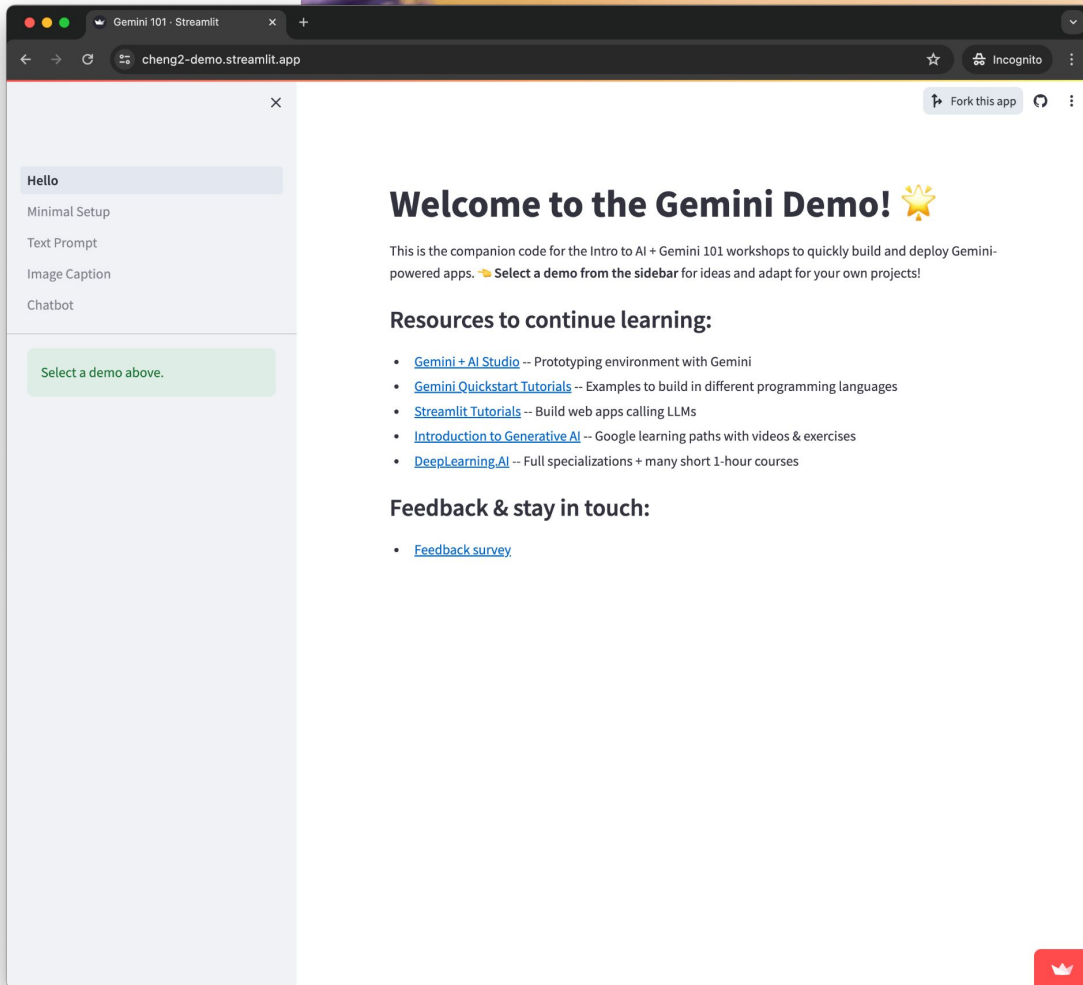
```
# Or use `os.getenv('GOOGLE_API_KEY')` to fetch an environment variable.
GOOGLE_API_KEY=userdata.get('GOOGLE_API_KEY')

genai.configure(api_key=GOOGLE_API_KEY)
```

# Streamlit App

- Fork the app
- Sign in with GitHub
- Setup secrets
- Edit & test
- Deploy & share!

[https://  
cheng2-demo  
.streamlit.app](https://cheng2-demo.streamlit.app)



Gemini 101 - Streamlit

cheng2-demo.streamlit.app

Fork this app

## Hello

- Minimal Setup
- Text Prompt
- Image Caption
- Chatbot

Select a demo above.

## Welcome to the Gemini Demo! 🌟

This is the companion code for the Intro to AI + Gemini 101 workshops to quickly build and deploy Gemini-powered apps. 🏠 Select a demo from the sidebar for ideas and adapt for your own projects!

### Resources to continue learning:

- [Gemini + AI Studio](#) -- Prototyping environment with Gemini
- [Gemini Quickstart Tutorials](#) -- Examples to build in different programming languages
- [Streamlit Tutorials](#) -- Build web apps calling LLMs
- [Introduction to Generative AI](#) -- Google learning paths with videos & exercises
- [DeepLearning.AI](#) -- Full specializations + many short 1-hour courses

### Feedback & stay in touch:

- [Feedback survey](#)

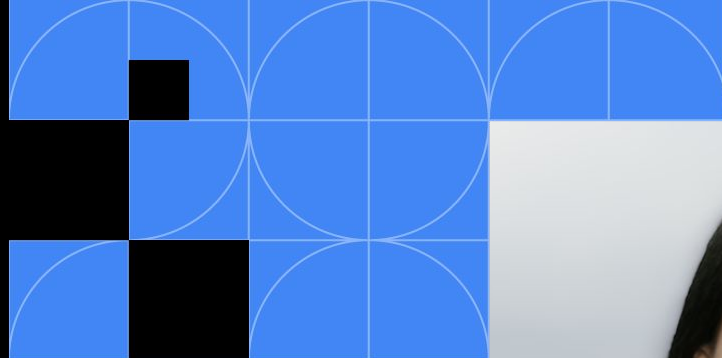
# Resources

[bit.ly/cheng2-slides](https://bit.ly/cheng2-slides)

1. **Gemini + AI Studio**  
Prototyping environment with Gemini
2. **Gemini Quickstart Tutorials**  
Examples to build in different programming languages
3. **Streamlit Tutorials**  
Build web apps calling LLMs
4. **Introduction to Generative AI**  
Google learning paths with videos & exercises
5. **DeepLearning.AI**  
Full specializations + many short 1-hour courses



# Build with AI



## ChengCheng Tan

ccstan99@gmail.com

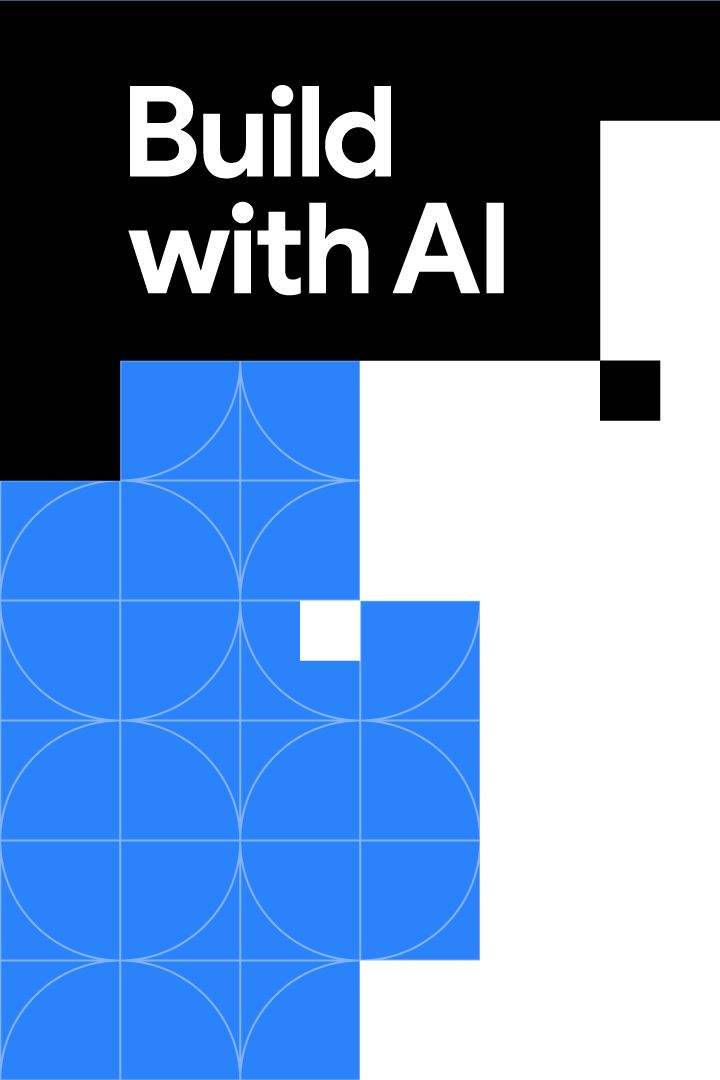
 cheng2-tan

 @cheng2\_tan

 Google Developer Groups



# Build with AI



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- Boy & Robot, Winter Plant, Granny images generated on stability.ai