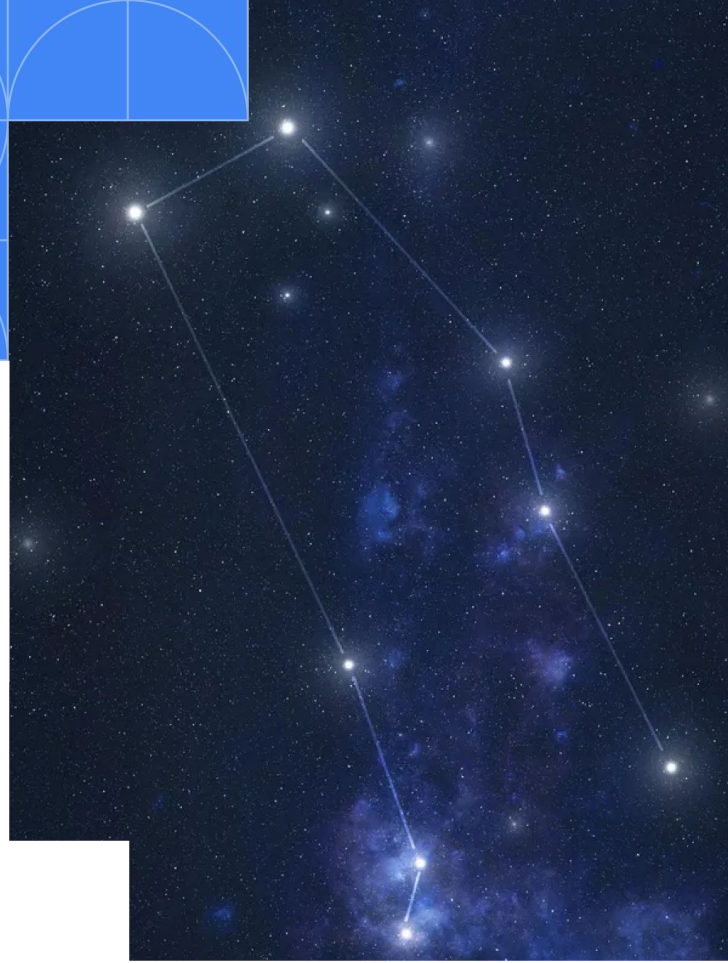
Build with AI



Intro to AI + Gemini 101

Google Developer Groups
Capital Region

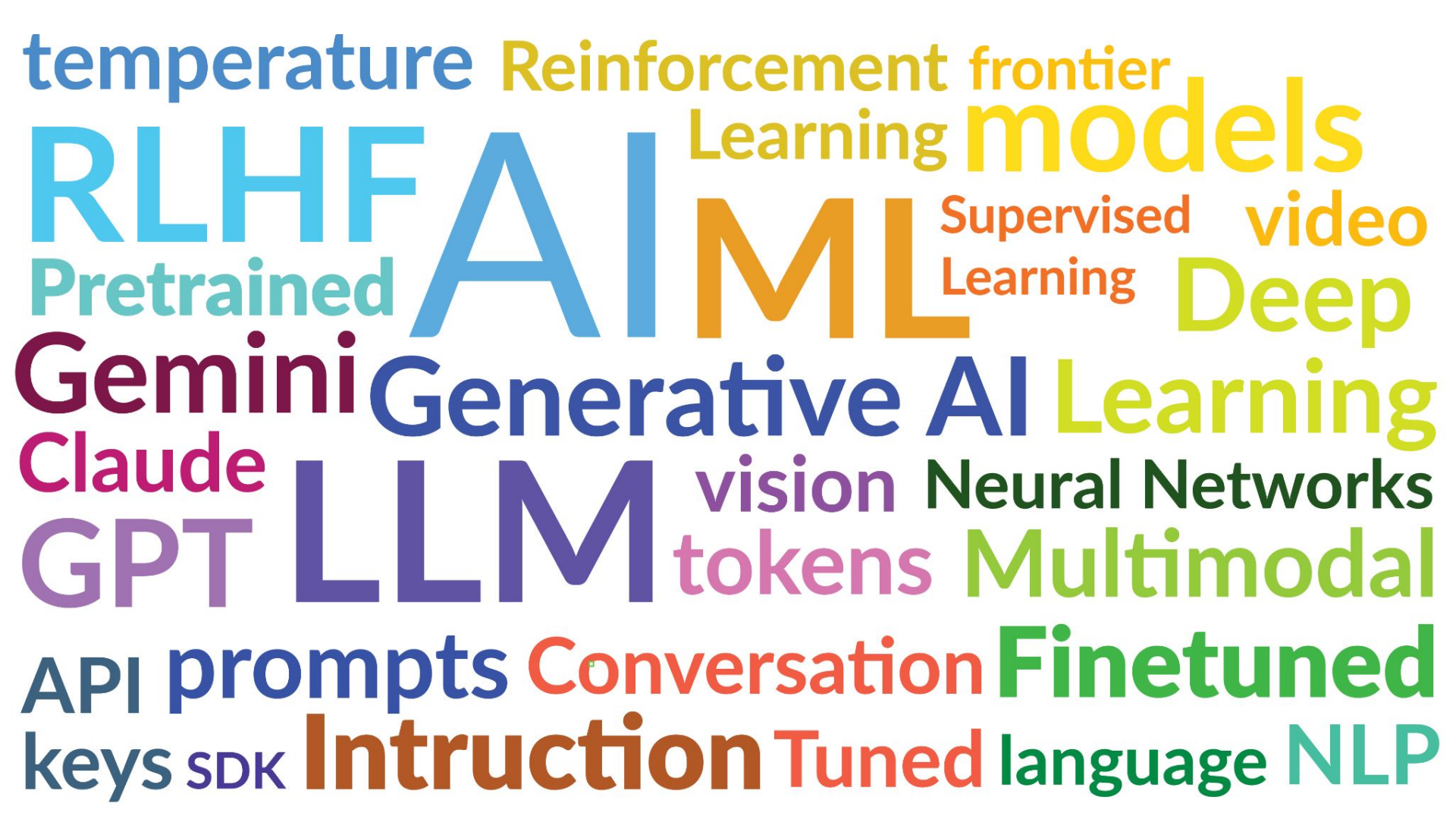
Who am I?

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

Google Developer Groups


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

Build with AI

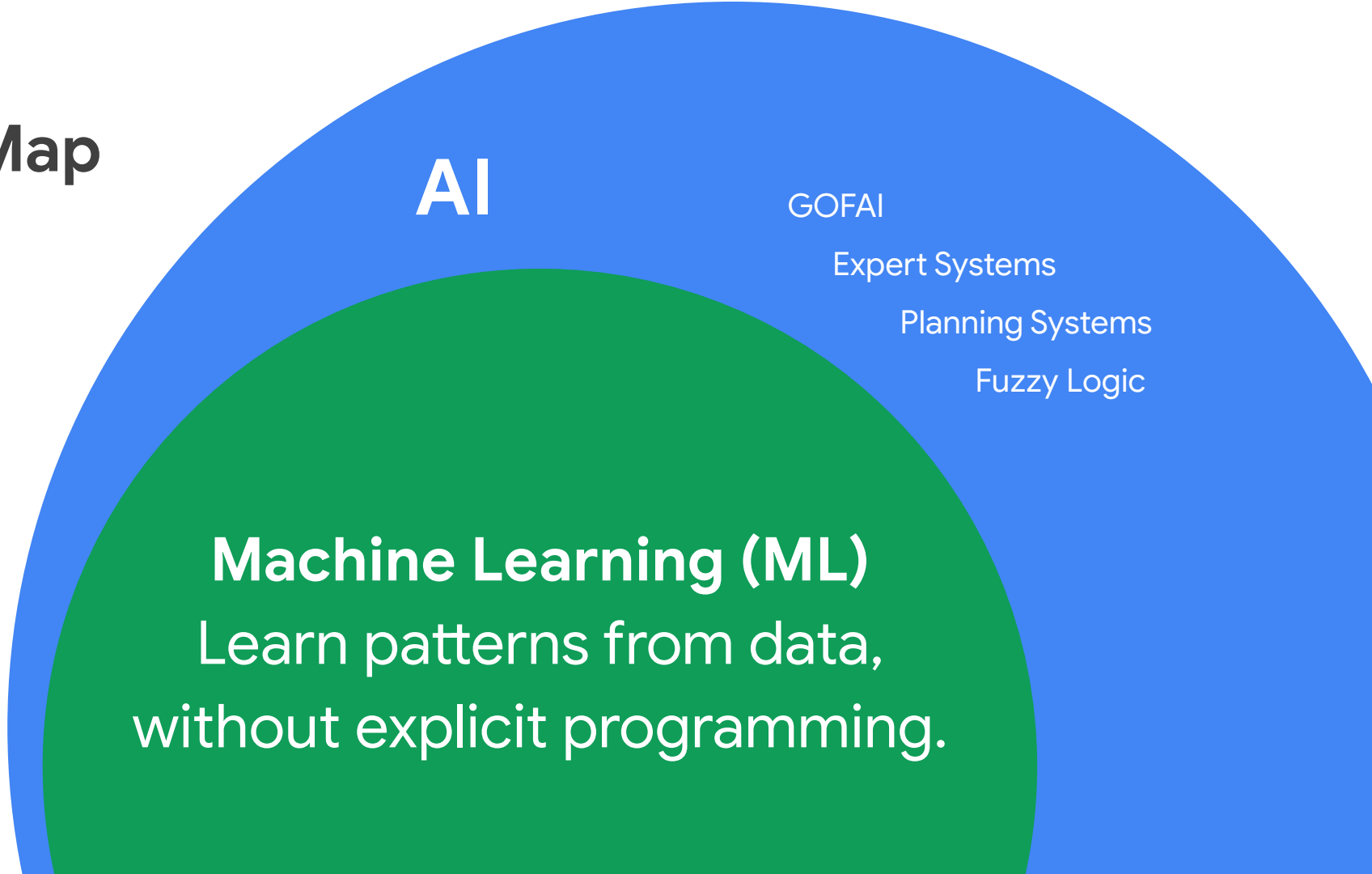
Google Developer Groups
Capital Region

Intro to AI

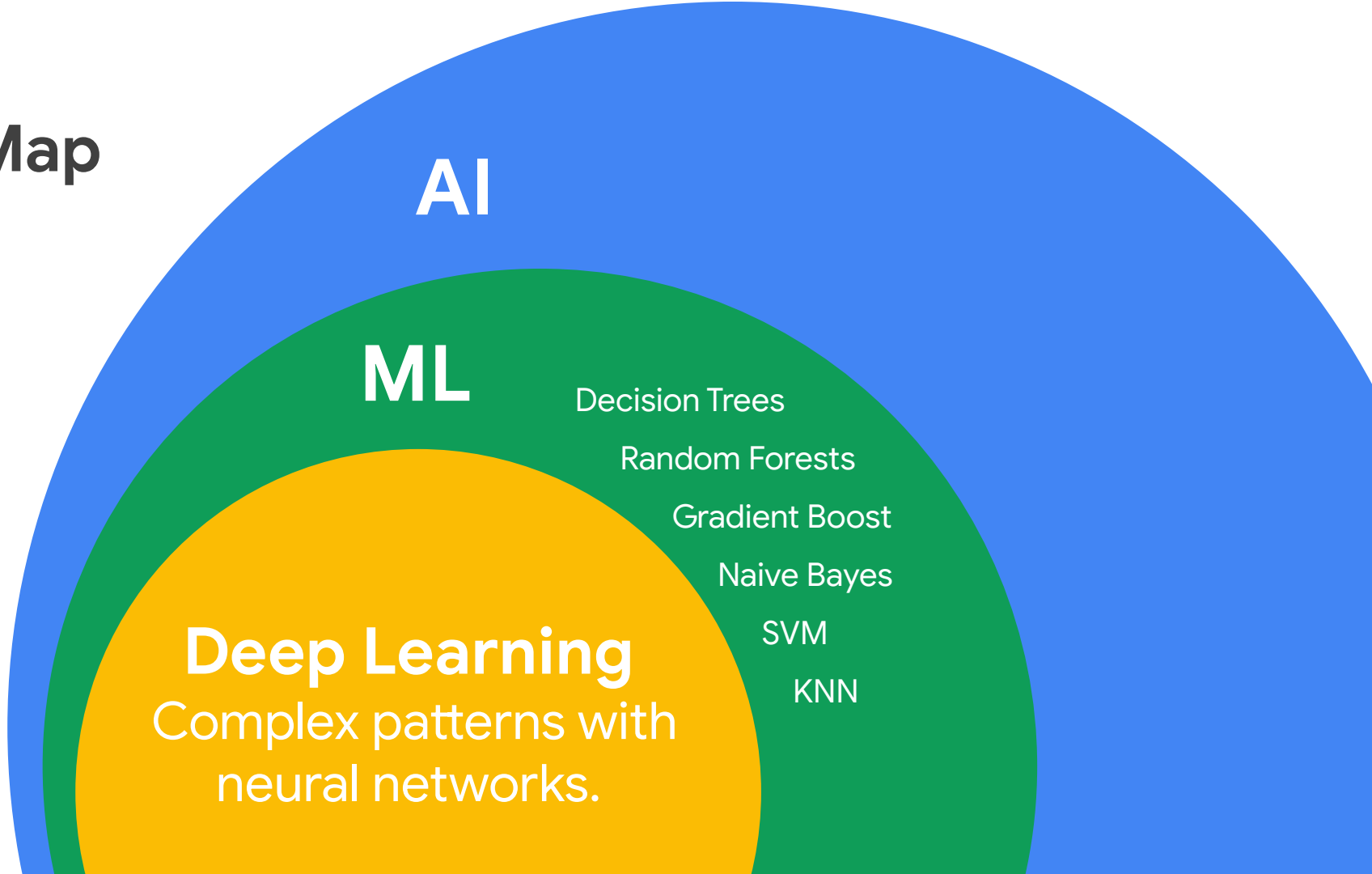
AI Map

Artificial Intelligence (AI)
Create machines that can perform tasks with human-like abilities: reasoning, learning & problem-solving.

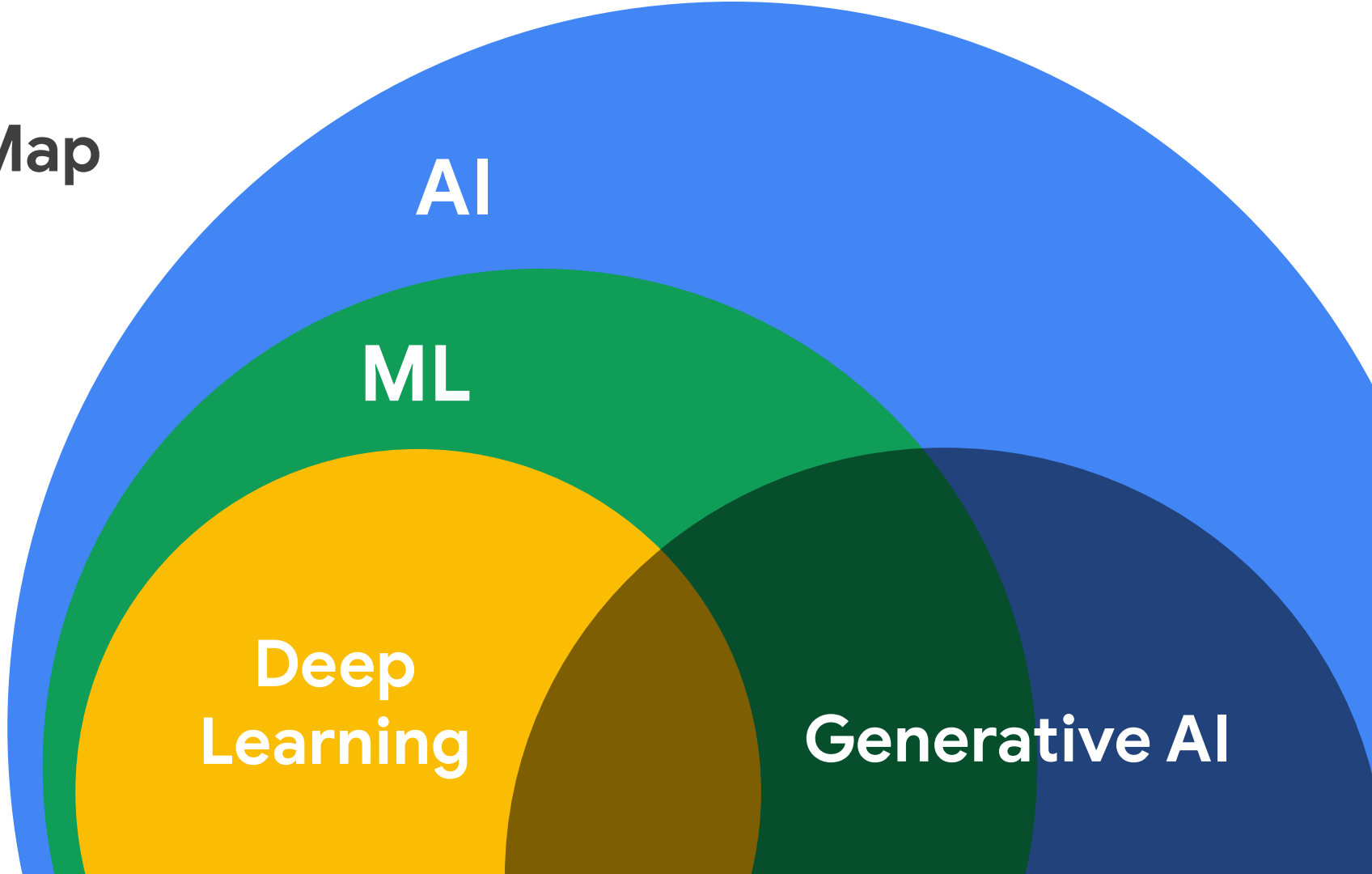
AI Map


AI
GOFAI
Expert Systems
Planning Systems
Fuzzy Logic
Machine Learning (ML)
Learn patterns from data,
without explicit programming.

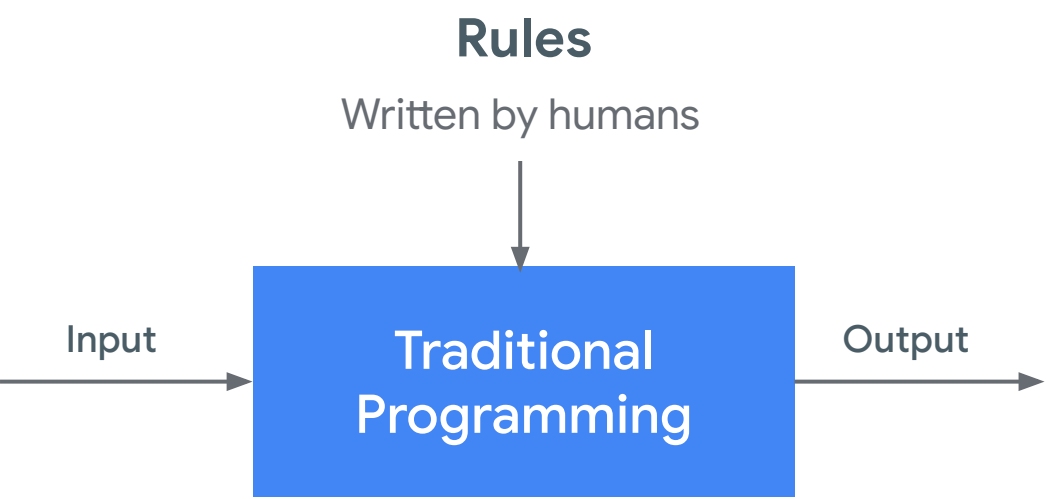
AI Map


AI
ML
Decision Trees
Random Forests
Gradient Boost
Naive Bayes
SVM
KNN
Deep Learning
Complex patterns with neural networks.

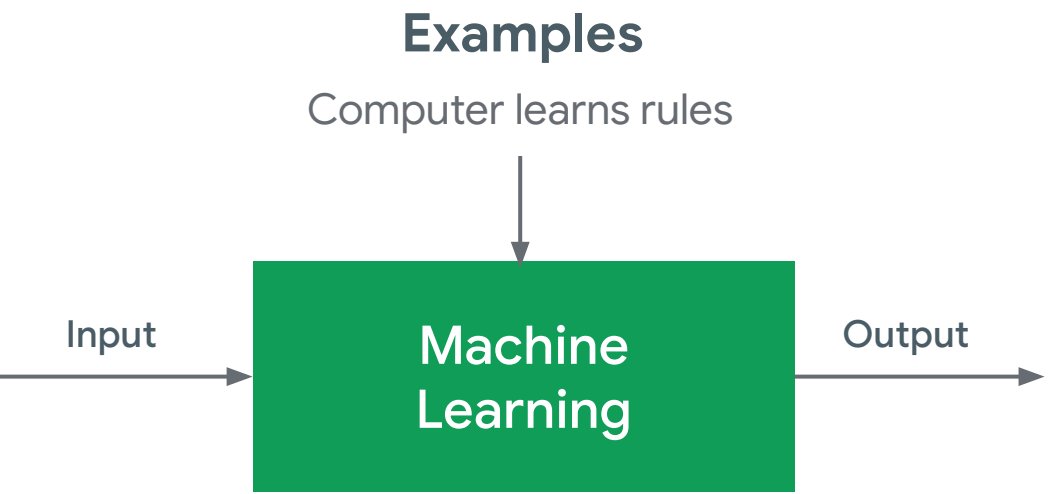
AI Map



Old GOFAI Way



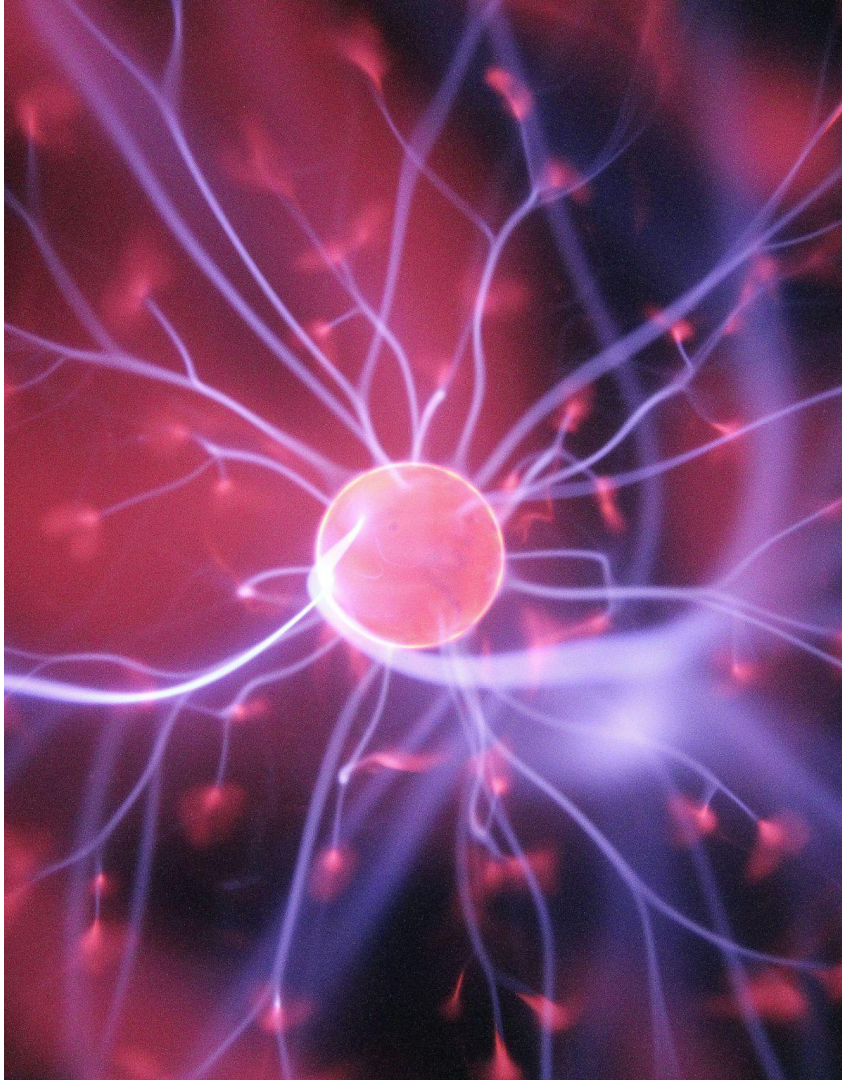
New ML Way


Examples
Computer learns rules
Input
Machine Learning
Output

Neural Networks

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

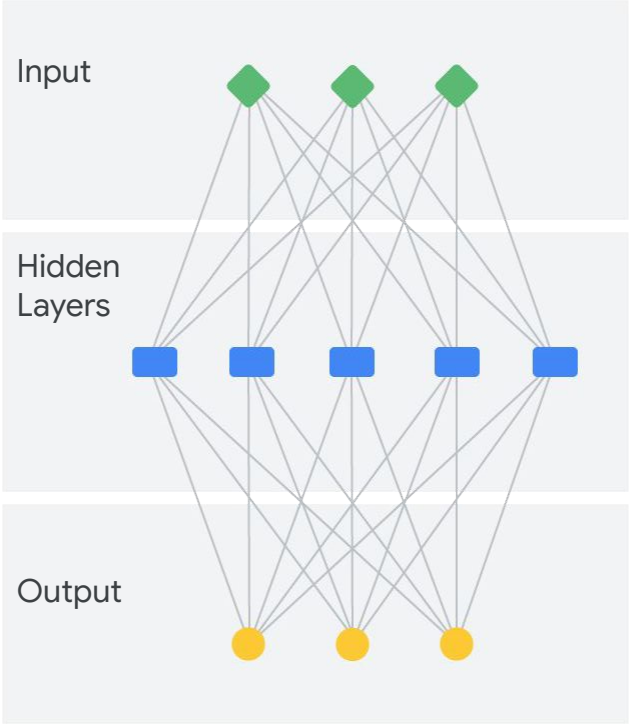
Can have one or more hidden layers.



Neural Networks

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

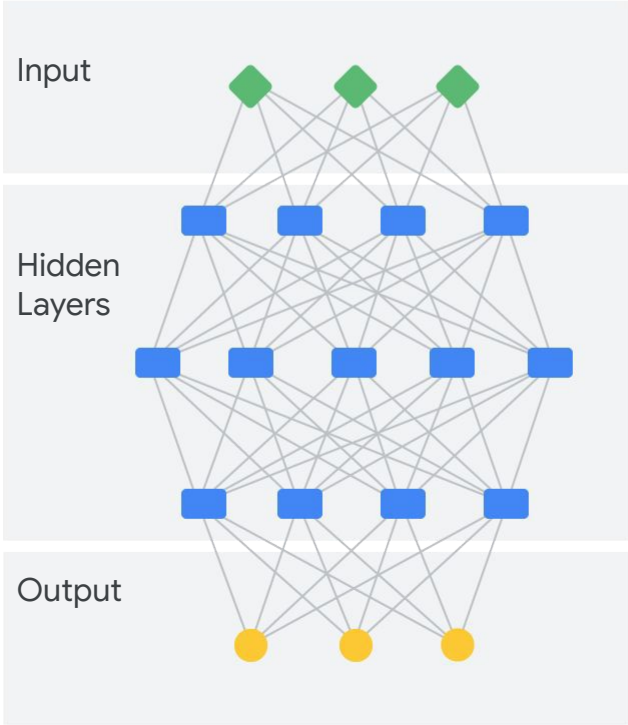
Can have one or more hidden layers.
Each node is a neuron or parameter.



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.

Why now?
Converging Forces

- Data
- Algorithms
- GPU Compute

How does it work?

Language Models

Next word prediction

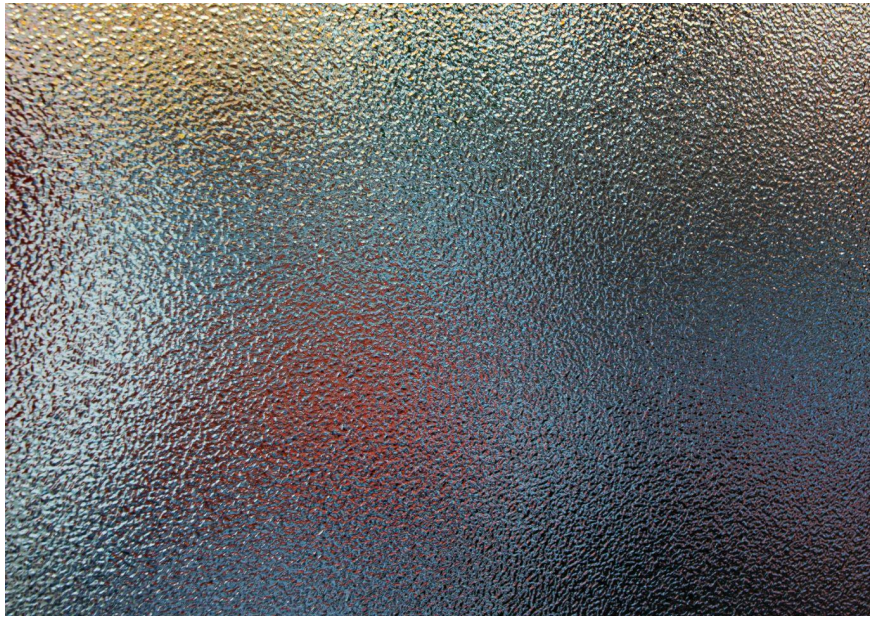


Image Generation

Denoising images

Understanding the Excitement

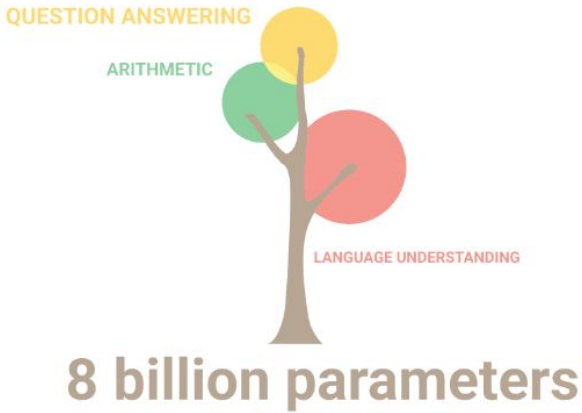
Narrow

Specialists

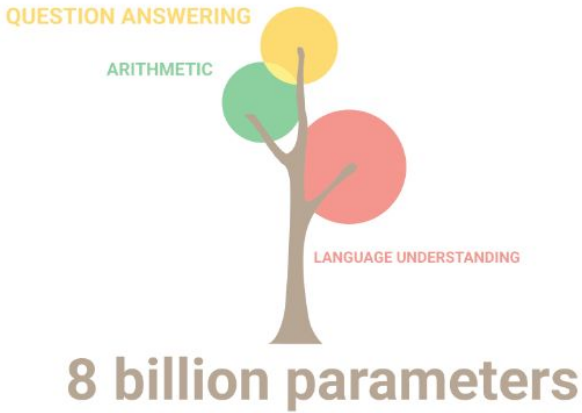
General

Artificial General Intelligence (AGI)

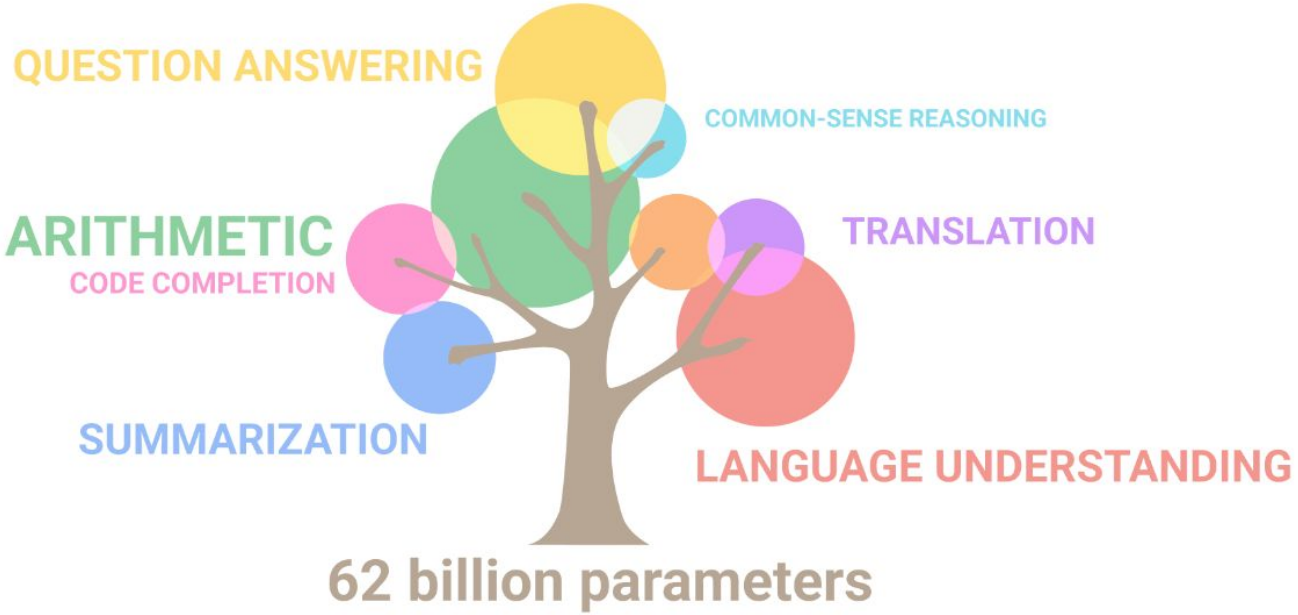
Emergent Abilities



Emergent Abilities



Emergent Abilities



Pre-trained Base

Generalist

vs

Fine-tuned Models

Specialists

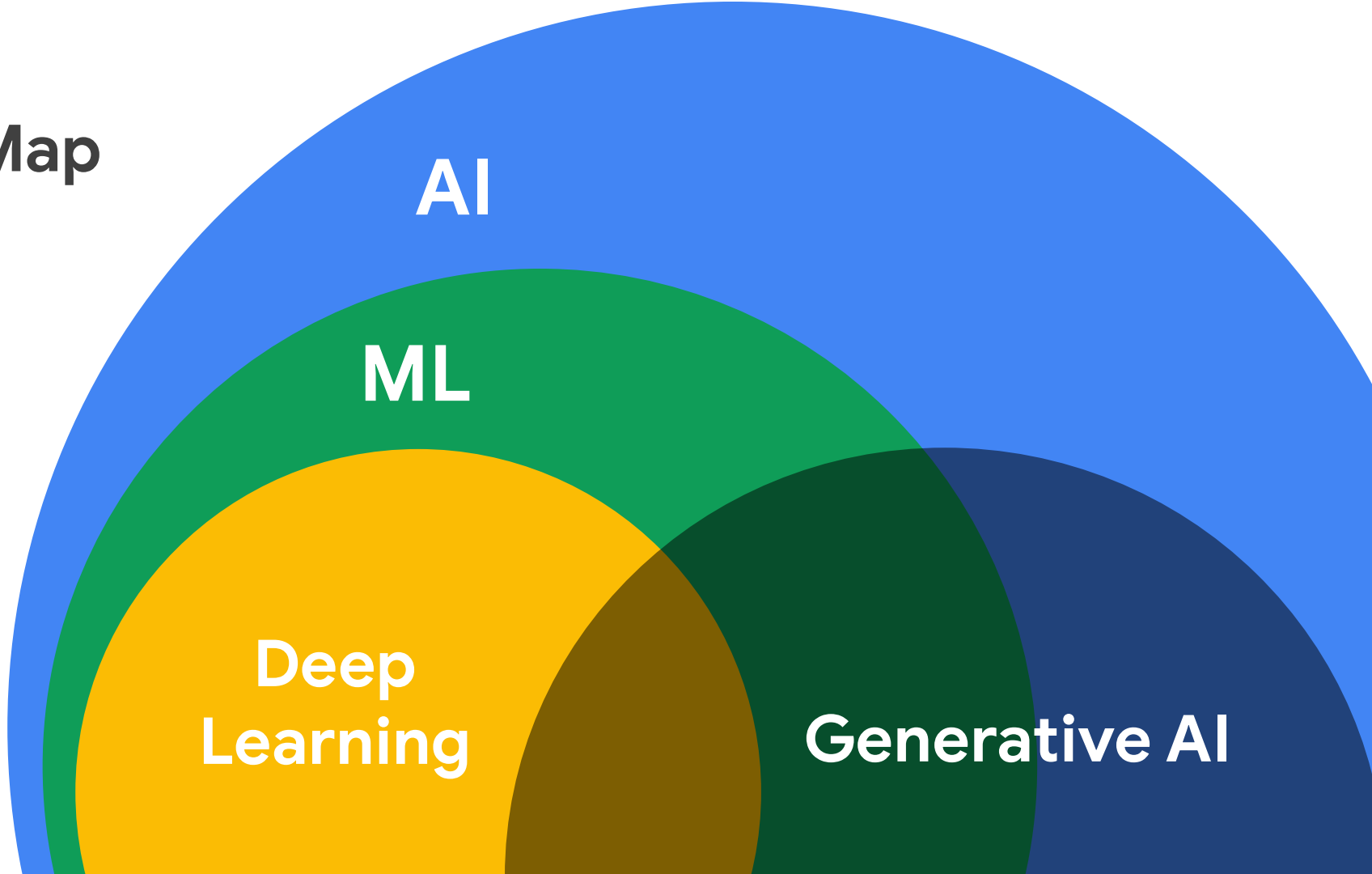
RLHF:

Reinforcement Learning
from Human Feedback

Fine-tuned

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

AI Map



Build with AI

Google Developer Groups
Capital Region

Gemini 101

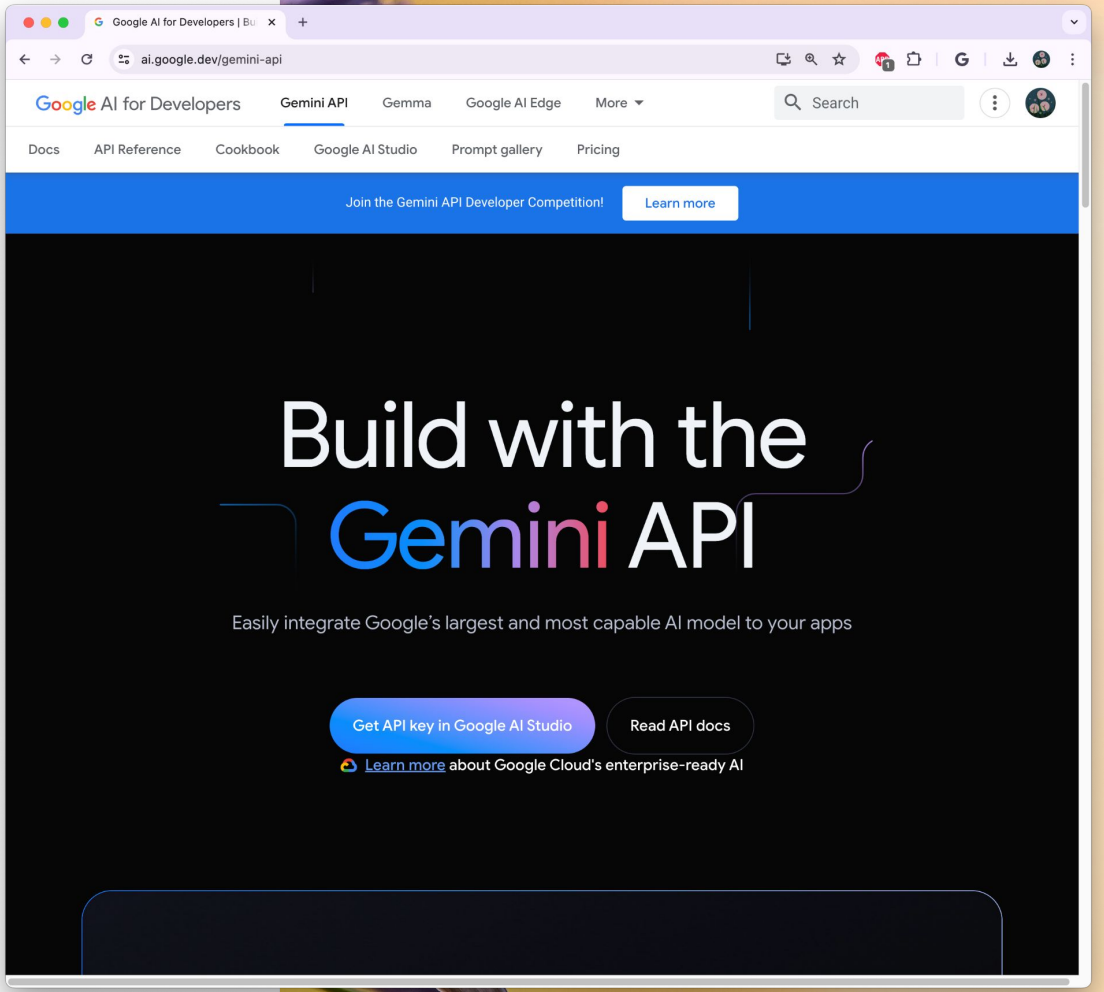
Gemini

Generalized Multimodal Intelligence Network

Google Developer Groups

Build with Gemini API

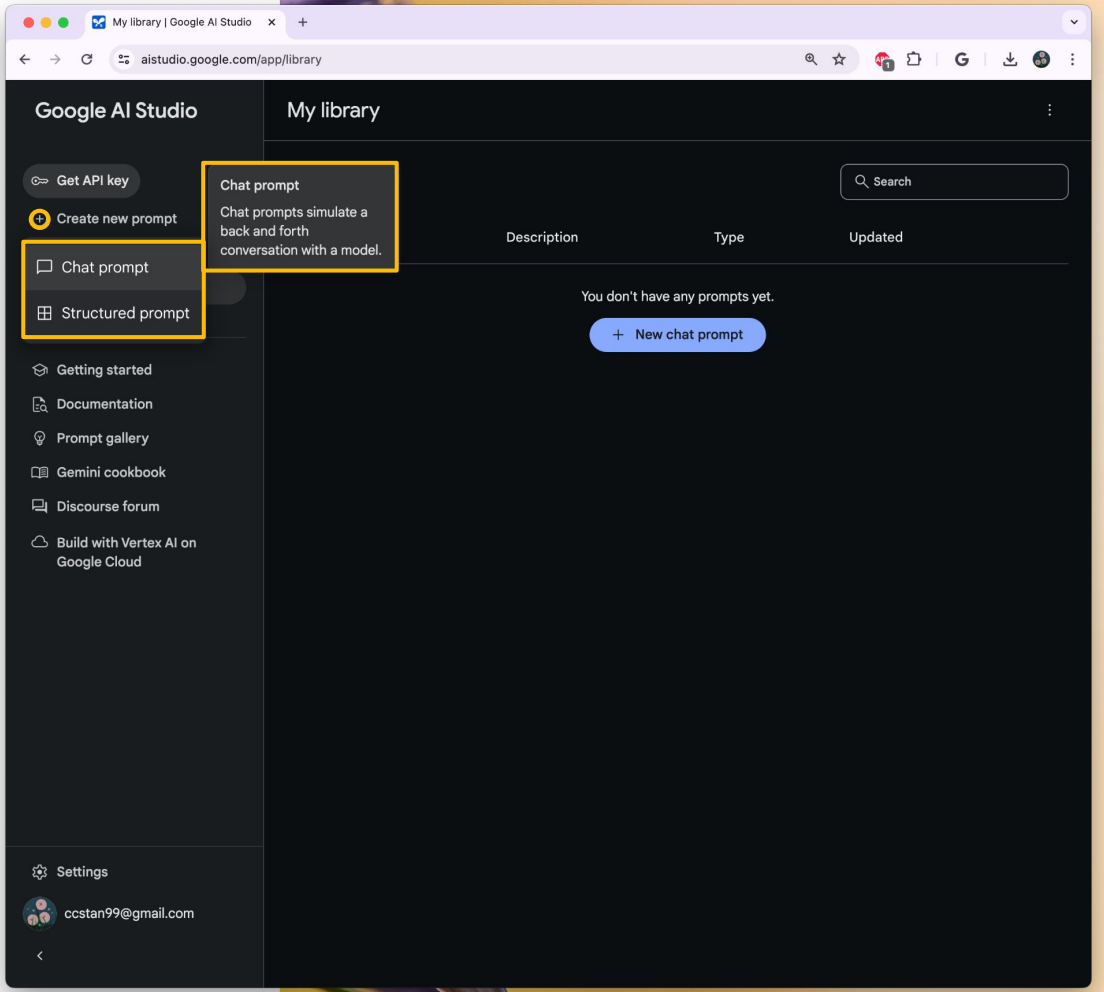
ai.google.dev



Google Developer Groups

Prototyping with

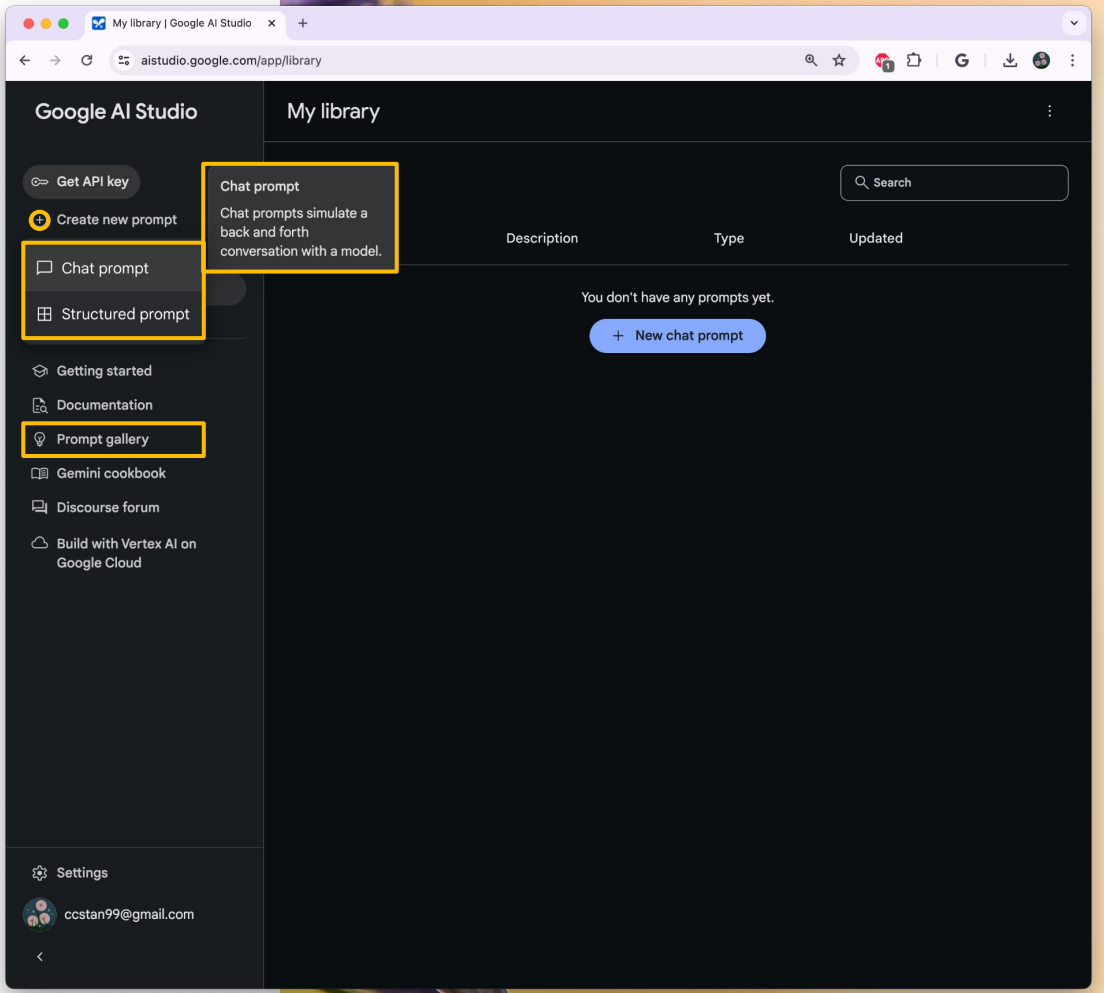
Google AI Studio



Google Developer Groups

Prompts

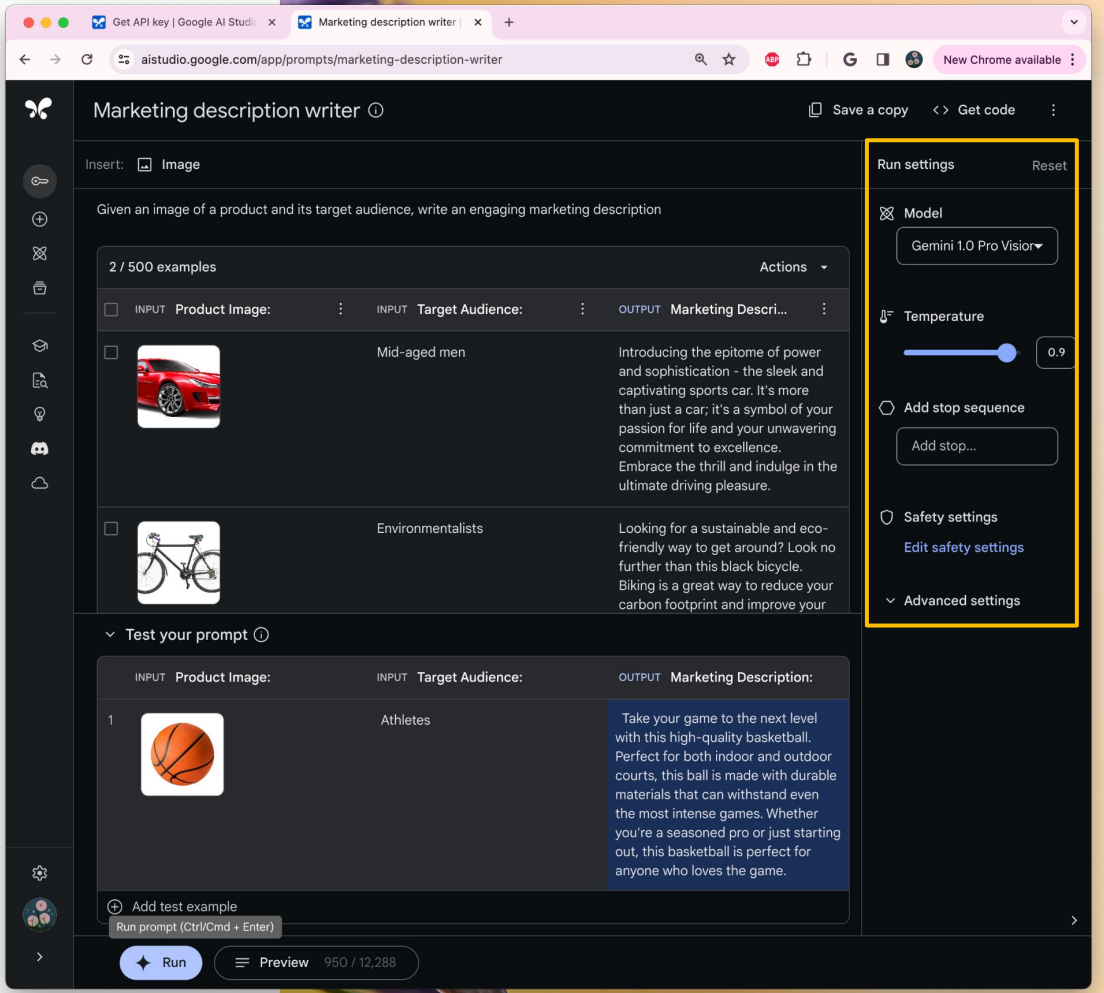
- Create new
- Prompt gallery



Google Developer Groups

Run settings

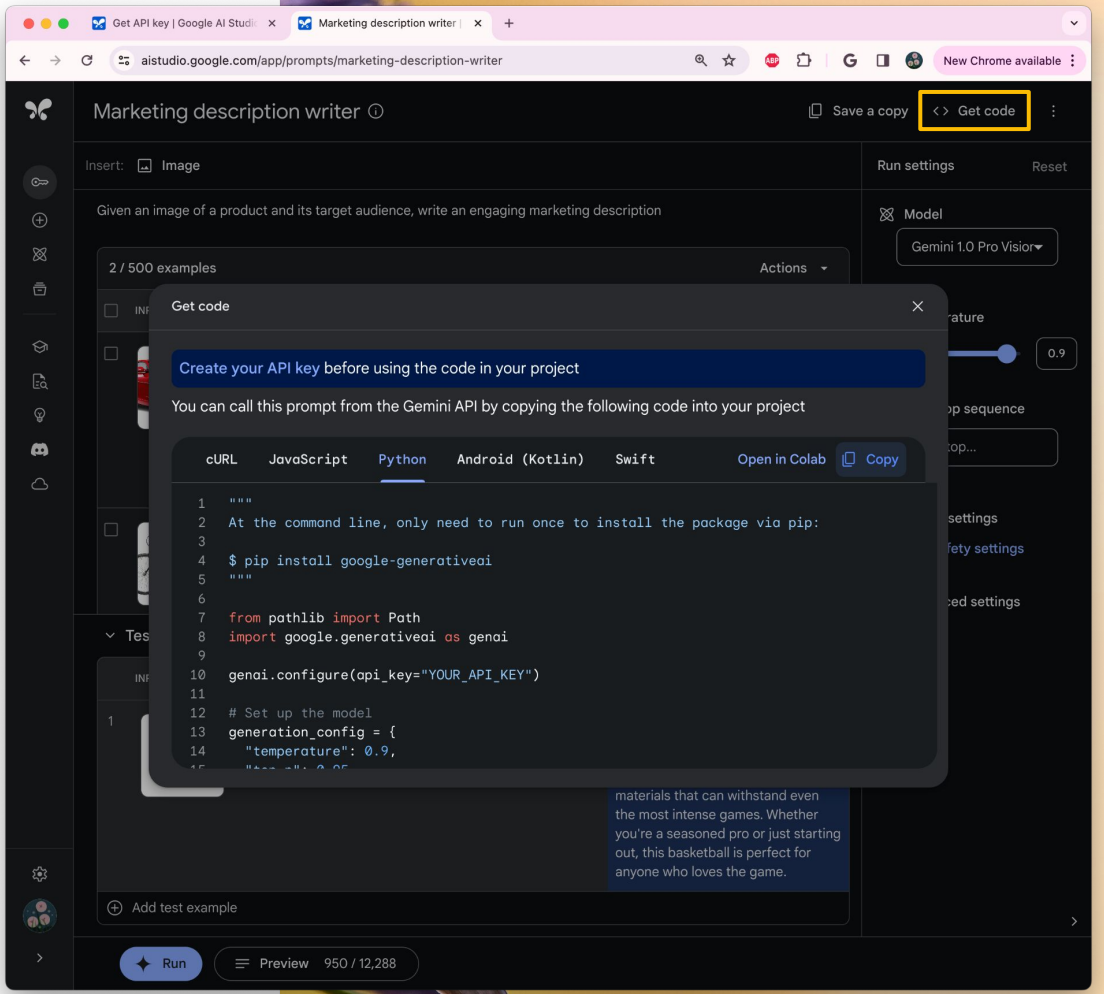
- Model
- Temperature
- Safety



Google Developer Groups

Get Code

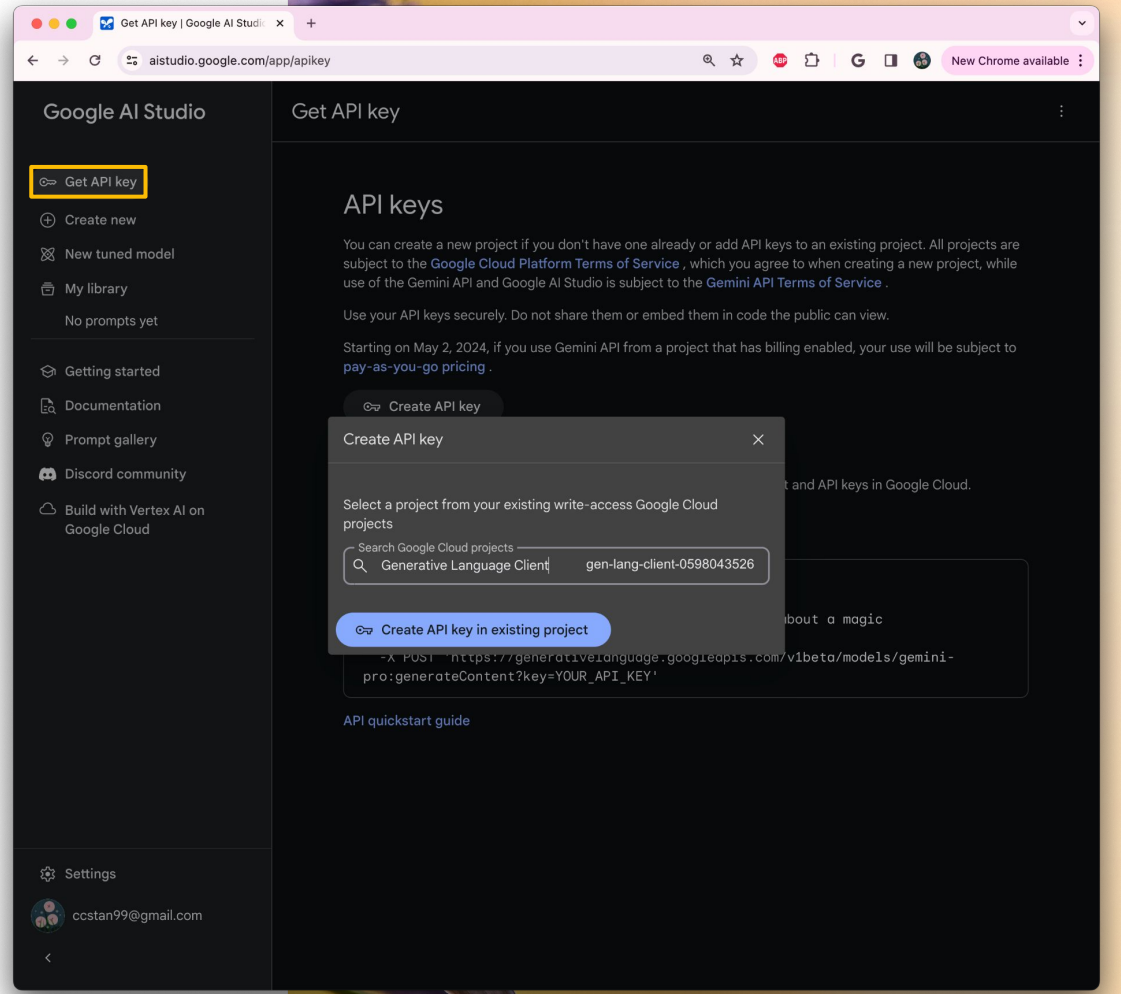
- Choose Language
- Open in Colab
- Copy to Editor



Google Developer Groups

Get API Key

Treat like password



Google Developer Groups

Settings

Tokens

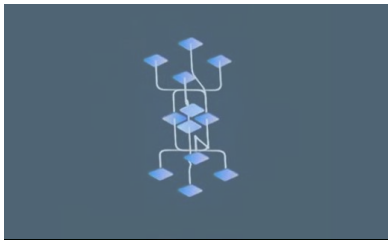
- Words or subwords
- Different LLM tokenizers
- 1-2M context window

Temperature

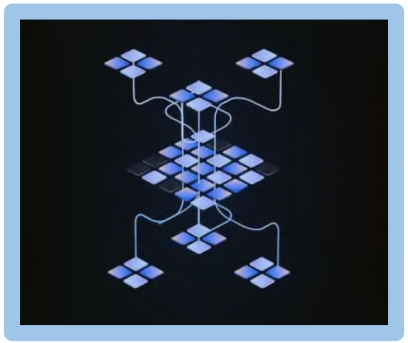
- Selected by probability
- Between 0 to 1.0
- Diversity or “creativity”

Settings

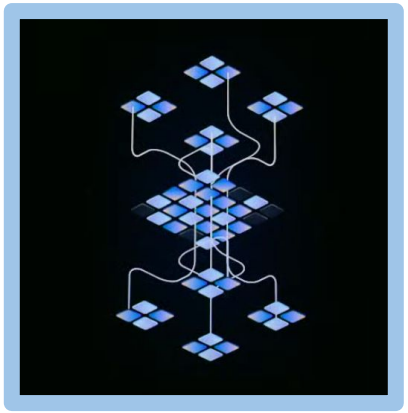
Model Sizes



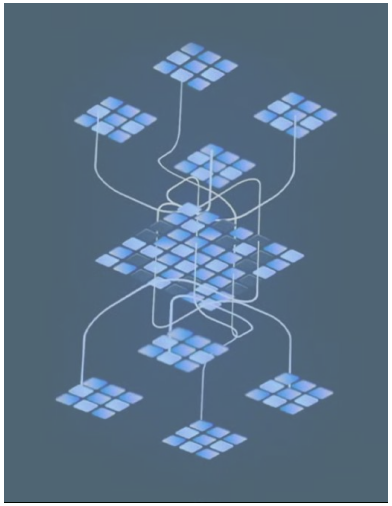
Nano



Flash



Pro



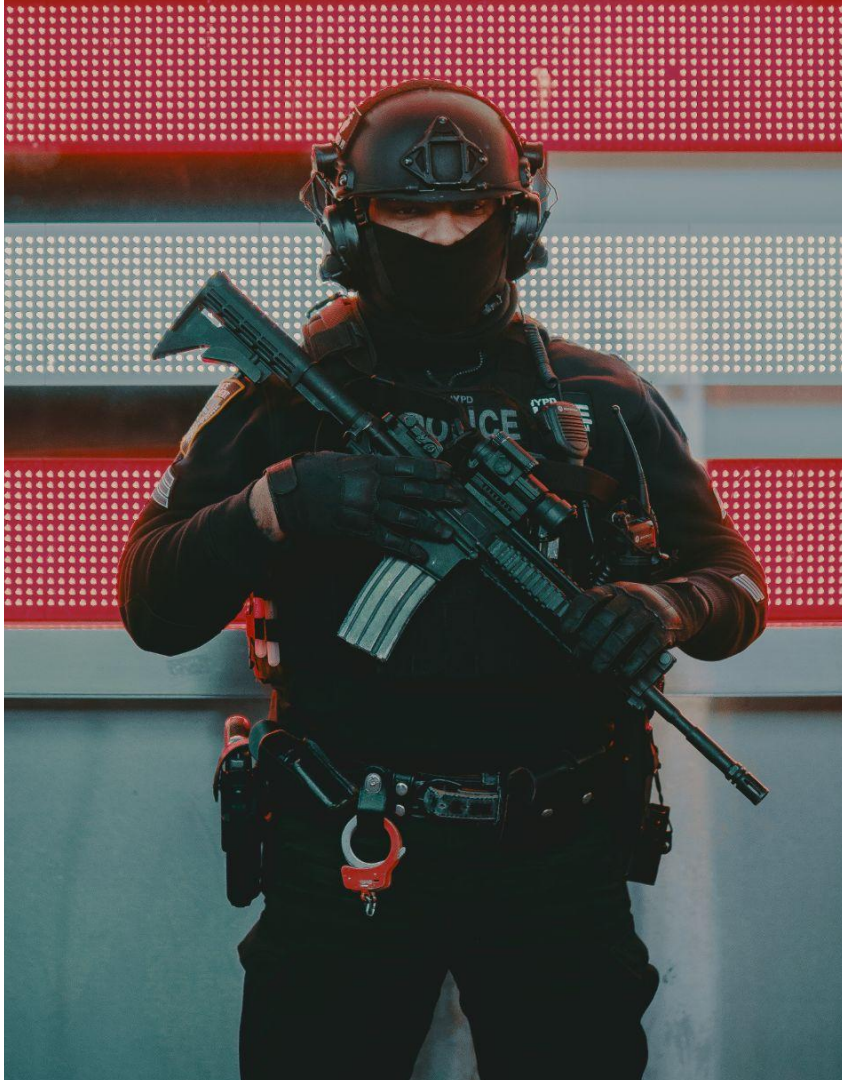
Ultra

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

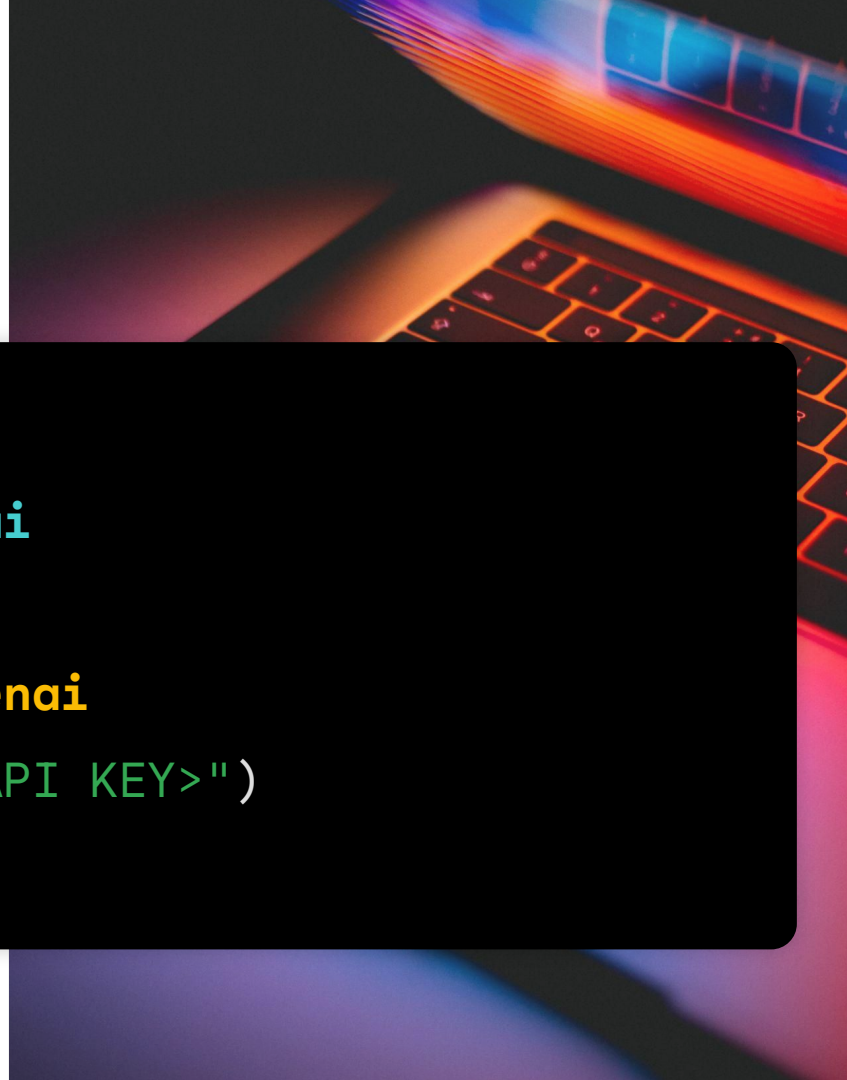
- Python
- JavaScript
- Android (Kotlin)
- Swift
- cURL

Setup

Install & import libraries

```
$ pip install google-generativeai

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



Generate Text

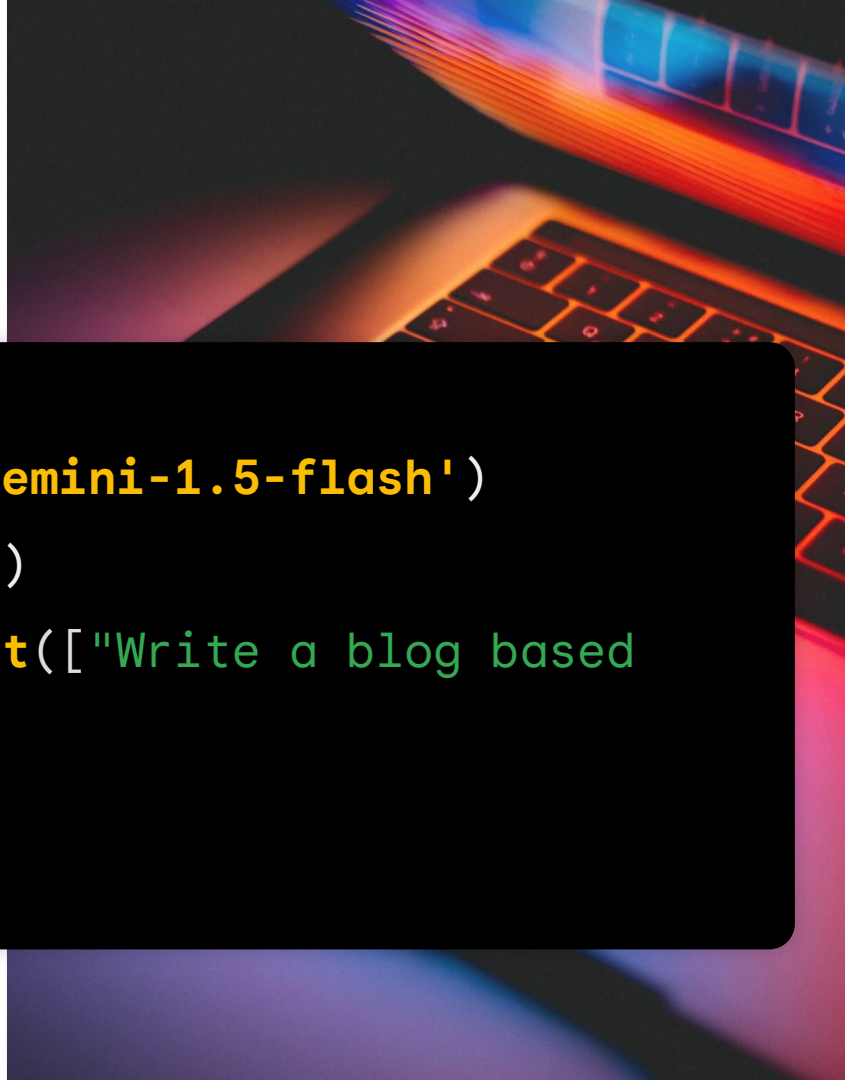
Text only prompt

```
model = genai.GenerativeModel('gemini-1.5-flash')

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

Generate Text

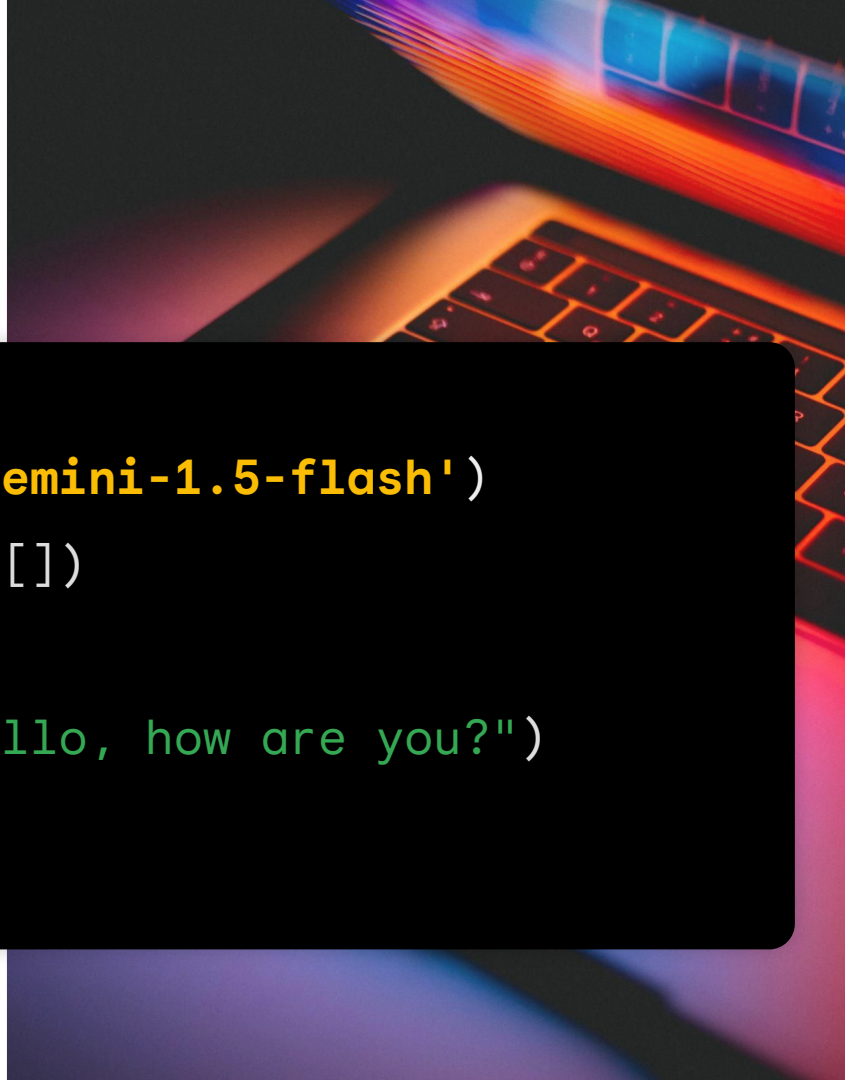
Text and image prompt



```
model = genai.GenerativeModel('gemini-1.5-flash')
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



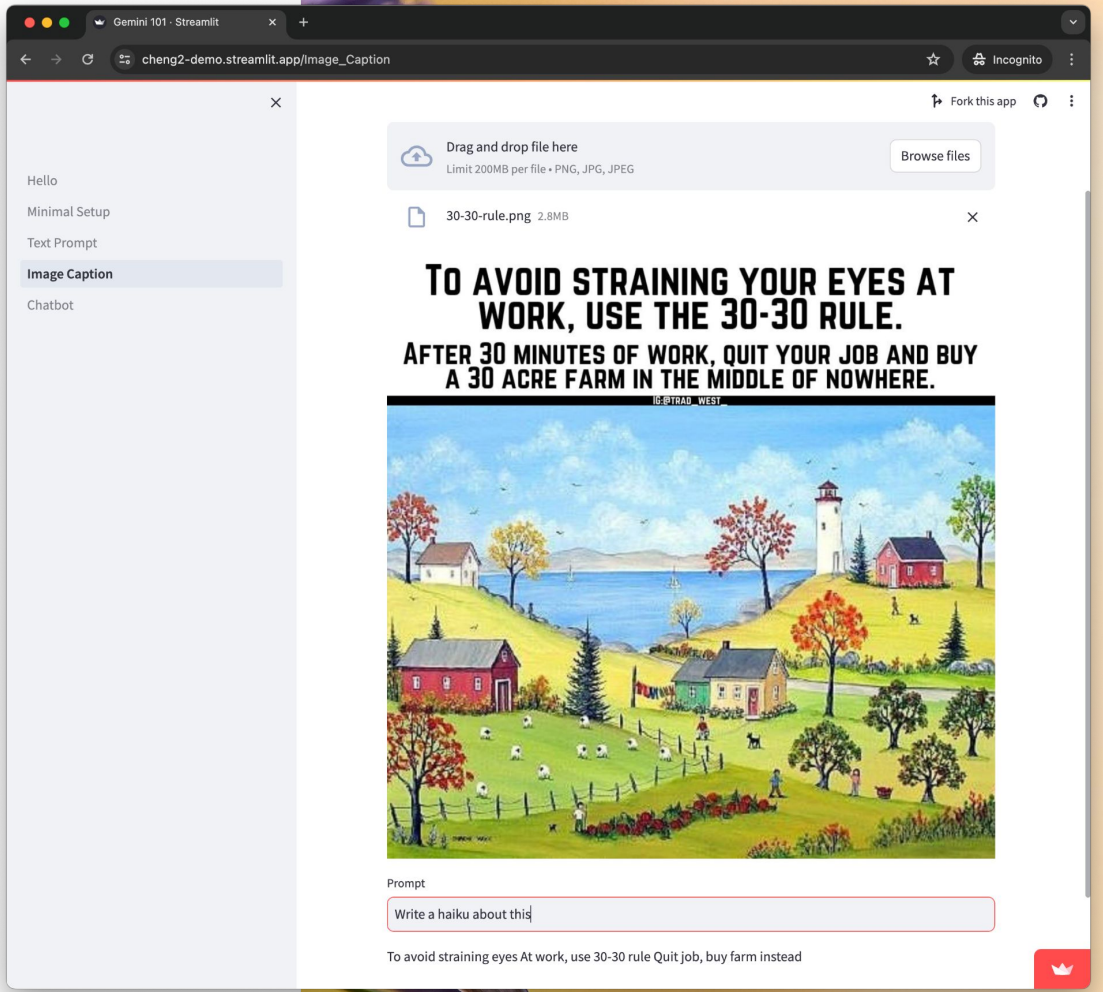
```
model = genai.GenerativeModel('gemini-1.5-flash')
chat = model.start_chat(history=[])

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

Demo App

- Text Prompt
- Image Caption
- Chatbot

https://
cheng2-demo
.streamlit.app

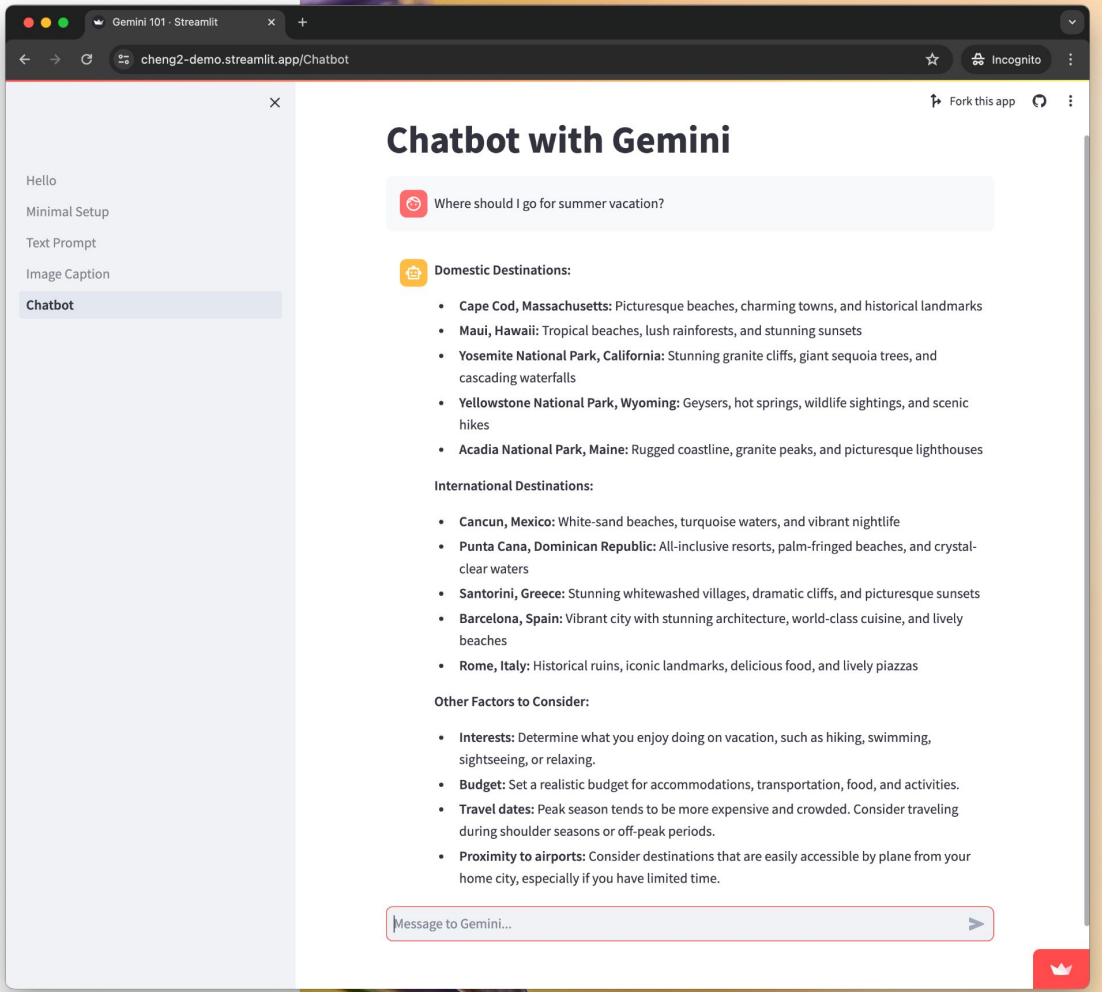


Google Developer Groups

Demo App

- Text Prompt
- Image Caption
- Chatbot

https://
cheng2-demo
.streamlit.app



Google Developer Groups

Build with AI

Google Developer Groups
Capital Region

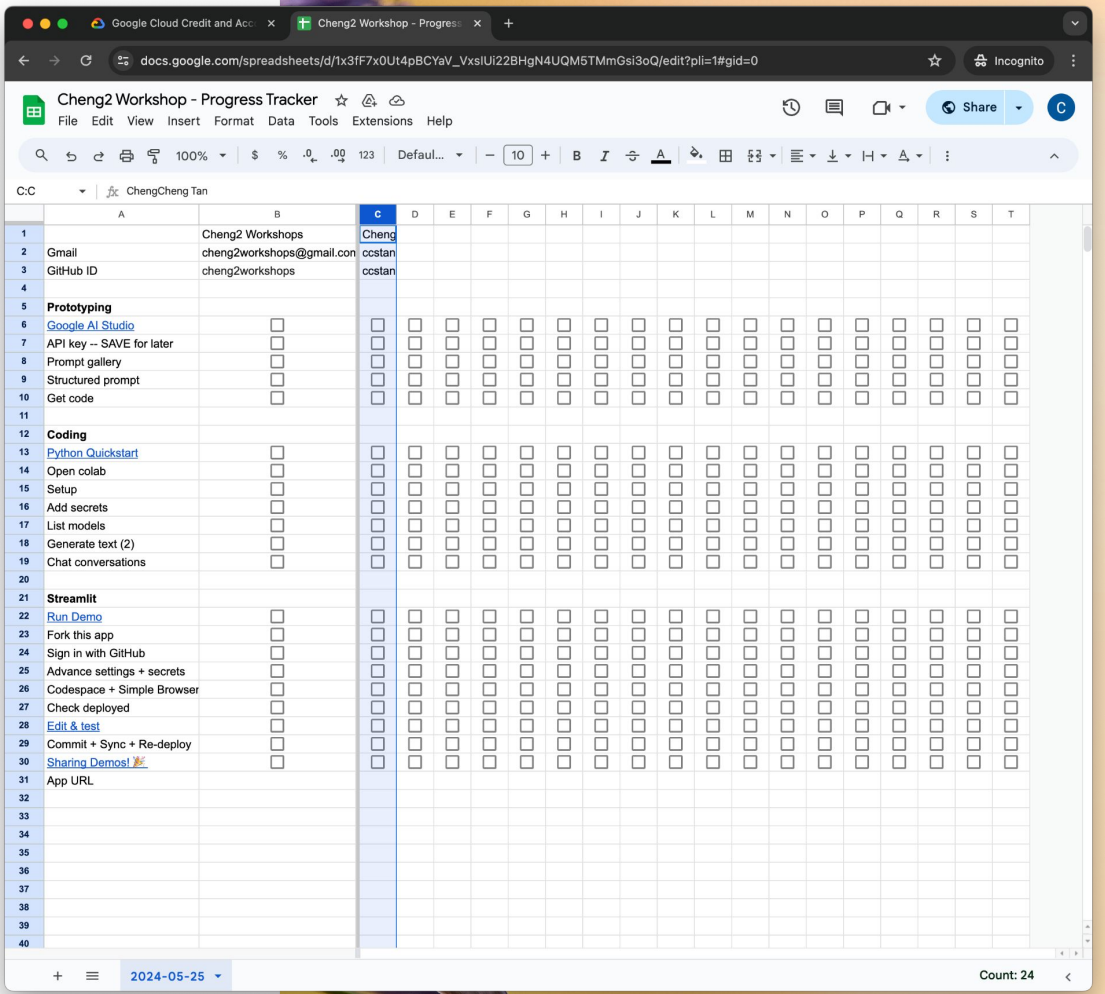
Now Your Turn!

Progress Tracker

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

bit.ly/**cheng2-workshop**

Google Developer Groups

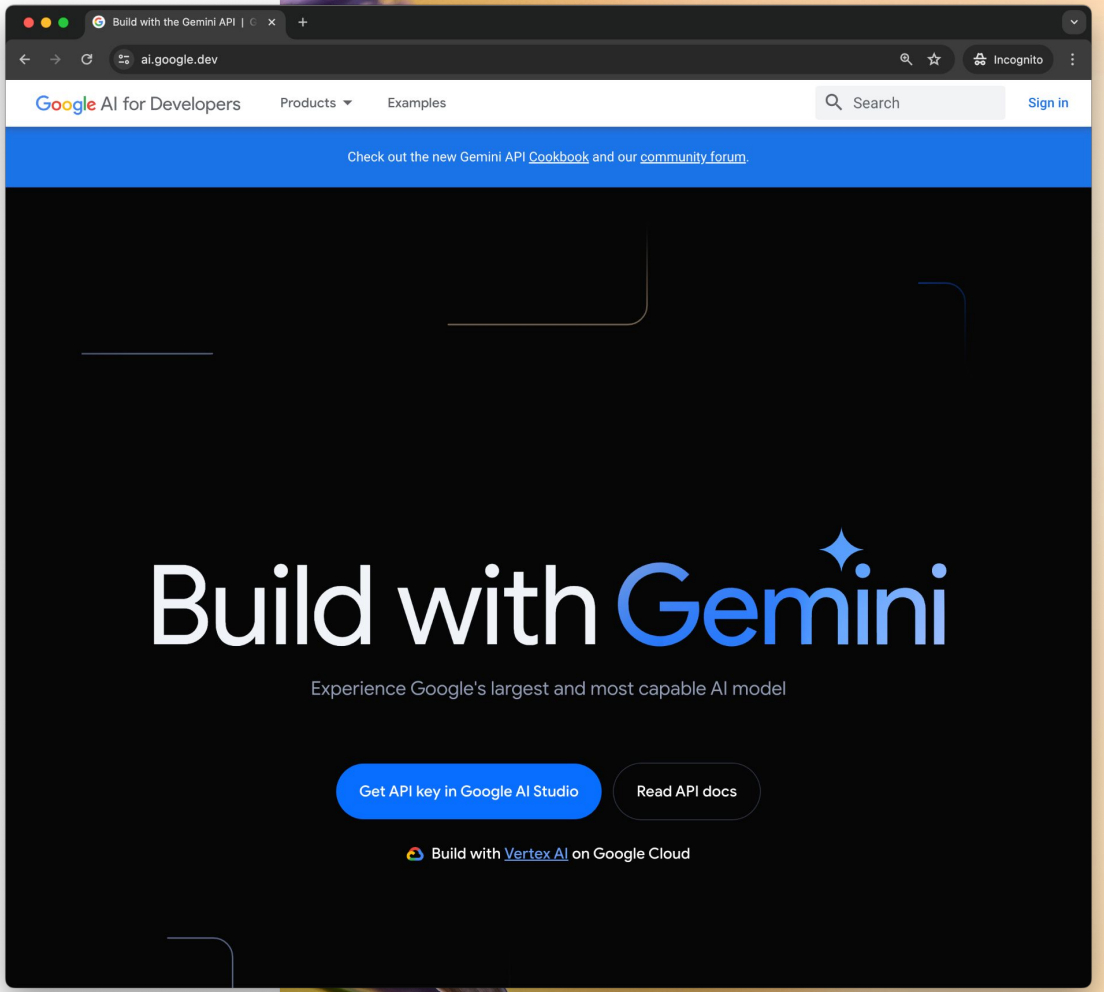


	A	B	C
1		Cheng2 Workshops	Cheng
2	Gmail	cheng2workshops@gmail.com	ccstan
3	GitHub ID	cheng2workshops	ccstan
4			
5	**Prototyping**		
6	Google AI Studio	☐	☐
7	API key -- SAVE for later	☐	☐
8	Prompt gallery	☐	☐
9	Structured prompt	☐	☐
10	Get code	☐	☐
11			
12	**Coding**		
13	Python Quickstart	☐	☐
14	Open colab	☐	☐
15	Setup	☐	☐
16	Add secrets	☐	☐
17	List models	☐	☐
18	Generate text (2)	☐	☐
19	Chat conversations	☐	☐
20			
21	**Streamlit**		
22	Run Demo	☐	☐
23	Fork this app	☐	☐
24	Sign in with GitHub	☐	☐
25	Advance settings + secrets	☐	☐
26	Codespace + Simple Browser	☐	☐
27	Check deployed	☐	☐
28	Edit & test	☐	☐
29	Commit + Sync + Re-deploy	☐	☐
30	Sharing Demos! 🎉	☐	☐
31	App URL		

Google AI Studio

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

ai.google.dev



Google Developer Groups

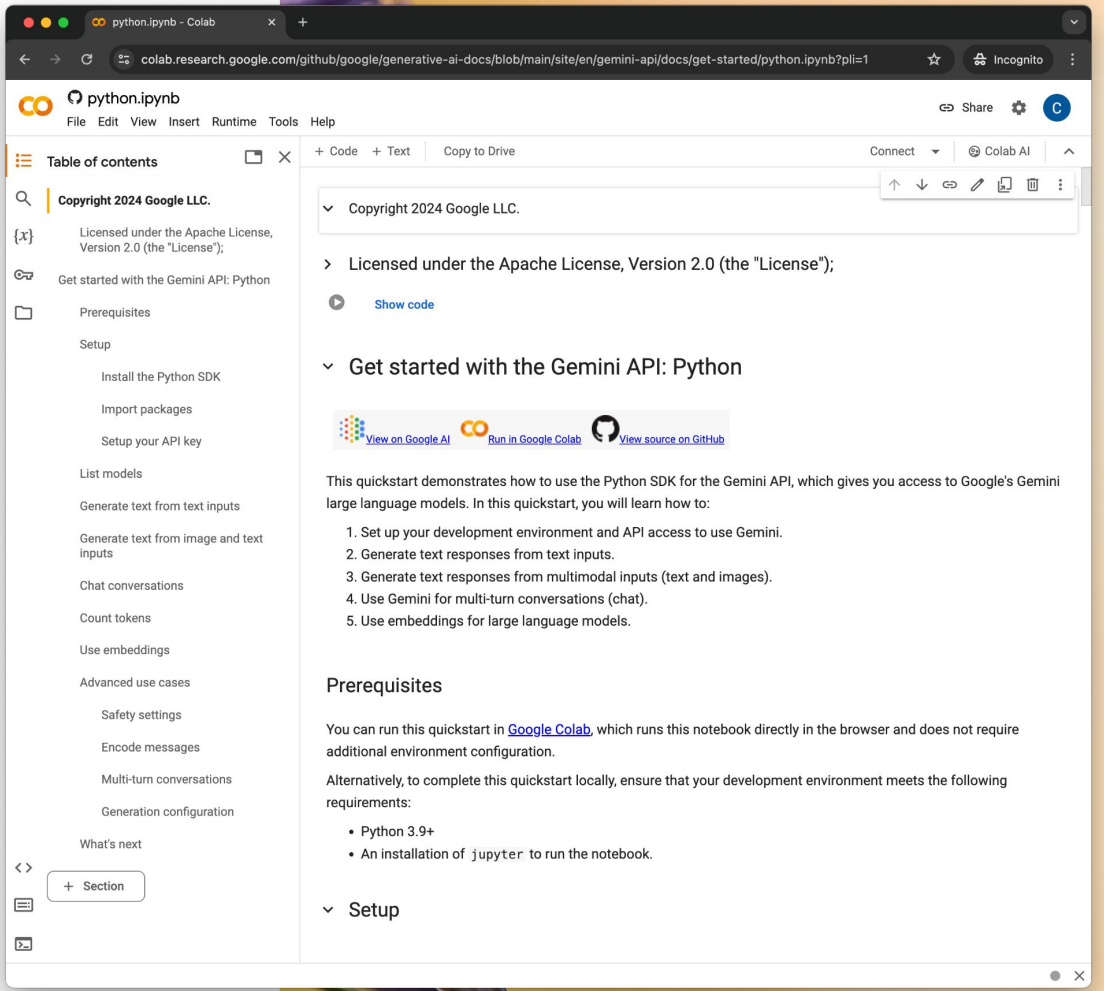
Colab Notebook

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

ai.google.dev/tutorials/

python_quickstart

Google Developer Groups

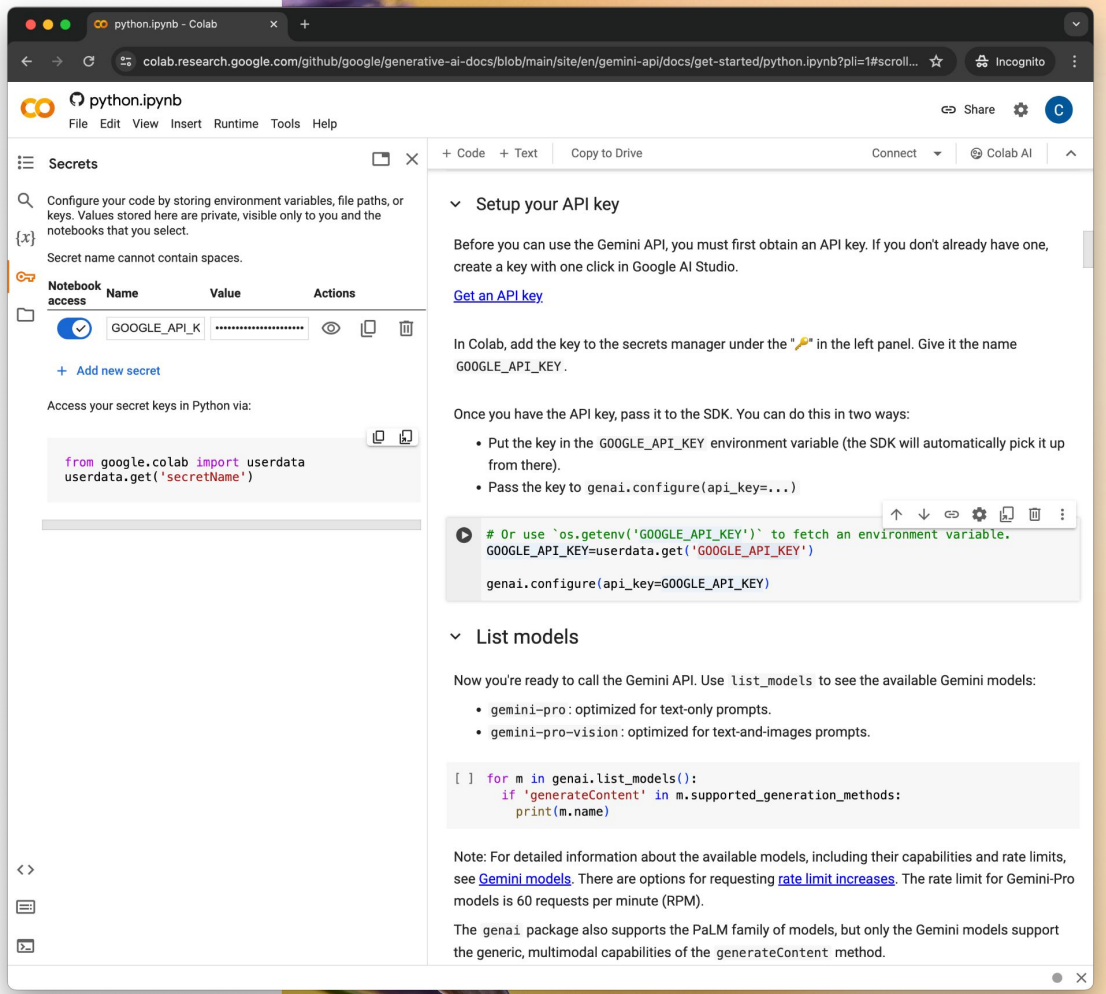


Colab Notebook

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

ai.google.dev/tutorials/

python_quickstart

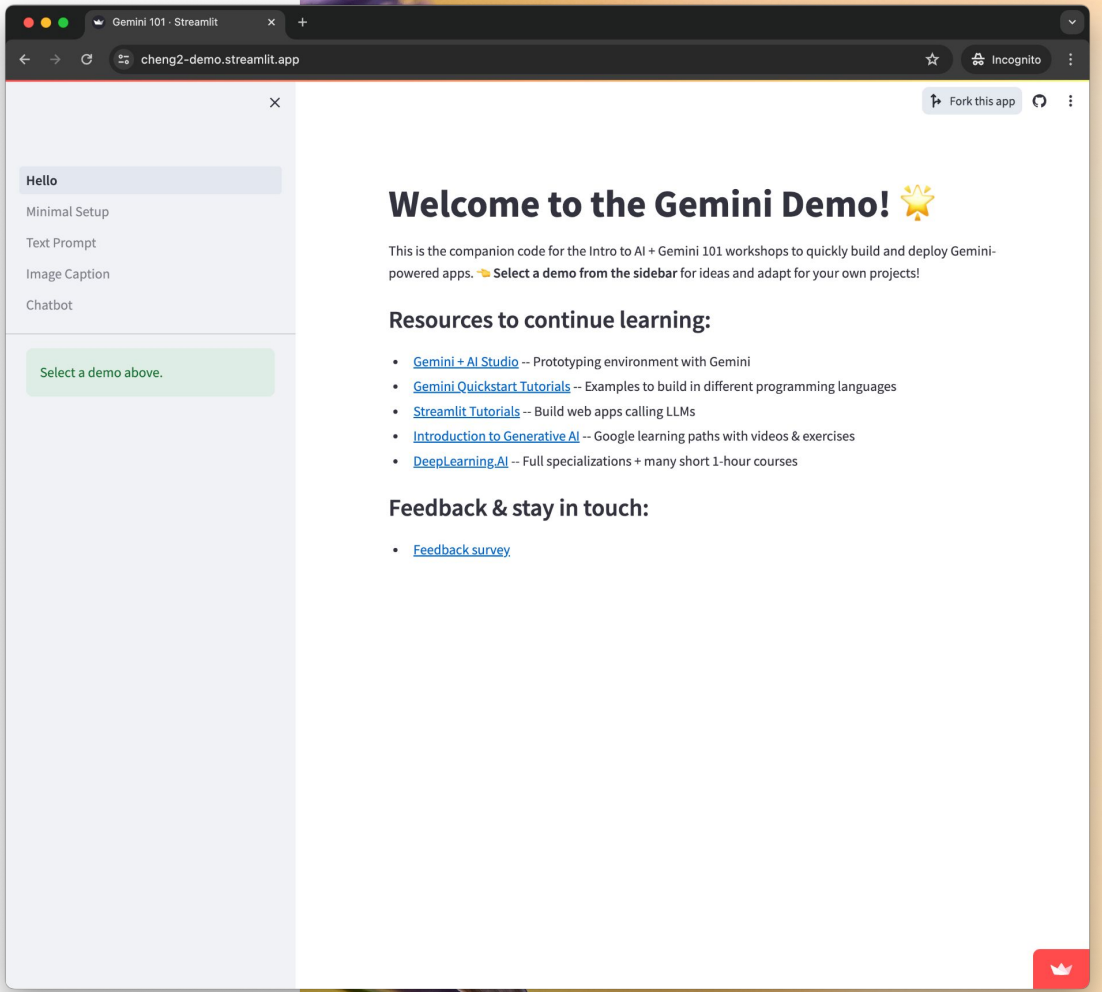


Google Developer Groups

Streamlit App

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

https://
cheng2-demo
.streamlit.app



Google Developer Groups

Resources

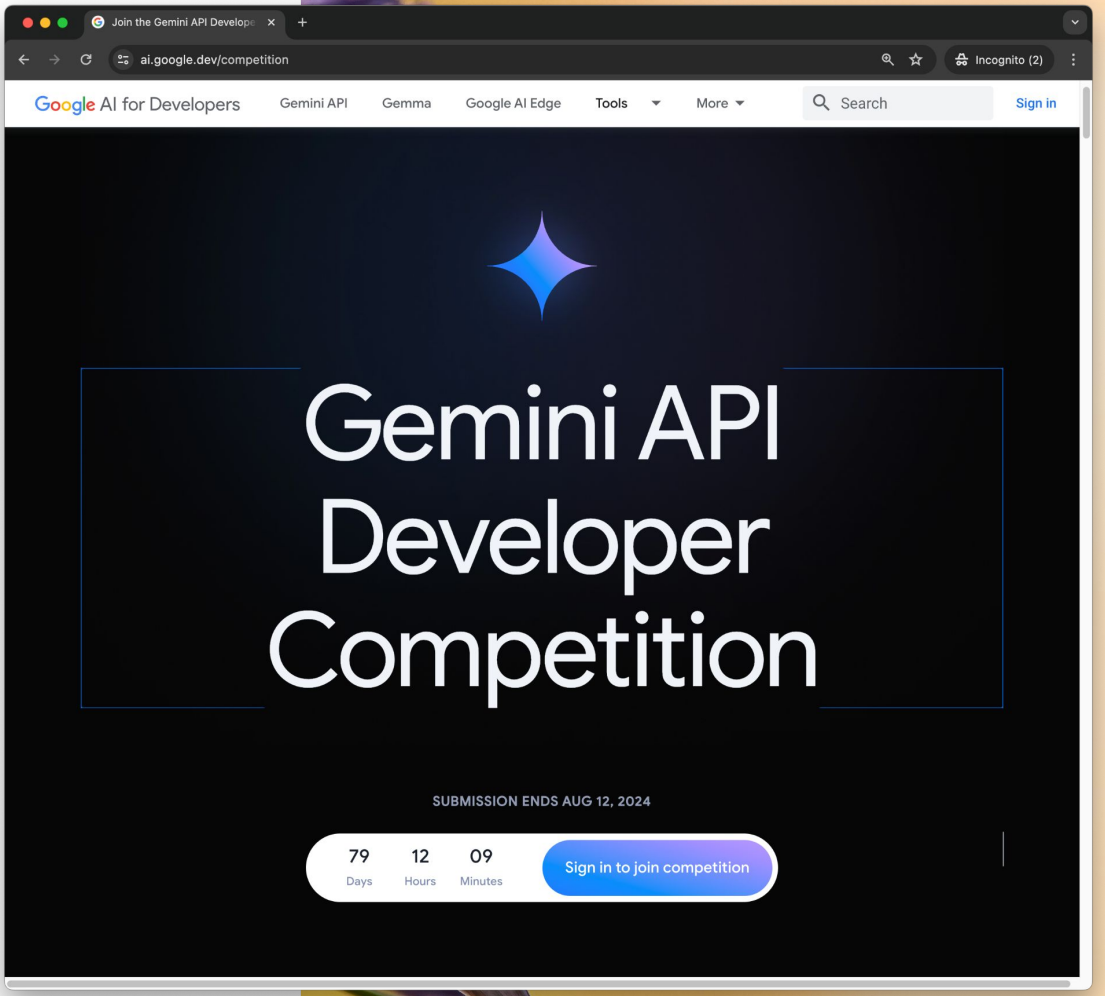
bit.ly/cheng2-slides

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

Competition

- Gemini API Developer Competition
- Share +$1 million in cash or other cool prizes
- Ends August 12
- Tag us if you submit

ai.google.dev/
competition



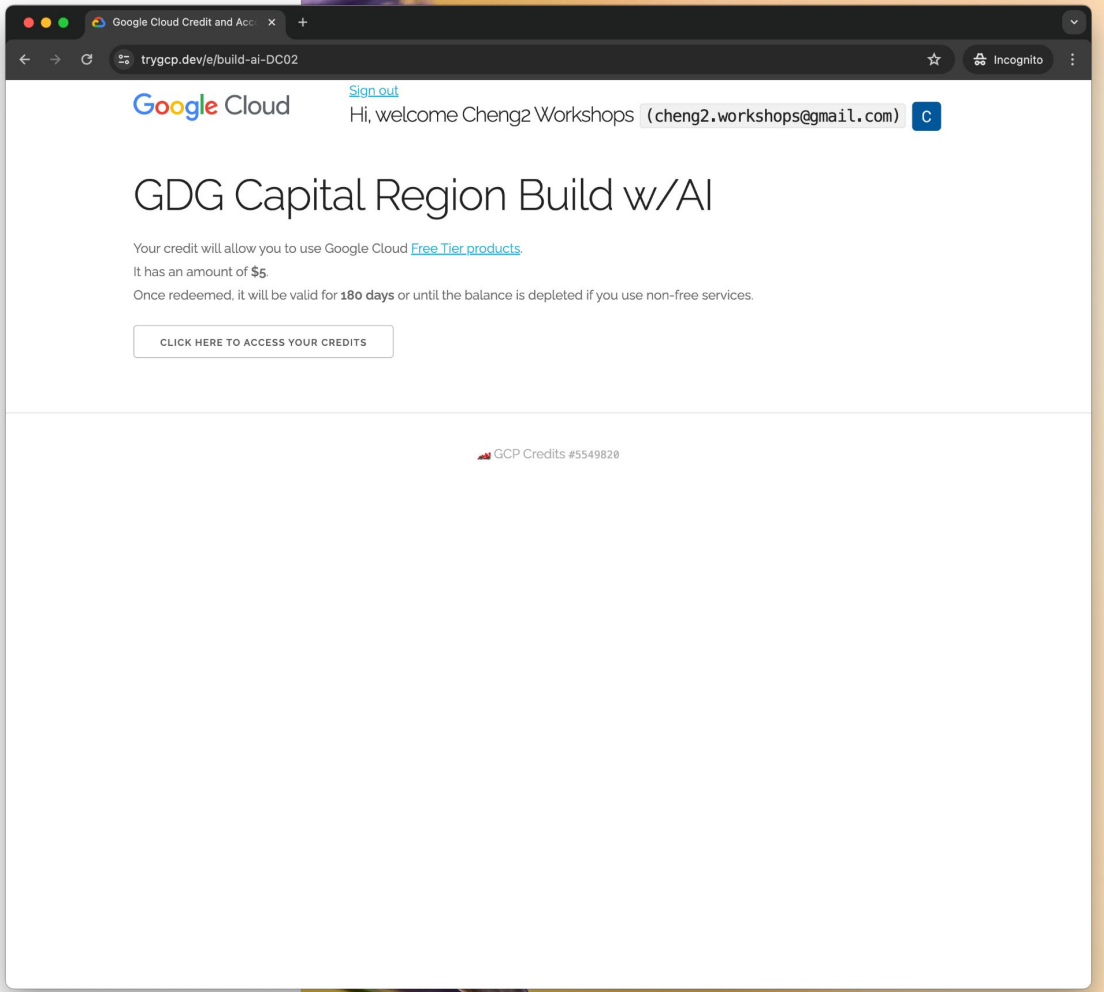
Google Developer Groups

Special Gift!

- Google Cloud Platform to use **Vertex AI**
- Free tier + credits
- **Google Cloud Innovators** Join for training with free Cloud Skills Boost

trygcp.dev/e/
build-ai-DC02

Google Developer Groups



Build with AI

ChengCheng Tan

ccstan99@gmail.com

cheng2-tan

@cheng2_tan

Google Developer Groups

Capital Region

Build with AI

Image Credits

- Alpaca by Samantha Amidon on Unsplash
- Calligraphy Pen by Digital Content Writers India on Unsplash
- Calculator by Towfiqu barbhuiya on Unsplash
- Fruits & Veggies by Brooke Lark on Unsplash
- Neuron by Hal Gatewood on Unsplash
- Scrabble Tiles by Merve Sehirli Nasir on Unsplash
- Runners Training by Fitsum Admasu on Unsplash
- Thumbs Up by Johan Godinez on Unsplash
- Butterfly & Flowers by Birger Strahl on Unsplash
- Tools by Haupes on Unsplash
- Security Guard by Alec Favale on Unsplash
- Reaching Hands by Matheus Viana on Unsplash
- Keyboard by Mohammad Rahmani on Unsplash
- Laptop by Andras Vas on Unsplash
- Stars by Aldebaran S on Unsplash
- Everything Everywhere All at Once (2022)
- Boy & Robot, Winter Plant, Granny images generated on stability.ai