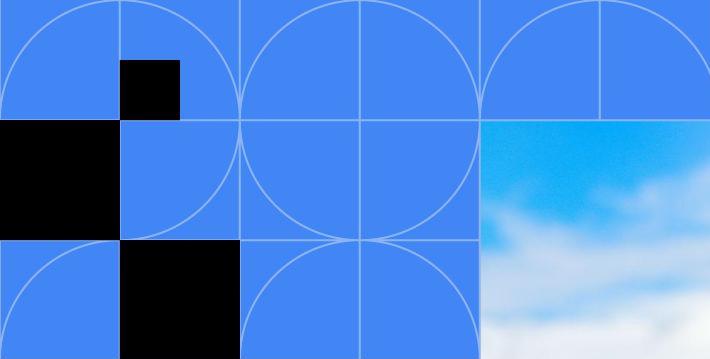


Build with AI



Intro to AI + Gemini 101



Who am I?

ChengCheng Tan

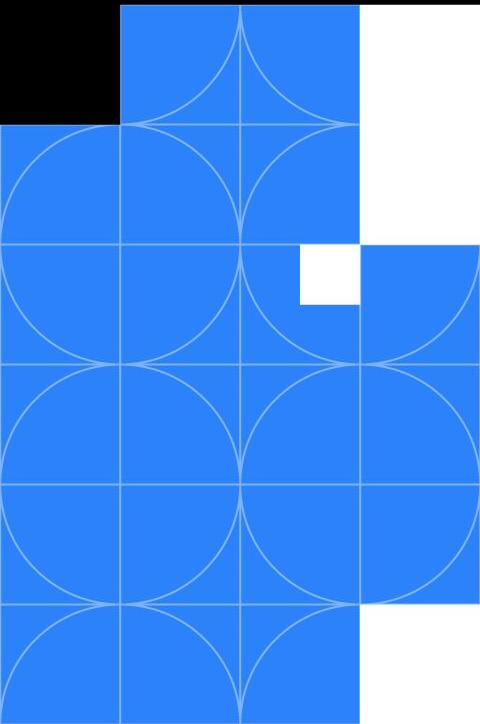
- BA Linguistics & CS, **UCLA**
- MS CS HCI, **Stanford**
- **LLM + AI Safety**
FAR AI Communications
AISafety.info + chatbot
- Google WTM Ambassador

* DISCLAIMER ideas presented here are my own



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

Build with AI

An abstract graphic in the bottom-left corner consists of a blue square containing a white grid of circles. A single white square is positioned at the intersection of the third column from the left and the fourth row from the top.

Google Developer Groups

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

Deep Learning
Complex patterns with
neural networks.

Decision Trees

Random Forests

Gradient Boost

Naive Bayes

SVM

KNN

AI Map

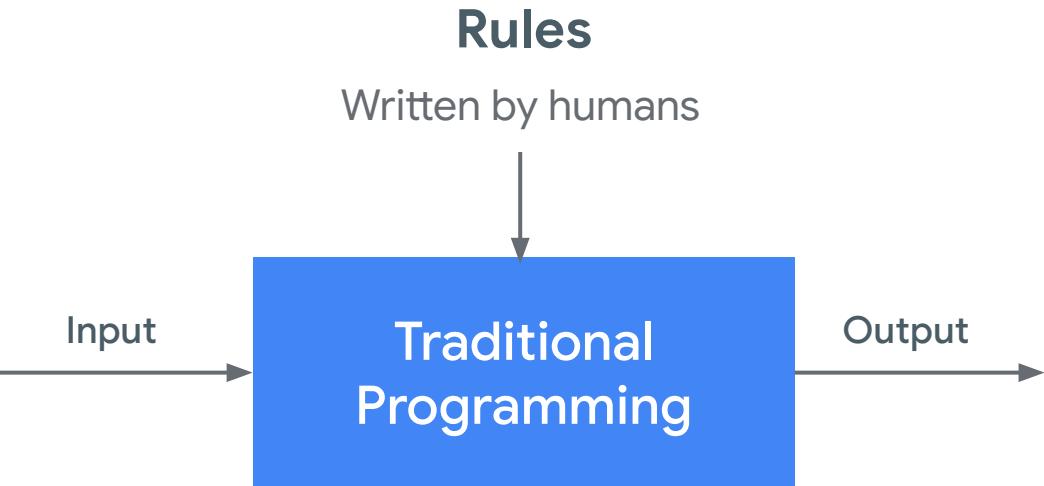
AI

ML

Deep
Learning

Generative AI

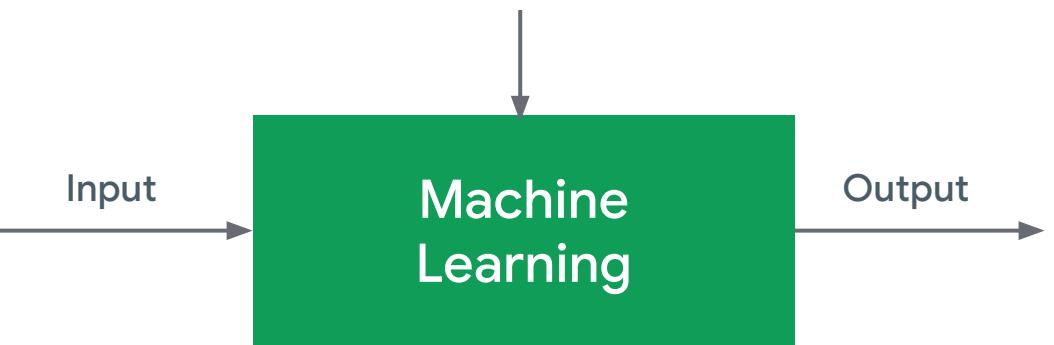
Old GOFAI Way



New ML Way

Examples

Computer learns rules



Types of ML Learning



Supervised
Learn from answers



Unsupervised
Notice patterns

Iris Dataset

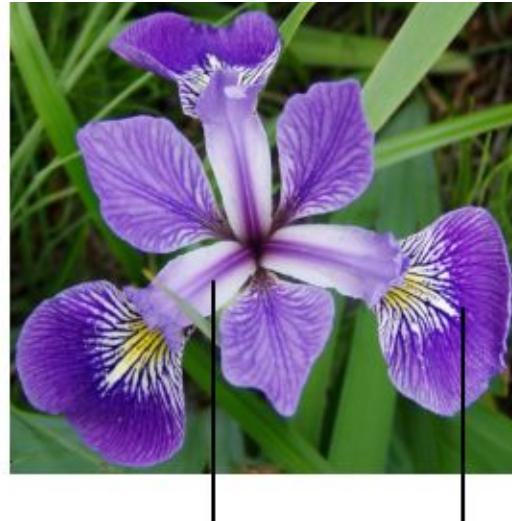
● Iris **sentosa**



petal

sepal

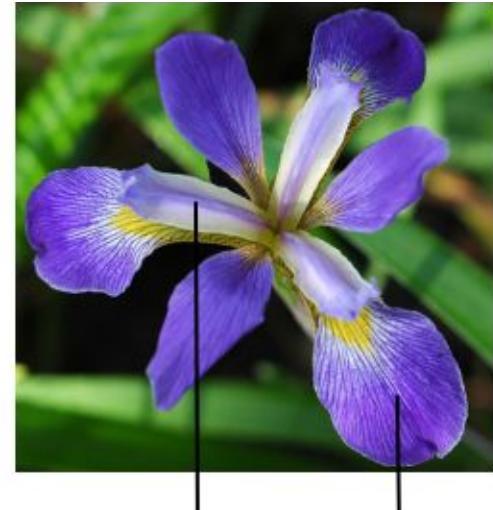
● Iris **versicolor**



petal

sepal

● Iris **virginica**

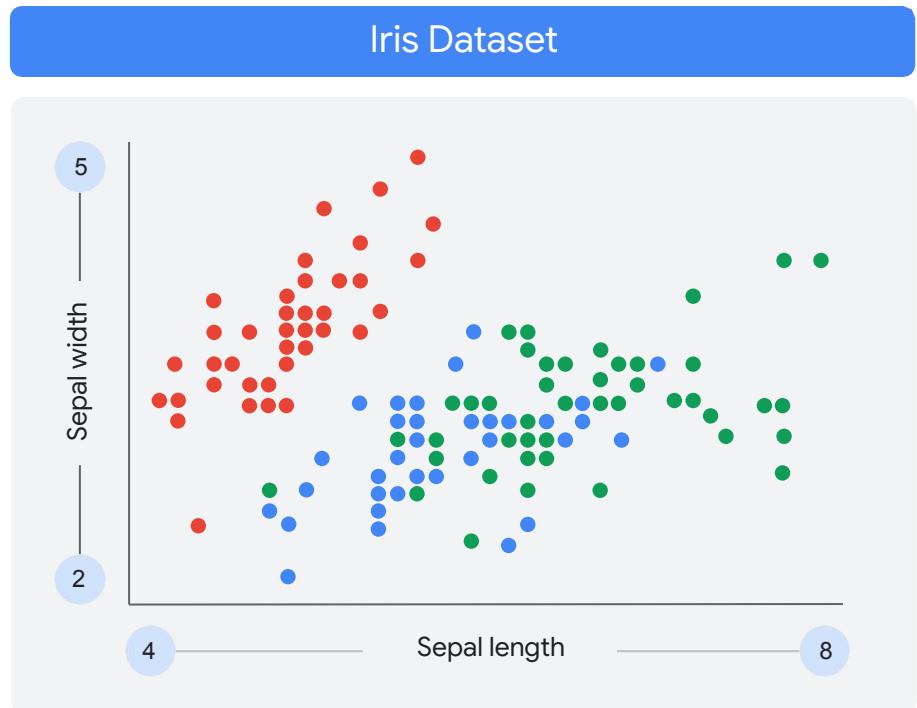


petal

sepal

Supervised Learning

The data is **already labeled**



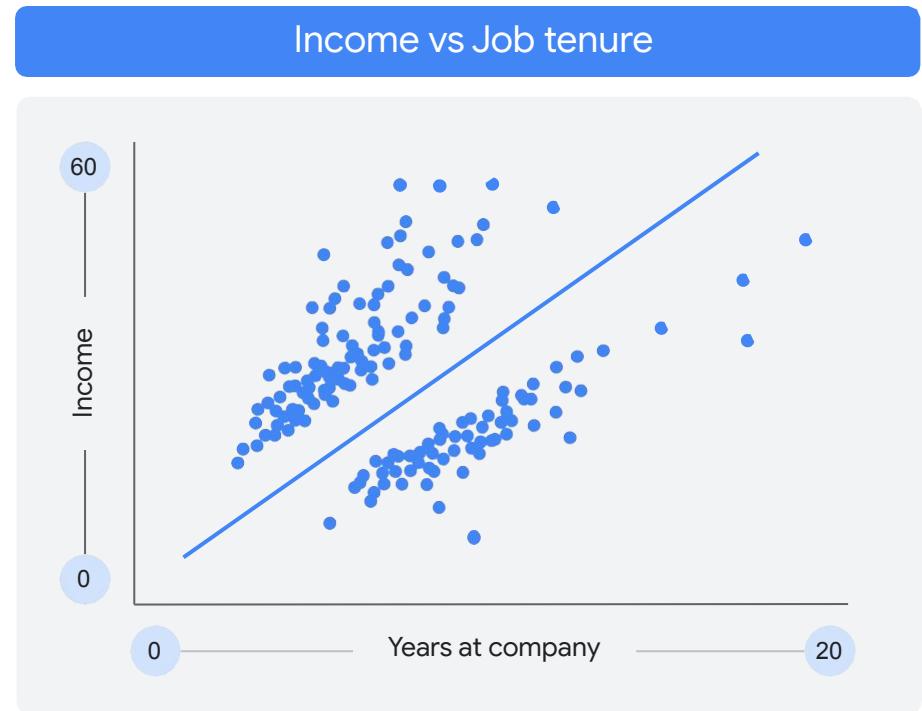
Learn from past examples
to predict future values.



Unsupervised Learning

The data is **not labeled**

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

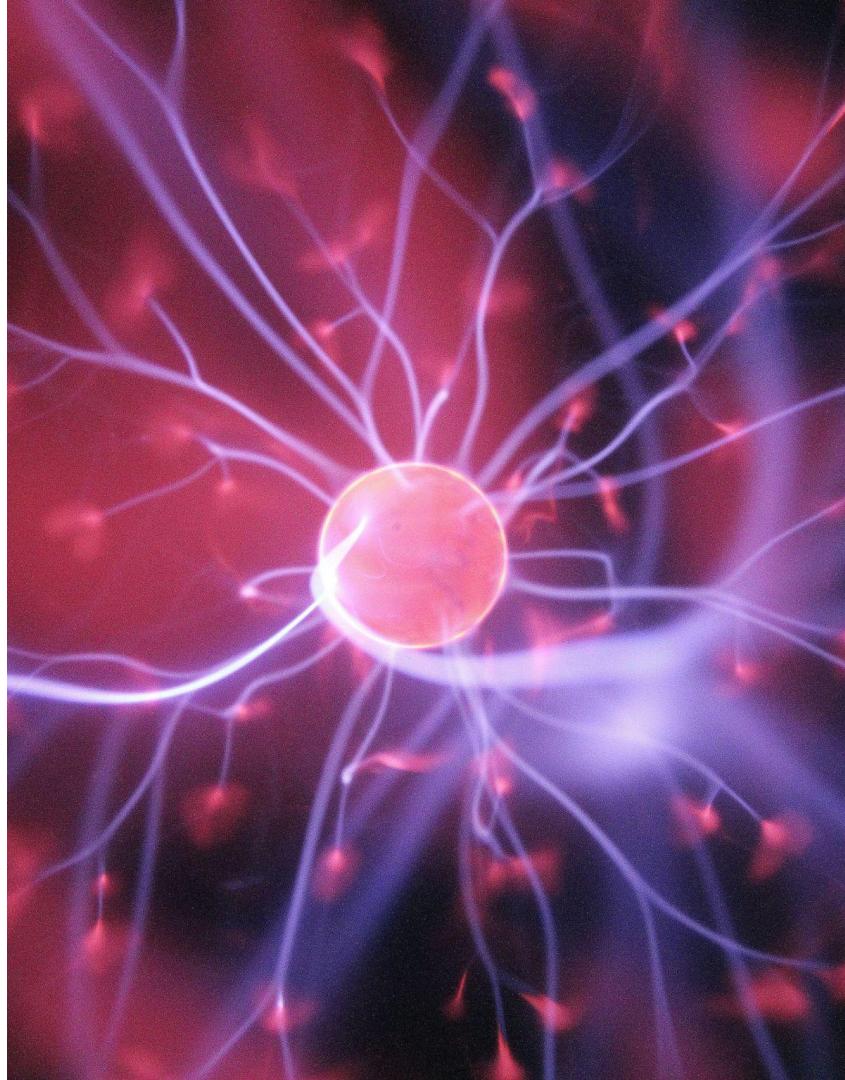


Example Model: Clustering
Is this employee on the “fast-track” or not?

Neural Networks

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

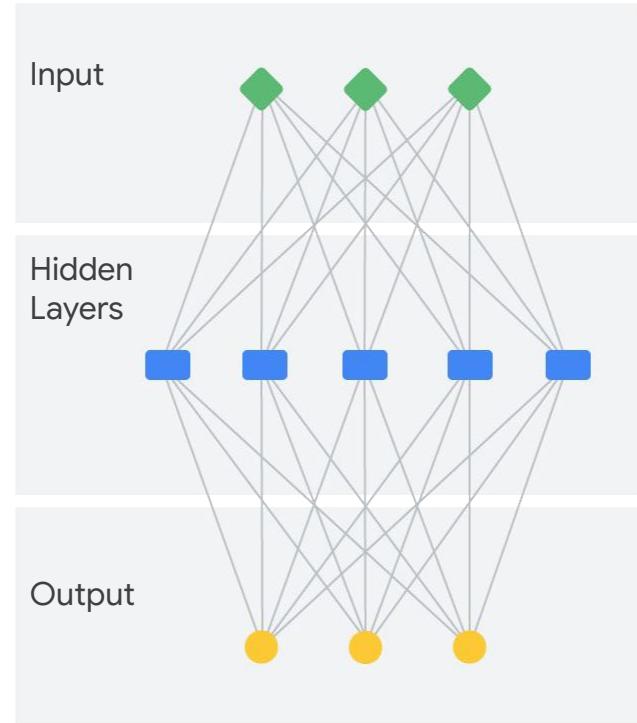
Can have one or more hidden layers.



Neural Networks

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

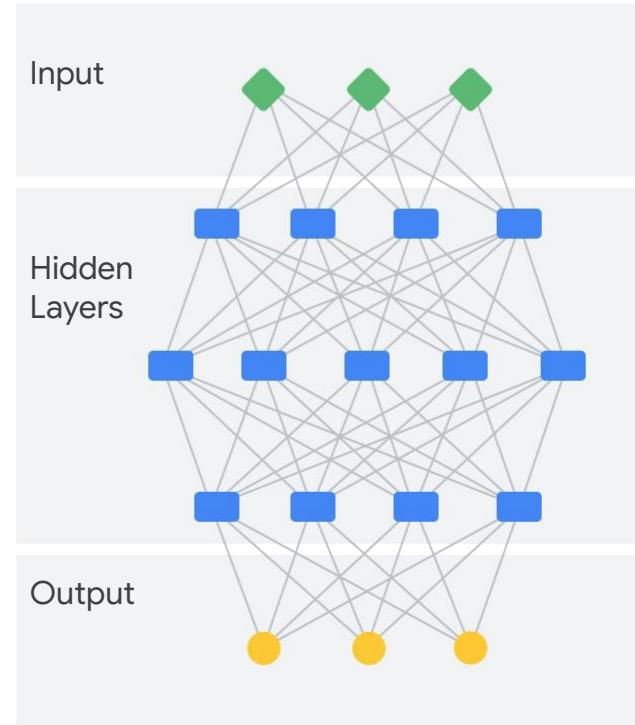
Can have one or more hidden layers.
Each node is a neuron or parameter.



Deep Learning

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

Large foundational models have
billions of neurons or parameters.



AI Model Types



Discriminative / Predictive
Simple Output



Generative
Complex Output

Generative AI (GenAI)

AI that **generates content** for you.



Text



Code



Image



Speech



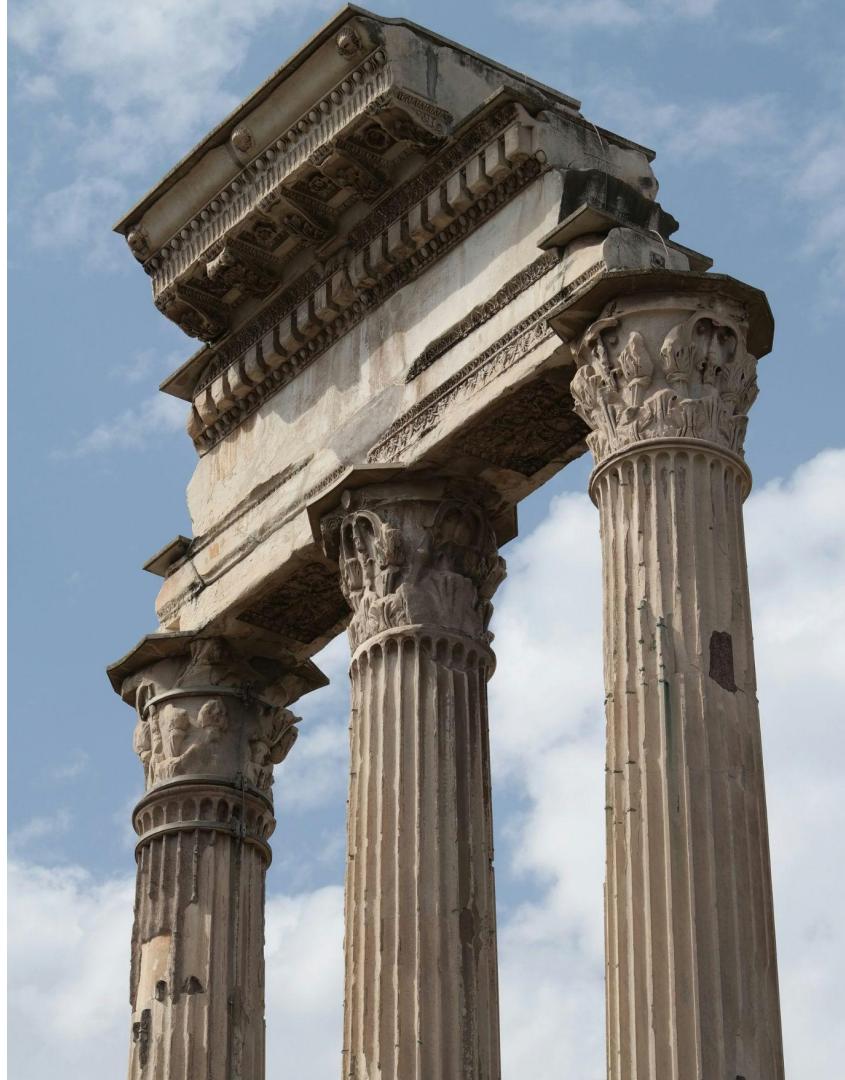
Video



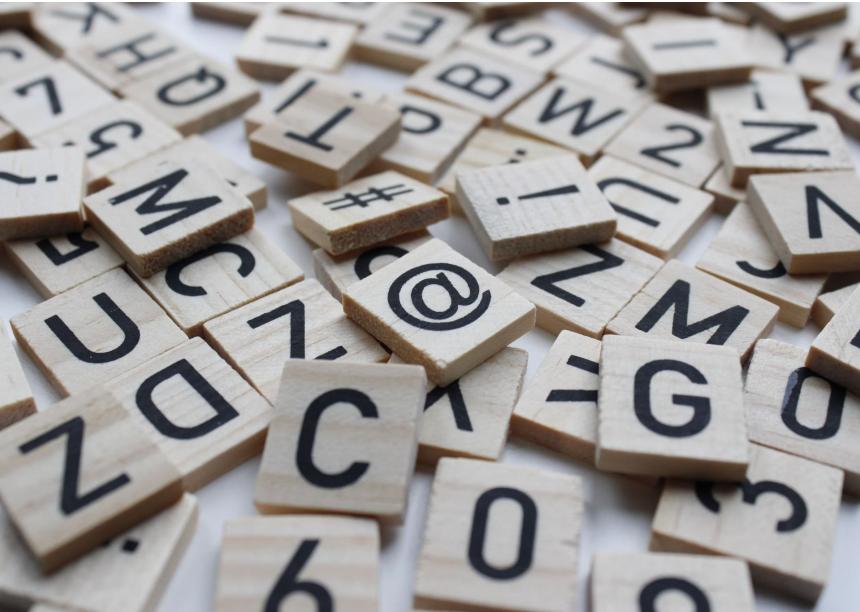
3D

Why now?

- Data
- Algorithms
- GPU Compute



How does it work?



Language Models

Next word prediction



Image Generation

Denoising images

Why the excitement?

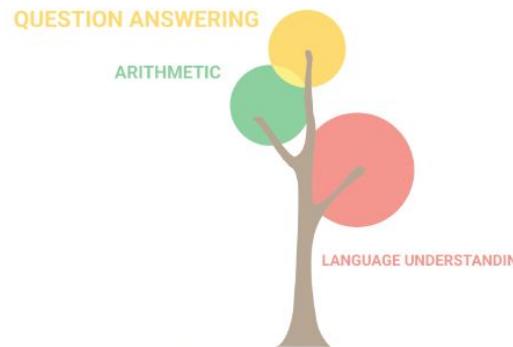


Narrow
Specialists



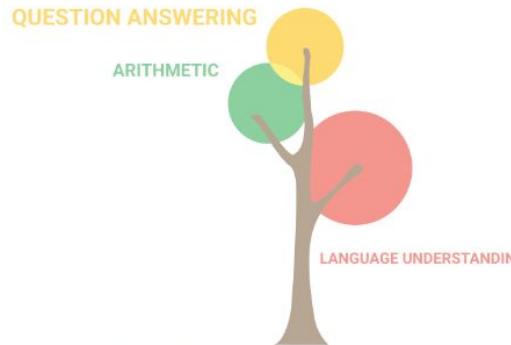
General
Artificial General Intelligence (AGI)

Emergent Abilities



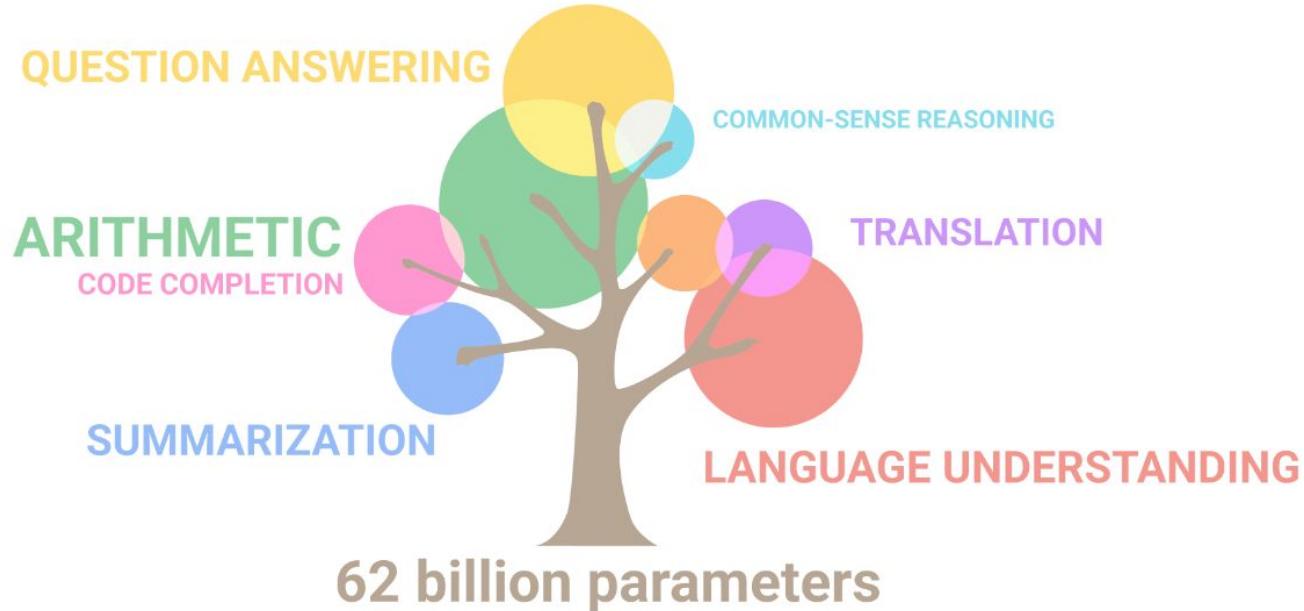
8 billion parameters

Emergent Abilities



8 billion parameters

Emergent Abilities



Pre-trained Base

Generalist

vs

Fine-tuned Models

Specialists



RLHF:

Reinforcement Learning
from Human Feedback

Fine-tuned

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



AI Map

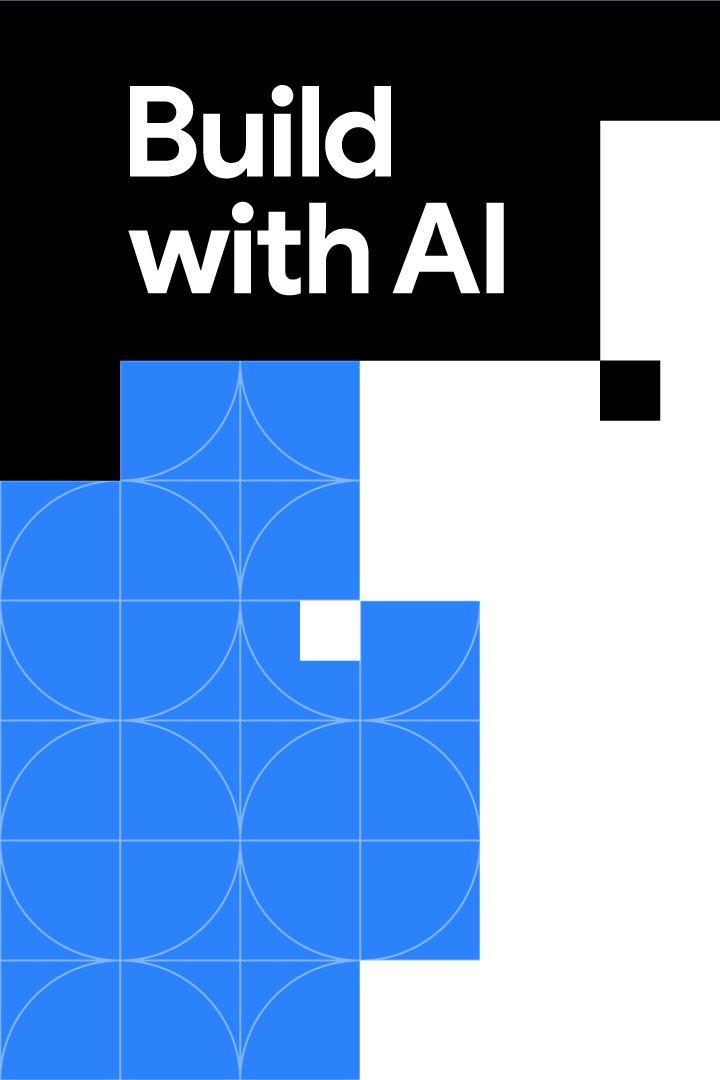
AI

ML

Deep
Learning

Generative AI

Build with AI

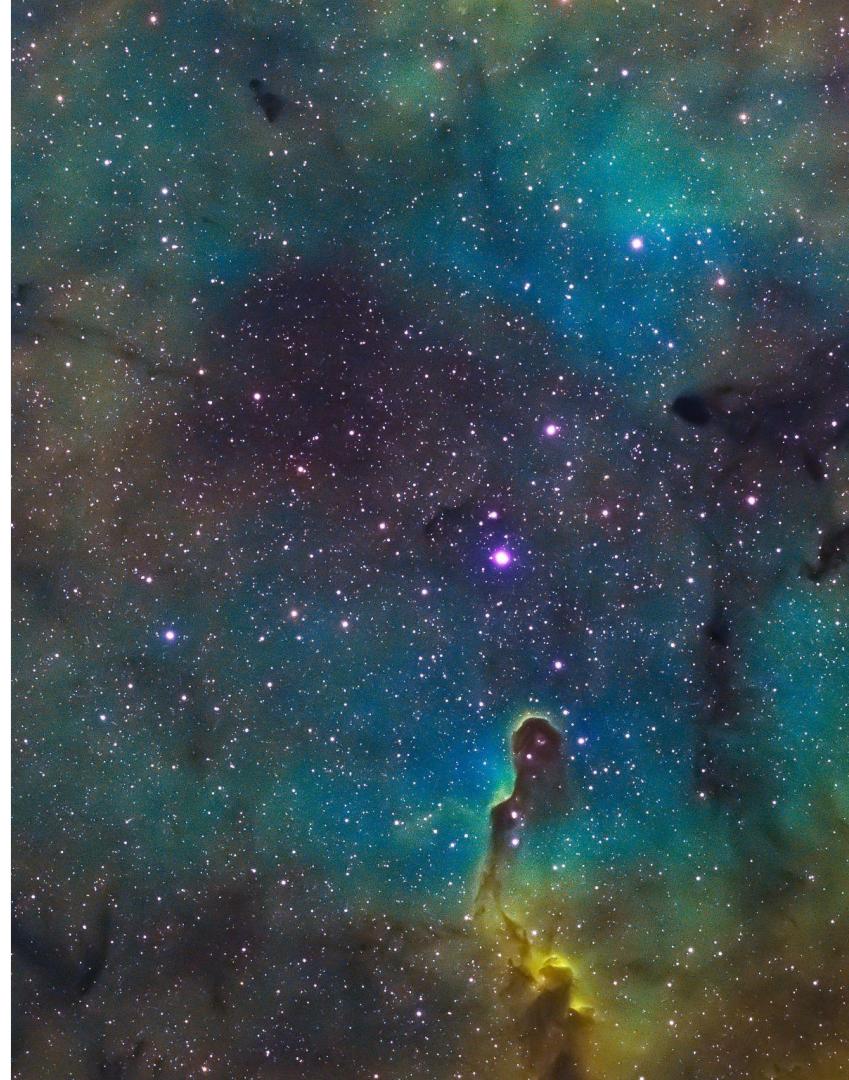


Google Developer Groups

Gemini 101



Generalized Multimodal
Intelligence Network



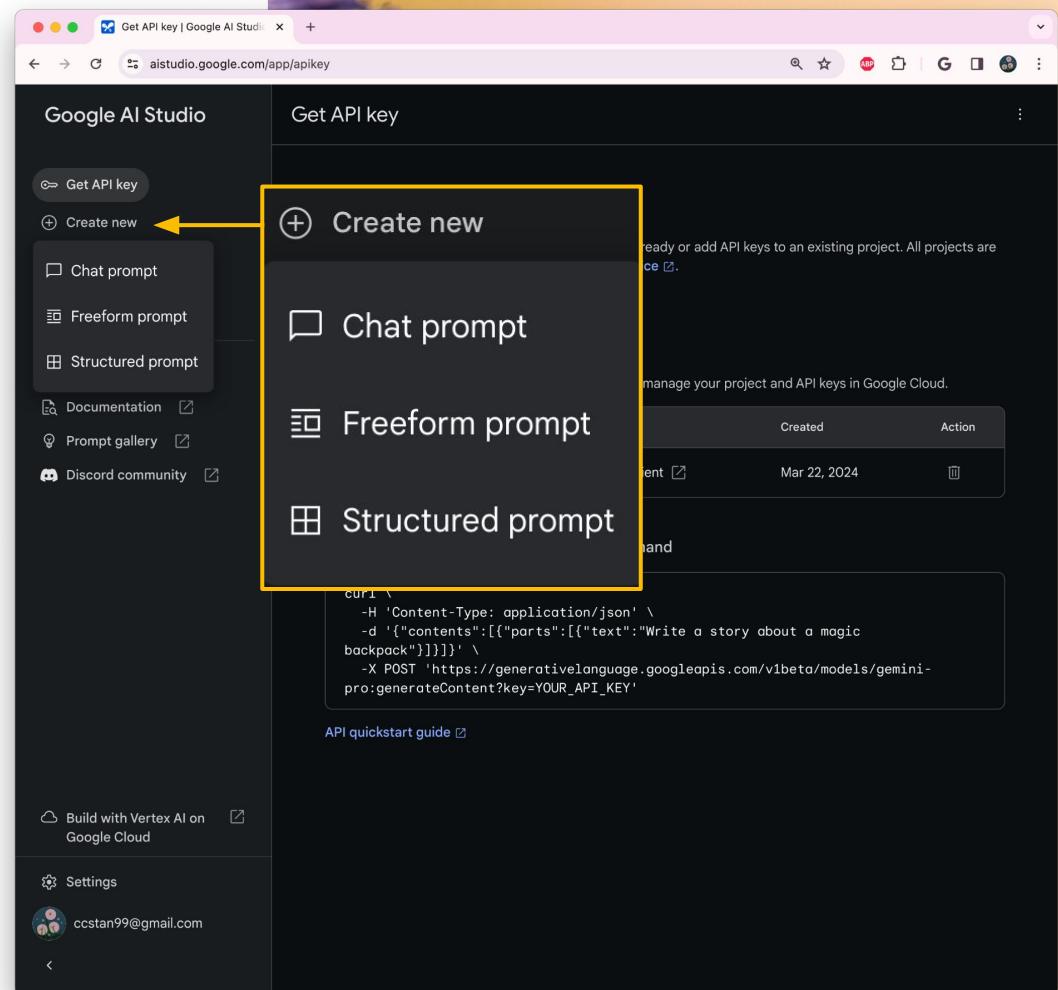
Prototyping with **Google** AI Studio

ai.google.dev

A screenshot of a web browser window displaying the "Build with the Gemini API" page at ai.google.dev. The page has a dark background with abstract white and blue line art. The main title "Build with Gemini" is prominently displayed in large white and blue letters. Below it, the subtitle "Experience Google's largest and most capable AI model" is shown in smaller white text. At the bottom of the main content area, there are two buttons: "Get API key in Google AI Studio" (blue) and "Read API docs" (white). A small note below the buttons says "Build with Vertex AI on Google Cloud". The top navigation bar includes the Google logo, a search bar, and links for "Products" and "Examples". The browser's address bar shows "ai.google.dev".

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.

Blog post creator

Insert: Image Video File Folder {{ }} Test input

Run settings Reset

Model Gemini 1.0 Pro Visor

Temperature 0.9

Add stop sequence Add stop...

Safety settings Edit safety settings Advanced settings

Write a short, engaging blog post based on this picture. It should include a description of the meal in the photo and talk about my journey meal prepping.



Meal prepping is a great way to save time and money, and it can also help you to eat healthier. When you meal prep, you cook a large batch of food ahead of time and then portion it out into individual meals. This makes it easy to grab a healthy meal on the go, even when you're short on time.

There are many different ways to meal prep, but I find that the easiest way is to cook a big batch of protein, vegetables, and grains. I then divide the food into individual containers and store them in the refrigerator or freezer. When I'm ready to eat, I simply grab a container and heat it up.

One of my favorite meal prep recipes is this teriyaki chicken and brown rice bowl with roasted vegetables pictured above. It's a healthy and satisfying meal that's perfect for busy weeknights.

To make this meal, I start by cooking the brown rice. While the rice is cooking, I marinate the chicken in a mixture of teriyaki sauce, soy sauce, and garlic. I then cook the chicken in a skillet until it's cooked through.

Once the chicken is cooked, I add the vegetables to the skillet and cook them until they're tender. I then serve the chicken and vegetables over the brown rice.

This meal is easy to make and it's very versatile. You can use any type of protein or vegetables that you like. You can also adjust the amount of teriyaki sauce and soy sauce to suit your taste.

Run Preview 291 / 12,288

Structured Prompt

Marketing description

Table-based interface for
more complex model
priming and prompting

The screenshot shows the 'Marketing description writer' interface in the AI Studio application. The main area displays a table with two examples. The first example shows a red sports car with the target audience 'Mid-aged men' and the marketing description: '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.' The second example shows a black bicycle with the target audience 'Environmentalists' and the marketing description: '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 health at the same time. If you're an environmentalist, there's no better way to get around than by bicycle.' A sidebar on the right contains 'Run settings' (Model: Gemini 1.0 Pro Visor, Temperature: 0.9), 'Safety settings' (Edit safety settings, Advanced settings), and a 'Get code' button.

INPUT Product Image:	INPUT Target Audience:	OUTPUT Marketing Description:
	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.
	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 health at the same time. If you're an environmentalist, there's no better way to get around than by bicycle.

Test your prompt

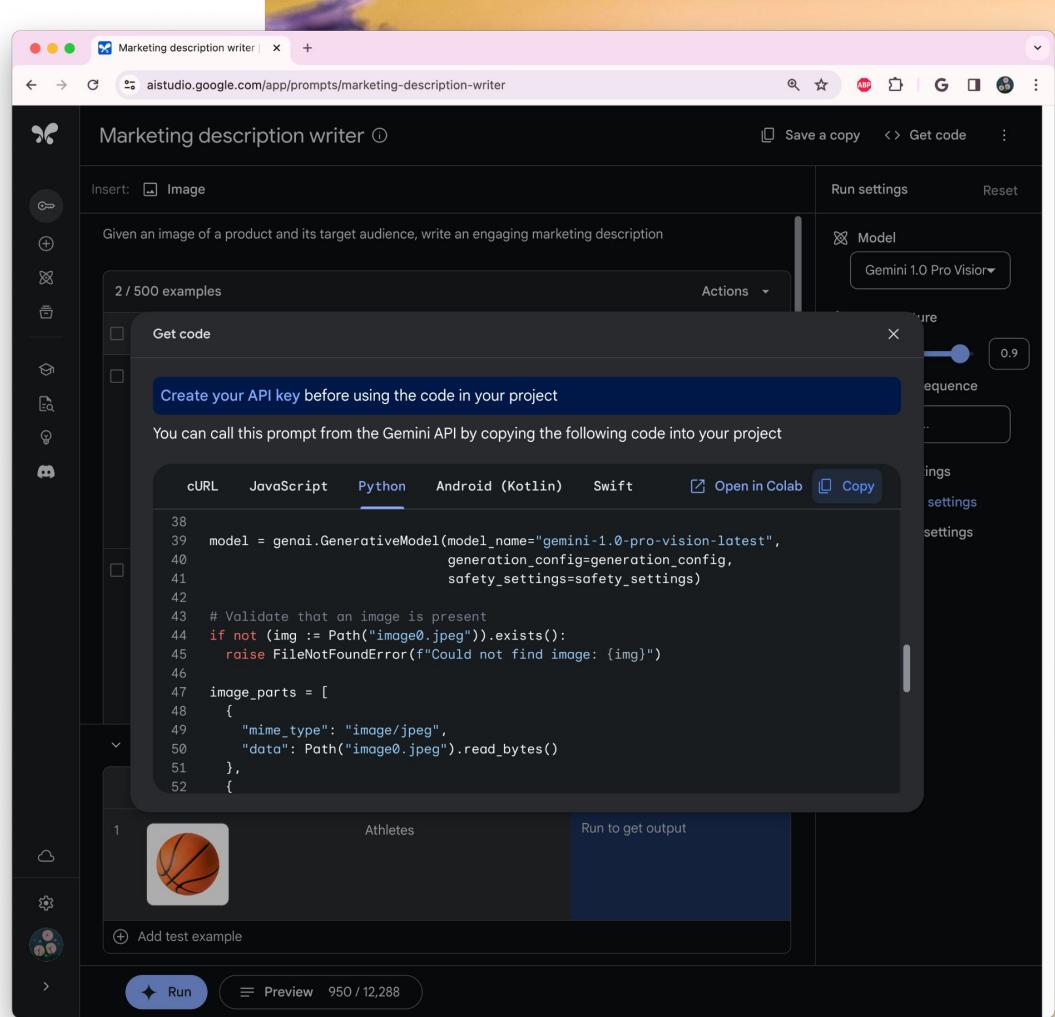
INPUT Product Image:	INPUT Target Audience:	OUTPUT Marketing Description:
	Athletes	Run to get output

Add test example

Run Preview 950 / 12,288

Get Code

- Choose Language
- Open in Colab
- Copy to Editor



Get API Key

Treat like password

The screenshot shows a browser window titled "Get API key | Google AI Studio" at the URL "aistudio.google.com/app/apikey". The interface is dark-themed.

Left Sidebar:

- "Get API key" button
- "Create new" button
- "New tuned model" link
- "My library" link
- "No prompts yet"
- "Getting started" link
- "Documentation" link
- "Prompt gallery" link
- "Discord community" link

Right Main Area:

Get API key

API keys

You can create a new project if you don't have one already or add API keys to an existing project. All projects are subject to the [Google Cloud Platform Terms of Service](#).

"Create API key" button

Create API key dialog box:

Select a project from your existing write-access Google Cloud projects

Search Google Cloud projects:

"Create API key in existing project" button

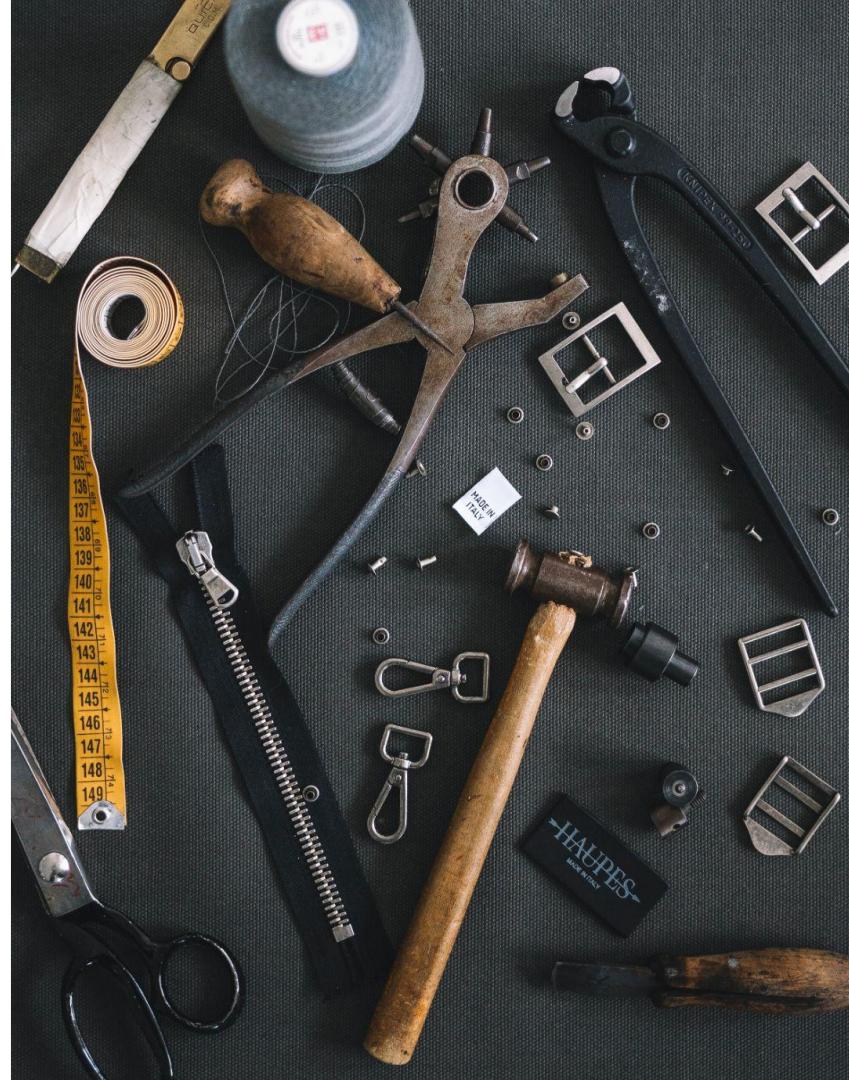
Settings

Tokens

- Words or subwords
- Different LLM tokenizers
- Training data, context window

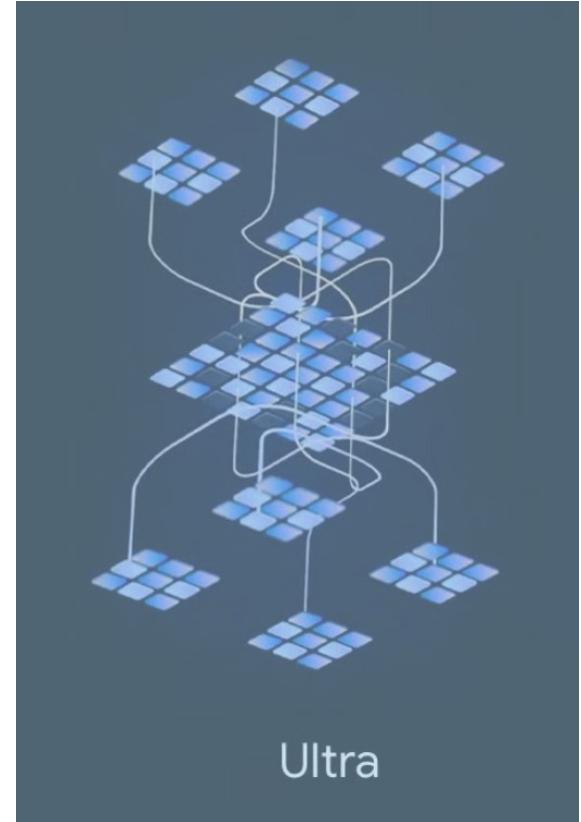
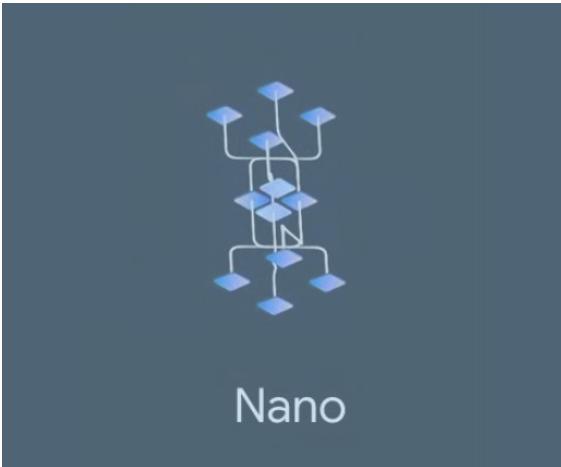
Temperature

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



Settings

Model Sizes

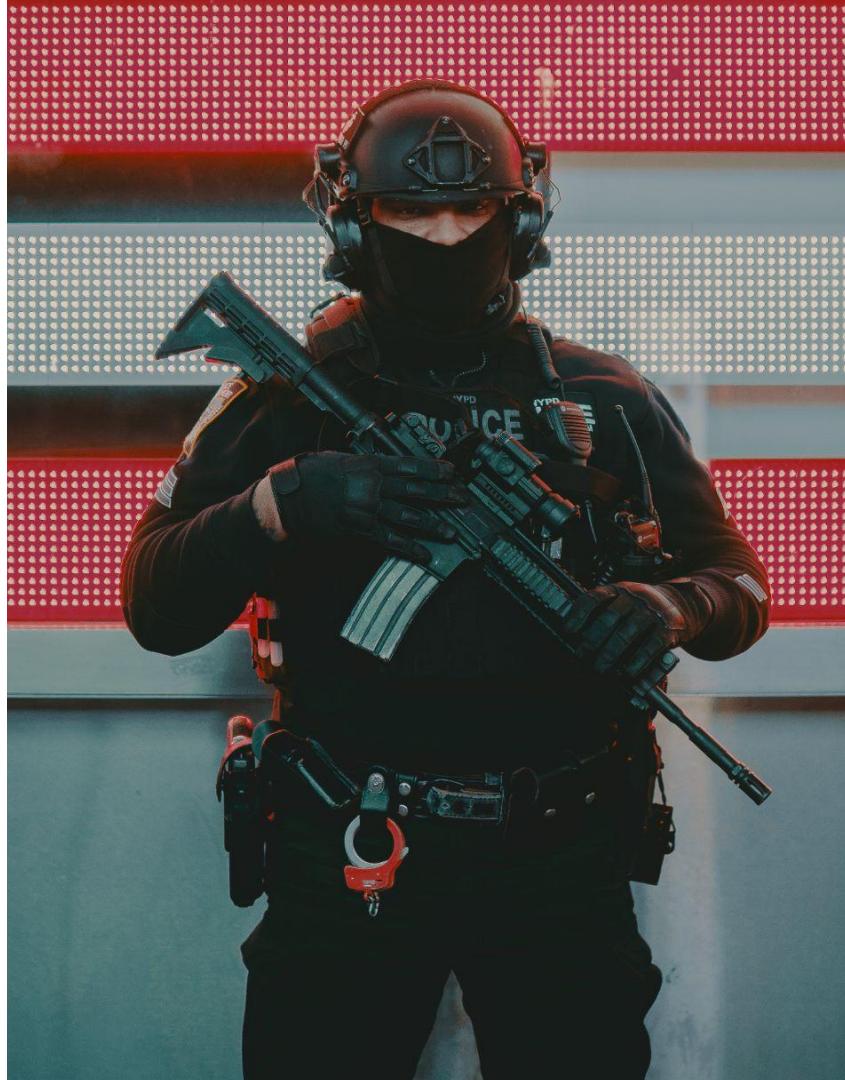


Settings

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.”

Andrey Karpathy
OpenAI

Prompt Engineering

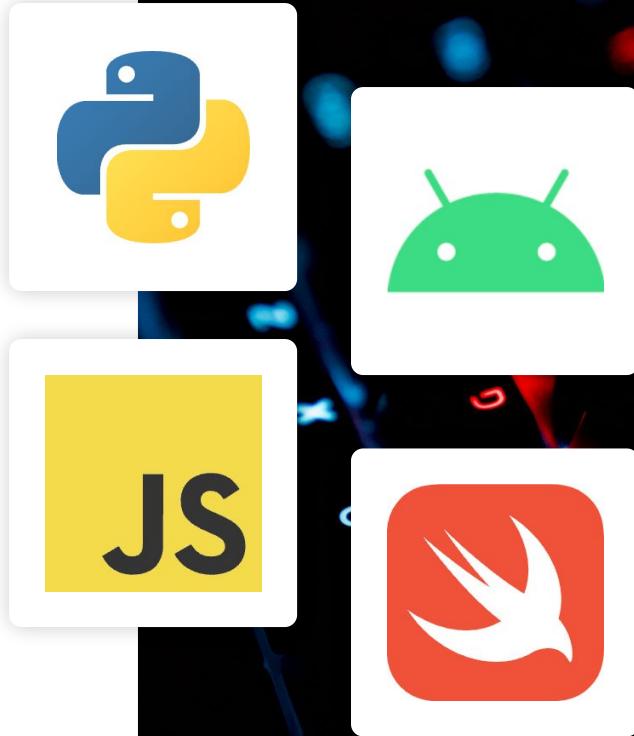
- Clear & Specific Instructions
- Give Examples
- Step by Step



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="")
```

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)
```

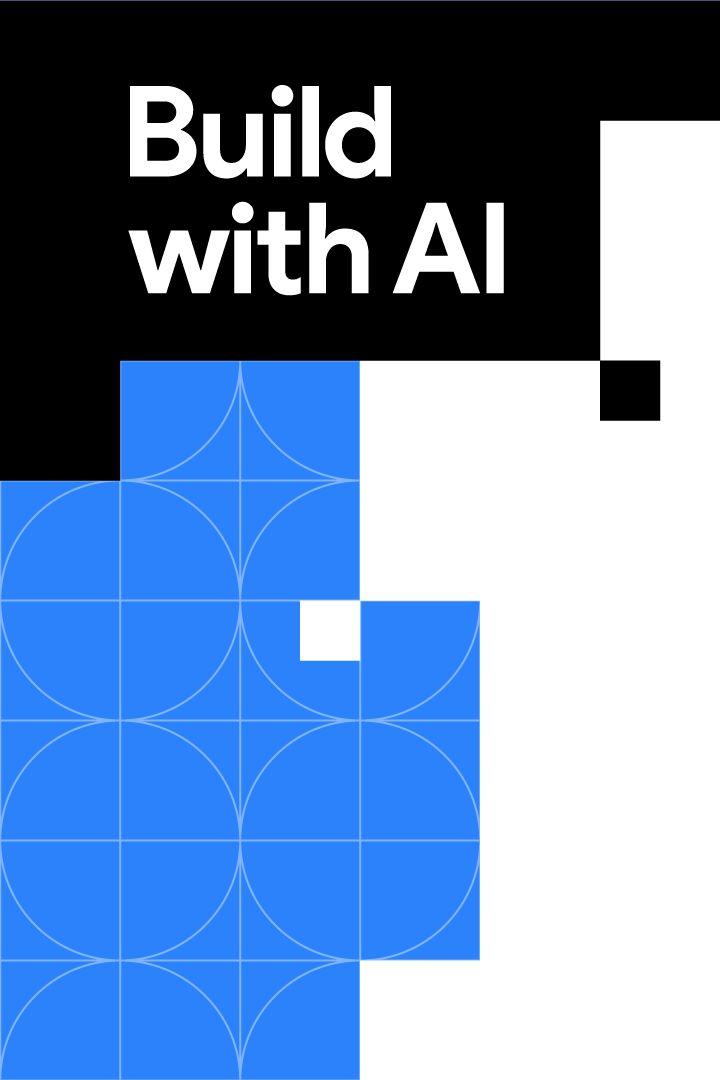
Chat Conversations

For interactive applications

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

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

Build with AI



Google Developer Groups

Your Turn

Resources

bit.ly/cheng2-slides

1. Gemini + AI Studio

Prototyping environment with Gemini

2. Gemini Quickstart Tutorials

Examples to build in different languages

3. Streamlit App

Build web apps calling AI

4. Introduction to Generative AI

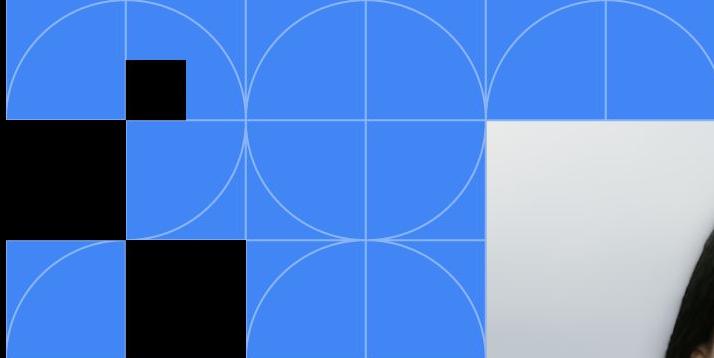
Google learning paths with videos & exercises

5. DeepLearning.AI

Full specializations + many 1-hour short courses



Build with AI



ChengCheng Tan

ccstan99@gmail.com

cheng2-tan

@cheng2_tan

Google Developer Groups

Build with AI

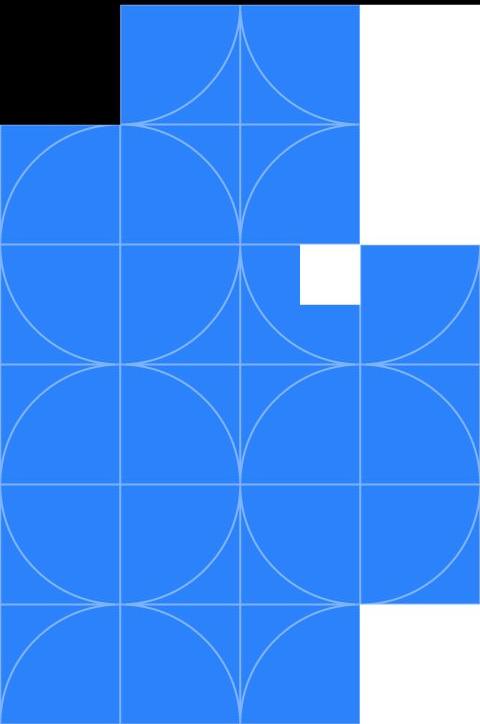


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- Neuron by Hal Gatewood on Unsplash
- Scrabble Tiles by Merve Sehirli Nasir on Unsplash
- Runners Training by Fitsum Admasu on Unsplash
- Thumbs Up by Johan Godinez on Unsplash
- Butterfly & Flowers by Birger Strahl on Unsplash
- Tools by Haupes on 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