

Intro to Artificial Intelligence

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Agenda

<https://github.com/iportilla/AI-101>

- Intros
- What is AI
- GenAI
- Demos
- Closing



AI Technical Leader & Educator



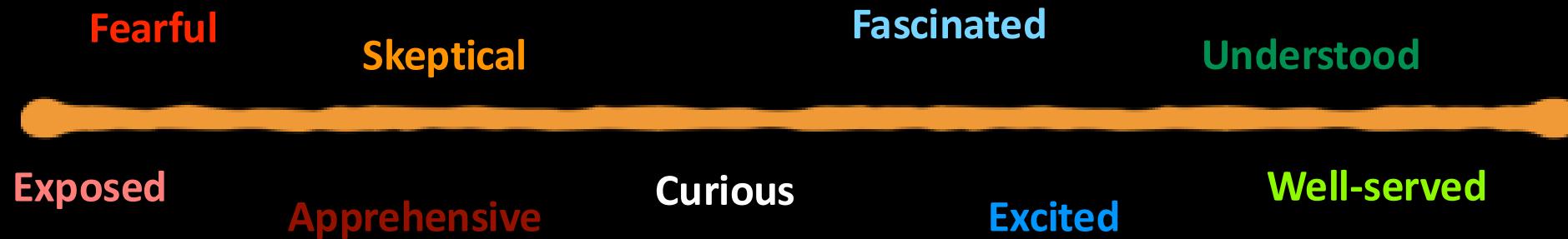
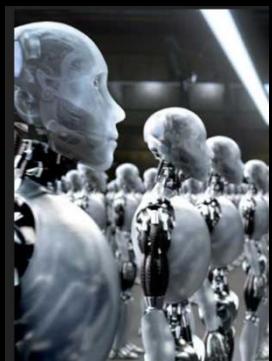
What is AI?

Slido.com - 4041174



AI Perception

What do people feel about AI?



What we know

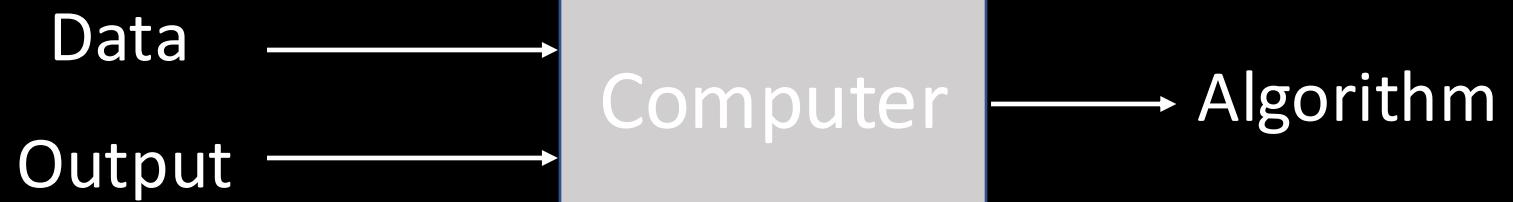


Why Machine Learning?

Traditional Programming



AI-Machine Learning



AI provides systems the ability to **automatically** learn from **experience**
(without being programmed)

Intelligence demonstrated
by CU Students

Exercise 1

How is AI being used today?

PB & J Recipe

WikiHow to Make a Peanut Butter and Jelly Sandwich

Exercise 1

Program how to make a Peanut Butter & Jelly sandwich

1. Get ingredients (PB, Jelly, Bread)
2. Get cooking utensils (plate, knives)
3. Get two slices of bread
4. Open PB, Jelly jars
5. With a knife spread 2 Tablespoons of peanut butter on one piece of bread
6. With a different knife, spread 2 Tablespoons of jelly on the other slice of bread
7. Put the slices together
8. Toddler adaptation: cut off crusts before serving.
9. Place on plate & serve



Exercise 2

Machine Learning.

Sample



Label



dog



cat



horse

Human Learning:

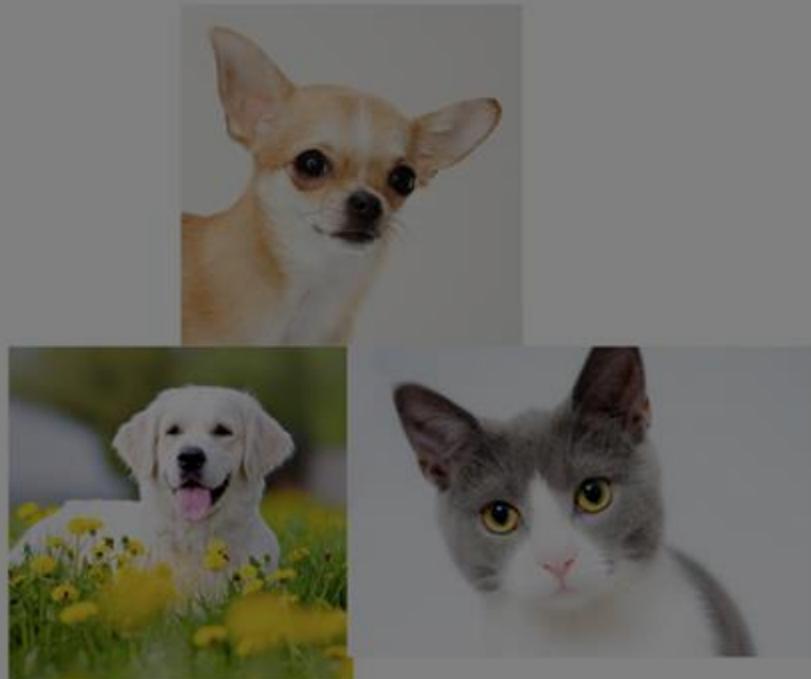
We learn through



Cat or Dogs

Long Ear Black nose

dog



Machine Learning:

Sample



Label



dog



cat



horse

Human Learning:

We learn through



Long Ear Black nose

dog



Examples

Diagrams

Comparisons

Exercise 3

A blurry photograph of a highway scene. In the foreground, the side of a large white truck is visible, showing its trailer and some red reflectors. The road has a solid yellow line on the left and a dashed white line in the center. In the distance, another truck is visible on the road. To the left, there's a yellow diamond-shaped road sign. The background is a dense forest of green and yellow trees, suggesting autumn. The overall image is out of focus.

Passing truck in
highway

Passing truck in highway

Don't Follow Closely Behind Prior to Passing

- As you prepare to pass, keep a healthy distance between your car and the truck in front of you. At minimum, 30 feet should separate the two vehicles. Signal clearly to indicate your next move.

Pass in the Left Lane

- The left lane is referred to as the 'passing lane' for a reason; it's the safest place to pass any vehicle, but particularly trucks and buses. It's frustrating to be stuck behind a slow truck in the left lane, but resist the urge to pass on the right side.

Don't Linger in the Truck's Blind Spot

- Trucks have huge blind spots on both sides. Pass promptly while still abiding by the speed limit. Don't hang out in the blind spot area, which, in the left (passing) lane, constitutes the truck's entire front half.

Recognition

- With GPS navigation, HiRes cameras, Laser-radar cameras: Location, speed of trucks, road conditions, emergency lane
- With Image Recognition: Turn signal (!lamp), paper or debris on the road

Insights

- Data is fed into multiple CPUs + collected data + rules
- Manufacturer knows who has the right of the way, when trucks can pass + MM miles driven have feedback on different driving style

Action (Cognitive Decision)

- Assist (alerts driver)
- Act (Pass or Not pass, Measure decision effects, feedback loop, and share w other cars)

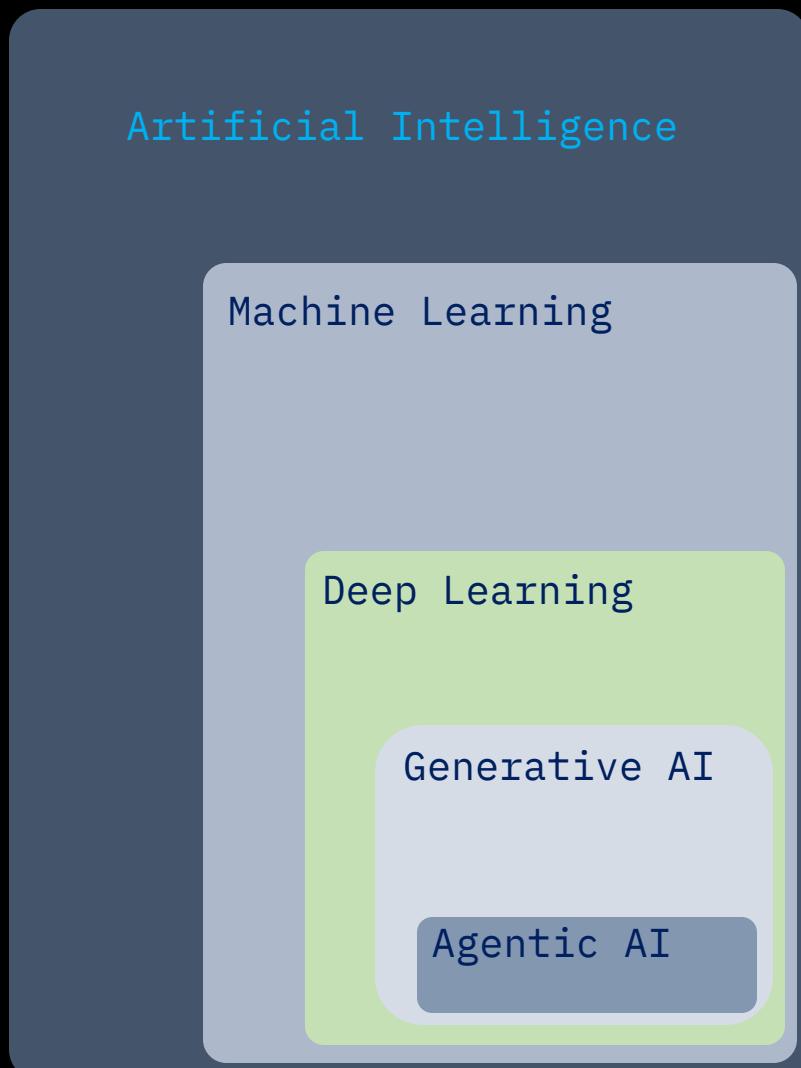
Agenda

Intro

Core

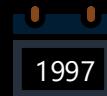
Closing

Brief history of artificial intelligence



Artificial Intelligence

Intelligence demonstrated by machines



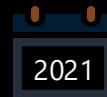
Machine Learning

Learn from data



Deep Learning

Model after the human brain (Neural Networks)



Generative AI

Create new written, visual, and auditory content



Agentic AI

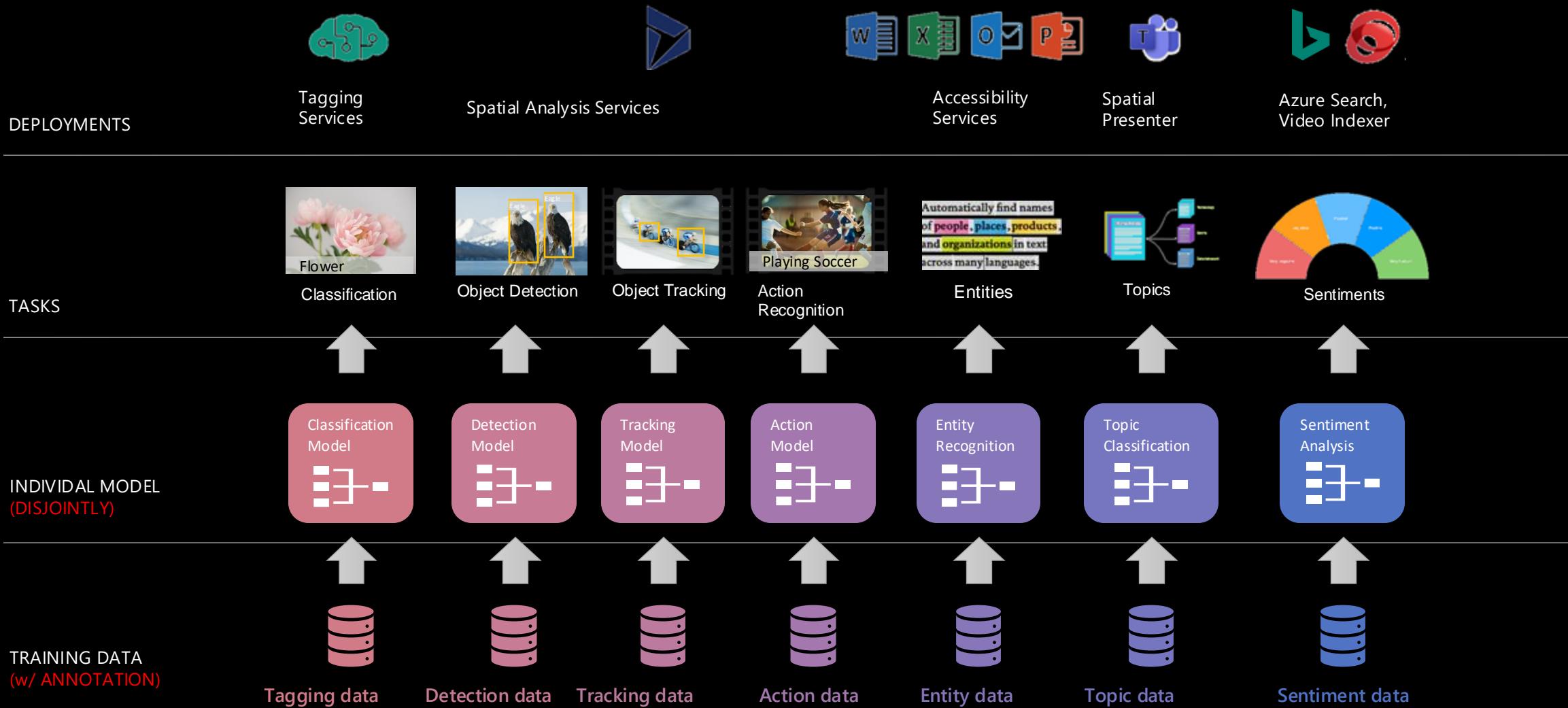
Can set goals, make decisions, & take actions to achieve those goals

Generative AI

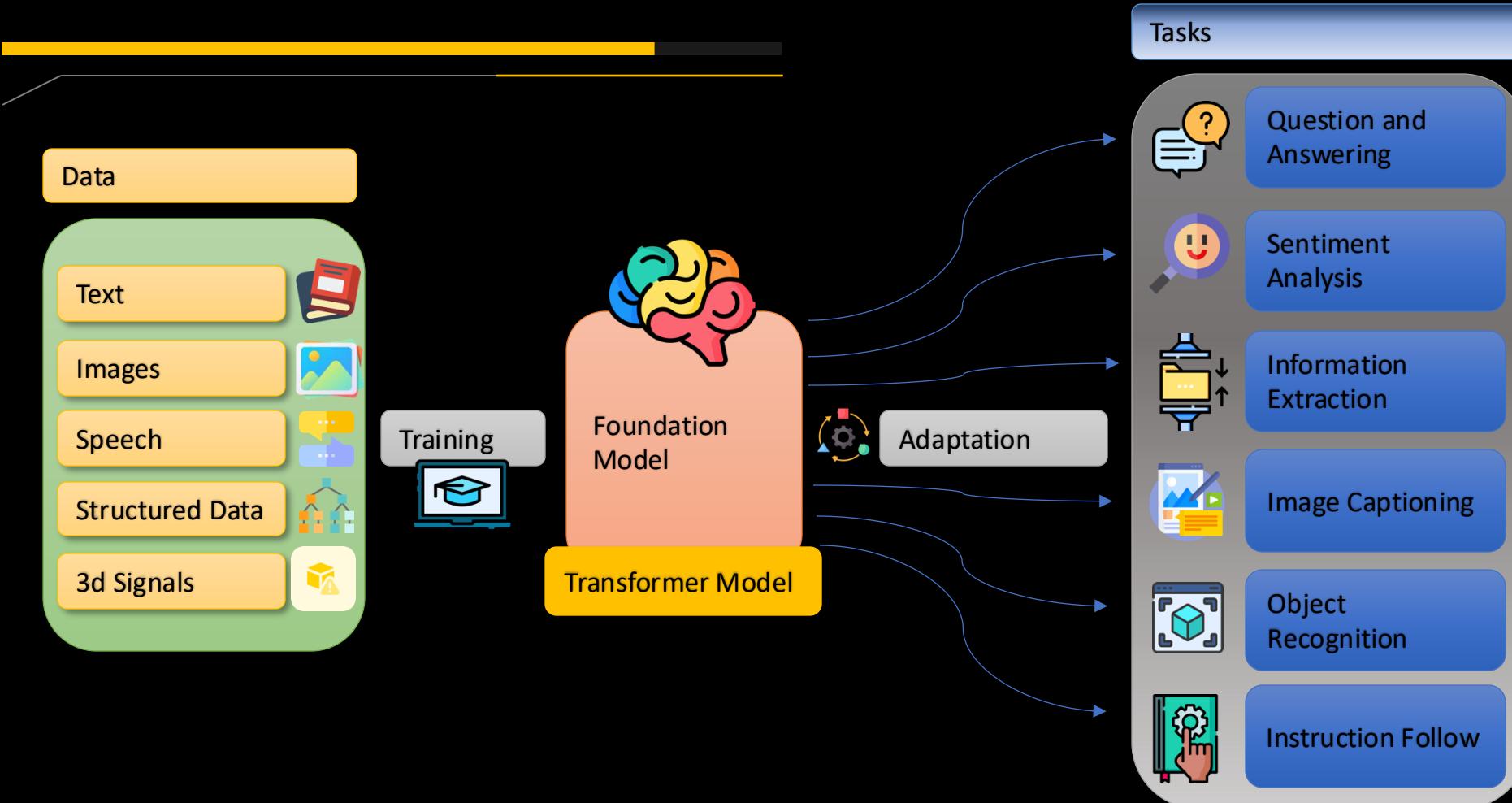
a type of artificial
intelligence that
creates new content
based on existing data

Traditional model development

High cost & slow deployment - Each service is trained disjointly



Foundation Models



Generative AI

The best thing about AI is its ability to ...

learn	4.5%
predict	3.5%
make	3.2%
understand	3.1%
do	2.9%



To Update for this audience

Generative AI

GPT-3

Prompt:

Write a tagline for an ice cream shop.

Response:

We serve up smiles with every scoop!

Codex

Prompt:

```
Table customers, columns =  
[CustomerId, FirstName,  
LastName, Company, Address,  
City, State, Country,  
PostalCode]
```

Create a SQL query for all customers in Texas named Jane
query =

Response:

```
SELECT *  
FROM customers  
WHERE State = 'TX' AND  
FirstName = 'Jane'
```

DALL·E

Prompt: A white Siamese cat

Response:



Media Example

News Analyses & Article Creations



News Broadcast (Global Warming)



Azure Speech Transcription



Azure OpenAI Text Completion

Search SEO
Virtual Agent
Analytics
Reporting
Knowledge Mining

Content Analysis

Content Creation

Ideation
Productivity
Personalization
Accessibility
A/B Testing

Topic Classification

Global warming, Deforestation,
Carbon footprint

Entity Extraction

Organizations: IPCC, UNFCCC, Green Peace
Geography: Canada, USA

Key Word Extraction

Human activities, fossil fuels,
earth atmosphere

Question and Answer

What is the Intergovernmental Panel on Climate Change (IPCC)?
The IPCC is an international organization that studies climate change and the effectiveness ...

Video summarization

The article discusses about global warming and its effects on the Earth's atmosphere, wildlife, and human communities. It states that the primary cause of global warming is

News article generation (or blogs, social media)

Global warming is the gradual increase in the overall temperature of the Earth's atmosphere, primarily caused ...

Script Generation

Act 1: The show opens with a shot of a beautiful coastal town
Act 2: As the town struggles to cope with the crisis ...

Personalized Content generation (or Advertising)

Simon, as someone passionate about global warming, you are aware of the urgent threat it poses to our planet ...

Demos

Future of AI Example (Semantic Analysis)

The Wining Shot

The soccer game was nearly over. The two teams were tied, one to one.

Alice kicked the ball. Oops! She kicked it the wrong way.

"What a bad kick," Alice thought.

But wait!. Her teammate John jumped to stop the ball. The ball went off John into the goal!.

Alice's team won the game. Hooray! It was not a bad kick, after all.

Who won the game?

Why?

Future of AI Example

The Wining Shot

The soccer game was nearly over. The two teams were tied, one to one.

Alice kicked the ball. Oops! She kicked it the wrong way.

"What a bad kick," Alice thought.

But wait!. Her teammate John jumped to stop the ball. The ball went off John into the goal!!.

Alice's team won the game. Hooray! It was not a bad kick, after all.

Who won the game?

Answer: Alice's team
Correct

Explanation: Alice's team won the game because Alice's team had more points than the other team

✓ Correct

ChatGPT

JE

read this: The Wining Shot

The soccer game was nearly over. The two teams were tied, one to one.

Alice kicked the ball. Oops! She kicked it the wrong way.

"What a bad kick," Alice thought.

But wait!. Her teammate John jumped to stop the ball. The ball went off John into the goal!.

Alice's team won the game. Hooray! It was not a bad kick, after all.

ChatGPT

JE who won the game

 Alice's team won the game, even though Alice initially thought she had made a bad kick. John's quick thinking and intervention helped the team to score the winning goal, and they were able to secure victory in the game.

JE why?

 Alice's team won the game because John was able to use his skills and reflexes to intercept the ball, even though Alice's kick was not aimed in the right direction. John's intervention caused the ball to go into the goal, which resulted in a score for Alice's team. Since this happened near the end of the game and there was no time left for the other team to catch up, Alice's team won the game with a score of 2-1.

Conversational AI

The screenshot shows a web-based conversational AI interface. On the left, there is a vertical sidebar with icons for Home (H), Data (cloud), User (person), and Settings (sun). The main area has a header bar with a back arrow, forward arrow, refresh icon, and the URL app.hita.ai/organizations/e2e814c6-3f14-4d32-817f-44dc698d5fc8/chat. Below the header are several navigation links: Google, Self Service Center, Assets, Application Design..., PREVIRED, IBM InfoSphere Bi..., Desteria, IBM SmartCloud C..., Tivoli Self Service..., and Video. The main content area features a large text "How can I help you **this morning?**". Below it is a text input field with placeholder text "Shift + Enter for new line" and a send button (a blue arrow icon). A section titled "Choose an Assistant" contains a sub-instruction: "Select an assistant to help you with your questions. If you're not sure, type your question above and we'll recommend some options." A search bar labeled "Search for an assistant" is present. Six assistant cards are displayed in a grid:

- STAT 5350 - Appli...** (Icon: Brain) - This course provides a comprehensive exploration of deep learning techniques and their...
- STAT-5350-SP-...** (Icon: Sun) - Applied Deep Learning
- Center for Wave...** (Icon: Wave) - Helps with research queries
- Career Center...** (Icon: Person) - (No description)
- Center for Wave...** (Icon: Wave) - Helps with questions about Center for Wave Phenomena at Mines
- Test Public...** (Icon: Document) - (No description)

<https://app.hita.ai/organizations/e2e814c6-3f14-4d32-817f-44dc698d5fc8/chat>

Text to Image Example

FLUX.1 [dev]

12B param rectified flow transformer guidance-distilled from [FLUX.1 \[pro\]](#)
[\[non-commercial license\]](#) [\[blog\]](#) [\[model\]](#)

a cowboy on a horse in mars

Run



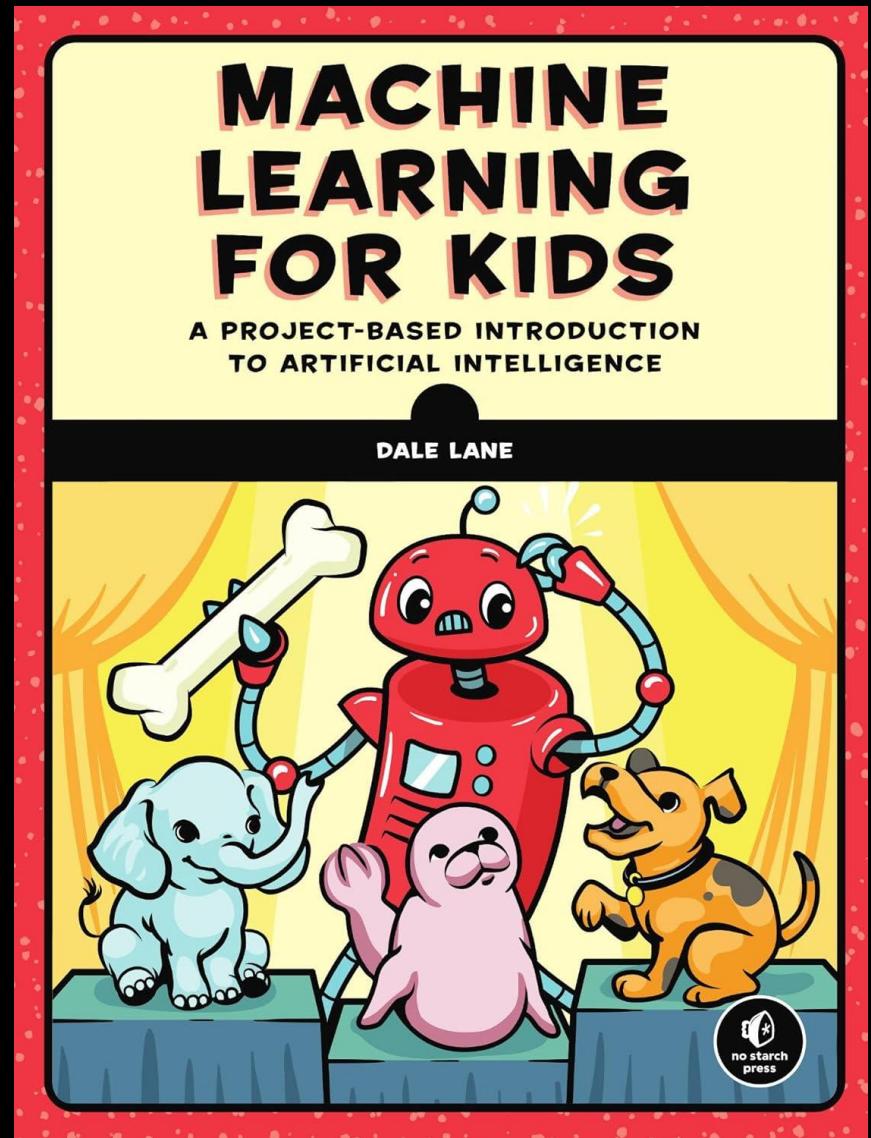
<https://huggingface.co/spaces/black-forest-labs/FLUX.1-dev>

Landing.ai

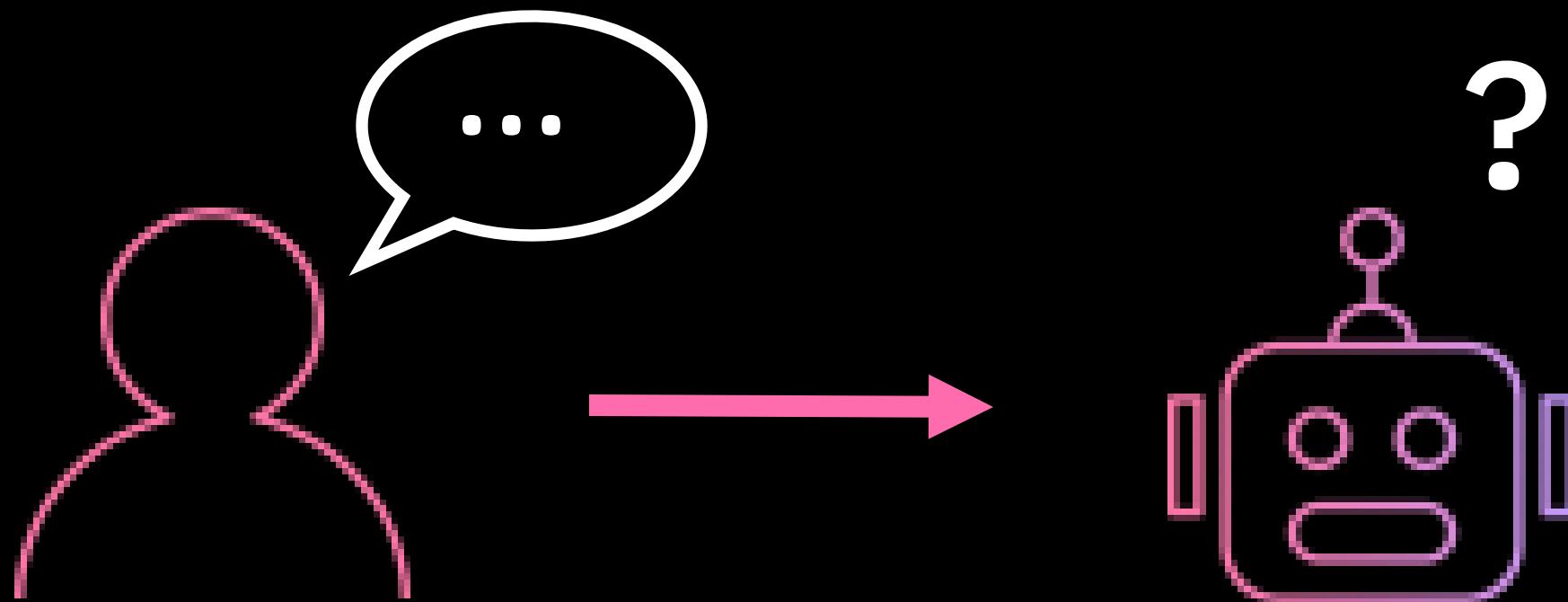
How many animals on this picture?



2025/4/9



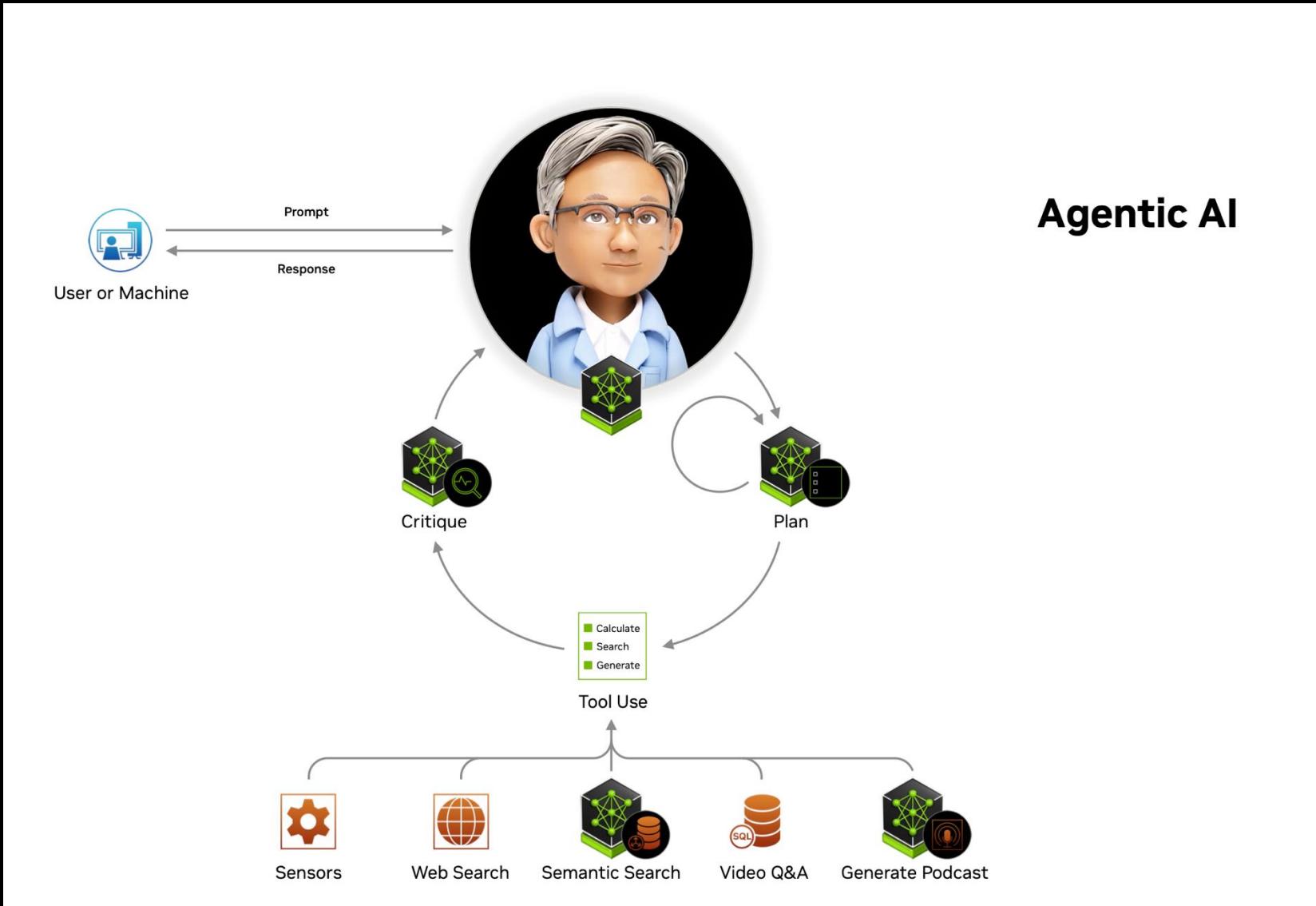
35



Agentic AI

AI systems that act as autonomous *agents*, capable of making decisions, taking actions, and pursuing goals with *minimal* human intervention

Agentic AI

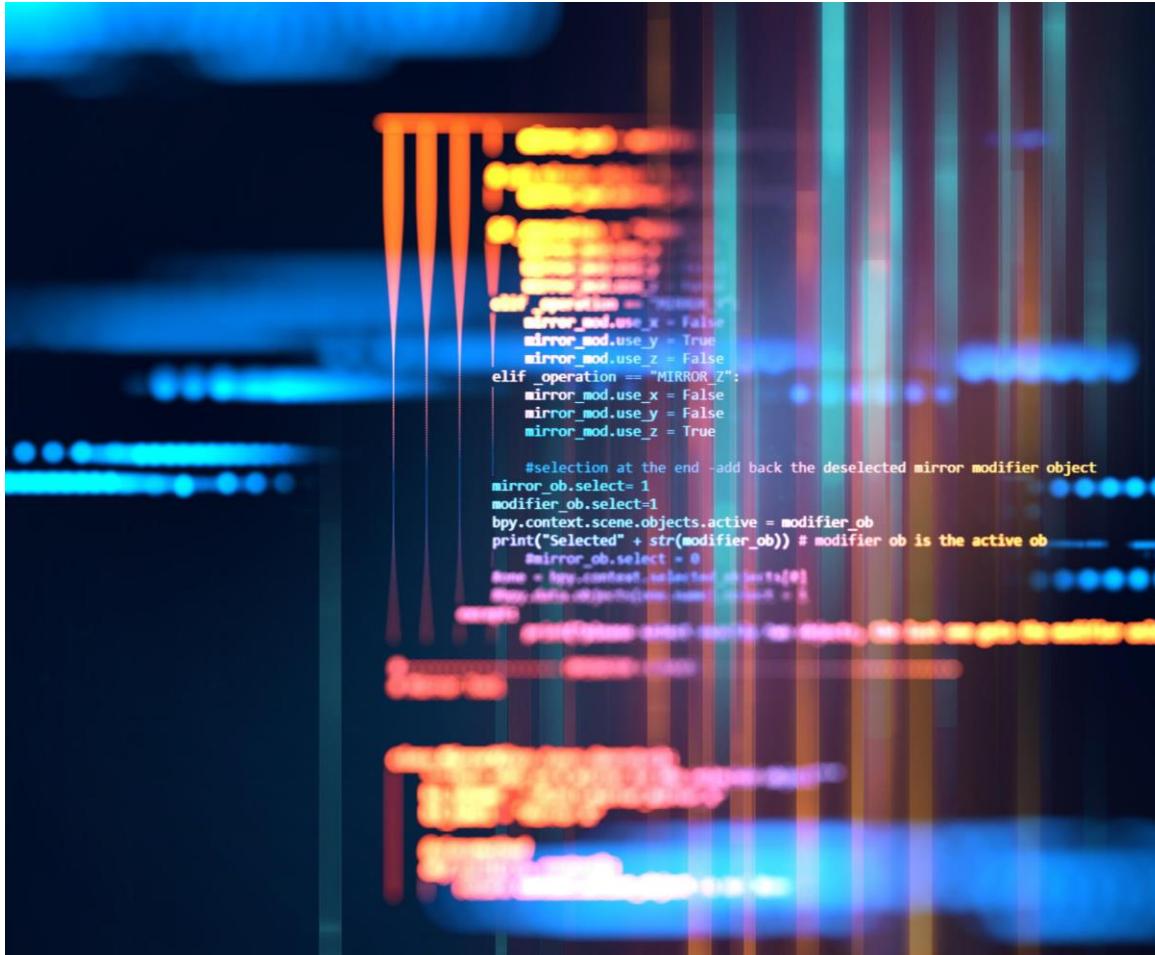


Vibe coding

Fast, intuitive coding with [AI assistance](#)

What's Changing?

AI tools now co-write code, design systems, & offer intelligent suggestions



- Generation
- Completion
- Explanation
- Translation
- Testing
- Documentation

Code generation

Write a Python script that connects to a MongoDB database, retrieves documents from a 'users' collection, and prints usernames and their corresponding email addresses.



watsonx

```
# Assisted by watsonx Code Assistant
import pymongo

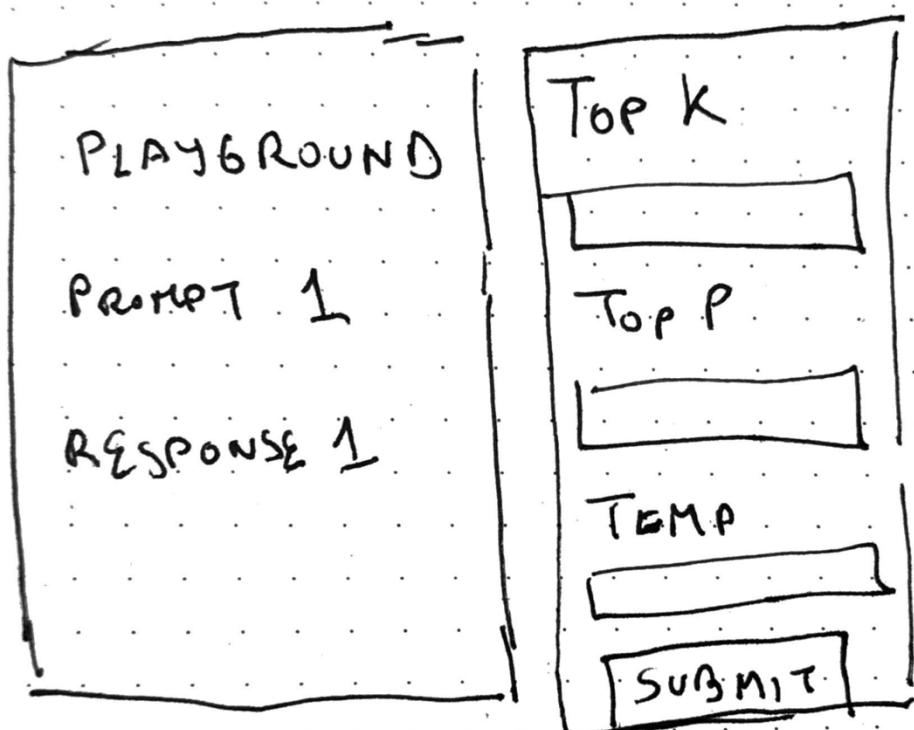
# Connect to MongoDB
client = pymongo.MongoClient("mongodb://localhost:27017/")

# Access the 'users' collection
db = client["mydatabase"]
collection = db["users"]
```

:



Code generation



Playground

Response 1

Response 2

Response 3

Top K

Enter top K value

Top P

Enter top P value

Temperature

Enter temperature valu

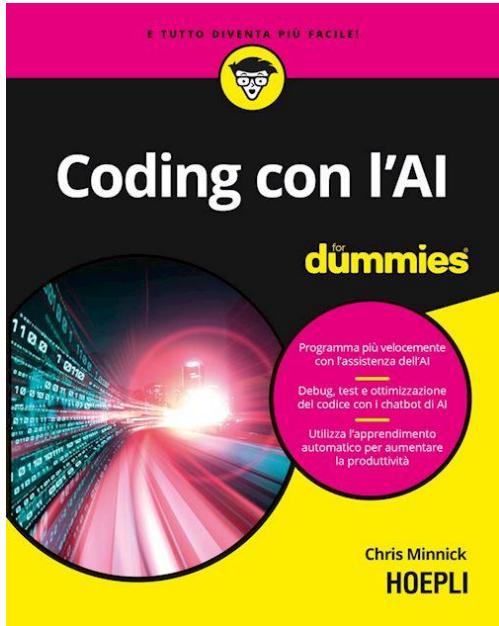
Max New Tokens

Enter max new tokens

Submit

**GitHub
Copilot
Demo**

Engineers Anyone can build faster, smarter, & with less manual work



I. Techniques & Technologies

1. Benefits
2. Parsing ML/DL
3. AI coding tools
4. Coding w chatbots

II. Using AI to write code

5. From plan to prototype
6. Formatting & improving code
7. Find, eliminate bugs
8. Translate & optimize code

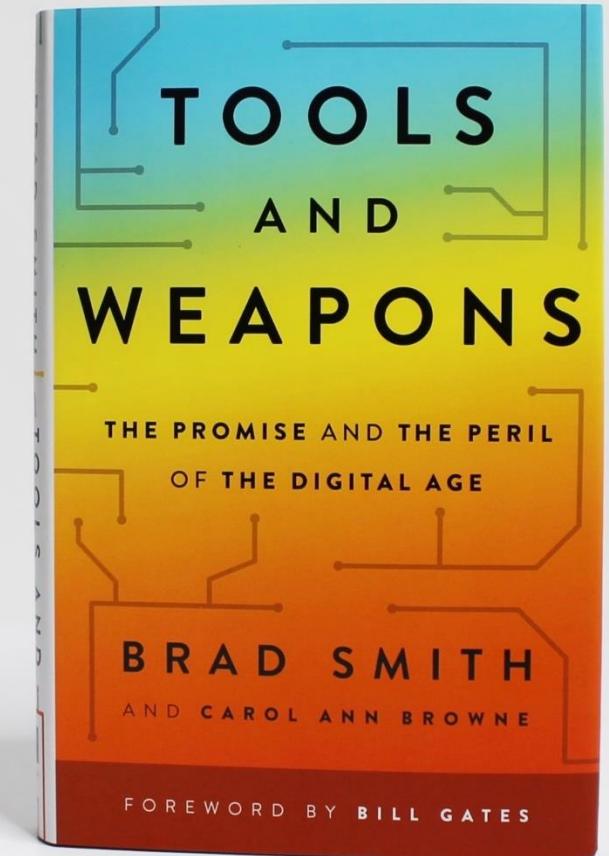
III. Test, Document & Maintain code

9. Testing your code
10. Documenting you code
11. Maintaining your code

Why responsible AI?

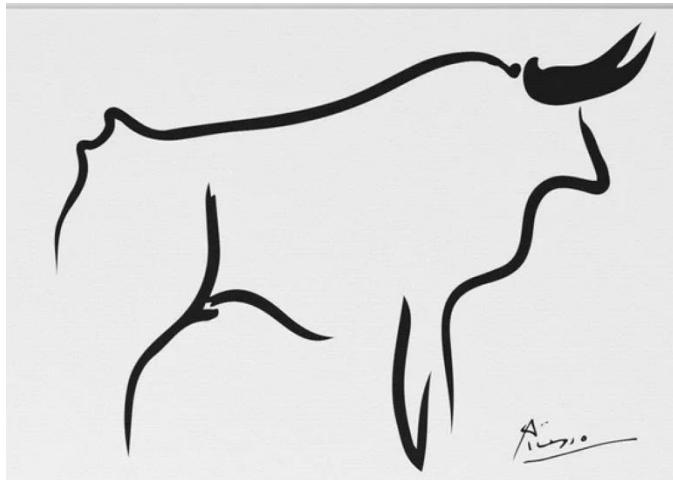
“The more powerful the tool, the greater the benefit or damage it can cause...Technology innovation is not going to slow down. The work to manage it needs to speed up.”

*Brad Smith
President and Chief Legal Officer, Microsoft*



Lab 3 – Images

- Create an image to match sample posted in Slack



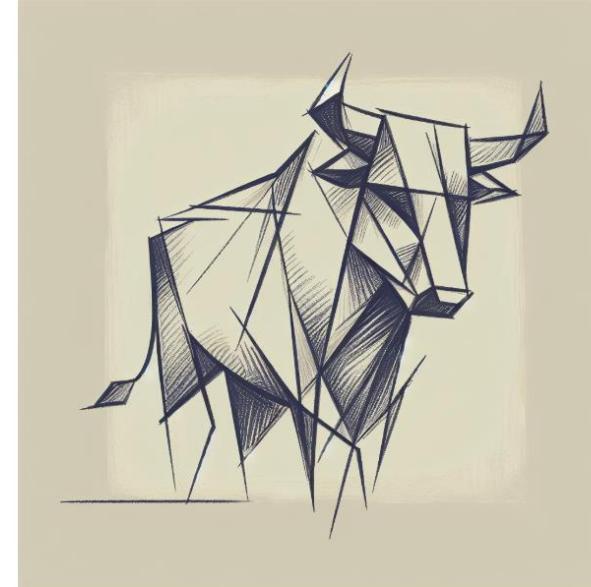
Images playground

Deployments dall-e-3

Filters feedback

Prompt ⓘ

lightly sketched image of a bull, Picasso style



lightly sketched image of a bull, Picasso style

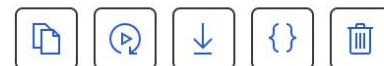


Image Generation



Image Generation



Drives governance policy effectiveness while tracking how data is used and its value to the company

Data Steward

Builds data pipelines that power dashboards and data platforms while ensuring high quality



Data Engineer



Prepares data to tease out the insights they're looking for, without IT involvement

Data Scientist



Business Analyst

Works with data to apply insights to the business strategy



App Developer

Makes insights immediately actionable and adds intelligence to apps in straightforward manner

Q&A

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<https://github.com/iportilla/AI-101>

