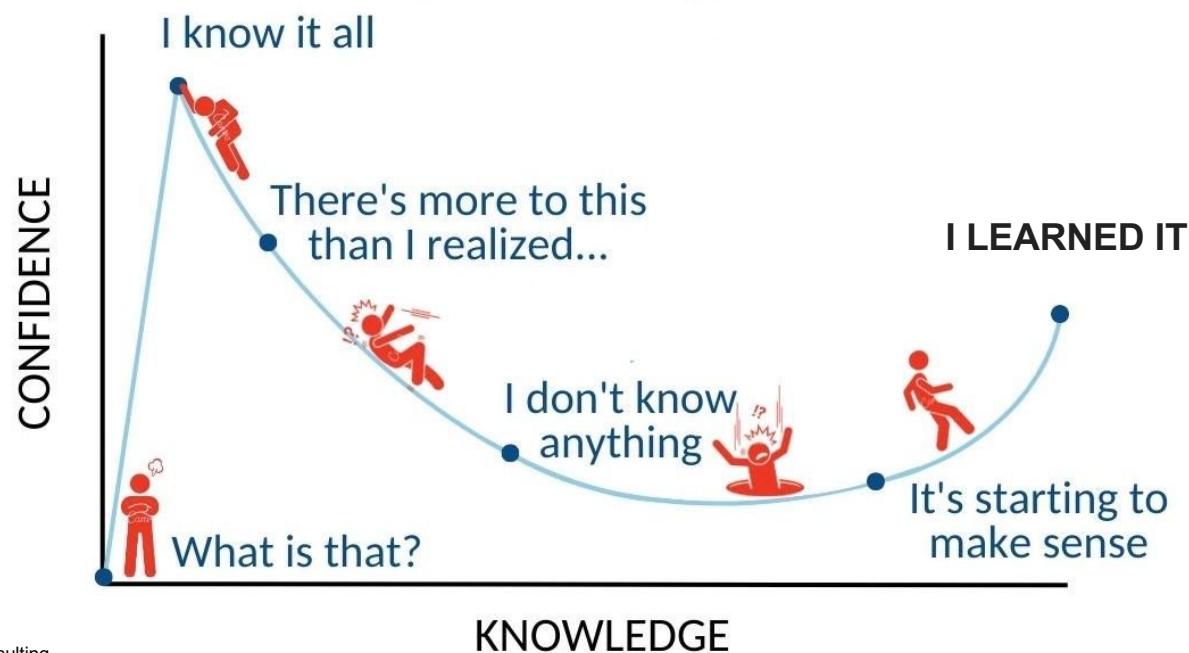


correlation.[•]one
TECH FOR JOBS

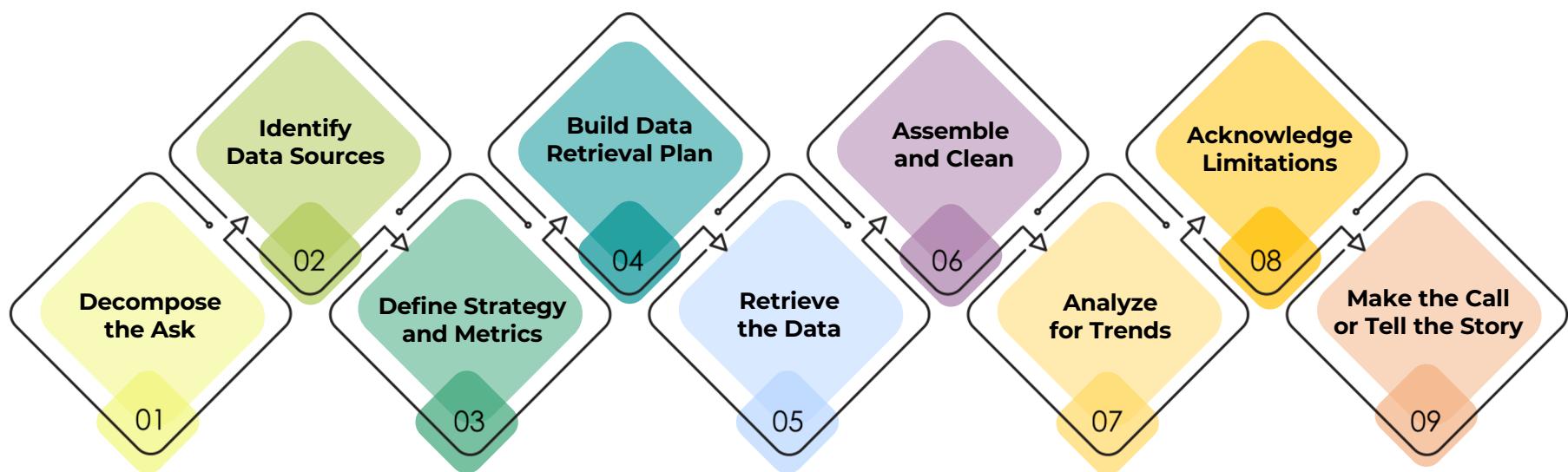
DUNNING-KRUGER Effect



Credit: BVA Nudge Consulting

Analytics Paradigm

Regardless of type or industry, this paradigm provides a repeatable pathway for effective data problem solving.



Python

Nested Lists and Dicts

A nested object is an iterable object that contains one or more iterable objects, thereby having “nested” levels of iteration.

Types of nested lists and dicts:



List of lists



List of dicts



Dictionary of lists



Dictionary of dicts

Nested Lists and Dicts

List of lists:

```
# List
ceo_list = ["Warren", "Jack", "Harry"]

# List of Lists
ceo_nested_list = [
    ["Warren Buffet", 88, "CEO of Berkshire Hathaway"],
    ["Jeff Bezos", 55, "CEO of Amazon"],
    ["Harry Markowitz", 91, "Professor of Finance"]
]

# Retrieve first entry of ceo_nested_list
first_entry = ceo_nested_list[0]

# Retrieve name of first entry
first_entry_name = ceo_nested_list[0][0]

# Retrieve age of first entry
first_entry_age = ceo_nested_list[0][1]

# Retrieve occupation of first entry
first_entry_occupation = ceo_nested_list[0][2]

# Print results to screen
print("The first entry in ceo_nested_list is:", first_entry)
print(f"{first_entry_name} is {first_entry_age} years old, serving as {first_entry_occupation}.")
```

Nested Lists and Dicts

Dict of lists:

```
# Dictionary of Lists
stocks_nested_list = {
    "APPL": ["Apple", 101.32, "NASDAQ", 937.7],
    "MU": ["Micron Technology", 32.12, "NASDAQ", 48.03],
    "AMD": ["Advanced Micro Devices", 23.12, "NASDAQ", 29.94],
    "TWTR": ["Twitter", 34.40, "NASDAQ", 26.42]
}

# Retrieve entry for APPL
appl_entry = stocks_nested_list["APPL"]

# Retrieve name, stock_price, and exchange for APPL entry
appl_name = stocks_nested_list["APPL"][0]
appl_stock_price = stocks_nested_list["APPL"][1]
appl_exchange = stocks_nested_list["APPL"][2]

# Print results to screen
print(f"APPL ticker stands for {appl_name}. APPL stock price is currently {appl_stock_price}, and
it is available on {appl_exchange}.")
```

Nested Lists and Dicts

Dict of dicts:

```
# Dictionary of Dicts
stocks_nested_dict = {
    "APPL": {
        "name": "Apple",
        "exchange": "NASDAQ",
        "market_cap": 937.7
    },
    "MU": {
        "name": "Micron Technology",
        "exchange": "NASDAQ",
        "market_cap": 48.03
    },
    "AMD": {
        "name": "Advanced Micro Devices",
        "exchange": "NASDAQ",
        "market_cap": 29.94
    },
    "TWTR": {
        "name": "Twitter",
        "exchange": "NASDAQ",
        "market_cap": 26.42
    }
}

# Retrieve Twitter entry
twitter_entry = stocks_nested_dict["TWTR"]

# Retrieve TWTR name, exchange, and market_cap
twitter_name = stocks_nested_dict["TWTR"]["name"]
twitter_exchange = stocks_nested_dict["TWTR"]["exchange"]
twitter_market_cap = stocks_nested_dict["TWTR"]["market_cap"]

# Print results to screen
print(f"Name of TWTR ticker is {twitter_name}. TWTR is available on {twitter_exchange}, and it currently has a market capitalization of {twitter_market_cap}.")
```



Conditionals are Boolean expressions that evaluate a condition to determine whether it is true or false. The result of the evaluation (true or false) determines the corresponding action.

Conditionals

```
if pedestrian:  
    do_not_hit()
```



Conditionals

A few things to keep in mind!

- Python uses `if`, `elif`, and `else` to create conditionals.
- Conditional statements are concluded with a colon. Because Python reads blocks of code based on indentation, all lines after the colon **must** be indented to be considered a part of that code block.
- All sorts of operators, like greater than, less than, and equal to, can be used to create logic tests for conditionals.
- The condition `is equal to` uses `==`, while variable assignment uses one equal sign.
- Multiple logic tests can be checked within a single conditional statement. If we use the term `and`, both tests must return `True`, while `or` requires that only one test return as `True`.
- Conditionals can even be nested, allowing programmers to run logic tests based on whether or not the original logic test returned as `True`.

Comparison Operators

Operator	Description
<code>'=='</code>	Equal to
<code>'!='</code>	Not equal to
<code>'>'</code>	Greater than
<code>'<'</code>	Less than
<code>'>='</code>	Greater than or equal to
<code>'<='</code>	Less than or equal to

Boolean Logic

AND

Value of A	Value of B	Value of A and B
False	False	False
False	True	False
True	False	False
True	True	True

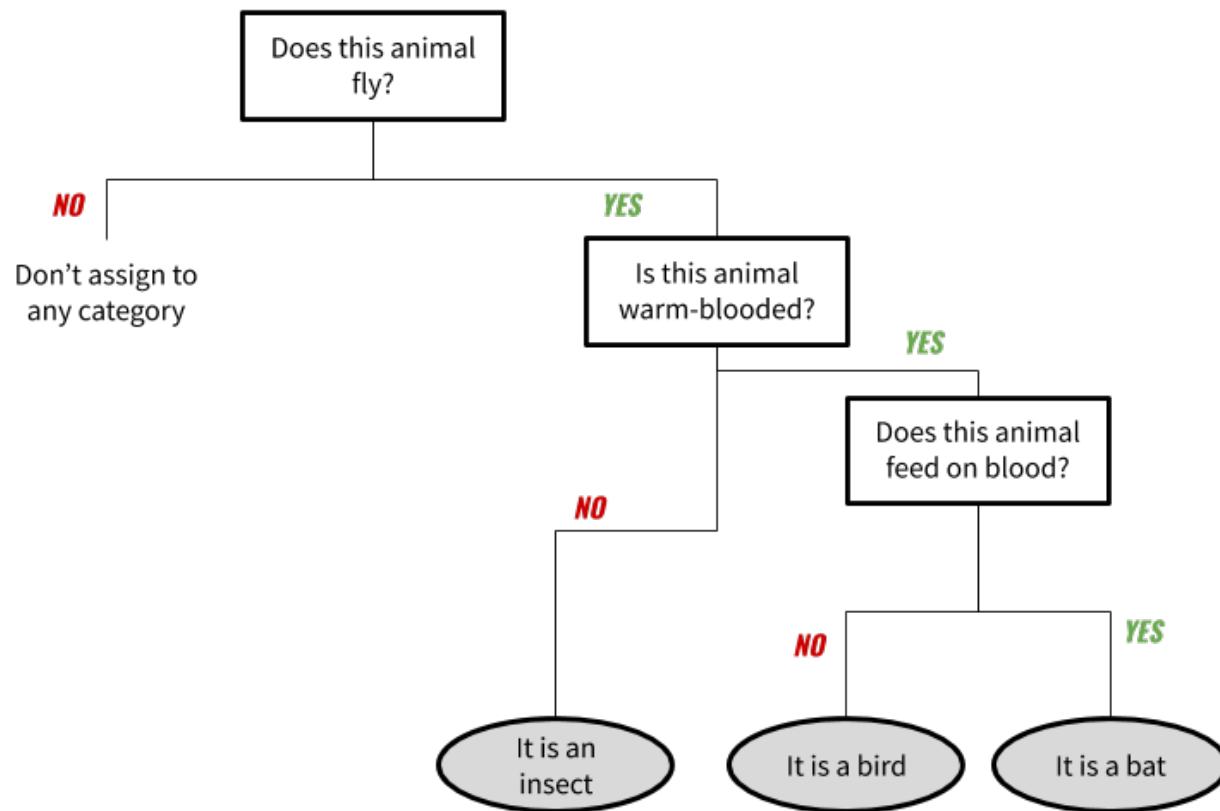
XOR

Value of A	Value of B	Value of A ^ B
False	False	False
False	True	True
True	False	True
True	True	False

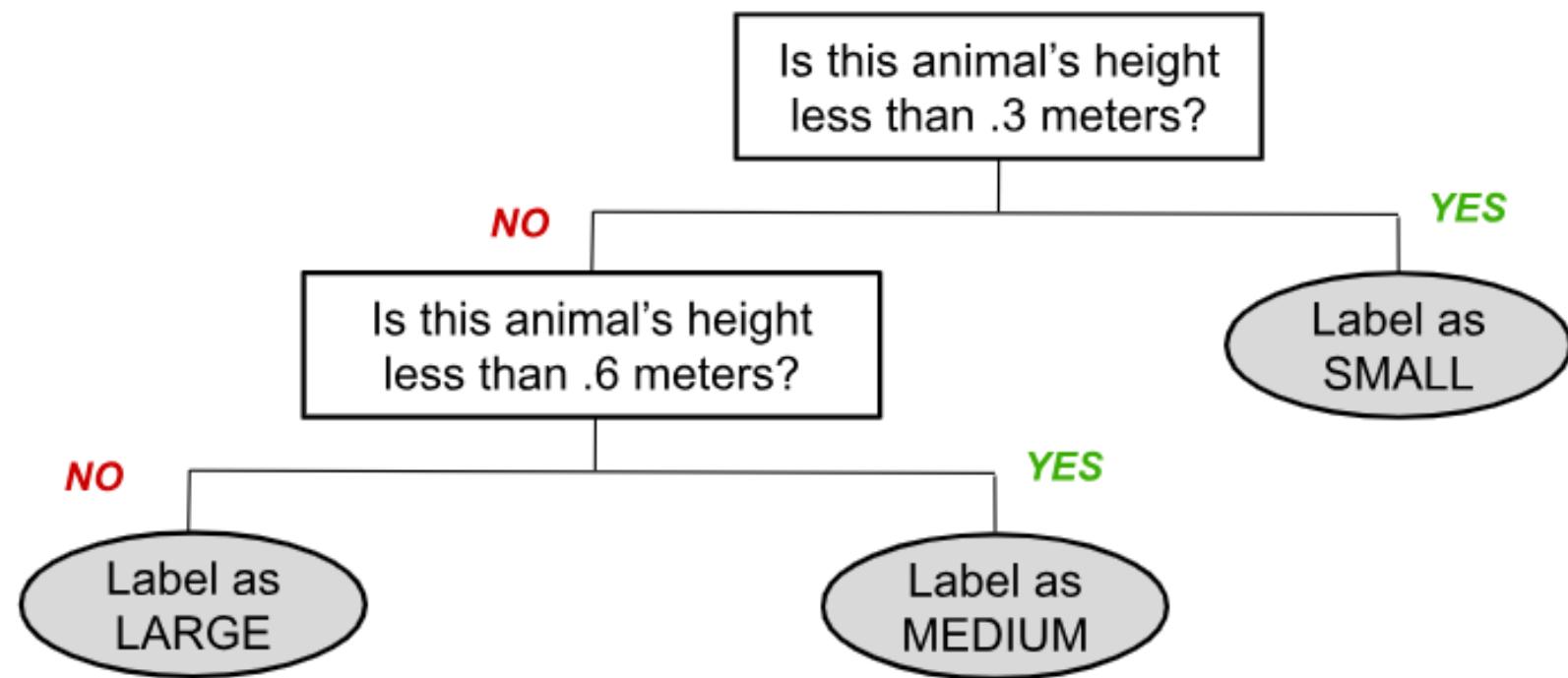
OR

Value of A	Value of B	Value of A or B
False	False	False
False	True	True
True	False	True
True	True	True

Conditions – Flow Chart Example



Conditions – Flow Chart Example



Quiz

```
height = 66
age = 16
adult_permission = True

if (height > 70) and (age >= 18):
    print("Can ride all the roller coasters")
elif (height > 65) and (age >= 18):
    print("Can ride moderate roller coasters")
elif (height > 60) and (age >= 18):
    print("Can ride light roller coasters")
elif ((height > 50) and (age >= 18)) or ((adult_permission) and (height > 50)):
    print("Can ride bumper cars")
else:
    print("Stick to lazy river")
```

Portfolio Project



Portfolio Project Presentation

Empowering data analysis, showcasing expertise, and storytelling with data

Project Overview



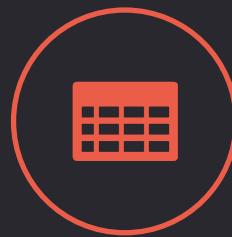
Empower Data Analysis

This project aims to empower you to conduct your own data analysis and showcase your knowledge base.



Report Thought Process

Report your thought process when analyzing data and seeking insights into the data.

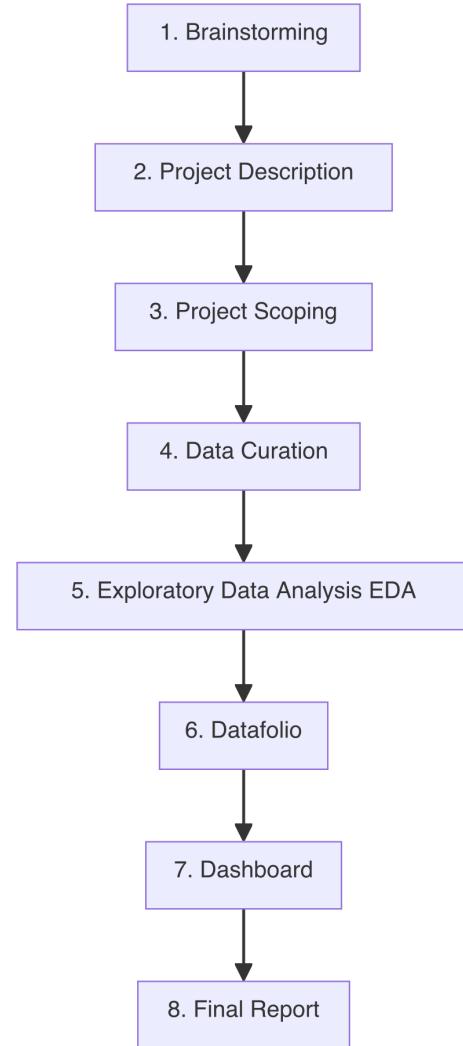


Explore Datasets

Explore a dataset to extract meaningful insights and narrate the compelling story embedded within the data.

This project empowers you to become a data-driven storyteller, leveraging your analytical skills to uncover and communicate impactful insights.

Process



Deliverables

- Project Description

A concise overview of the purpose, scope, and expected deliverables of the data analysis project.

- Project Scoping

Clearly defining the problem and constructing a proposed solution, considering factors such as feasibility, impact, usability, and timelines with milestones.

- Data Curation

Sourcing additional datasets, profiling the data to ensure quality and suitability, and wrangling the datasets to clean and set them up for compatibility.

- Exploratory Data Analysis (EDA)

Understanding and summarizing the contents of the dataset, relying heavily on visualizing the data to assess patterns and identify data characteristics.

- Datafolio

A single-page conference poster that displays the participant's work in a concise and informative way, including charts, graphs, and tables.

- Dashboard

An interactive and visual display of data that can add value to the user experience, telling a story using a combination of meaningful outputs and visualizations.

- Final Report

A document that catalogs the execution of the project, including an introduction, data analysis and computation, challenges and solutions, and a description of the dashboard.

Project Description

Industry Overview

Provide a high-level summary of the industry or domain to which the dataset belongs, including key players, trends, and challenges.

Business Context

Describe the specific business or organization that the dataset is related to, including its mission, goals, and the role the dataset plays in its operations.

Problem Statement

Clearly define the problem or question that needs to be addressed, highlighting the specific business or organizational issue that the analysis aims to solve.

Desired Outcomes

Outline the expected outcomes or insights that the analysis should deliver, and how they will provide value to the business or organization.

Stakeholders

Identify the key stakeholders, decision-makers, or end-users who will be interested in the findings and recommendations from the analysis.

Project Scoping

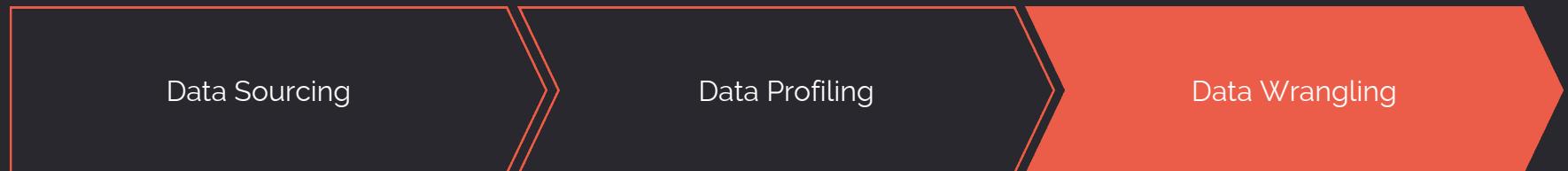
Clarify the Problem

Write Scoping Document

Business Problem Overview

Data Exploration and Wrangling

Data Curation



Identify and obtain supplementary datasets to complement the primary dataset. Document the dataset name, description, source, size, and acquisition method.

Analyze the datasets to gain insights into data quality, including structure discovery, content discovery, and relationship discovery. Document the findings and progress based on the profiling recommendations.

Clean and prepare the datasets for analysis, including merging multiple data sources, handling missing data, removing unnecessary data, identifying outliers, fixing data types, and documenting the wrangling steps.

Exploratory Data Analysis (EDA)

- 1. Select columns of interest

Identify the key variables, including numerical, textual, and datetime columns, to help answer the research questions.

- 3. Plot variable interactions

Examine how the dependent variable changes across different values of the independent variables to validate or refine the initial hypothesis.

- 2. Explore individual columns

Analyze the distribution, statistics, and subgroups of the data to uncover preliminary insights.

- 4. Analyze variable correlations

Understand and resolve any surprising correlations between variables to further validate or refine the initial hypothesis.

Datafolio

Worldwide Billionaires in 2023

Fellow Name

Background

The increasing concentration of wealth in the hands of a small number of billionaires is a growing concern for businesses, policymakers, and society as a whole. Billionaires may have the power to influence government policies, manipulate markets, and stifle competition.



Data

A dataset from [Kaggle](#) is used; it shows multiple aspects of the 2023's billionaires life and background such as their net worth, age, gender, country of origin and citizenship, industry, sources and much more.

Data curation is applied to clean the data by removing all useless data and filling missing values.

Original Data	
2640 rows	35 columns
Curated Data	
2640 rows	22 columns

Tools

In this project, Python Programming Language is used within a Jupyter Notebook to complete the data curation and Exploratory Data Analysis. Then, Tableau is used to develop a dashboard that represents the main observations

EDA

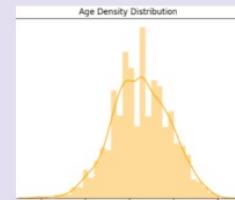
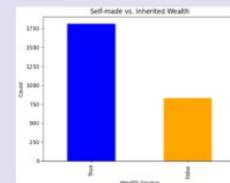
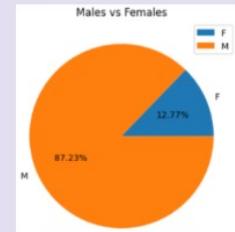


Figure 1: Percentages of Male and Female Billionaires in 2023

Male billionaires are dominating with a percentage of 87.23%, however female billionaires are only 12.7%. The difference between the genders is alarming and shows a significant gap.

Figure 2: Origin of Billionaires Wealth

Around 1750 billionaires have their wealth self-made while approximately 750 billionaires inherited their wealth.

Figure 3: Billionaires Age Distribution

Billionaires age concentration is between the age of 55 and 70. It is notable that there are teenage billionaires and elderly ones as well.

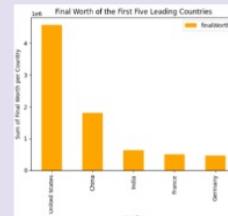


Figure 4: Top 5 countries with respect to Billionaires Final Worth

The United States is leading the list, followed by China, India, France and Germany.

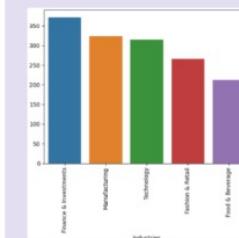


Figure 5: Top 5 Billionaires Industries

Finance & Investments is the top industry followed by

Dashboard



Figure 6: Interactive [Dashboard](#) was designed to show the most important elements of Billionaire's background, source of wealth, country of origin and the top and bottom industries.

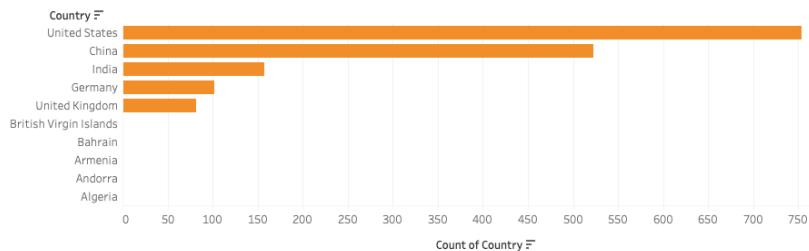
Conclusion

The analysis conducted has provided compelling evidence to support the initial hypothesis that billionaires are primarily drawn from specific demographic groups and industries. This concentrated representation of wealth has resulted in a situation where billionaires exert a significant influence on the overall business landscape. Their ability to command vast resources and steer market trends has far-reaching implications for the global economy. While billionaires have undoubtedly contributed to innovation and economic growth, their dominance also raises concerns about equity and the potential for excessive influence. Further research is warranted to delve deeper into the complex dynamics surrounding wealth concentration and its impact on society.

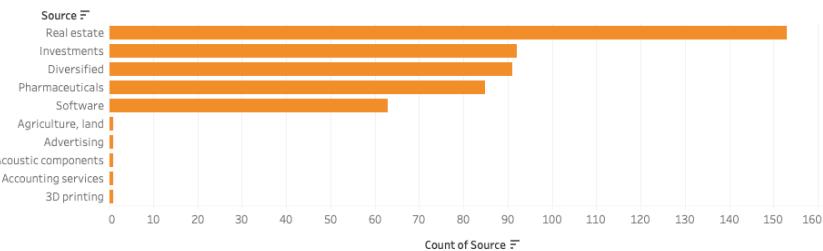
Dashboard

Billionaires - 2023

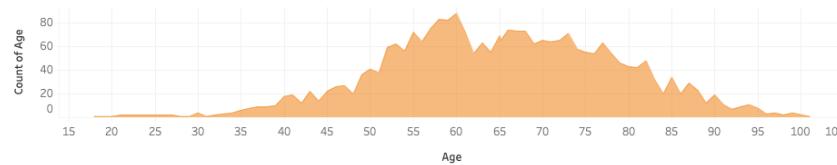
Top & Bottom 5 Countries of Billionaires' Origin



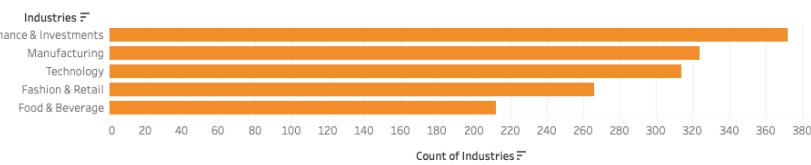
Top and Bottom 5 Sources of Billionaires' Wealth



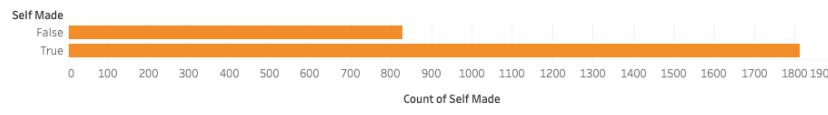
Billionaires' Age



Top 5 Industries Billionaires Working in



Self Made vs Inherited Wealth



Male vs. Female Billionaires'



Final Report

- **Introduction**

Provide background on the problem or need, summarize your process of scoping the project, and state the context and objectives of your analysis/model.

- **Data Analysis & Computation**

Explain the datasets, data cleaning and wrangling processes, exploratory data analysis, and any statistical analysis or predictive modeling you performed. Discuss the rationale behind your choices and evaluate the validity of your models.

- **Challenges and Solutions**

Document the difficulties you encountered during the project and how you overcame them.

- **Description of Dashboard**

Explain the purpose, key features, and user experience of your interactive dashboard.

- **Conclusions and Future Work**

Provide actionable conclusions based on your work and discuss potential ways to expand or improve your model/application.

Generative AI Integration

- Project Description & Scoping

Generative AI can generate research questions, hypotheses, and identify relevant data sources to effectively scope your project.

- Data Curation

Generative AI can identify data issues, create synthetic data to fill gaps, and enhance the quality and completeness of your dataset.

- Exploratory Data Analysis

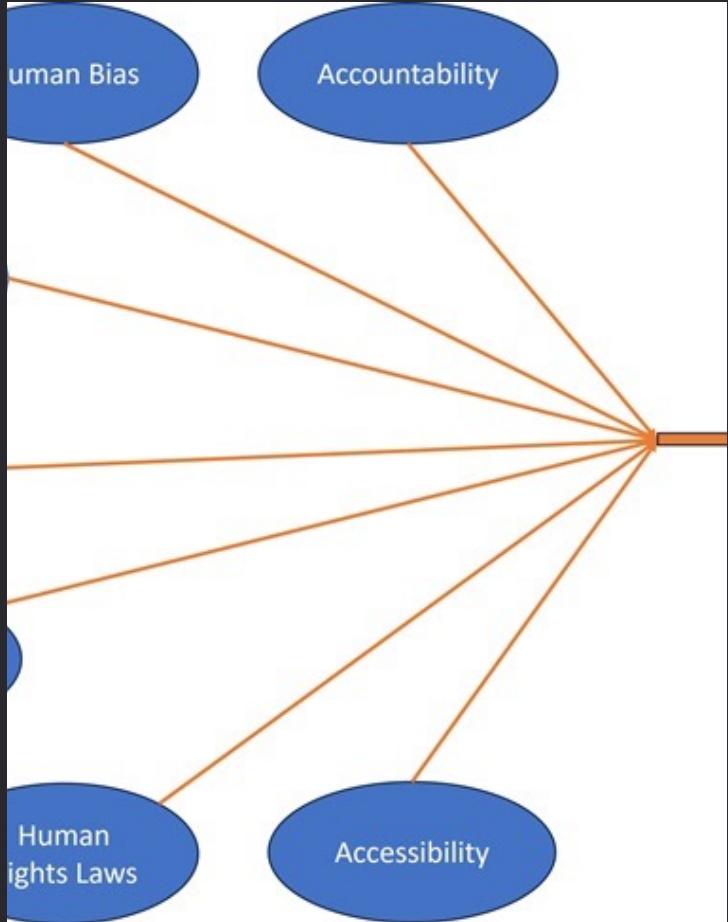
Generative AI can uncover hidden patterns, generate insights, and create visually appealing data visualizations to aid your analysis.

- Datafolio & Dashboard

Generative AI can generate engaging summaries, determine the most suitable chart types, and improve the visual appeal of your datafolio and dashboard.

- Final Report

Generative AI can generate concise summaries of key findings and provide recommendations to streamline the reporting process.



Transparency and Ethical Considerations

When using generative AI in data analytics projects, it is crucial to be transparent about its application and the potential limitations of the generated content. Participants should verify the accuracy of any AI-generated content and provide the necessary context to ensure the reliability and trustworthiness of the insights presented.

Artificial Intelligence

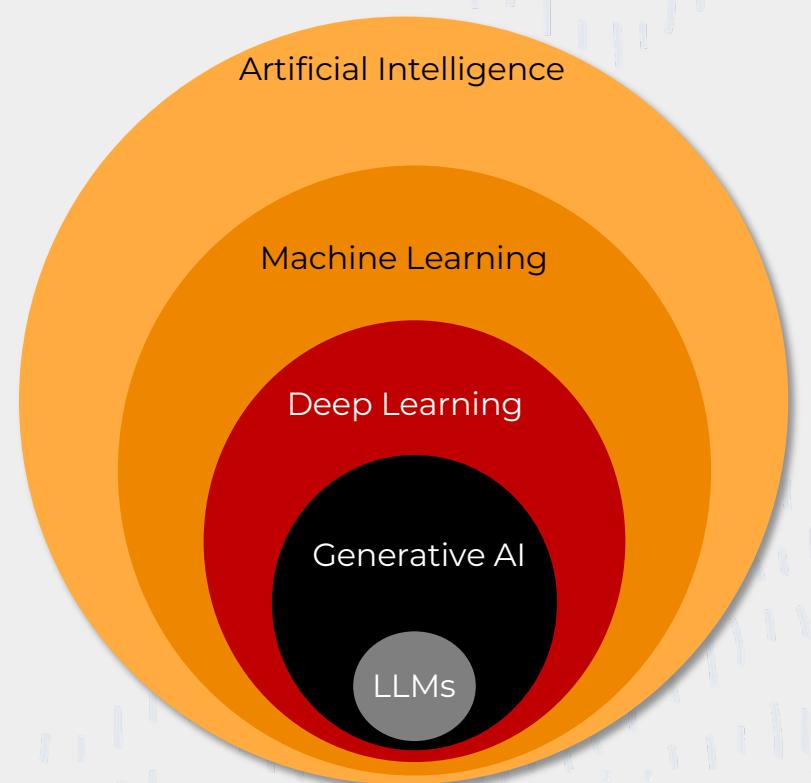
AI refers to the broad concept of machines or computers performing tasks that typically require **human intelligence**. This includes reasoning, learning, problem-solving, perception, language understanding, etc.

ML is a subset of AI focused on the idea that **machines can learn from data**, identify patterns, and make predictions with minimal human intervention

DL is a subset of ML that uses neural networks with many layers (deep networks) to **model complex patterns** in data. Excelled in NLP, Voice (Speech), and Computer Vision tasks

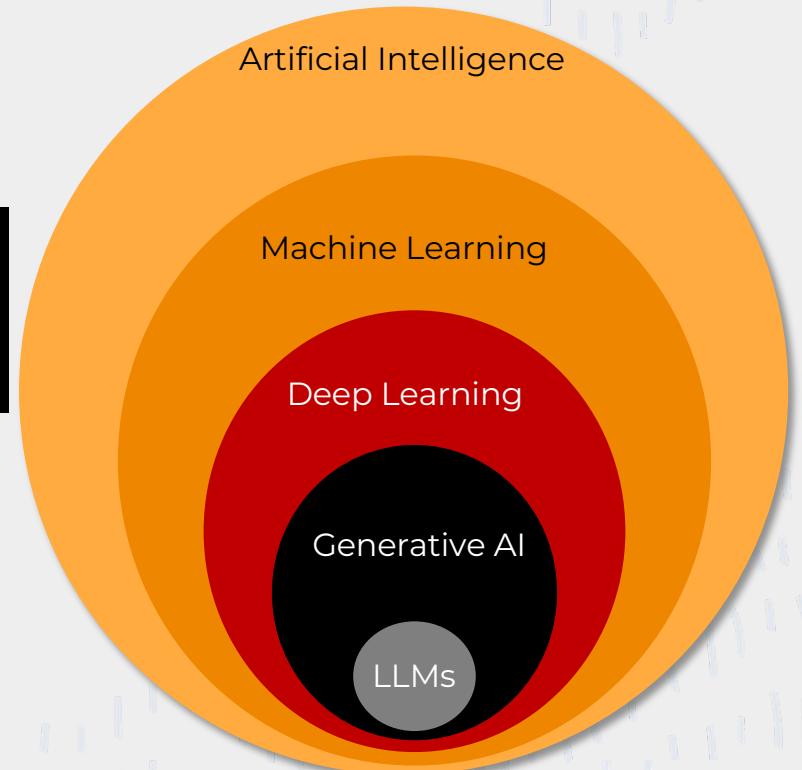
Generative AI refers to a class of AI, often realized through DL, that focuses on **generating new content** or data that is similar to but distinct from the training data.

LLMs are a type of deep learning model designed to understand, generate, and interact with human language at a large scale. They are trained on vast amounts of text data.

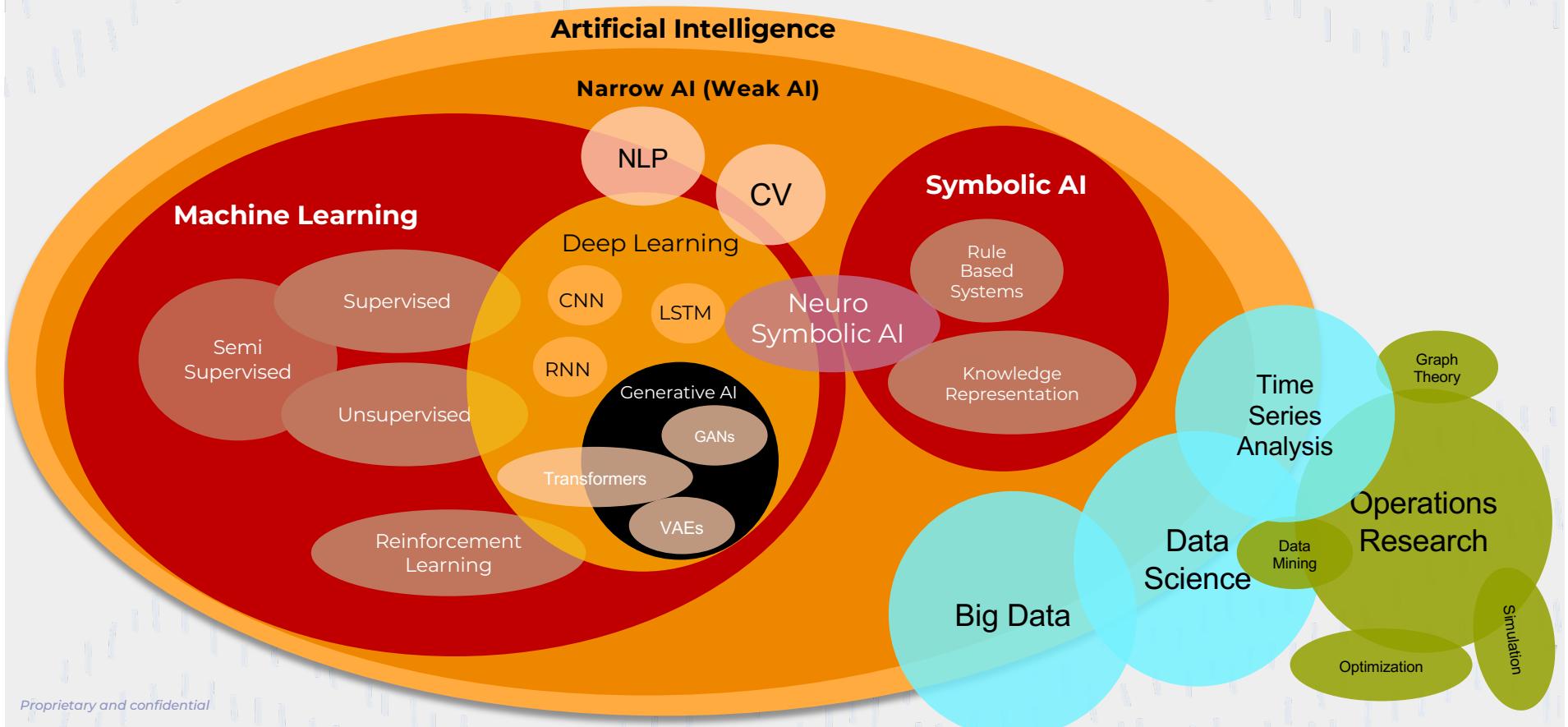


What is Generative AI?

Generative AI is designed to **generate new content** as its primary output.



Artificial Intelligence



Discriminative AI vs Generative AI

Discriminative AI

Classifies or predicts based on input data (e.g., image classification)

Generative AI

Creates new data or content (e.g., generating new images)

Discriminative AI vs Generative AI (Objective)

Discriminative AI

A discriminative AI and its algorithms can be used to:

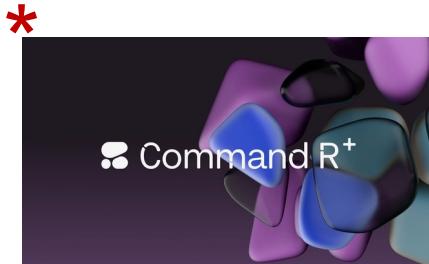
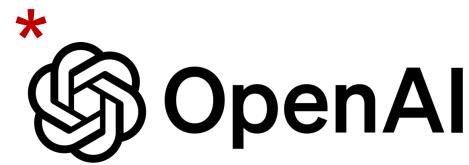
- Differentiate
- Classify
- Identify Patterns
- And Draw Conclusions
- Example: Email spam filters
- They are best applied to classification tasks.

Generative AI

A generative AI can generate new content/output as:

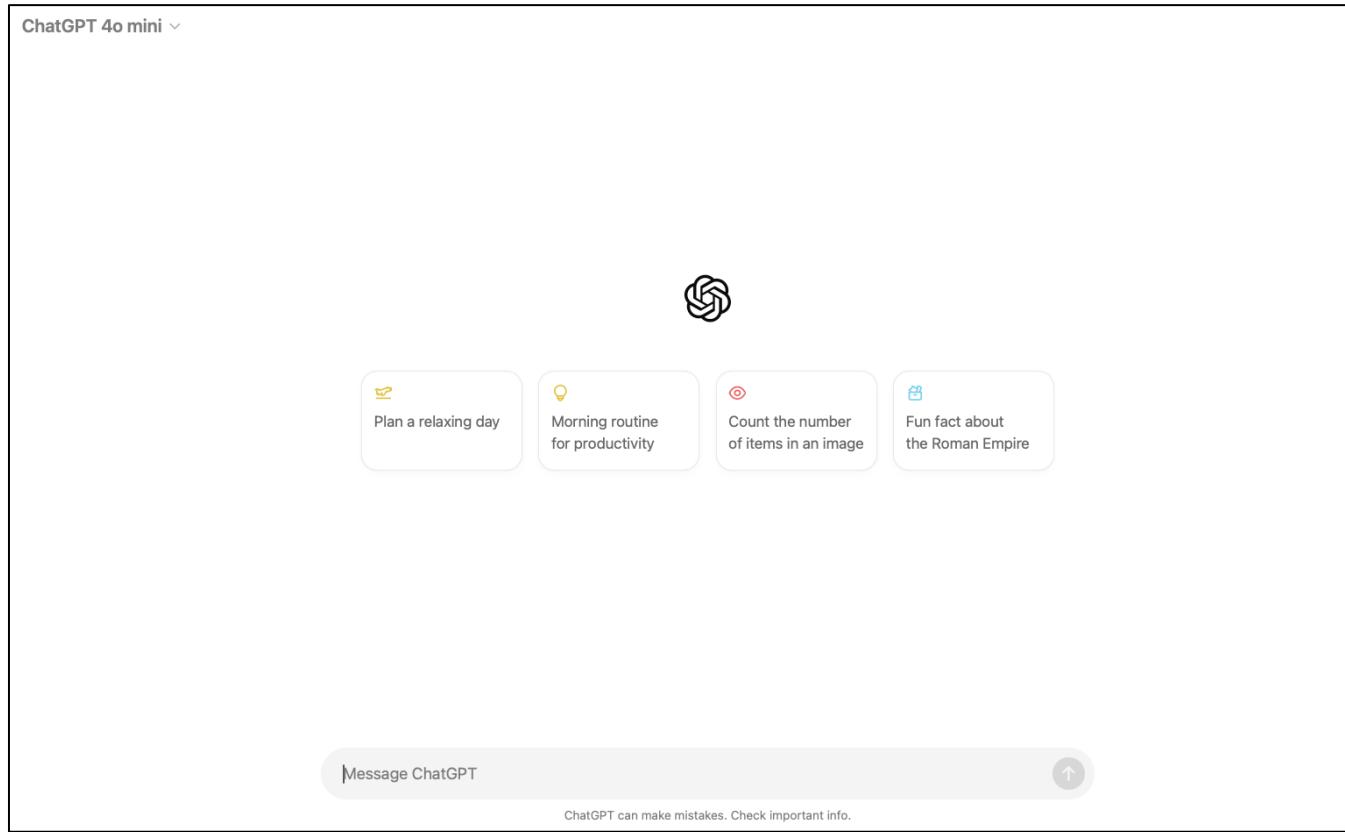
- Text
- Images
- Audio
- Video
- Code
- And new data

Frontier Models

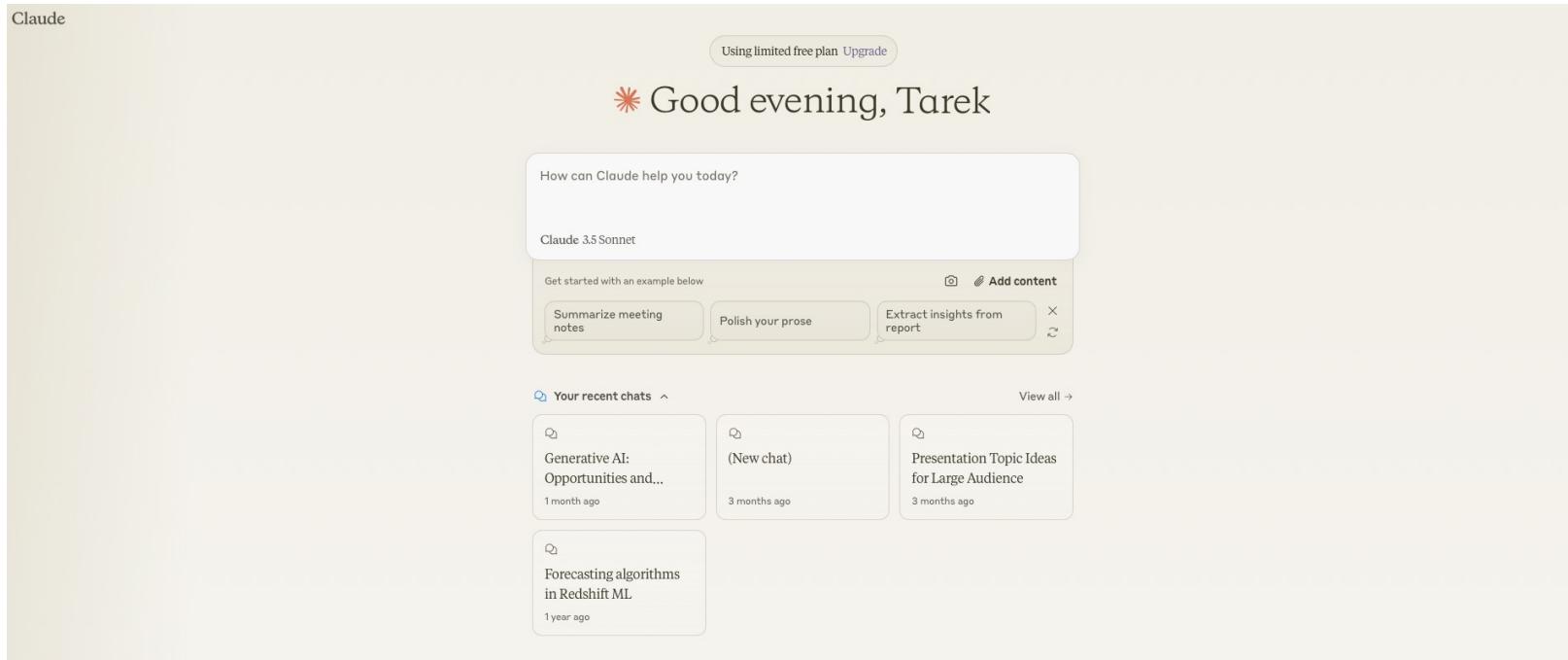


* Closed Source

OpenAI ChatGPT



Anthropic Claude



Cohere Command R+

The screenshot shows the Cohere Command R+ interface. At the top, there's a navigation bar with the Cohere logo, a search bar containing "Chat below to try Command R+, now with 10 supported languages!", and links for CHAT, DASHBOARD, PLAYGROUND, DOCS, and COMMUNITY.

The main area is titled "Chat with Cohere". On the left, there's a sidebar with "Chats" and "PINNED (0)" and "MOST RECENT (10)".

In the center, a callout box says "Try a prompt in Chat mode" with tabs for "USE TOOLS" (selected) and "JUST CHAT". Below it, a note says "Use Command R+ without any access to external sources." and lists three tools:

- ENGLISH TO FRENCH**: Create a business plan for a marketing agency in French
- MULTILINGUAL**: Redacta una descripción de empleo Diseñador(a) Web
- CODE GENERATION**: Help me clean up some data in Python

At the bottom, there's a message input field with "Message..." placeholder text and a send button with an arrow icon. Below the input field are icons for file, user, and other communication options.

Google Gemini

The screenshot shows the Google Gemini AI interface. At the top, there's a navigation bar with "Gemini" and a dropdown arrow, a "Try Gemini Advanced" button, and a settings icon. A banner at the top says "See the latest updates to the Gemini Apps Privacy Hub". Below this, a large greeting says "Hello, Tarek" and "How can I help you today?". There are four search suggestions: "Find hotels in Recoleta in Buenos Aires, and things to do", "Quiz me to find out if I'm a soccer superfan", "Explain the following code step-by-step in detail", and "Suggest a Python library to solve a problem". Each suggestion has a small circular icon below it. A modal window titled "Try Gemini Advanced at no charge" offers \$0/month for 1 month, with a "Try now" button. At the bottom, there's a search input field with "Enter a prompt here" placeholder text, a microphone icon, and a "Gemini may display inaccurate info, including about people, so double-check its responses. Your privacy & Gemini Apps" note.

Gemini ▾ Try Gemini Advanced X

See the latest updates to the Gemini Apps Privacy Hub

Hello, Tarek

How can I help you today?

Find hotels in Recoleta in Buenos Aires, and things to do

Quiz me to find out if I'm a soccer superfan

Explain the following code step-by-step in detail

Suggest a Python library to solve a problem

Try Gemini Advanced at no charge

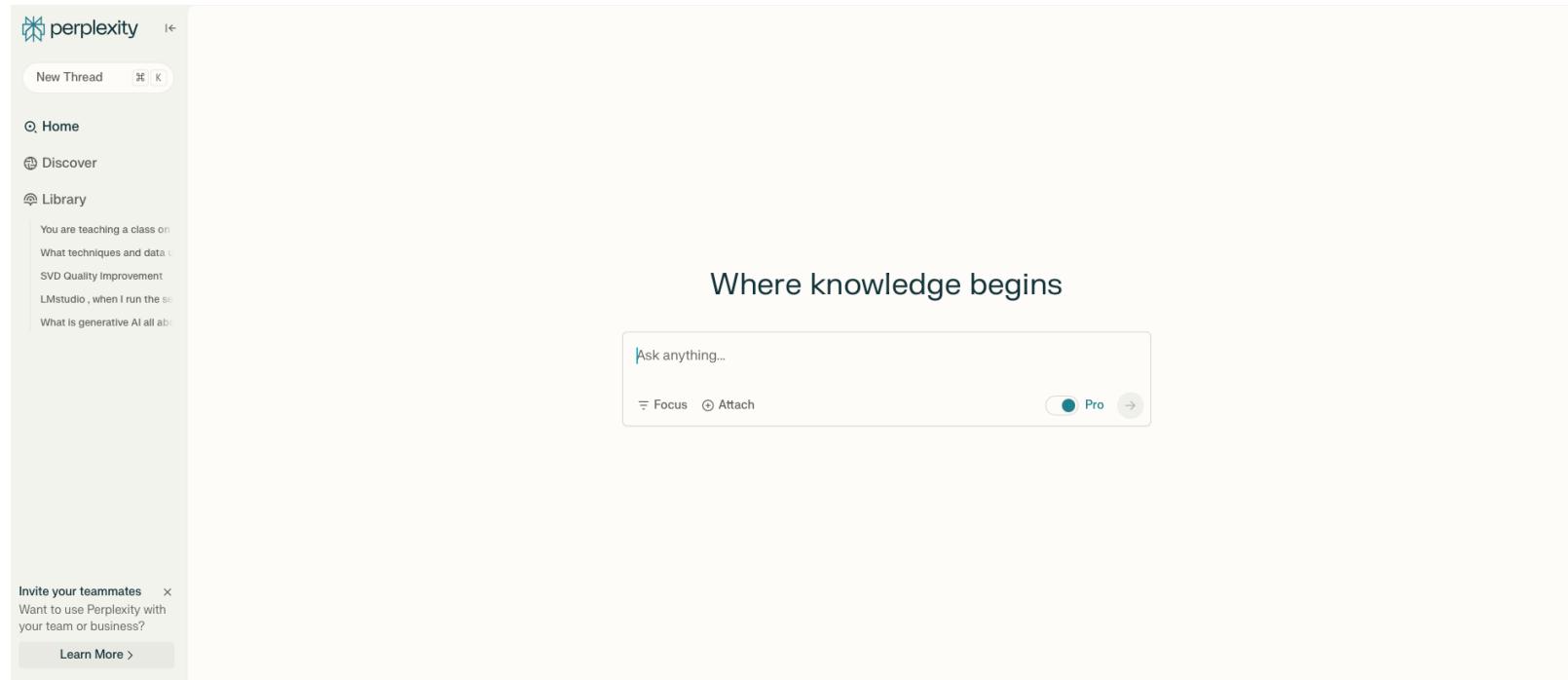
Experience Google's most capable AI models and get priority access to new features for \$19.99 \$0/month for 1 month

Try now

Enter a prompt here

Gemini may display inaccurate info, including about people, so double-check its responses. Your privacy & Gemini Apps

Perplexity AI



HuggingChat

 HuggingChat [New Chat](#)

 **HuggingChat v0.9.4**

Making the community's best AI chat models available to everyone.

NEW Llama 3.3 70B is now available! [Try it out!](#)

Current Model
meta-llama/Llama-3.3-70B-Instruct 

[Model page](#) [API](#) [Website](#)

Examples

Write an email from bullet list Code a snake game Assist in a task

tatwan

Theme

Models 10

Assistants

Tools New

Settings

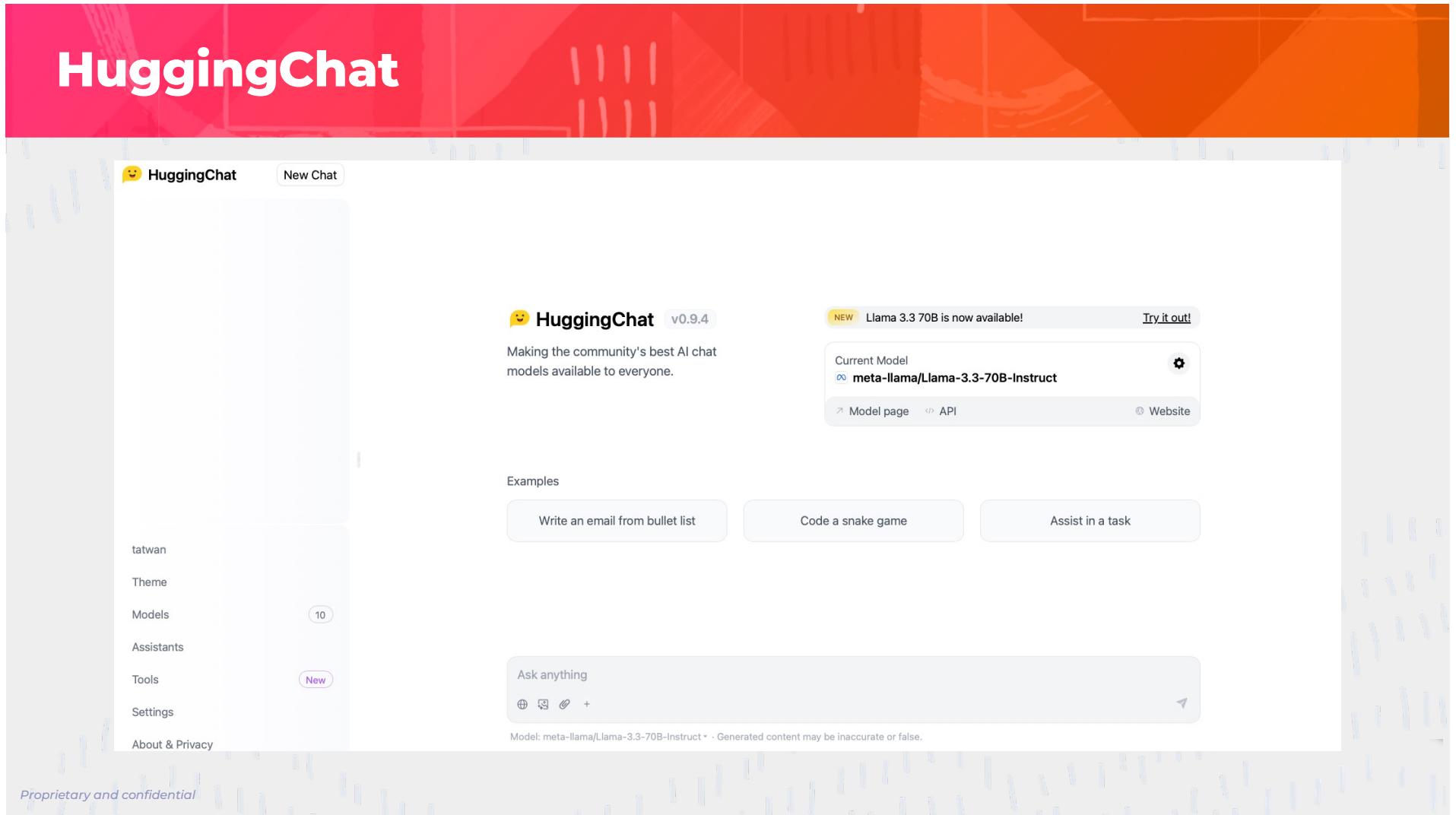
About & Privacy

Ask anything

⊕ ↗ 🔍 +

Model: meta-llama/Llama-3.3-70B-Instruct • Generated content may be inaccurate or false.

Proprietary and confidential



NotebookLM

rss NotebookLM

Settings



Welcome to NotebookLM

Create your first notebook

NotebookLM is an AI-powered research and writing assistant that works best with the sources you upload



Upload your documents and NotebookLM will answer detailed questions or surface key insights



Convert complex material into easy-to-understand formats like FAQs or Briefing Docs

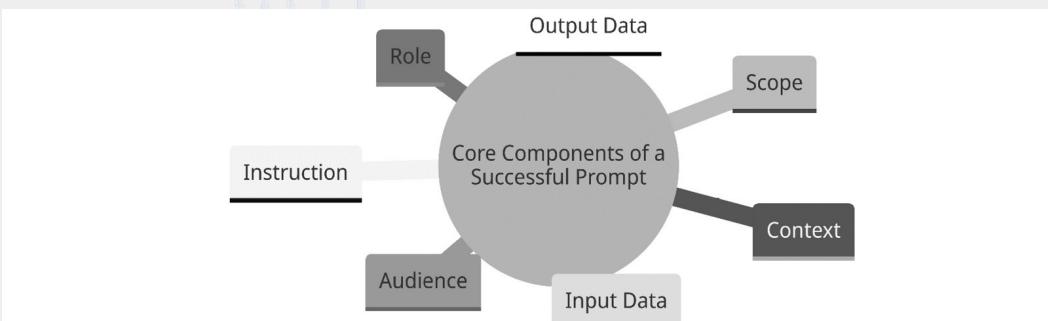


Add key resources to a notebook and share with your org to create a group knowledge base

Create

[Try an example notebook](#)

Prompt Engineering – More Advanced



Prompting Technique	When to use?
Zero-shot prompting	Effective on various basic tasks but not as effective for advanced tasks
Few-shot in-context learning	Add high-quality demonstrations to steer the model better
Chain-of-thought (CoT)	Applies chain of thoughts to elicit models to use reasoning steps before responding
ReAct	Enables LLMs to leverage external tools and knowledge to improve performance and reduce hallucination
Prompt chaining	Chains several prompts to achieve complex tasks that involve different subtasks
Tree of thoughts	Encourages exploration over thoughts that serve as intermediate steps for general problem solving with language models
Retrieval Augmented Generation (RAG)	Helps to leverage external knowledge to optimize prompt context and improve output quality and reliability

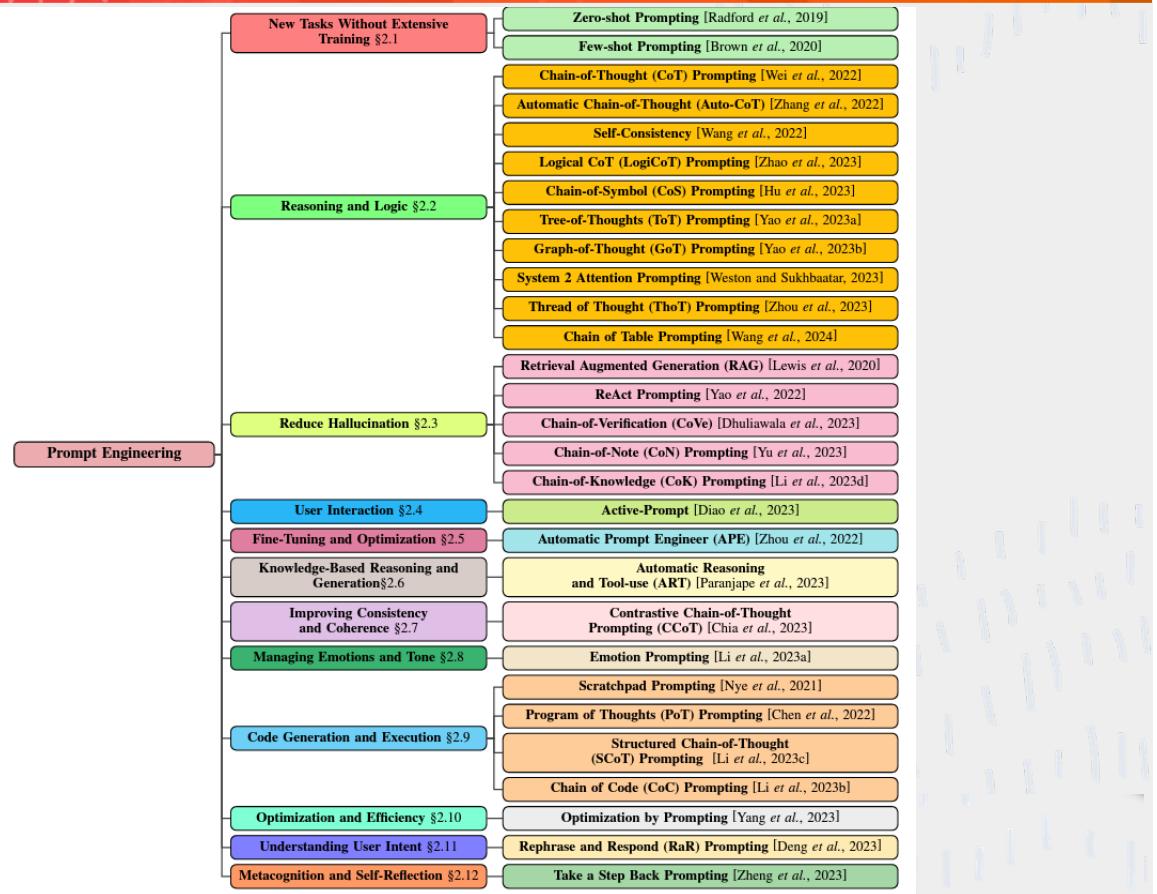
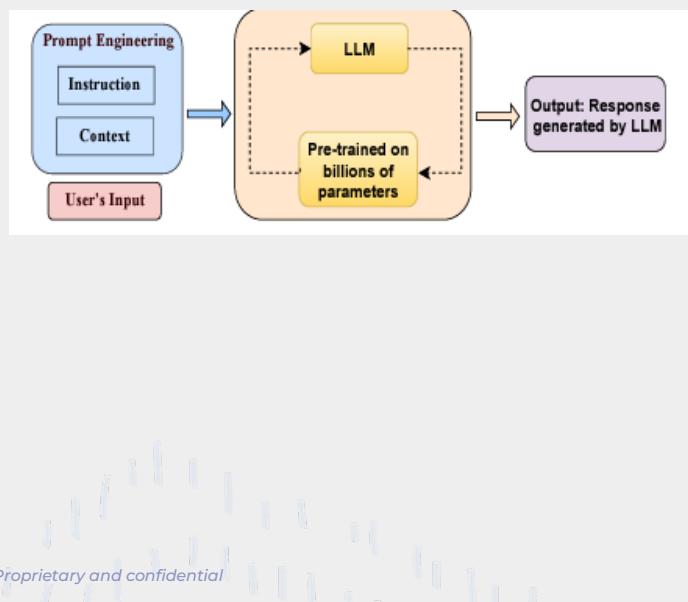
A Good Prompt

To get the best results from a chat LM, you need a well-crafted prompt. The key components of a strong prompt include:

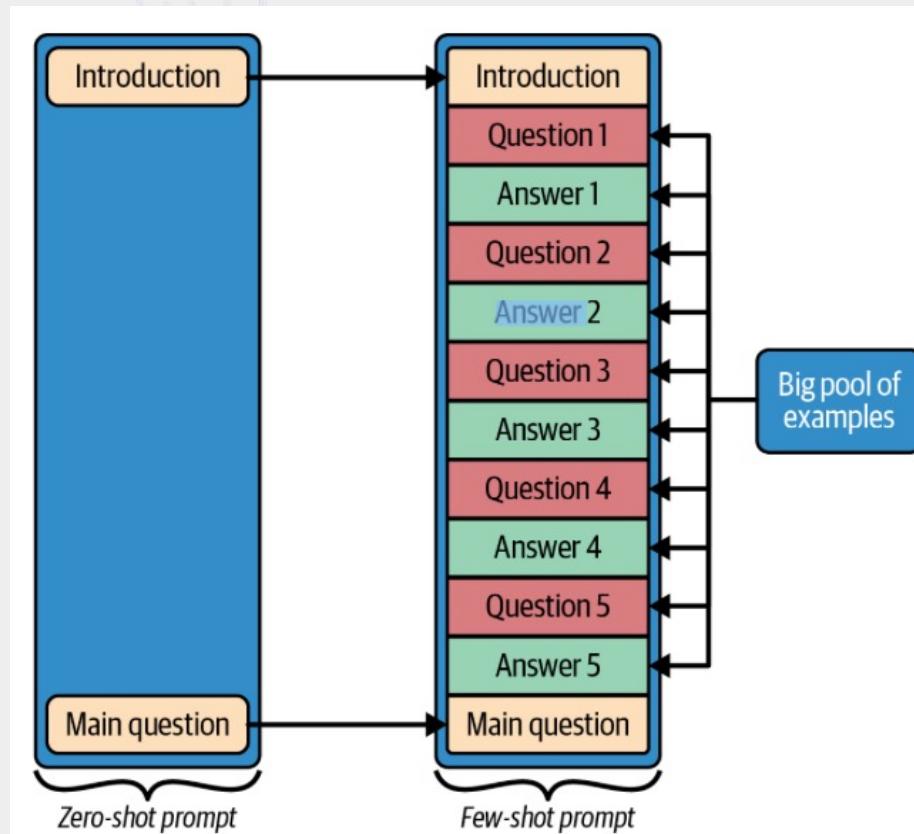
1. **Situation:** Describe why you're asking for help.
2. **Role:** Define the expert persona the model should emulate.
3. **Task:** Give clear, specific instructions about what the model must do.
4. **Output format:** Explain how you expect the response to be structured, such as bullet points, JSON, or code.
5. **Constraints:** Mention any limitations, preferences, or requirements.
6. **Quality criteria:** Define what makes a response satisfactory.
7. **Examples:** Provide few-shot examples of inputs with expected outputs.
8. **Call to action:** Restate the task simply and ask the model to perform it.

Prompt Engineering - Research

A Systematic Survey of Prompt Engineering in Large Language Models: Techniques and Applications



Zero vs Few Shot Prompt



Zero vs Few Shot Prompt

Let's look at book review summaries and their corresponding ratings.

Anglophile's dream book: 5

A long-awaited investment title: 5

Satisfying Entertainment: 4

Knowledge is Power: 4

Don't waste your time.: 1

Superb, exactly what I was in search of!: 5

A Small Book, but It Packs a Punch:

Introduction

Examples

Main question

Without Personal Pattern

What should I look for in a computer? Give me a short answer.



When choosing a computer, consider these key factors:

1. **Processor (CPU):** Look for a recent generation with multiple cores for better performance.
2. **Memory (RAM):** At least 8GB for general use; 16GB or more for intensive tasks.
3. **Storage:** SSD for faster performance, with adequate capacity for your needs (256GB minimum).
4. **Graphics:** Integrated for basic use; dedicated GPU for gaming or graphic-intensive work.
5. **Ports and Connectivity:** Ensure it has necessary ports (USB, HDMI, etc.) and supports Wi-Fi/Bluetooth standards.
6. **Display:** Quality and size according to your preference; consider resolution and color accuracy.
7. **Battery Life:** Important for laptops; aim for at least 8 hours.
8. **Build Quality and Design:** Durable and ergonomic, with a comfortable keyboard and touchpad.

These factors will help ensure the computer meets your performance and usability needs.



With Personal Pattern

Act as though you were an ergonomic specialist.

What should I look for in a computer? Give me a short answer.



As an ergonomic specialist, prioritize these features in a computer:

1. **Adjustable Monitor:** Ensure the monitor height and tilt can be adjusted to maintain eye level with the screen.
2. **Ergonomic Keyboard:** Look for a keyboard with a comfortable layout, adjustable tilt, and soft-touch keys to reduce strain.
3. **Comfortable Mouse:** Choose an ergonomic mouse that supports a natural hand position and reduces wrist strain.
4. **Screen Size and Resolution:** Opt for a screen large enough to reduce eye strain (at least 22 inches) with a high resolution for clear text and images.
5. **Adjustable Stand:** Ensure the computer or laptop has an adjustable stand or use a separate stand to position the screen correctly.
6. **Low Glare Display:** A screen with anti-glare coating to reduce eye strain.
7. **Port Placement:** Conveniently placed ports to minimize reaching and twisting.
8. **Lightweight Design:** For laptops, ensure it's lightweight and easy to carry, reducing strain during transport.

These features will help maintain a comfortable and healthy posture, minimizing the risk of ergonomic-related issues.



With a forecasting pattern

1836	M 6.8
1838	M 7 San Andreas fault
1865	M 6.5 San Andreas fault
1868	M 7 Hayward fault zone
1892	M 6.5 Undetermined fault
1898	M 6.5 Rogers Creek fault
1906	M 7.8 San Andreas fault
1911	M 6.5 Calaveras fault
68 year quiet period — 1911 to 1979*	
1979	M 6.0 Undetermined fault
1980	M 6.0 Mt. Diablo-Greenville fault
1984	M 6.3 Calaveras fault
1989	M 7.1 San Andreas fault
2001	M 5.1 West Napa fault

Assume these are the years of the biggest earthquakes in San Francisco [Attached Image]

When will the next big earthquake occur in San Francisco? Keep your answer concise. Use any type of regression model to solve the problem.



Based on the regression analysis and historical data, the model predicts that the next significant earthquake in San Francisco was expected around the year 2014.75. Given that this year has already passed, it indicates that another significant earthquake could be imminent or overdue. However, it's important to note that this is a statistical estimation and not a precise prediction. Earthquake preparedness remains crucial. [\[+\]](#)



Question refinement pattern

When I write a question, suggest a better question and ask me if I would like to use it instead.

What is the best way to reach the Aconcagua?



Would you like to use this question instead: "What are the most recommended routes and methods to reach the summit of Aconcagua?"



Cognitive verifier pattern

Whenever I ask a question, only ask me additional questions to clarify what I am asking before you provide an answer.



Memory updated

Got it! Please go ahead and ask your question.

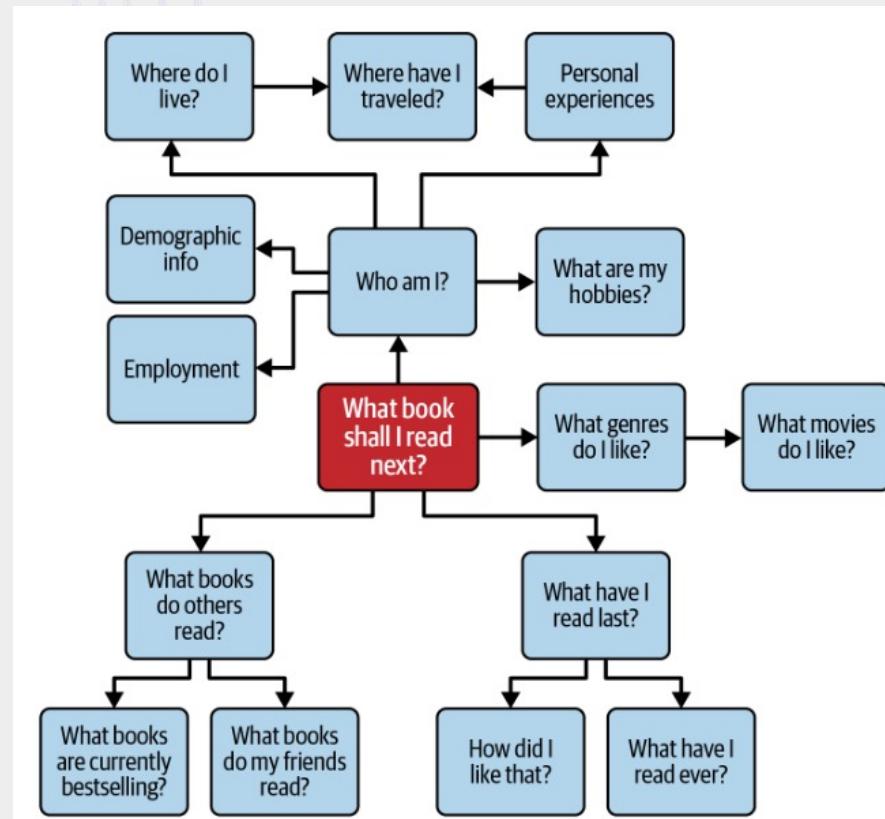
How much money should I take on a trip to Europe from Jordan?



Could you specify the duration of your trip? Also, which countries in Europe are you planning to visit? Are there any specific activities or experiences you are planning to include, such as dining at certain restaurants, visiting attractions, or shopping?



Context and Flipped Interaction



Flipped interaction pattern

Ask me questions about my reading interests until you have enough information about my goals. When you have enough information to achieve that condition, suggest me a book. Ask me the first question.

💬 Sure! What genres of books do you enjoy reading the most?

Science fiction

💬 Great! Do you prefer classic science fiction or more contemporary works?

Contemporary

💬 Do you enjoy science fiction with a focus on hard science, space exploration, dystopian futures, or a mix of these themes?



AI and Ethical dilemmas

💬 Are you interested in standalone novels, or do you prefer series that explore AI and ethical dilemmas over multiple books?

Series

Flipped interaction pattern



Do you have any preferred authors or series that you've enjoyed in the past, related to AI and ethical dilemmas?

No



Do you prefer stories that are more character-driven or those that focus heavily on the technological and ethical aspects?

Yes



Would you prefer a series with a fast-paced plot, or one that delves deeply into philosophical and ethical discussions?

fast-paced plot



Based on your interest in contemporary science fiction, AI, ethical dilemmas, series format, and a fast-paced plot, I recommend the "The Themis Files" series by Sylvain Neuvel. This series blends action with deep ethical questions about AI and humanity, making it an engaging read.

Would you like more details about this series?



Few shot pattern

input:

Person 1: I do not want to miss the train

Person 2: Relax, it leaves at 4:15 and we still have plenty of time left

output: Person 1 doesn't want to miss the train, and person 2 reassures they have plenty of time

input 1: I hated this movie

input 2: Yeah, it had a sucky plot, and lasted three hours.



Input 1: I hated this movie

Input 2: Yeah, it had a sucky plot, and lasted three hours.

Output: The first person expresses their dislike for the movie, and the second person agrees, criticizing the plot and its length.



Chain of thought pattern

Explicit
Instructions

Standard Prompting	Chain-of-Thought Prompting
<p>Model Input</p> <p>Q: Roger has 5 tennis balls. He buys 2 more cans of tennis balls. Each can has 3 tennis balls. How many tennis balls does he have now?</p> <p>A: The answer is 11.</p> <p>Q: The cafeteria had 23 apples. If they used 20 to make lunch and bought 6 more, how many apples do they have?</p>	<p>Model Input</p> <p>Q: Roger has 5 tennis balls. He buys 2 more cans of tennis balls. Each can has 3 tennis balls. How many tennis balls does he have now?</p> <p>A: Roger started with 5 balls. 2 cans of 3 tennis balls each is 6 tennis balls. $5 + 6 = 11$. The answer is 11.</p> <p>Q: The cafeteria had 23 apples. If they used 20 to make lunch and bought 6 more, how many apples do they have?</p>
<p>Model Output</p> <p>A: The answer is 27. ❌</p>	<p>Model Output</p> <p>A: The cafeteria had 23 apples originally. They used 20 to make lunch. So they had $23 - 20 = 3$. They bought 6 more apples, so they have $3 + 6 = 9$. The answer is 9. ✓</p>

Chain of thought pattern

Implicit
Instructions

[a] Zero-shot prompting

Q: A juggler can juggle 16 balls. Half of the balls are golf balls, and half of the golf balls are blue. How many blue golf balls are there?

A: The answer (arabic numerals) is

(Output) 8 ✗

[b] "Let's think step by step" trick

Q: A juggler can juggle 16 balls. Half of the balls are golf balls, and half of the golf balls are blue. How many blue golf balls are there?

A: **Let's think step by step.**

(Output) There are 16 balls in total. Half of the balls are golf balls. That means that there are 8 golf balls. Half of the golf balls are blue. That means that there are 4 blue golf balls. ✓

Chain of thought pattern

The **Chain of Thought (CoT)** technique in prompt engineering involves encouraging a model, like ChatGPT, to break down its reasoning process step by step to arrive at a final answer. This method enhances the model's ability to handle more complex problems by making its internal reasoning explicit.

Why use CoT?

- It helps the model manage more complex, multi-step problems by breaking them down.
- It enhances transparency, making it easier to understand the reasoning and catch potential mistakes.

Chain of thought pattern

The odd numbers in this group add up to an even number: 4, 8, 9, 15, 12, 2, 1.

Think carefully and logically, explain your answer and break it down into steps.

Chain of thought pattern



Let's analyze the given group of numbers and determine if the sum of the odd numbers in the group is even.

The group of numbers is: 4, 8, 9, 15, 12, 2, 1

Step 1: Identify the odd numbers.

- 4 (even)
- 8 (even)
- 9 (odd)
- 15 (odd)
- 12 (even)
- 2 (even)
- 1 (odd)

So, the odd numbers in the group are: 9, 15, and 1

Step 2: Add the odd numbers together.

- $9 + 15 + 1$

Step 3: Perform the addition.

- $9 + 15 = 24$
- $24 + 1 = 25$

Chain of thought pattern

Step 4: Determine if the sum is even or odd.

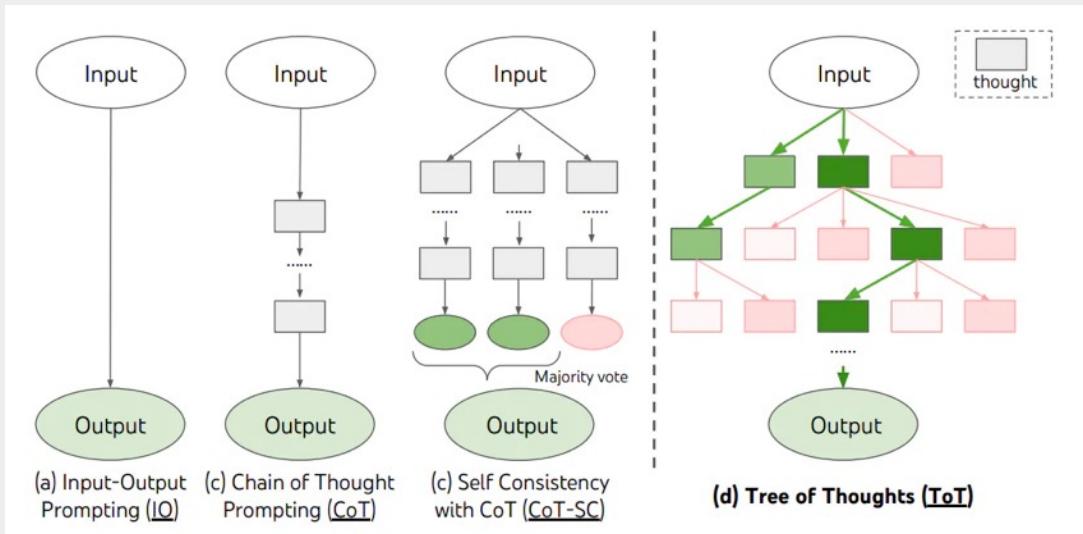
- The sum of the odd numbers (25) is odd.

Conclusion:

The statement "The odd numbers in this group add up to an even number" is incorrect. The sum of the odd numbers (9, 15, and 1) is 25, which is an odd number.

So, the correct answer is that the sum of the odd numbers in the group is **25**, which is an odd number.

Tree of Thought pattern



Tree of Thought pattern

Tree of Thought (ToT) is another advanced prompt engineering technique used with models like ChatGPT. It builds on the Chain of Thought (CoT) approach but adds a branching component to explore multiple lines of reasoning before settling on the best solution. Instead of following a single path (as in CoT), the model explores several possibilities simultaneously, like branches of a tree, evaluating and comparing different solutions to find the most suitable one.

Tree of Experts pattern

The **Tree of Experts** technique is useful in systems that require multi-faceted decision-making or hierarchical problem-solving, where multiple factors must be considered and weighed by different expert modules. It's often used in multi-agent systems, ensemble models in machine learning, or hierarchical AI systems that combine specialized models into a broader framework.

In essence, Tree of Experts is about dividing a problem into subproblems, assigning them to experts who specialize in each area, and then aggregating their solutions to form a comprehensive answer. It's an approach designed to handle complex, multi-dimensional tasks where different aspects require specialized attention.

Tree of Thought vs Tree of Experts

Feature	Tree of Thought (ToT)	Tree of Experts
Structure	Decision tree with branching paths	Collaborative expert contributions
Mechanism	Uses search algorithms to explore multiple paths	Iterative expert collaboration and correction
Applications	Complex reasoning tasks like math and writing	Scenarios needing diverse expertise
Advantages	Dynamic exploration and backtracking	Collective insight and error correction

Tree of thought pattern

Imagine three different experts are answering this question.

All experts will write down 1 step of their thinking,
then share it with the group.

Then all experts will go on to the next step, etc.

If any expert realises they're wrong at any point then they leave.

The question is...

Bob is in the living room.

He walks to the kitchen, carrying a cup.

He puts a ball in the cup and carries the cup to the bedroom.

He turns the cup upside down, then walks to the garden.

He puts the cup down in the garden, then walks to the garage.

Where is the ball?

Tree of thought pattern

Expert 1: Logical Tracker

Step 1: Bob starts in the living room and walks to the kitchen carrying a cup. He puts a ball in the cup.

- **Current Ball Location:** Kitchen, inside the cup.

Step 2: Bob carries the cup with the ball to the bedroom.

- **Current Ball Location:** Bedroom, inside the cup.

Step 3: Bob turns the cup upside down in the bedroom.

- **Current Ball Location:** Bedroom, on the floor (since he turned the cup upside down).

Step 4: Bob walks to the garden and puts the cup down, then walks to the garage.

- **Current Ball Location:** Bedroom, on the floor.

Tree of thought pattern

Expert 2: Visualizer

Step 1: Bob starts in the living room with a cup and walks to the kitchen. He puts a ball in the cup.

- **Current Ball Location:** Kitchen, inside the cup.

Step 2: Bob carries the cup with the ball from the kitchen to the bedroom.

- **Current Ball Location:** Bedroom, inside the cup.

Step 3: Bob turns the cup upside down in the bedroom, so the ball falls out.

- **Current Ball Location:** Bedroom, on the floor.

Step 4: Bob goes to the garden with the cup and leaves it there, then heads to the garage.

- **Current Ball Location:** Bedroom, on the floor.

Tree of thought pattern

Expert 3: Sequence Analyzer

Step 1: Bob starts in the living room, then goes to the kitchen with a cup and puts a ball in it.

- **Current Ball Location:** Kitchen, inside the cup.

Step 2: Bob moves from the kitchen to the bedroom with the cup containing the ball.

- **Current Ball Location:** Bedroom, inside the cup.

Step 3: In the bedroom, Bob turns the cup upside down, making the ball fall out.

- **Current Ball Location:** Bedroom, on the floor.

Step 4: Bob takes the now empty cup to the garden and puts it down, then moves to the garage.

- **Current Ball Location:** Bedroom, on the floor.

Conclusion

All experts agree that after Bob's sequence of actions, the ball is in the **bedroom on the floor**.



Prompt Chaining

- **Sequential Prompts:** The process involves breaking down a task into smaller, manageable steps. Each step is addressed by a separate prompt, and the output from one prompt is used as input for the next.
- **Contextual Relevance:** By building on previous outputs, the model maintains context and continuity, which improves the accuracy and depth of the final result.

Prompt Chaining

Step-by-Step Example of Prompt Chaining:

1. **Goal:** Gather introductory information about AI in healthcare. **Prompt:** "Summarize the key areas where AI is currently being applied in healthcare."
2. **Goal:** Identify specific examples of AI applications in each of these areas. **Prompt:** "Provide specific examples of AI applications in diagnostics, personalized medicine, and drug discovery."
3. **Goal:** Explore the challenges of AI adoption in healthcare. **Prompt:** "What are the major challenges in adopting AI in healthcare systems?"
4. **Goal:** Conclude the findings and suggest potential solutions. **Prompt:** "Based on the challenges, suggest potential solutions to increase AI adoption in healthcare."

Prompt Chaining

Full Process:

By breaking down the task into smaller chunks:

1. You gathered an overview of AI in healthcare.
2. Then you drilled down into specific examples.
3. You identified the challenges.
4. Finally, you generated actionable recommendations.

Local LLMs

LM Studio

New in v0.3.0: Chat with documents, UI refresh, Structured Output API, and so much more! [Read the Announcement](#) 🎉

LM Studio

Discover, download, and run local LLMs

Run any [Llama 3](#) [Phi 3](#) [Falcon](#) [Mistral](#) [StarCoder](#) [Gemma](#) [gguf](#) models from Hugging Face

LM Studio 0.3.0 is finally here! 🎉🎉🎉

[Download LM Studio for Mac \(M1/M2/M3\)](#) 0.3.2

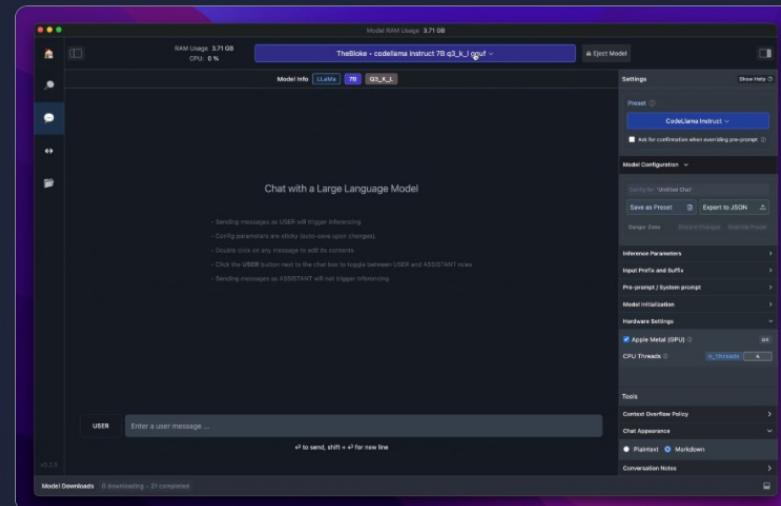
[Download LM Studio for Windows](#) 0.3.2

[Download LM Studio for Linux](#) 0.3.2

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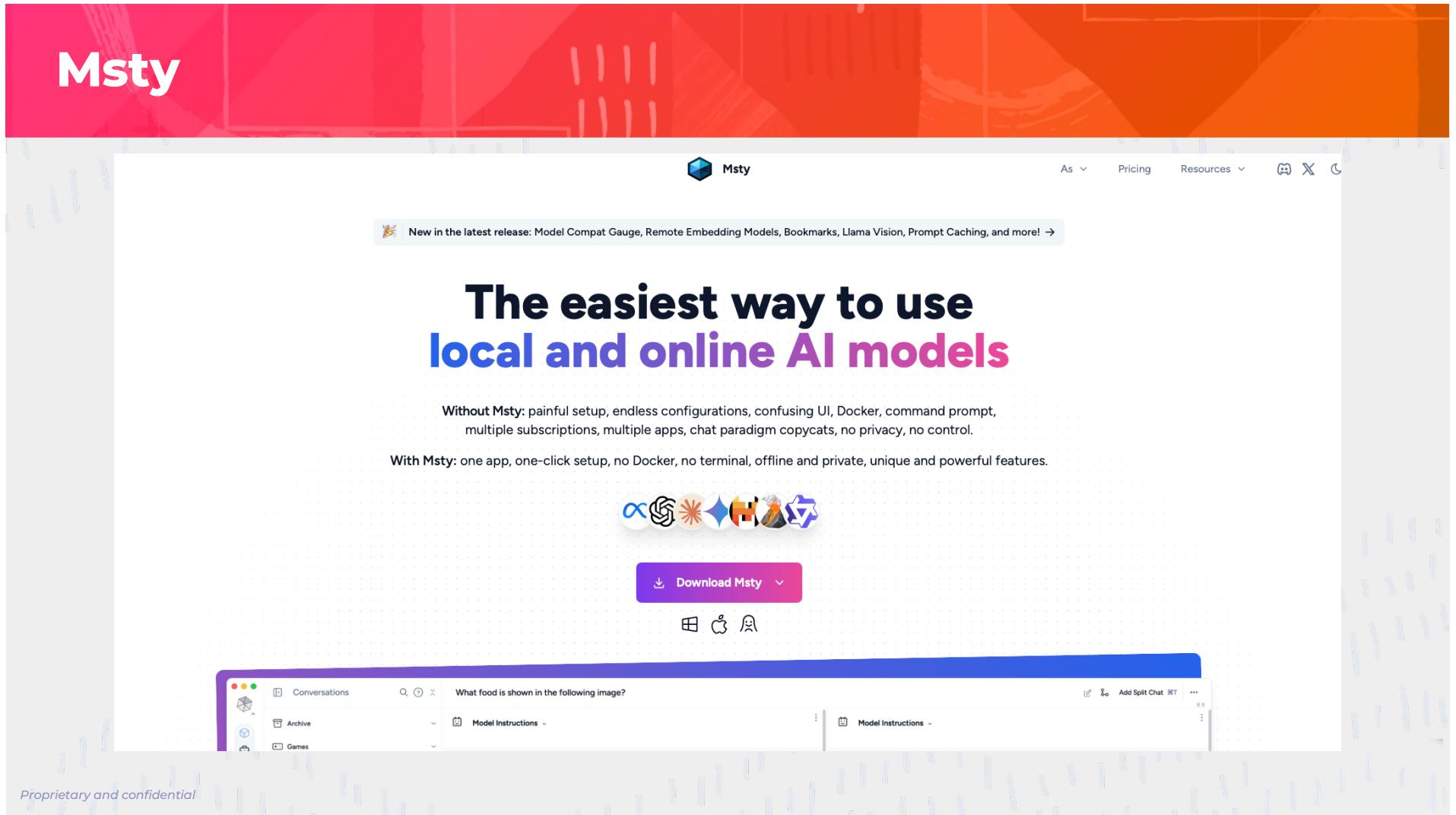
Sign up for new version email updates

Twitter Github Discord Email



The screenshot shows the LM Studio application window. At the top, there's a banner with a red-to-orange gradient background featuring a stylized geometric pattern. Below the banner, the main interface has a dark theme. On the left, there's a sidebar with various icons and sections like "Recent Models", "Model Store", "Model Configurations", and "Logs". The central area contains a large text input field labeled "USER" with placeholder text "Enter a user message ...". To the right of the input field is a "Send" button with the text "alt to send, shift + enter for new line". Above the input field, there's a status bar showing "Model Info Usage: 3.71 GB" and "CPU: 6 %". The status bar also indicates the current model is "TheBloke · codellama/Instruct7B-q3_k_12guf" and shows an "Eject Model" button. The right side of the window is a "Settings" panel with tabs for "Model Info" (selected), "Presets", "Model Configuration", "Inference Parameters", "Input Profile and Buffers", "Pre-prompt / System prompt", "Model Initialization", "Hardware Settings" (with a checked "Apple Metal (GPU)" option), and "Tools". The bottom of the window shows a progress bar for "Model Downloads" with the text "0 downloading - 21 completed".

Proprietary and confidential



The image shows the Msty AI landing page. At the top, there's a large red banner with the word "Msty" in white. Below it is a navigation bar with a logo, "As", "Pricing", "Resources", and a user icon. A notification bar says "New in the latest release: Model Compat Gauge, Remote Embedding Models, Bookmarks, Llama Vision, Prompt Caching, and more! →". The main headline is "The easiest way to use local and online AI models" in bold black and blue text. Below it, a comparison section highlights "Without Msty: painful setup, endless configurations, confusing UI, Docker, command prompt, multiple subscriptions, multiple apps, chat paradigm copycats, no privacy, no control." and "With Msty: one app, one-click setup, no Docker, no terminal, offline and private, unique and powerful features." It features icons for various AI models like Qwen, Qwen Plus, Qwen-Plus-7B, Qwen-Plus-13B, Qwen-Plus-30B, and Qwen-Plus-100B. A "Download Msty" button is shown. At the bottom, there's a screenshot of the Msty app interface with a search bar asking "What food is shown in the following image?", a sidebar with "Conversations", "Archive", and "Games", and a "Model Instructions" section. The footer contains the text "Proprietary and confidential".

Msty

New in the latest release: Model Compat Gauge, Remote Embedding Models, Bookmarks, Llama Vision, Prompt Caching, and more! →

The easiest way to use local and online AI models

Without Msty: painful setup, endless configurations, confusing UI, Docker, command prompt, multiple subscriptions, multiple apps, chat paradigm copycats, no privacy, no control.

With Msty: one app, one-click setup, no Docker, no terminal, offline and private, unique and powerful features.

Download Msty

Proprietary and confidential

Ollama



Get up and running with large language models.

Run [Llama 3.1](#), [Phi 3](#), [Mistral](#), [Gemma 2](#), and other models. Customize and create your own.

Download ↓

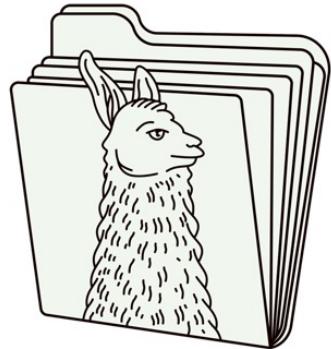
Available for macOS, Linux, and Windows (preview)

llamafile

llamafile

CI Passing

Mozilla AI 3160 MEMBERS



llamafile lets you distribute and run LLMs with a single file. ([announcement blog post](#))

Our goal is to make open LLMs much more accessible to both developers and end users. We're doing that by combining [llama.cpp](#) with [Cosmopolitan Libc](#) into one framework that collapses all the complexity of LLMs down to a single-file executable (called a "llamafile") that runs locally on most computers, with no installation.



llamafile is a Mozilla Builders project.

GPT4ALL

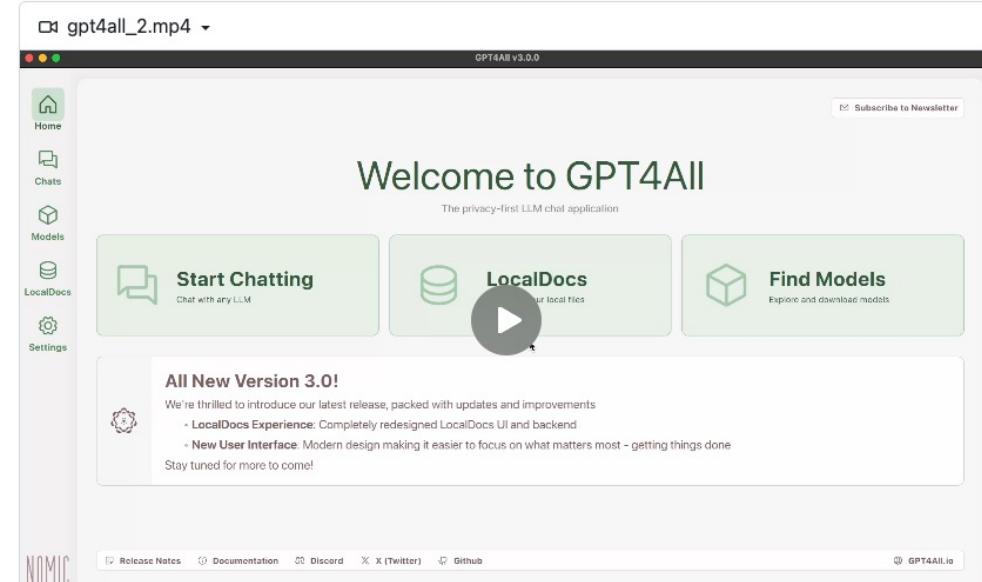
[Website](#) • [Documentation](#) • [Discord](#) • [YouTube Tutorial](#)

GPT4All runs large language models (LLMs) privately on everyday desktops & laptops.

No API calls or GPUs required - you can just download the application and [get started](#).

Read about what's new in [our blog](#).

[Subscribe to the newsletter](#)



GPT4All is made possible by our compute partner [Paperspace](#).

[Phorm](#) [Ask AI](#)

Proprietary and confidential

Jan

Jan - Turn your computer into an AI computer



[Getting Started](#) - [Docs](#) - [Changelog](#) - [Bug reports](#) - [Discord](#)

⚠ Warning

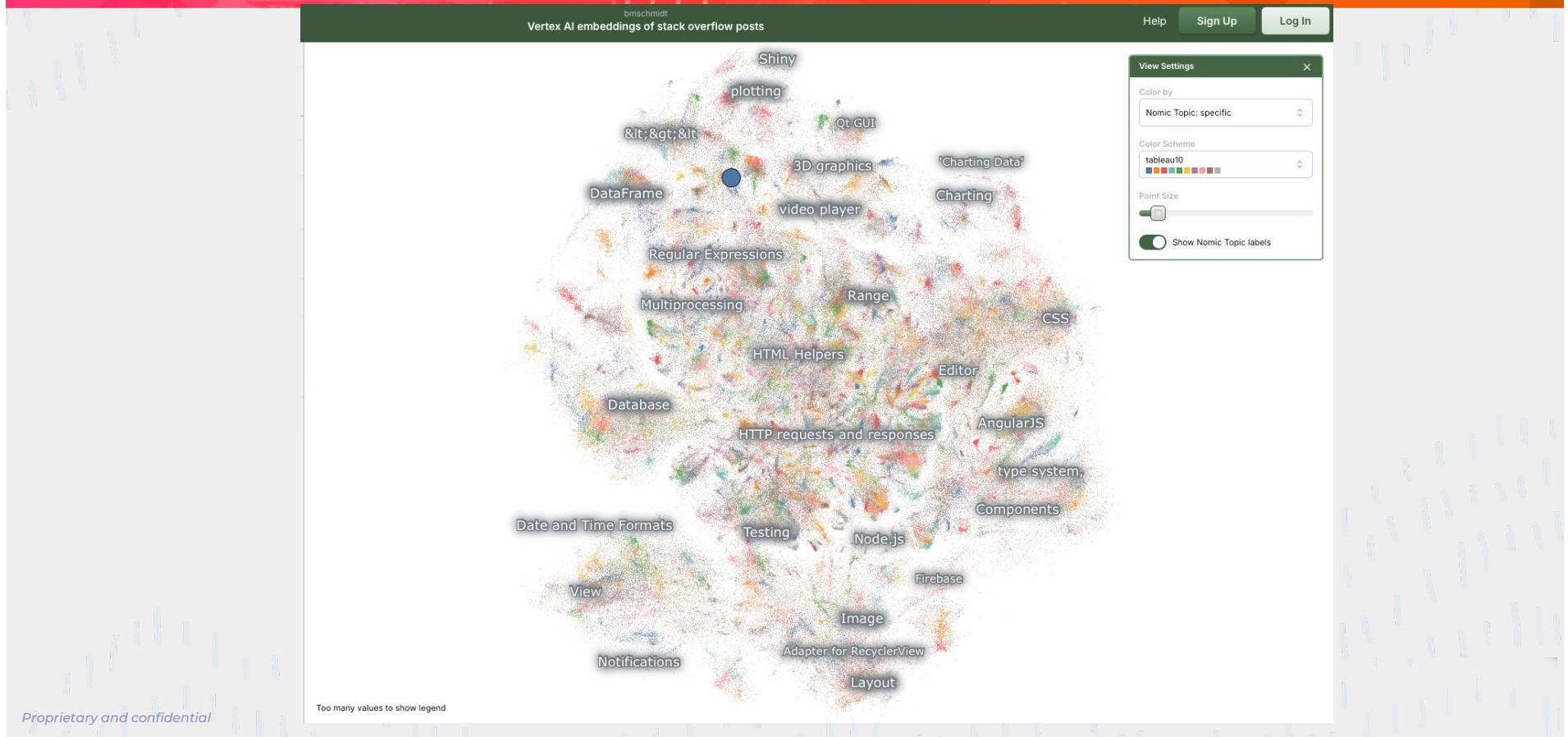
Jan is currently in Development: Expect breaking changes and bugs!

Jan is an open-source ChatGPT alternative that runs 100% offline on your computer.

Jan runs on any hardware. From PCs to multi-GPU clusters, Jan supports universal architectures:

- NVIDIA GPUs (fast)
- Apple M-series (fast)
- Apple Intel
- Linux Debian
- Windows x64

Embeddings of Stack Overflow Posts



Word Embedding

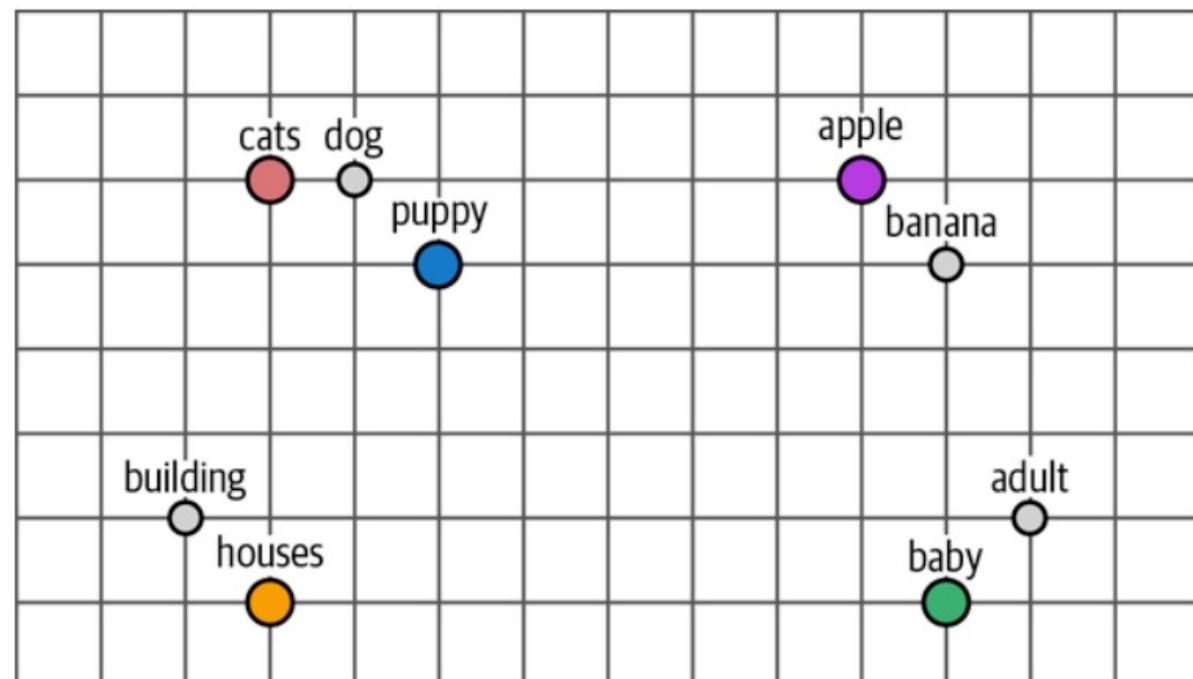
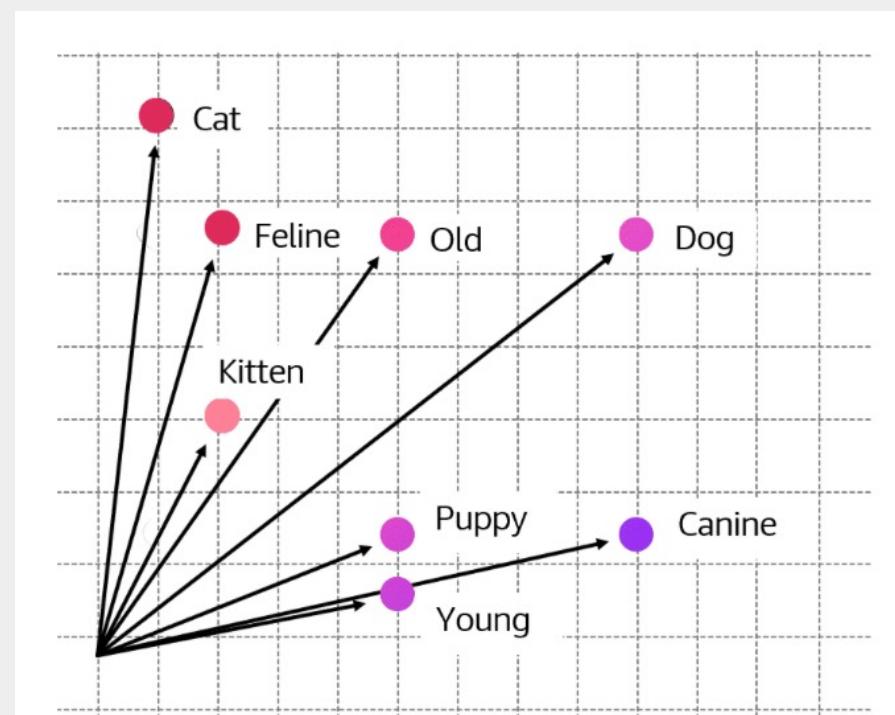
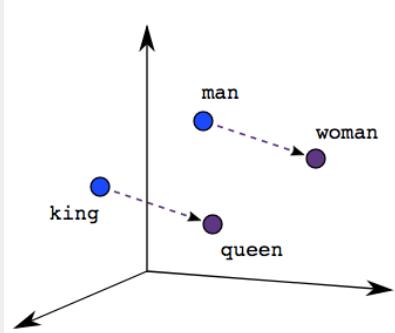


Figure 1-9. Embeddings of words that are similar will be close to each other in dimensional space.

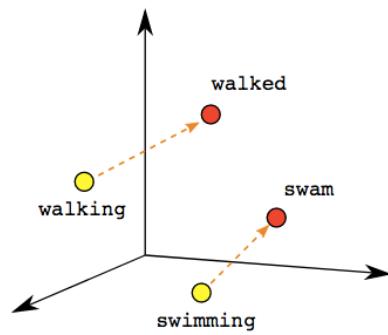
Word Embedding



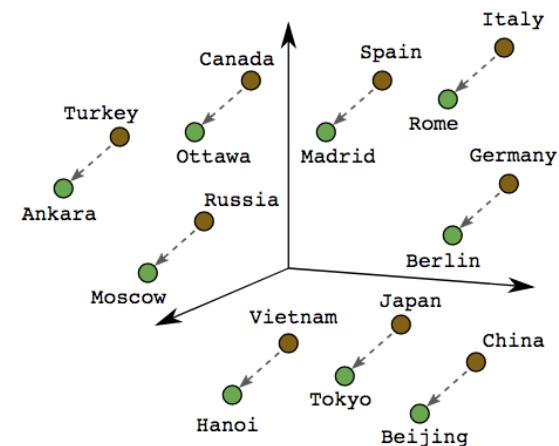
Embedding



Male-Female



Verb Tense



Country-Capital

Word Embeddings

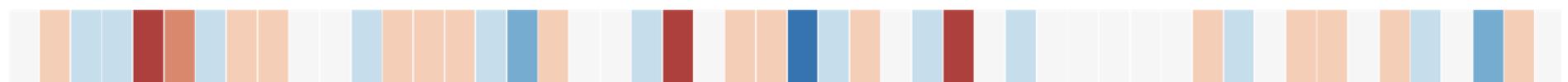
“king”



“Man”



“Woman”



Proprietary and confidential