

Artificial Intelligence – Yesterday, Today and Tomorrow

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WHAT IS AI?

Whenever we hear the term “Artificial Intelligence (AI)”, the following questions may start buzzing in our head?

- Robots?
- Artificial Human-being?
- Artificial Animal?
- ...
- A threat to human being?
- ...
- ...
- etc.?

But the actual question is:

What is Artificial Intelligence (AI)?

AGENDA

1
WHAT IS AI?

2
APPLICATIONS
OF AI

3
TASKS OF AI

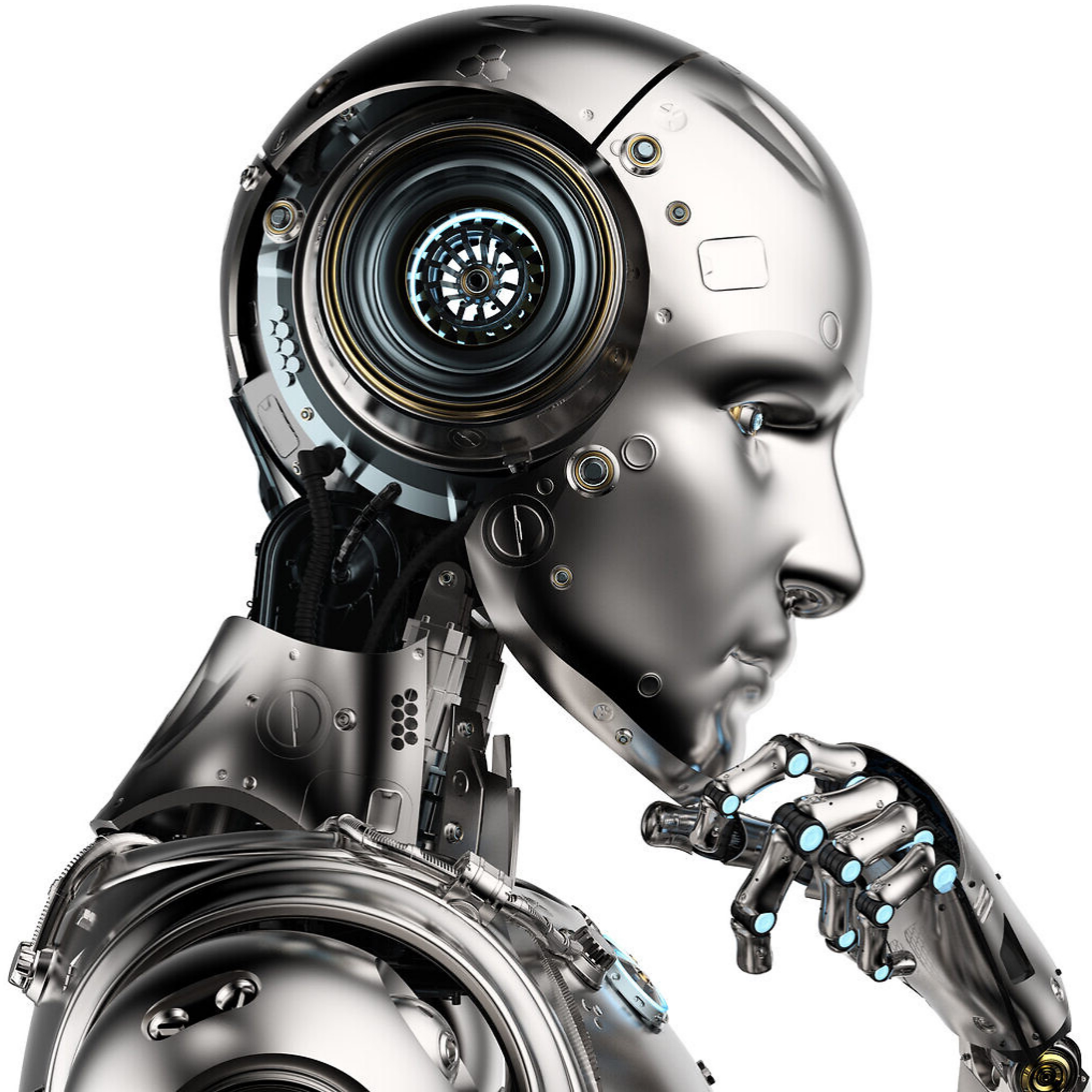
4
FASHION

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ETHICS IN AI

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WHAT IS AI?



WHAT IS AI?

The term '**artificial intelligence**' was first used at a **1956** workshop held at Dartmouth College, a US Ivy League university, to describe the "**science and engineering of making intelligent machines, especially intelligent computer programs**".

— McCarthy et al., 2006, p. 2

A branch of modern science and technology aiming at the **exploration of the secrets of human intelligence** on one hand and **the transplantation of human intelligence to machines** as much as possible on the other hand, so that **machines would be able to perform functions as intelligently as they can**.

— Zhong, 2006, p. 90

Machines capable of **imitating certain functionalities of human intelligence**, including such features as **perception, learning, reasoning, problem solving, language interaction, and even producing creative work**.

— COMEST, 2019



Sony Aibo Robot

WHAT IS AI?

Human being has two capabilities that makes him uniquely intelligent:

- Learning
- Problem Solving

Any system with these two abilities can mimic the cognitive functions associated to human mind.

WHY DO WE
EVER NEED
AI?

WHY DO WE EVER NEED AI?

“People read around 10 MB worth of material a day, hear 400 MB a day, and see 1 MB of information every second.”

— The Economist, Nov. 2006

In 2015, consumption will raise to 74 GB a day.

— UCSD Study 2014



**APPLICATIONS
OF AI
IN OUR EVERYDAY LIFE?**

APPLICATIONS OF AI



- Personalization
 - Recommendation
 - Online Advertising
 - Gmail auto-complete
- Map Routing
- Autonomous Driving
- Medical Image Processing
- Banking Mortgage Approval
- Voice Assistance
 - Amazon Alexa
 - Apple Siri
 - Samsung Bixby
- Text-2-Speech & Speech-2-Text
- Weather Forecast
- Auto Smile Photo Shooting
- Online Security Systems
- and many more...

RECOMMENDATION

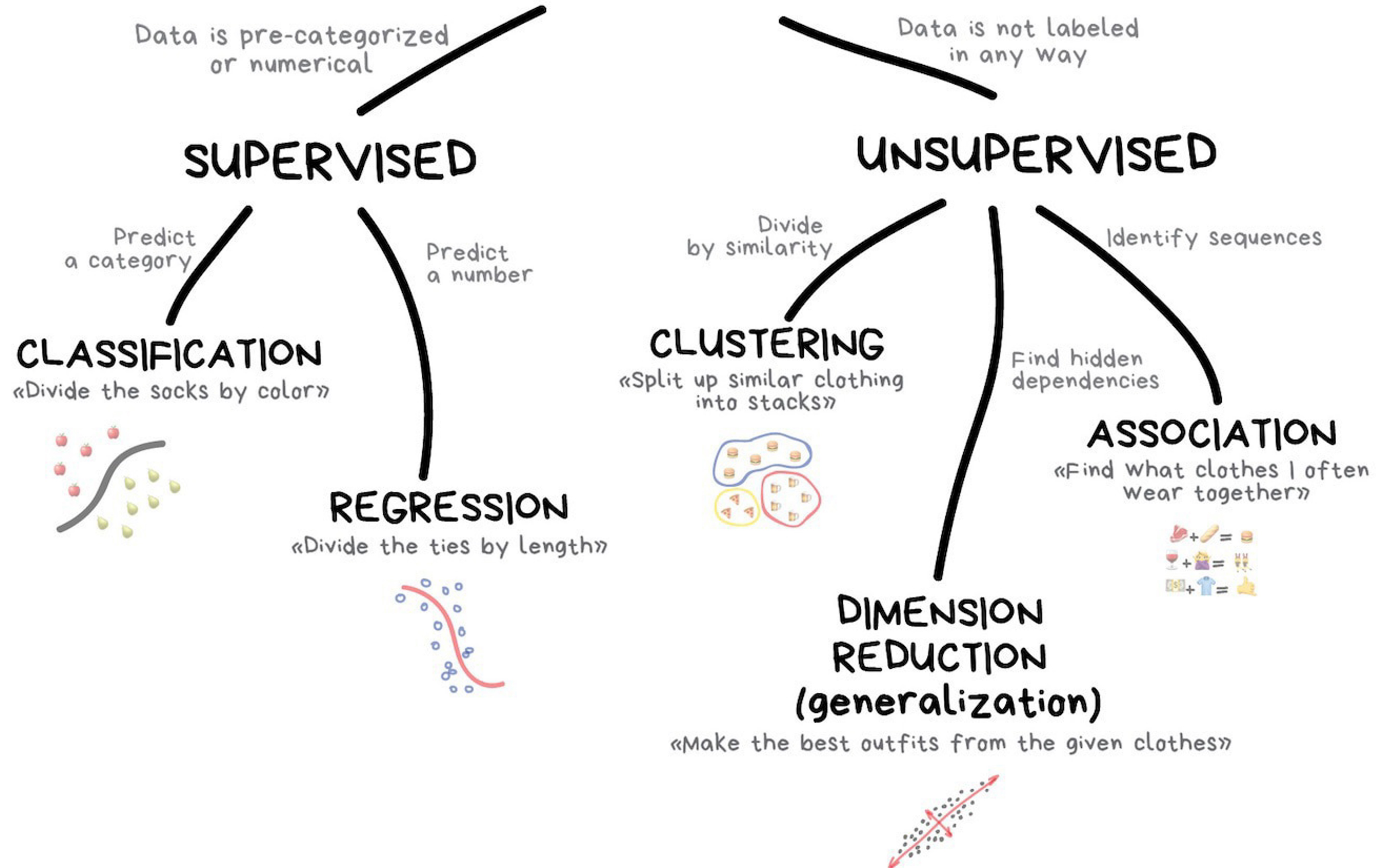
Recommender systems using AI has increased the revenue of companies dramatically.

- Netflix: 2/3 of the movies watched are recommended
- Google News: recommendations generate 38% more click-through
- Amazon: 35% sales from recommendations
- Choicestream: 28% of the people would buy more music if they found out what they like.

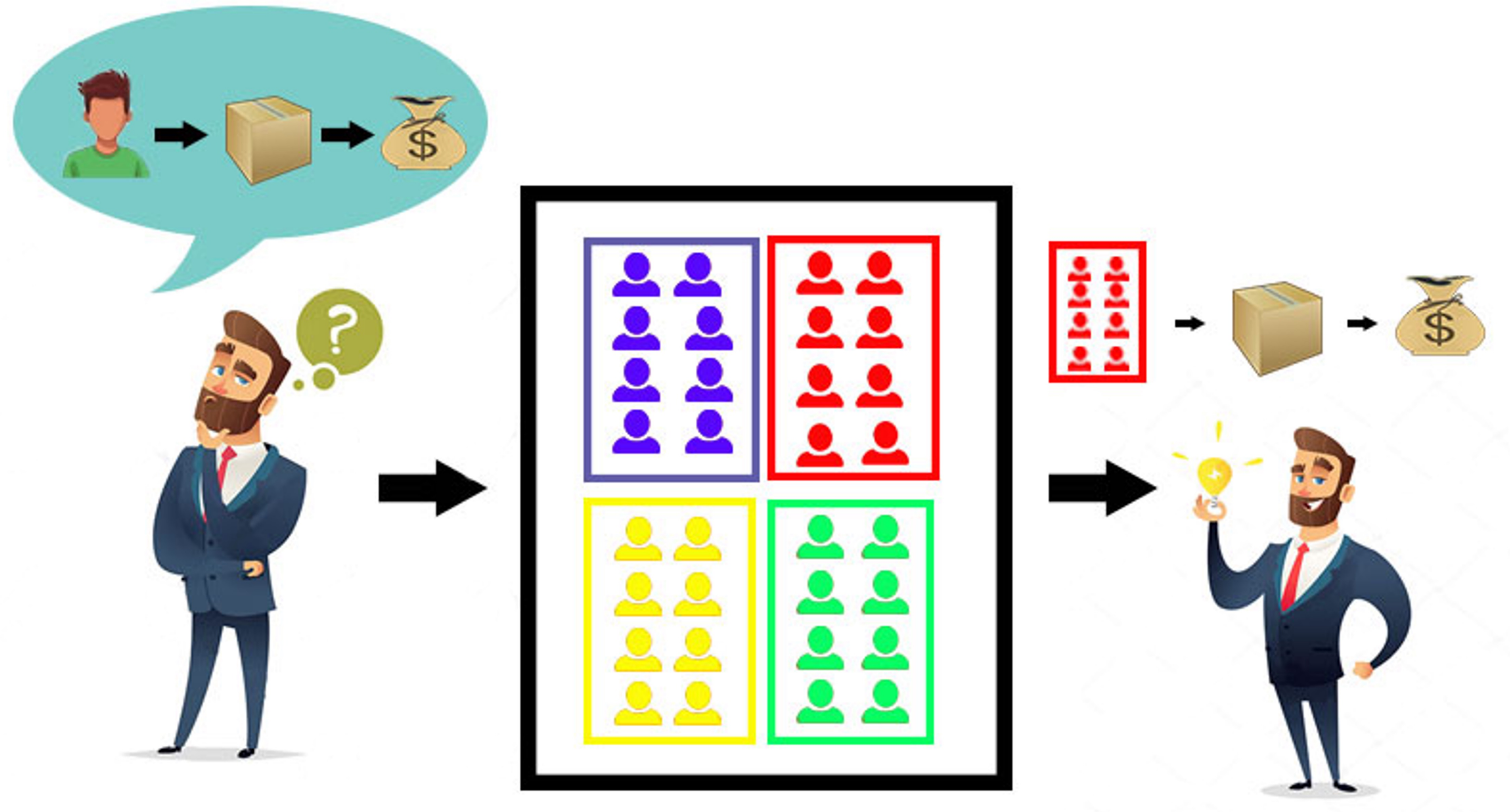


TASKS OF AI

CLASSICAL MACHINE LEARNING



CLUSTERING

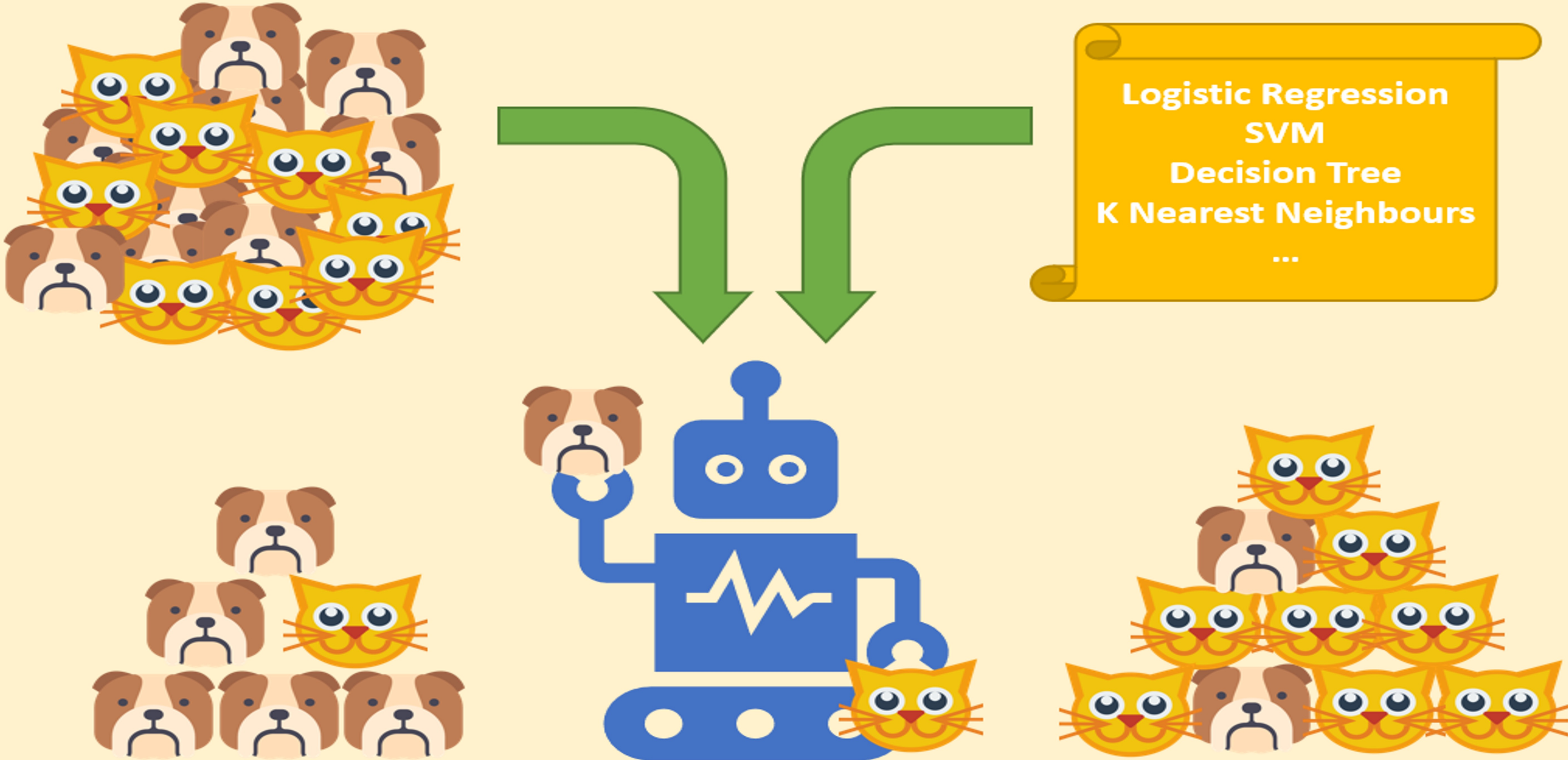


Trying to determine the appropriate audience for different types of services

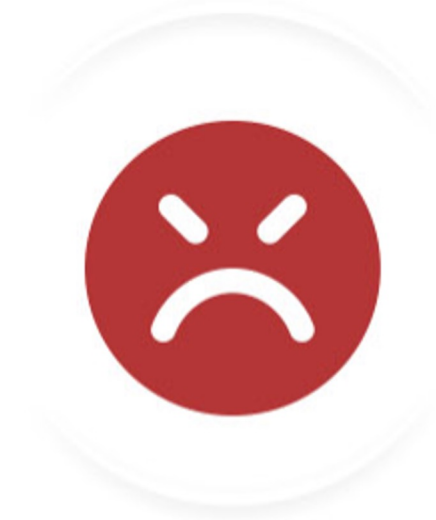
Using clustering algorithm on the eligible customer base

Providing the service to the targeted audience

CLASSIFICATION

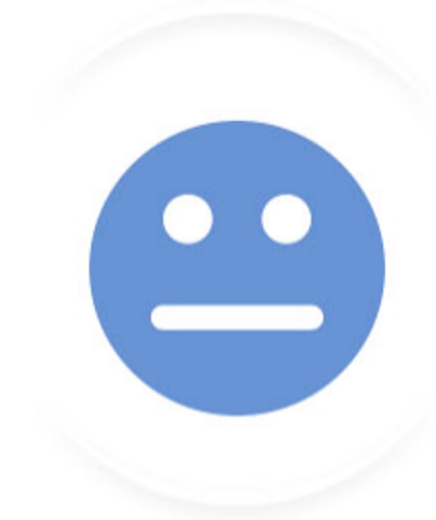


CLASSIFICATION - SENTIMENT ANALYSIS



Negative

I'm dissatisfied with your customer service.
No one was able to help me with the
problems I had with using your product.



Neutral

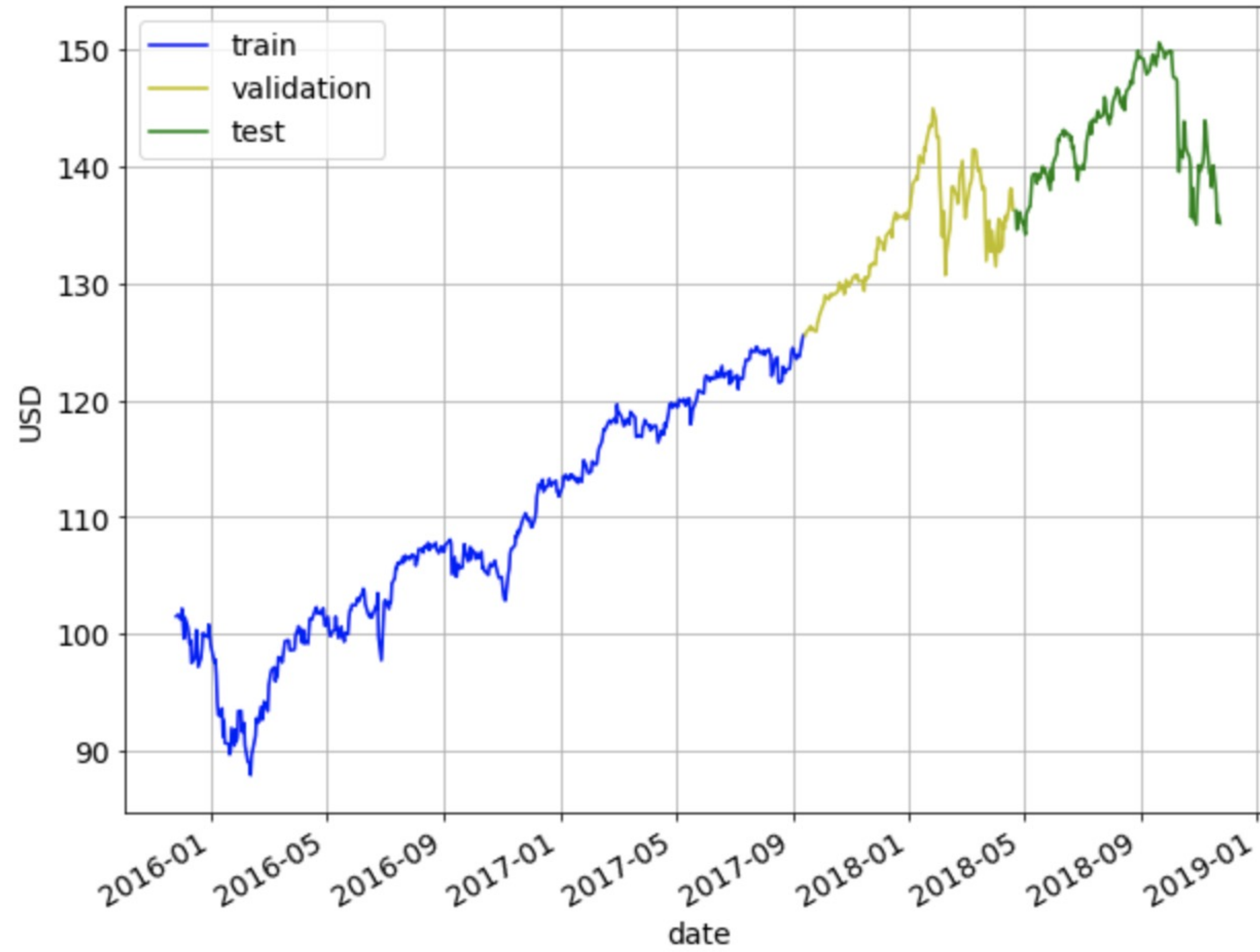
The product has multiple features
that are suitable for users with different
levels of experience.



Positive

I really enjoy how easy this product
is to use and how it successfully helps
my team complete their day-to-day tasks.

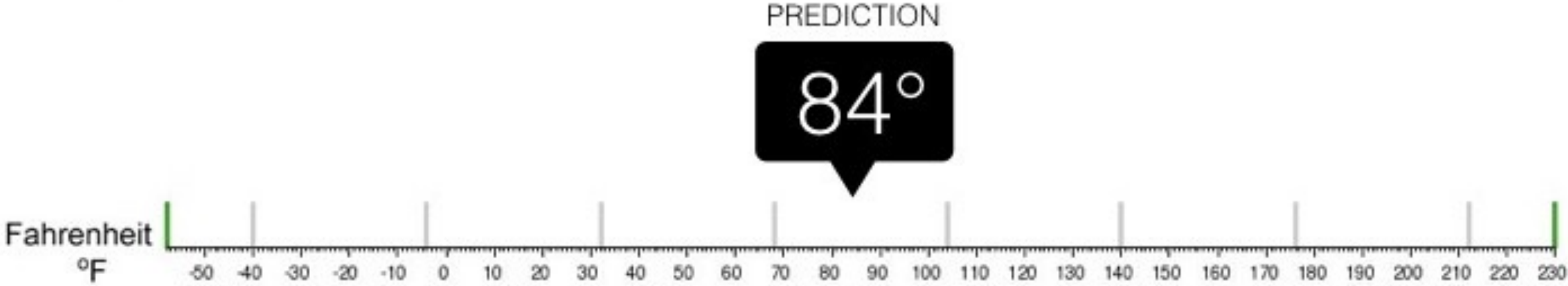
REGRESSION





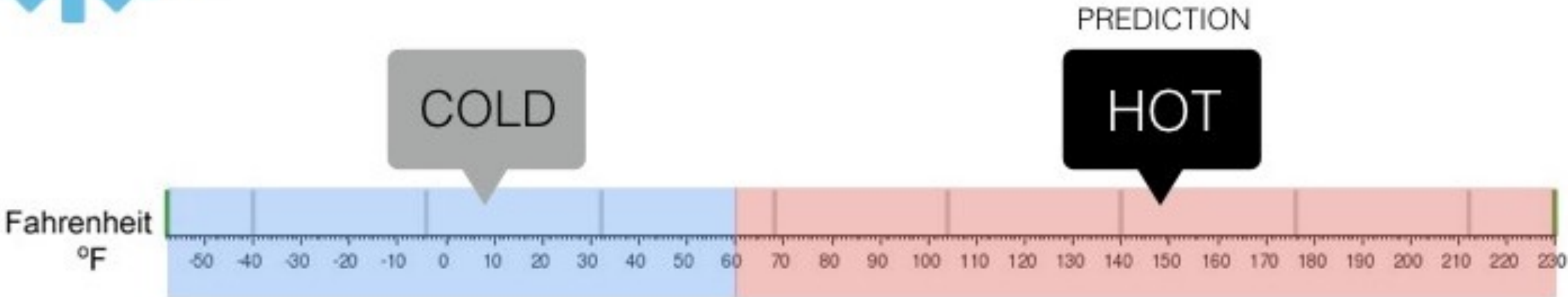
Regression

What is the temperature going to be tomorrow?

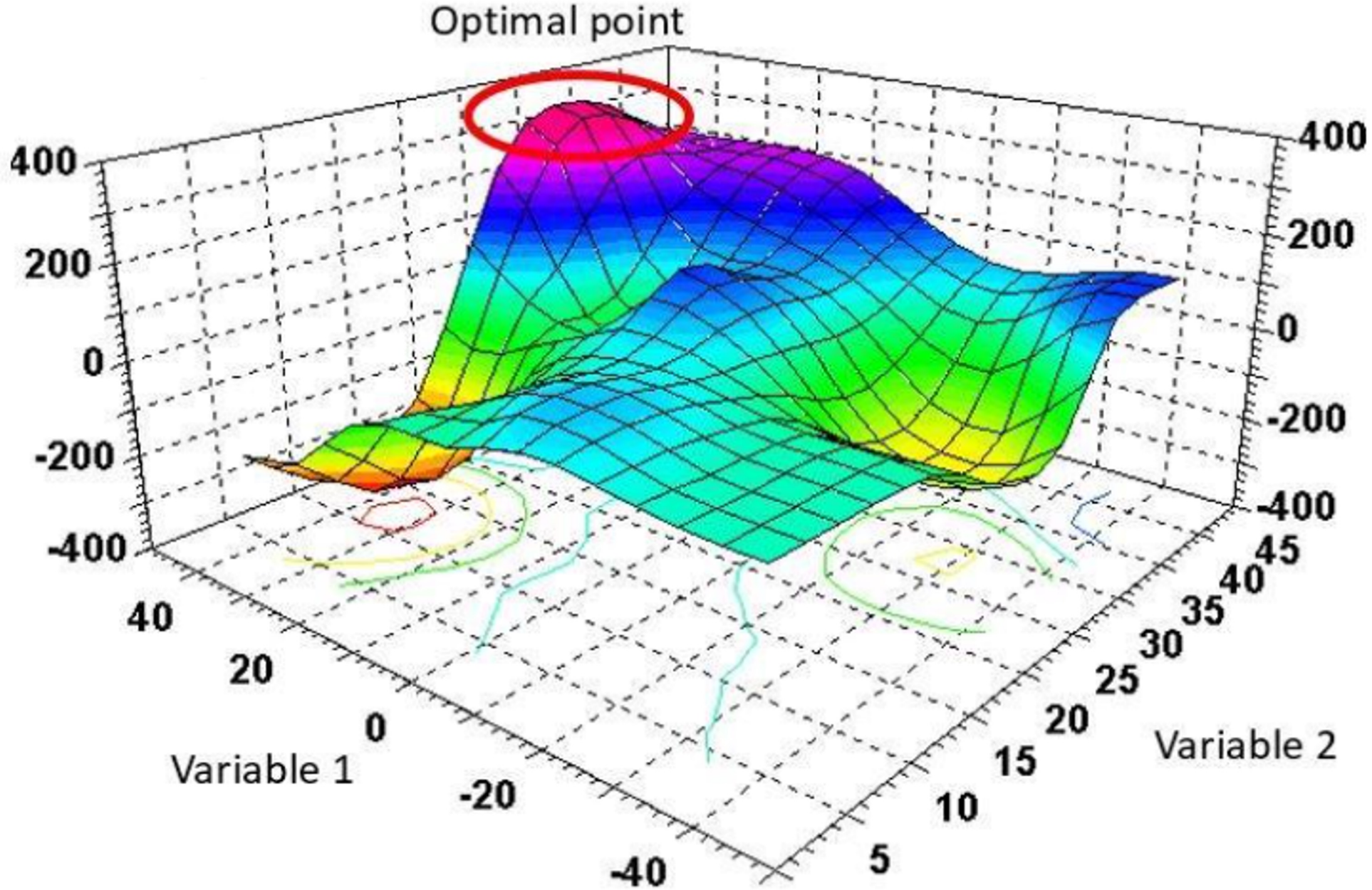
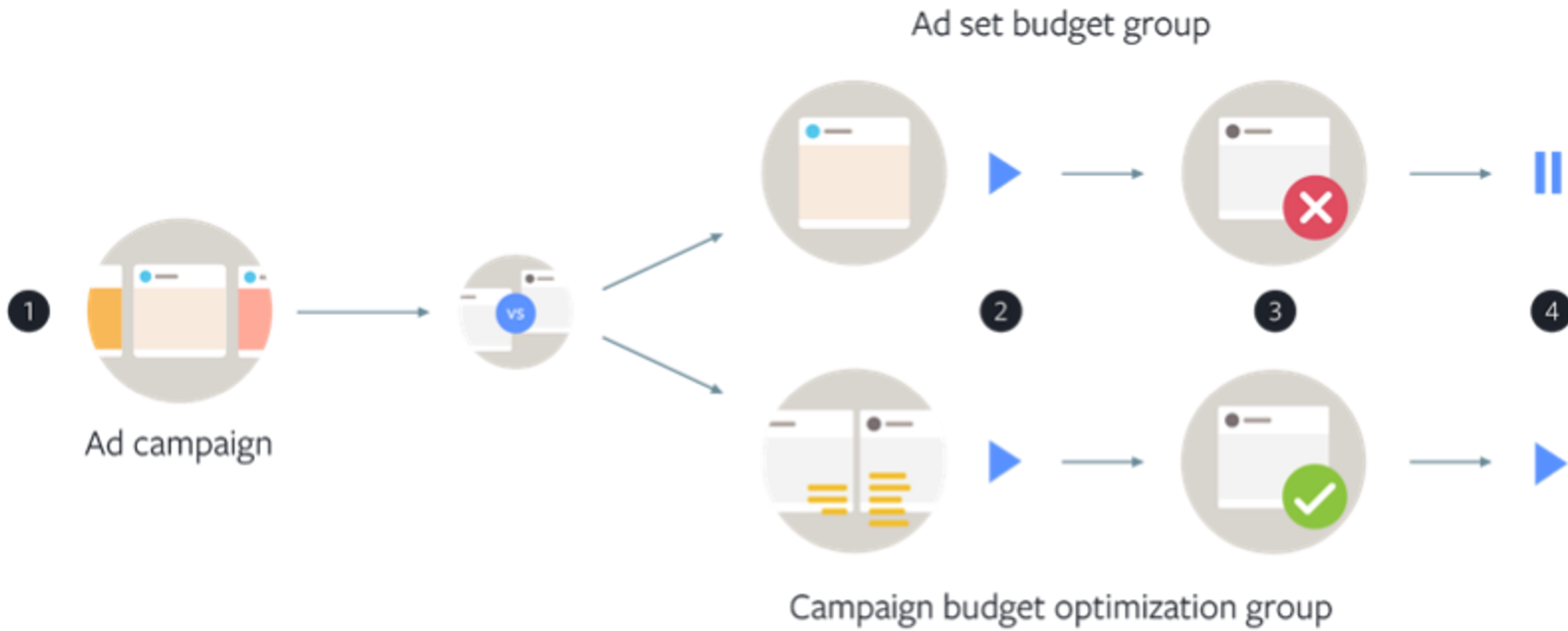


Classification

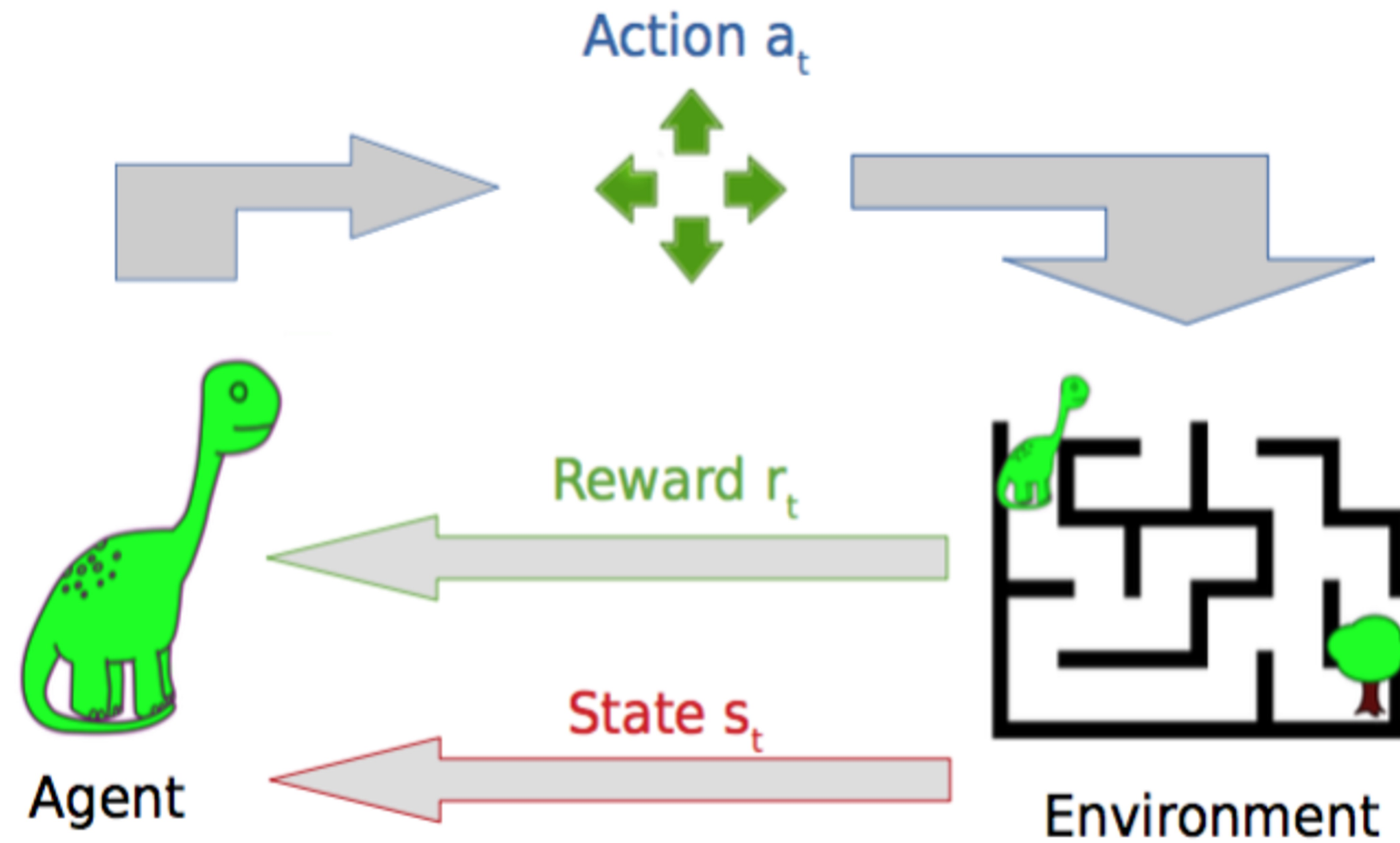
Will it be Cold or Hot tomorrow?



OPTIMIZATION

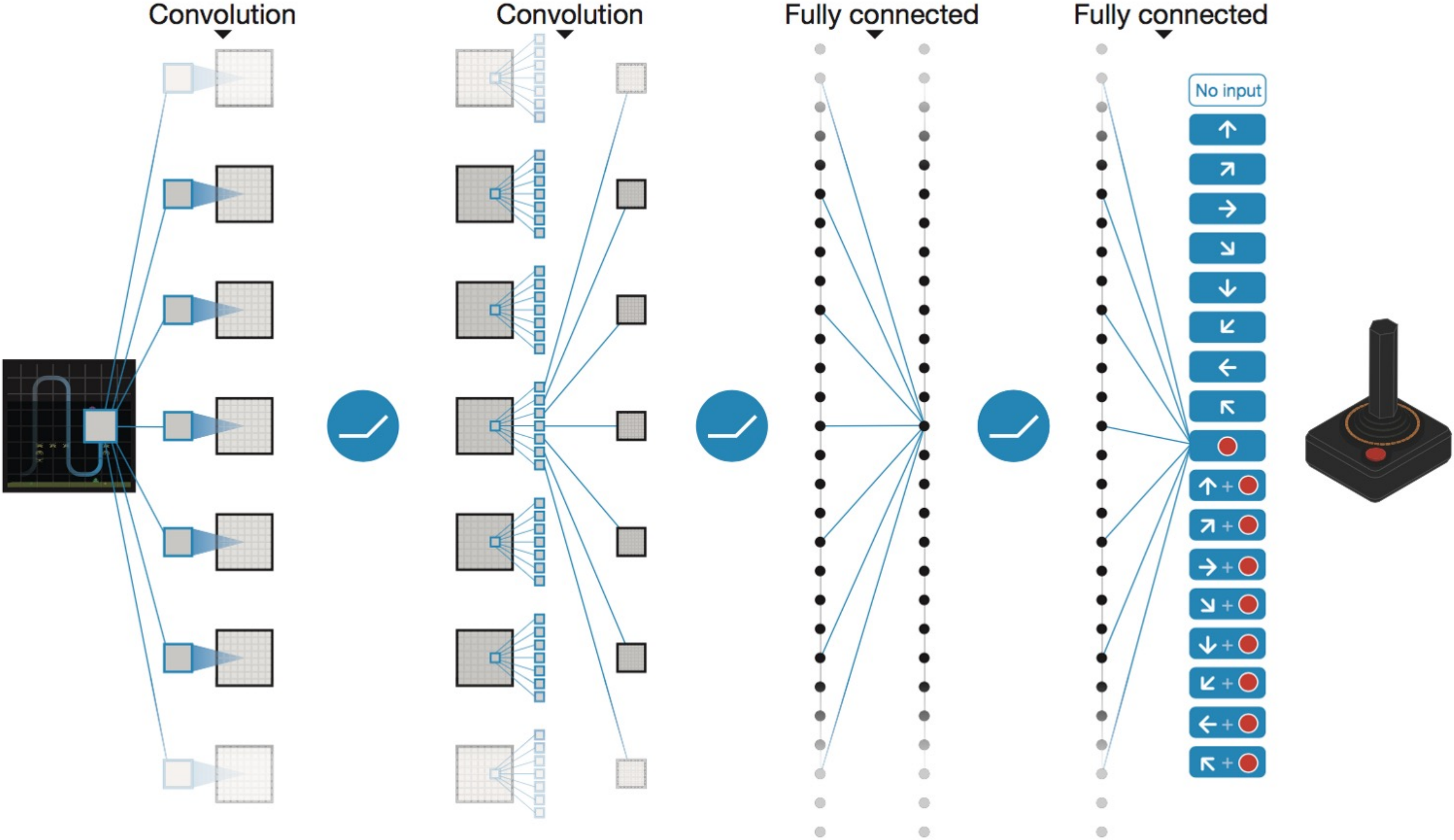


REINFORCEMENT LEARNING

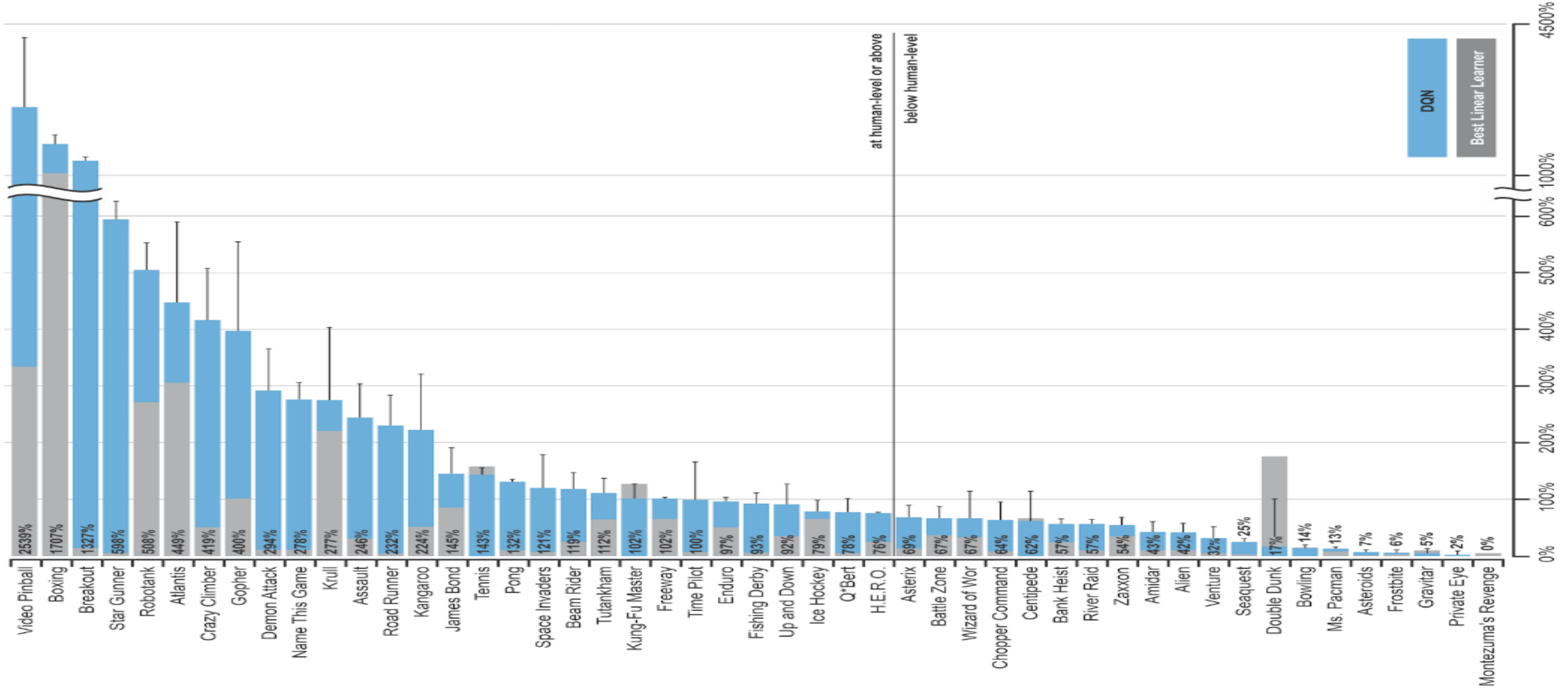


The agent is currently in a position (State) within an environment. It takes an action a_t within the environment, and it results with a reward r_t and moves the agent to a new position (State) s_t . The agent's goal is to maximize the reward over time, by exploring different actions in different states.

REINFORCEMENT LEARNING



REINFORCEMENT LEARNING



SPOT THE AI

AUTONOMOUS SELF-DRIVING CAR



ART OF FASHION

ART & FASHION



- **Jason Allen** entered a fine art competition with an **AI-generated artwork** and **won the first prize**.
- Allen won in the digital art category with his artwork called '**Théâtre D'opéra Spatial**' using an **AI software called Midjourney**.

AI GENERATED FASHION



















AI can generate fashion, something which has not been existed before.

AI **CAN**:

- Style
- Design
- Manufacture
- Be creative to some degree
- Optimize the process

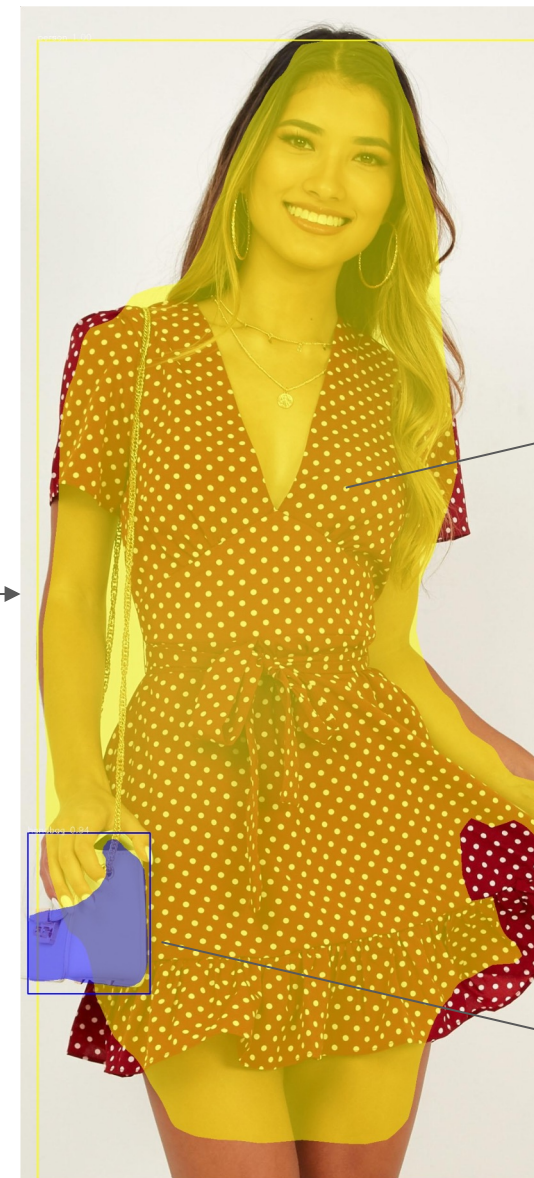
COMPUTER VISION - IMAGE SEGMENTATION

		<ul style="list-style-type: none">■ null■ bag■ blouse■ cape■ hair■ loafers■ skin■ skirt■ stockings			<ul style="list-style-type: none">■ null■ belt■ hair■ jacket■ jeans■ shirt■ shoes■ skin■ sunglasses■ tie
		<ul style="list-style-type: none">■ null■ bag■ boots■ coat■ hair■ skin■ skirt■ stockings■ sweater			<ul style="list-style-type: none">■ null■ bag■ coat■ hair■ jeans■ shoes■ skin■ sunglasses■ t-shirt
		<ul style="list-style-type: none">■ null■ bag■ blouse■ dress■ hair■ shoes■ skin			<ul style="list-style-type: none">■ null■ accessories■ belt■ blouse■ hair■ hat■ purse■ shoes■ skin■ skirt
		<ul style="list-style-type: none">■ null■ coat■ hair■ pants■ sandals■ skin■ t-shirt■ wallet			<ul style="list-style-type: none">■ null■ dress■ hair■ skin■ wedges

COMPUTER VISION - IMAGE SEGMENTATION



Visual Search



Segmented Image



MOLLY GODDARD
Red Cotton Mini Dress
\$1190



DOLCE & GABBANA
White Micro Shoulder Bag
\$1075

AI GENERATED FASHION



AI GENERATED FASHION



AI GENERATED FASHION

AI can generate fashion, something which has not been existed before.

AI CAN:

- Style
- Design
- Manufacture
- Be creative to some degree
- Optimize the process

AI CANNOT:

- Understand
Why do we need clothing?
- Feel
How does it feel to wear a dress?
- Experience
How is it like to wear a dress?



LEARN AI

HOW TO LEARN AI

AI REQUIREMENTS

- Math, Math, & Math
- Statistics
- Probablistics

PROGRAMMING LANGUAGES

- Python
- Go! Lang
- R
- Julia

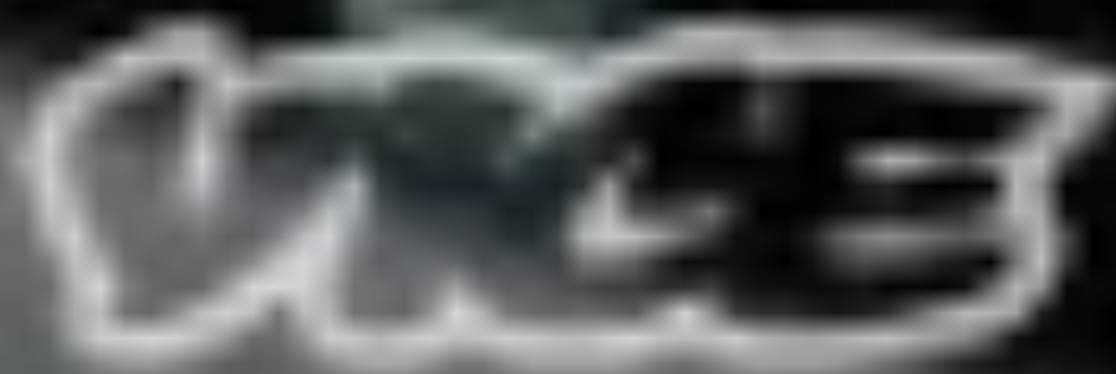
SUPPLIMENTARY TOOLS

- RapidMiner
- Weka
- IBM SPSS
- Matlab



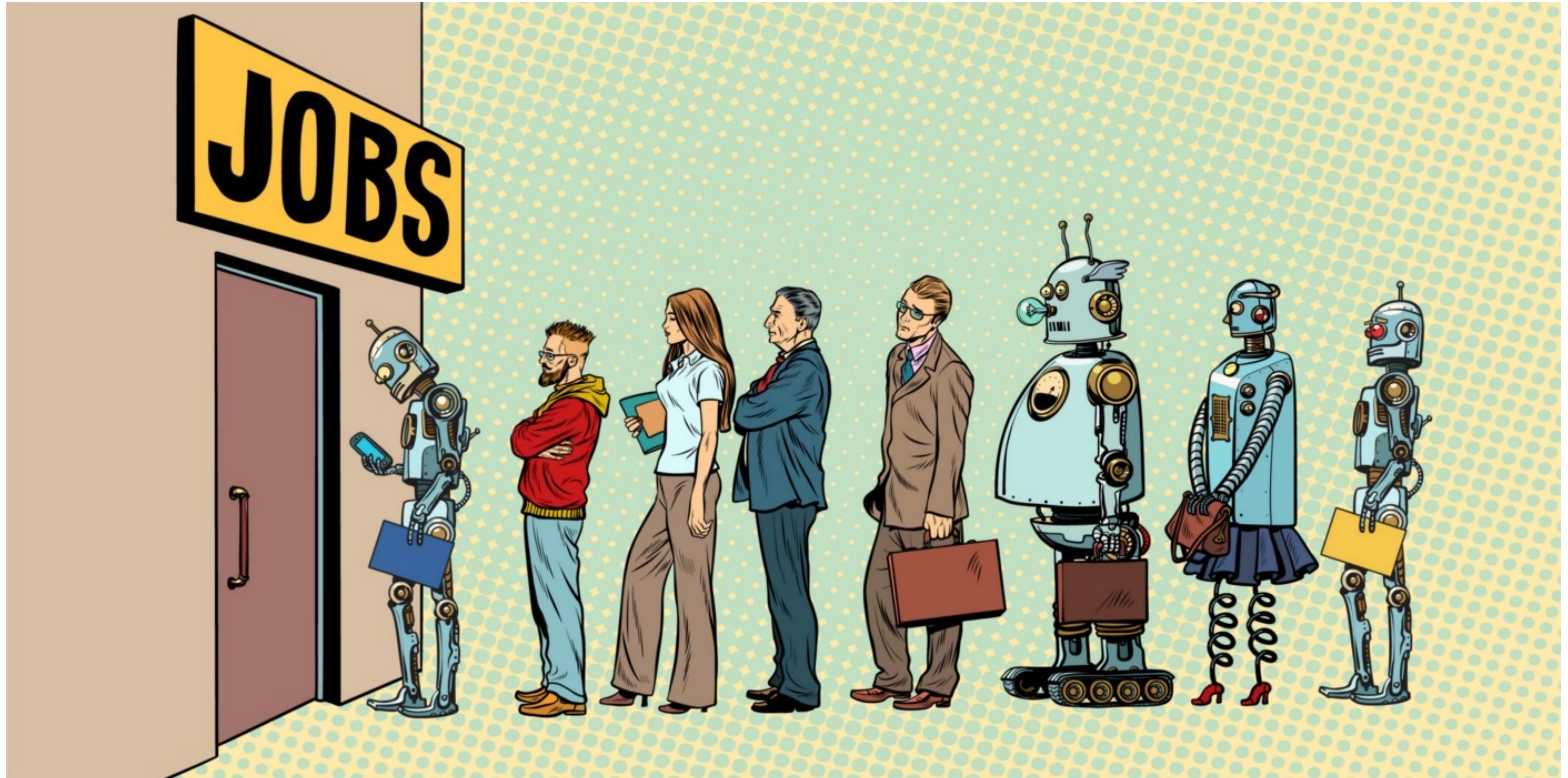
ETHICS IN AI

Super Users



World News

ETHICS



AI CAN BE UNETHICAL

AI can become unethical and dangerous if it is trained and used irresponsibly.



Deepnude

- Deepnude
- Deepfake
- Unconscious bias
- In 2018, Amazon realized that their recruitment tool is discriminating against candidate based on gender.
- In 2021, an investigation by The Markup found lenders were more likely to deny home loans to people of color than to white people with similar financial characteristics.

Specifically, **80% of Black** applicants are more likely to be rejected, along with **40% of Latino** applicants, and **70% of Native American** applicants are likely to be denied.

The Associated Press found that **Chicago** lenders were **150% more likely to reject Black applicants** than similar white applicants. In **Waco, TX**, the situation is even worse because lenders were more than **200% more likely to reject Latino applicants** than white applicants.

PERSONAL FINANCE

A.I. Bias Caused 80% Of Black Mortgage Applicants To Be Denied

Kori Hale Contributor

I'm the CEO of CultureBanx, redefining business news for minorities.

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Fighting discrimination in mortgage lending

A new technique for removing bias in datasets can enable machine-learning models to make loan approval predictions that are both fair and accurate.

Adam Zewe | MIT News Office
March 30, 2022

<https://www.forbes.com/sites/korihale/2021/09/02/ai-bias-caused-80-of-black-mortgage-applicants-to-be-denied/?sh=7fabf88436fe>

FUTURE OF AI

FUTURE OF AI



EMOTIONAL INTELLIGENCE

Intelligent systems are becoming more emotional aware to interact with human being effectively.

They tend to understand you and your emotions and mimic a proper emotion in response.

FUTURE OF AI



ARTIFICIAL GENERAL INTELLIGENCE (AGI)

Having an intelligent system which can be suitable for anything and any purpose.

- Assistant Robots

WHEAT & CHESSBOARD PROBLEM



The story is first known to have been recorded in **1256** by **Ibn Khallikan**. Another version has the inventor of chess (in some tellings Sessa, an ancient Indian Minister) request his ruler give him wheat according to the wheat and chessboard problem.

The ruler laughs it off as a meager prize for a brilliant invention, only to have court treasurer's report the unexpectedly huge number of wheat grains would outstrip the ruler's resources.

On the entire chessboard there would be:
 $2^{64}-1 = \mathbf{18,446,744,073,709,551,615^*}$ grains of wheat,
weighing about 1,199,000,000,000 metric tons.

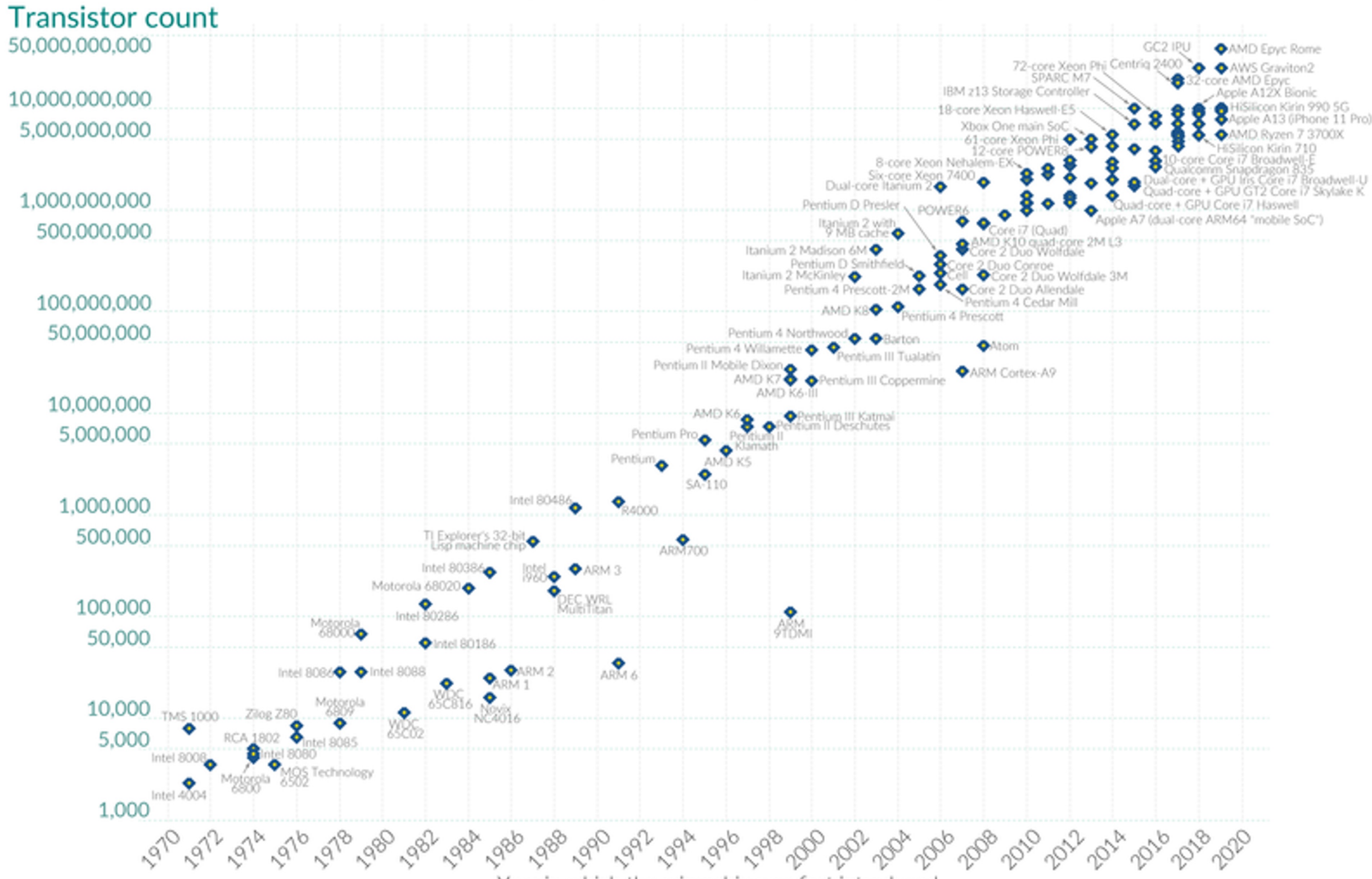
This is over 2,000 times the annual world production of wheat, which in the period 2020-21 was an estimated 772.64 million metric tons.

* Eighteen quintillion, four hundred and forty-six quadrillion, seven hundred and forty-four trillion, seventy-three billion, seven hundred and nine million, five hundred and fifty-one thousand and six hundred and fifteen

MOORE'S LAW

Moore's Law: The number of transistors on microchips doubles every two years Our World in Data

Moore's law describes the empirical regularity that the number of transistors on integrated circuits doubles approximately every two years. This advancement is important for other aspects of technological progress in computing – such as processing speed or the price of computers.

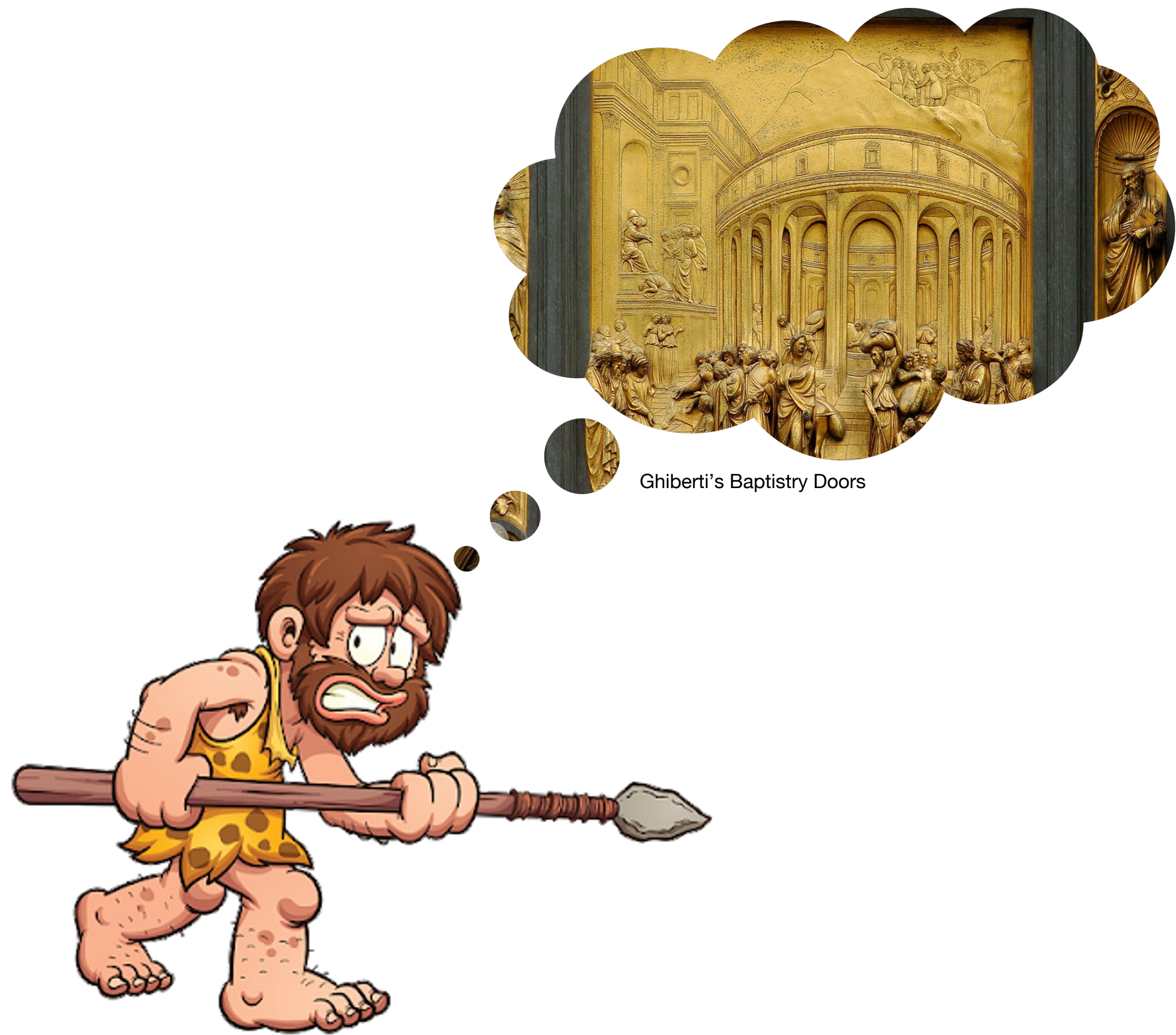


Data source: Wikipedia (wikipedia.org/wiki/Transistor_count)
 OurWorldinData.org – Research and data to make progress against the world's largest problems. Licensed under CC-BY by the authors Hannah Ritchie and Max Roser.

Moore's law, prediction made by American engineer **Gordon Moore** in **1965**, co-founder of **Intel Corp.** that the **number of transistors per silicon chip (IC) doubles every year.**

In **1975**, he revised the forecast to **doubling every two years.**

His prediction with the **average of 18 months** held since **1975** and has since become known as "Moore's law".



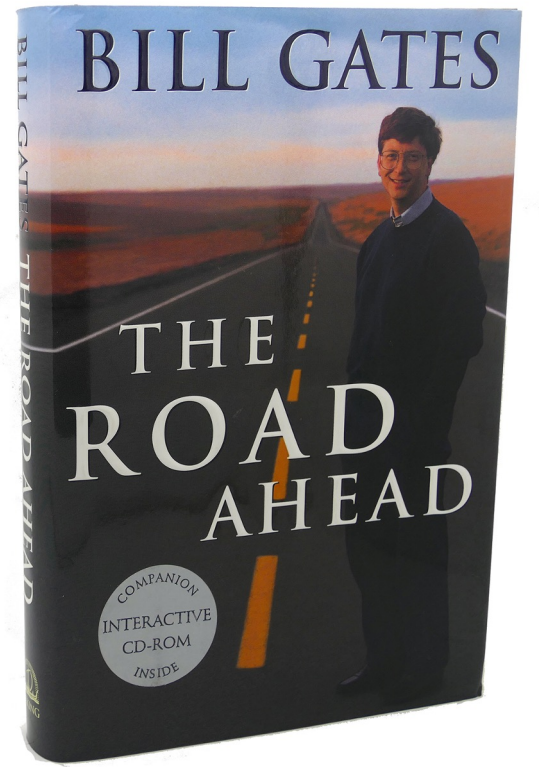
FUTURE

“But we can no more imagine what the information highway will carry in **twenty-five years** than a **Stone Age man using a crude knife could have envisioned Ghiberti's Baptistry doors in Florence.**”

Only when the highway arrives will all its possibilities be understood.

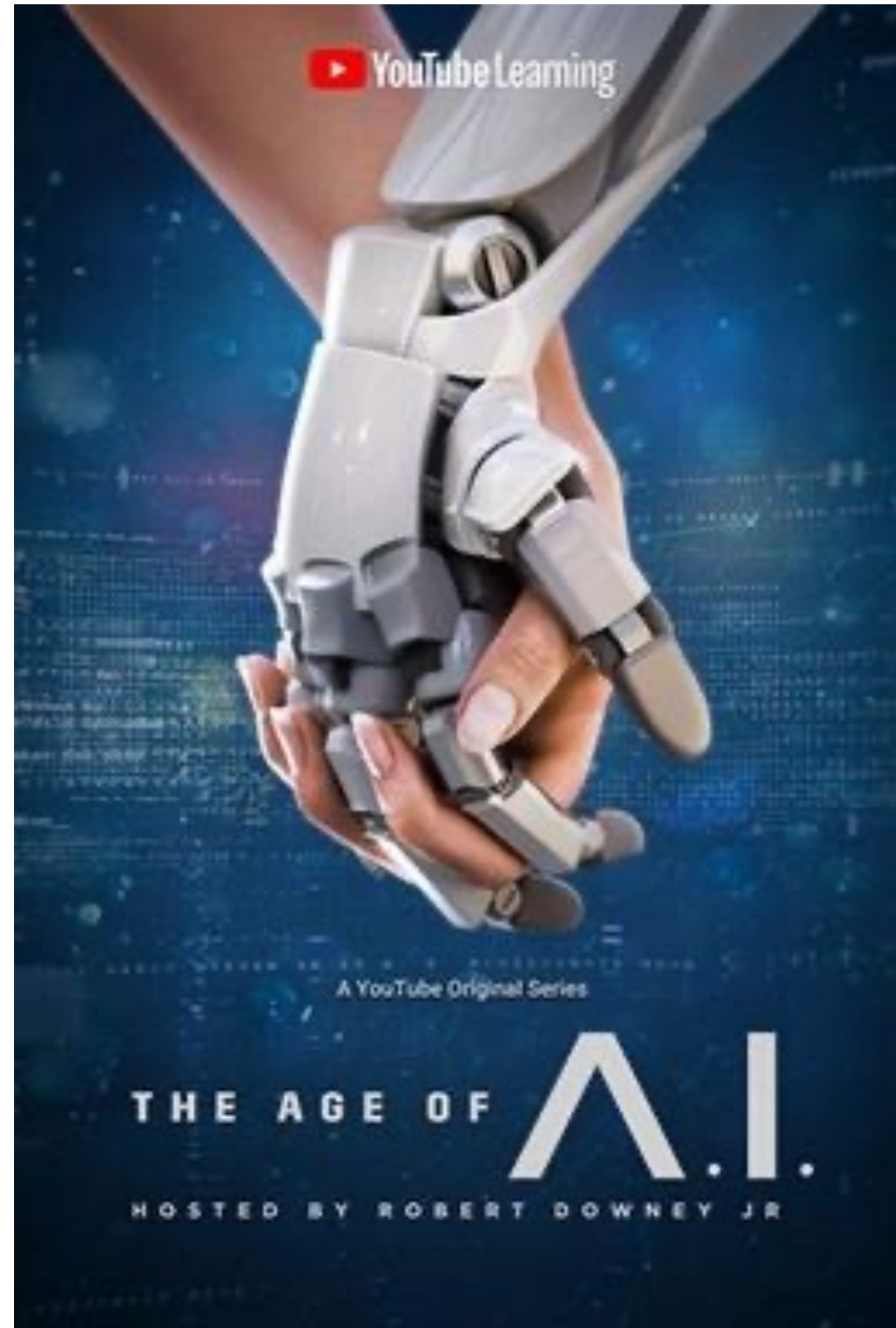
However, the last twenty years of experience with digital breakthroughs allow us to understand some of the key principles and possibilities for the future.”

— Bill Gates, “The Road Ahead”, 1995



INTERESTED ?

INTERESTED?



The Age of A.I. is a 8 part documentary series hosted by Robert Downey Jr. covering the ways Artificial Intelligence, Machine Learning and Neural Networks will change the world.

IMDb: 7.9

<https://www.imdb.com/title/tt8421554>

Q&A