

<https://ibm.webex.com/join/ivanp>

Understanding Big Data & AI

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12/02/2019

IBM

Agenda

1. Artificial Intelligence
2. Big Data & Machine Learning
3. Ethics of AI



Robo del siglo

<https://www.nacion.com/el-mundo/cambian-a-jefe-de-seguridad-de-aeropuerto-en-chile-tras-robo-millonario/5TJT3TDHEJAQXEC4KKZRQFAV2I/story/>

Entity Resolution

Solution
at Degrees of Difficulty

Exactly
Same

Bob Jones
123455

Fuzzy

Bob Jones
123455

Robert T Jonnes
000123455

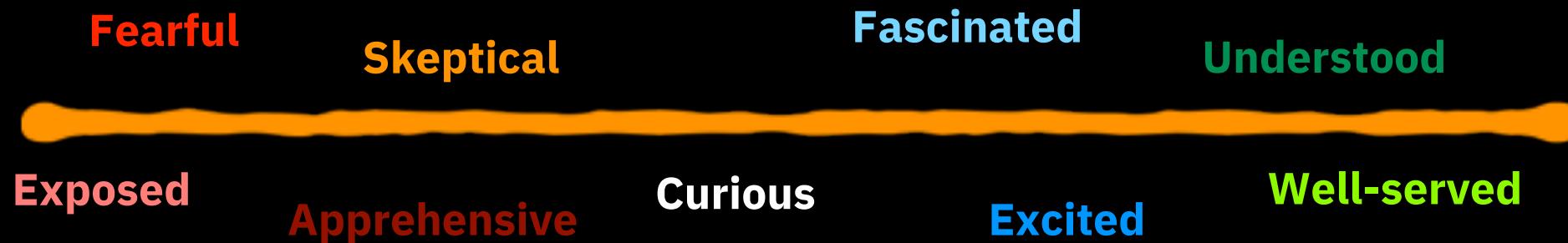
Incompatible
Features

Bob Jones
123455

What is AI?

AI Perception

What do people feel about AI?



What is AI?

Artificial Intelligence | noun

An area of computer science that emphasizes the creation of intelligent machines that work and react like humans.

What led to the prominence of AI?

Data explosion

Computing power

Deep learning algorithms

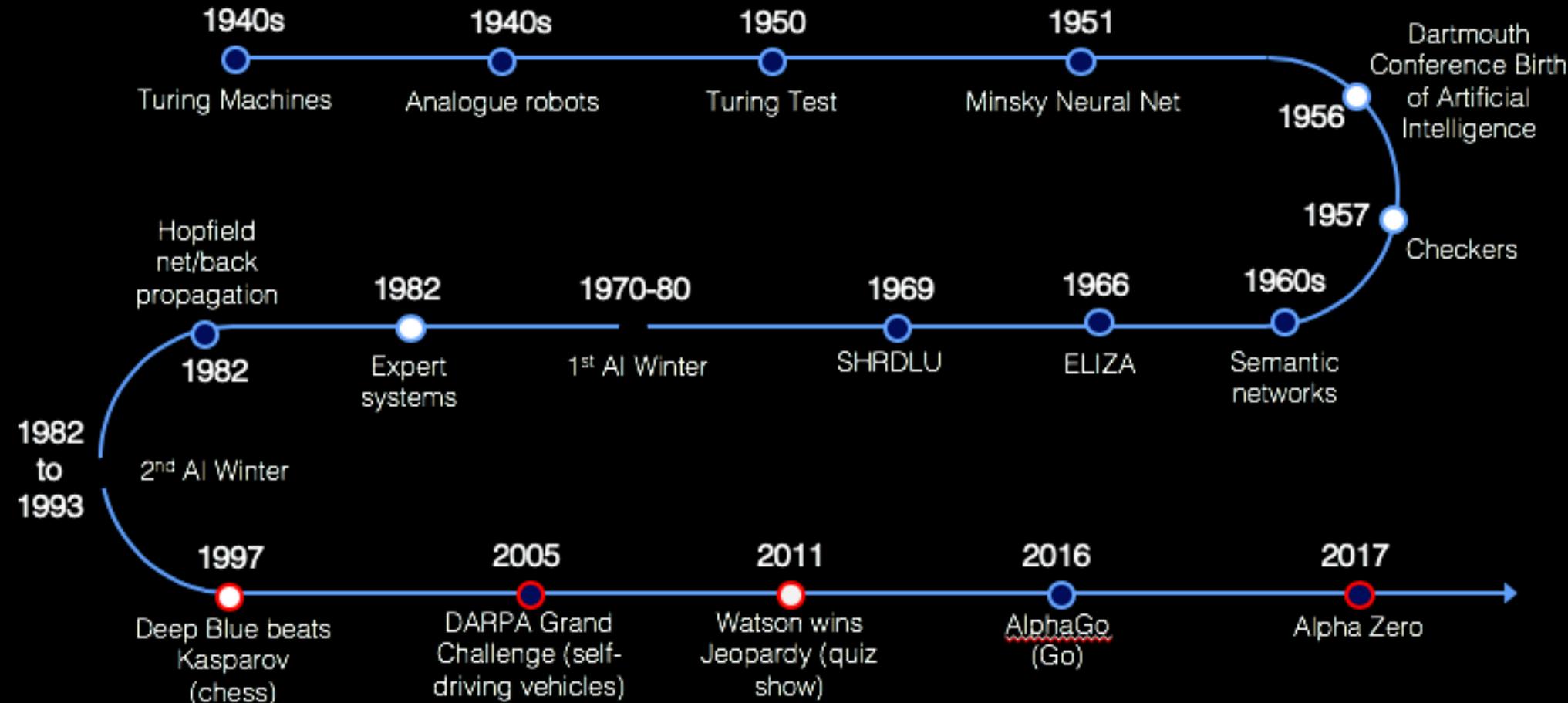
What is AI?

Artificial Intelligence | noun

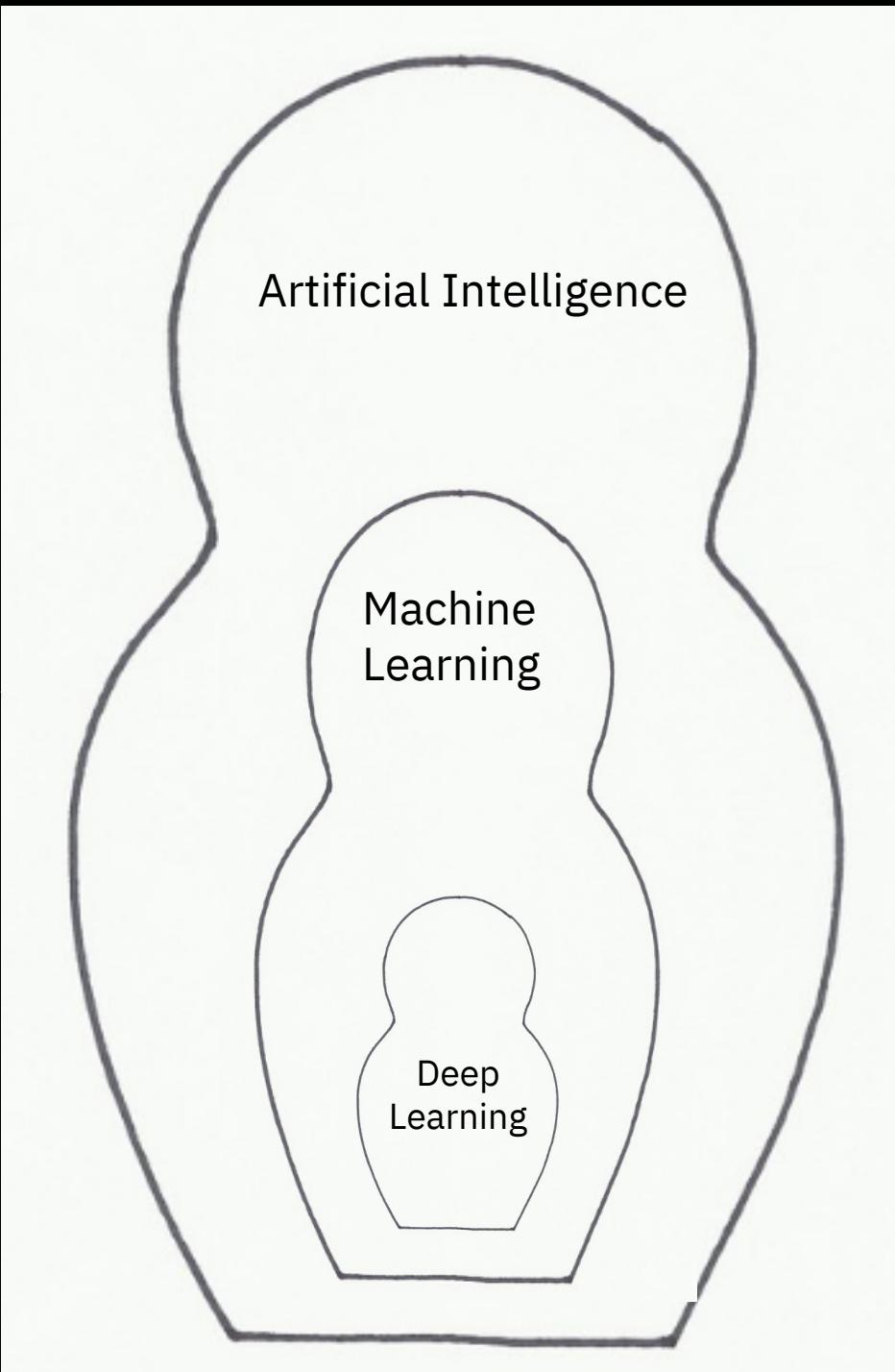
An area of computer science that emphasizes the creation of intelligent machines that work and react like humans.

Intelligence demonstrated
by machines

A brief history of AI



AI Definitions

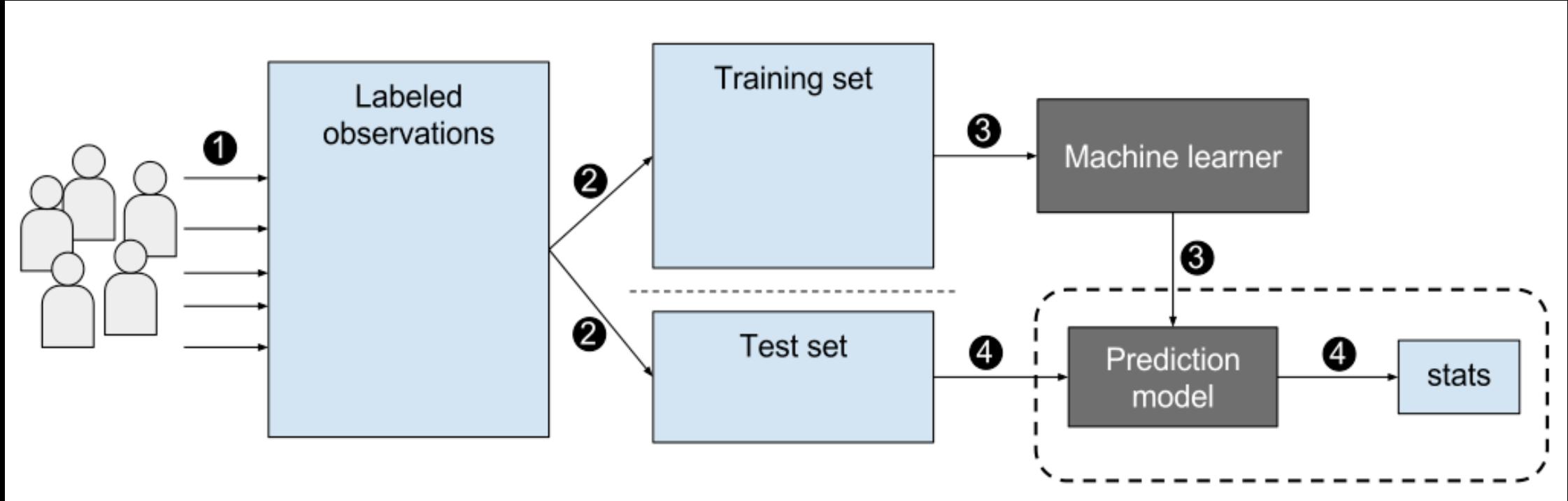


AI is intelligence demonstrated by computers

ML is a set of algorithms that allow computers to learn from data

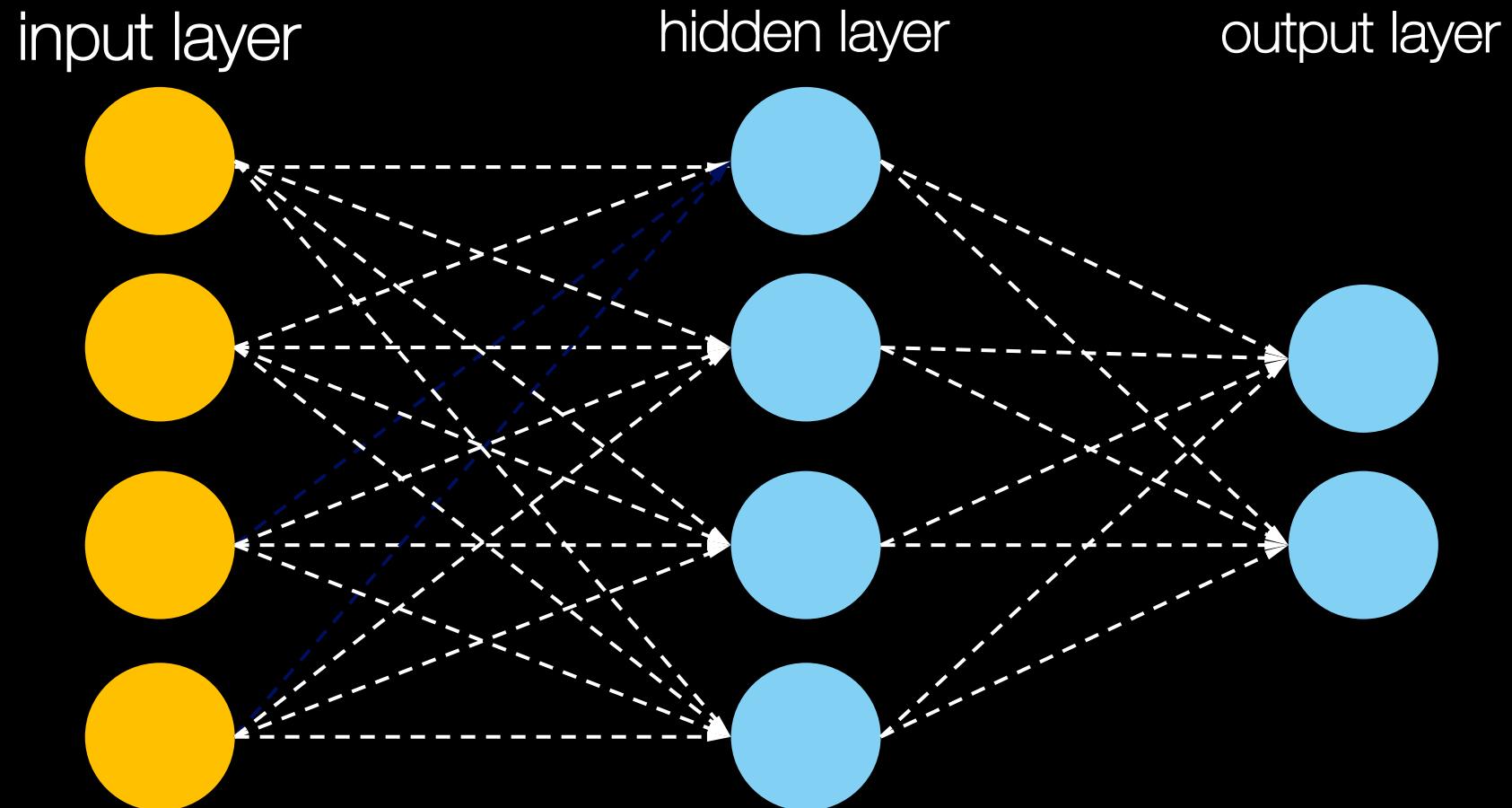
DL is a more recently developed set of learning techniques

Supervised Machine Learning



Supervised machine learning algorithms can apply what has been learned in the past to new data using labeled examples to predict future events

Remind me, what is a deep learning (neural network) again?



Traditional Programming



AI - Machine Learning



ML provides systems the ability to **automatically** learn & improve from **experience** (without being explicitly programmed)

Intelligence demonstrated
by CU Students

Exercise

Where is AI going?

AI is Everywhere

Everyone working with information technology is already relying on AI, and if not, will be soon.

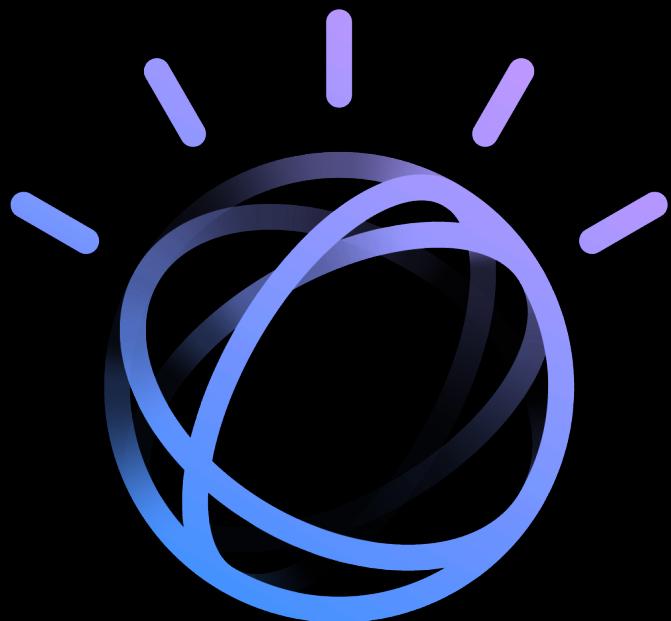
What Machine Learning Can Do

A simple way to think about supervised learning.

INPUT A	RESPONSE B	APPLICATION
Picture	Are there human faces? (0 or 1)	Photo tagging
Loan application	Will they repay the loan? (0 or 1)	Loan approvals
Ad plus user information	Will user click on ad? (0 or 1)	Targeted online ads
Audio clip	Transcript of audio clip	Speech recognition
English sentence	French sentence	Language translation
Sensors from hard disk, plane engine, etc.	Is it about to fail?	Preventive maintenance
Car camera and other sensors	Position of other cars	Self-driving cars

SOURCE ANDREW NG

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Data

Embed AI, machine learning and deep learning to drive insights from data, wherever it resides.

Knowledge

Get insights through accelerated data optimization capabilities.

Vision

Identify and tag content then analyze and extract detailed information found in an image.

Speech

Convert text and speech with the ability to customize models.

Language

Analyze text and extract meta-data from unstructured content.

Empathy

Understand tone, personality, and emotional state.

Personality Insights

Try the service

You need text written by the person whose personality you're interested in. It should contain words about every day experiences, thoughts, and responses.

You can play with the demo with as little as 100 words, but for a more accurate analysis, you need more words.

 [Reset](#) | [Terms of use](#)

Tweets and Replies

Body of Text

Your Twitter Personality

Choose:



@Oprah (EN)



@KingJames (EN)



@DonFranciscoTV (ES)



@pontifex_es (ES)



@trikaofficial (AR)



@faridyu (JA)



@Krungy21 (KO)

Analyze

<https://personality-insights-demo.ng.bluemix.net/>

Big Data Definition

Understanding Big Data



Term	Factor	# RAMACs	# IPODs
1 Giga (GB)	10^9	200	
1 Tera (TB)	10^{12}	200K	200
1 Peta (PB)	10^{15}	200M	200K
1 Exa (EB)	10^{18}		200M
1 Zetta (ZB)	10^{21}		

?	10^{24}	
---	-----------	--

?	10^{100}	
---	------------	--

Volume

Health records
Insurance
Transactions
Mobile sensors

3 V's of
Big Data

Batch
Near Time
Real Time
Streaming

Structured
Unstructured
Semi-structured
All the above

Velocity

Variety

Let's look at some interesting trends.

The Evolution of AI

General AI
Revolutionary

Broad AI

Disruptive and
Pervasive

Narrow AI
Emerging

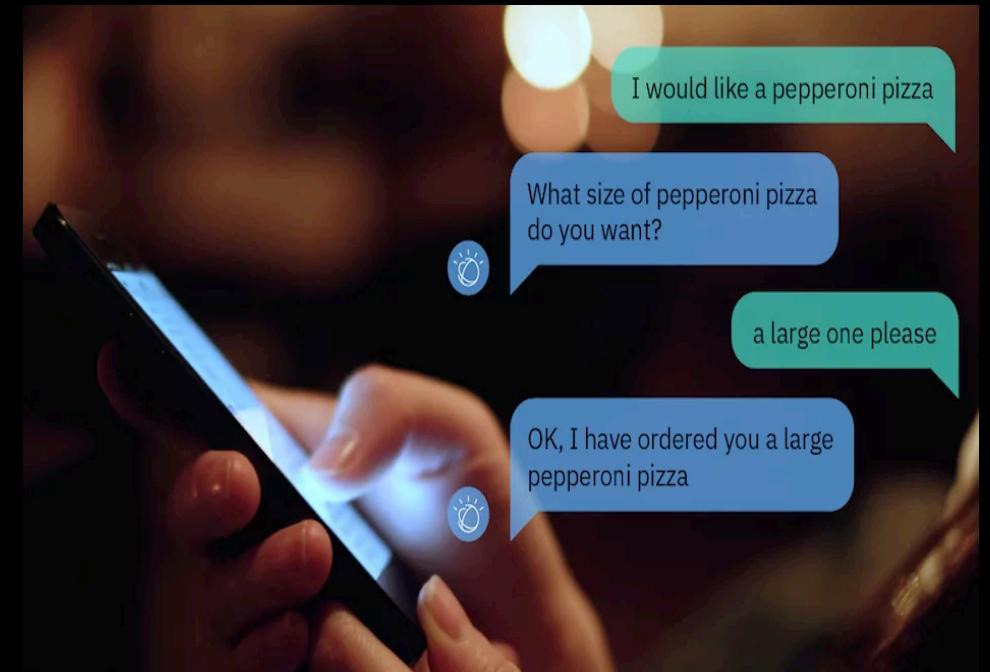
▼ We are
here

2050 and
beyond

Consumer Behavior AI Trends

The top trends in consumer AI give us a hint of where AI is going, and how to make use of it today.

- **Voice Activation:** Voice assistant software is the No. 1 AI app today.
4 billion devices will carry AI-powered voice assistants this year
- **Chatbots:** AI bots will power 85% of customer service interactions by 2020
- **Personalization:** Digital Assistants will “know you” by end of 2019



AI Means Business Across All Industries

E-COMMERCE:
Recommender
Systems

EDUCATION:
Research Insight

FINANCE:
Fraud Detection

GOVERNMENT:
Smarter Services

HEALTHCARE:
Patient Diagnosis

- **Opportunity Identification**
- **Competitive Advantage**
- **Intelligent Content**
- **Sales Growth**

MANUFACTURING:
Anomaly Detection

MEDIA:
Interaction & Speed

NETWORKS:
Intrusion Detection

RETAIL:
Inventory
Optimization

TRANSPORTATION:
Demand
Forescating

How can AI power smart consumer experiences?

Today

smart banking

all digital consumer bank supported by virtual assistants



Future

intelligent and proactive financial advisor



smart product intelligence

Trained on 62 products and answers 283,000 questions a month with a 95% accuracy rate



end to end product recommendations on any channel



Bradesco

smart shopping

Intelligent shopping assistant that increased web traffic by 21%



proactive shopping advisor that analyzes consumers' needs and preferences

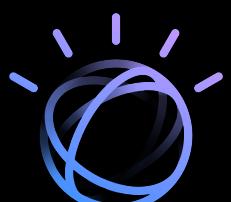


Ethics of AI

Data & AI Responsibility

IBM's Principles for Trust and Transparency

<https://www.ibm.com/downloads/cas/J45XZOAR>



1.The purpose of AI is to augment
human intelligence

2.Data and insights belong to
their creator

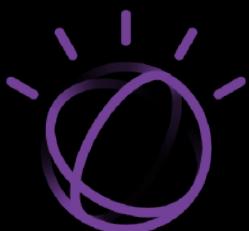
3.AI systems must be transparent
and explainable

AI: Augmented Intelligence

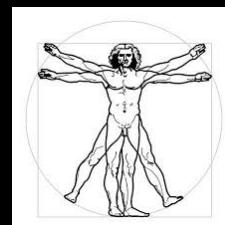
“It is **augmented intelligence** that is going to propel the world forward...



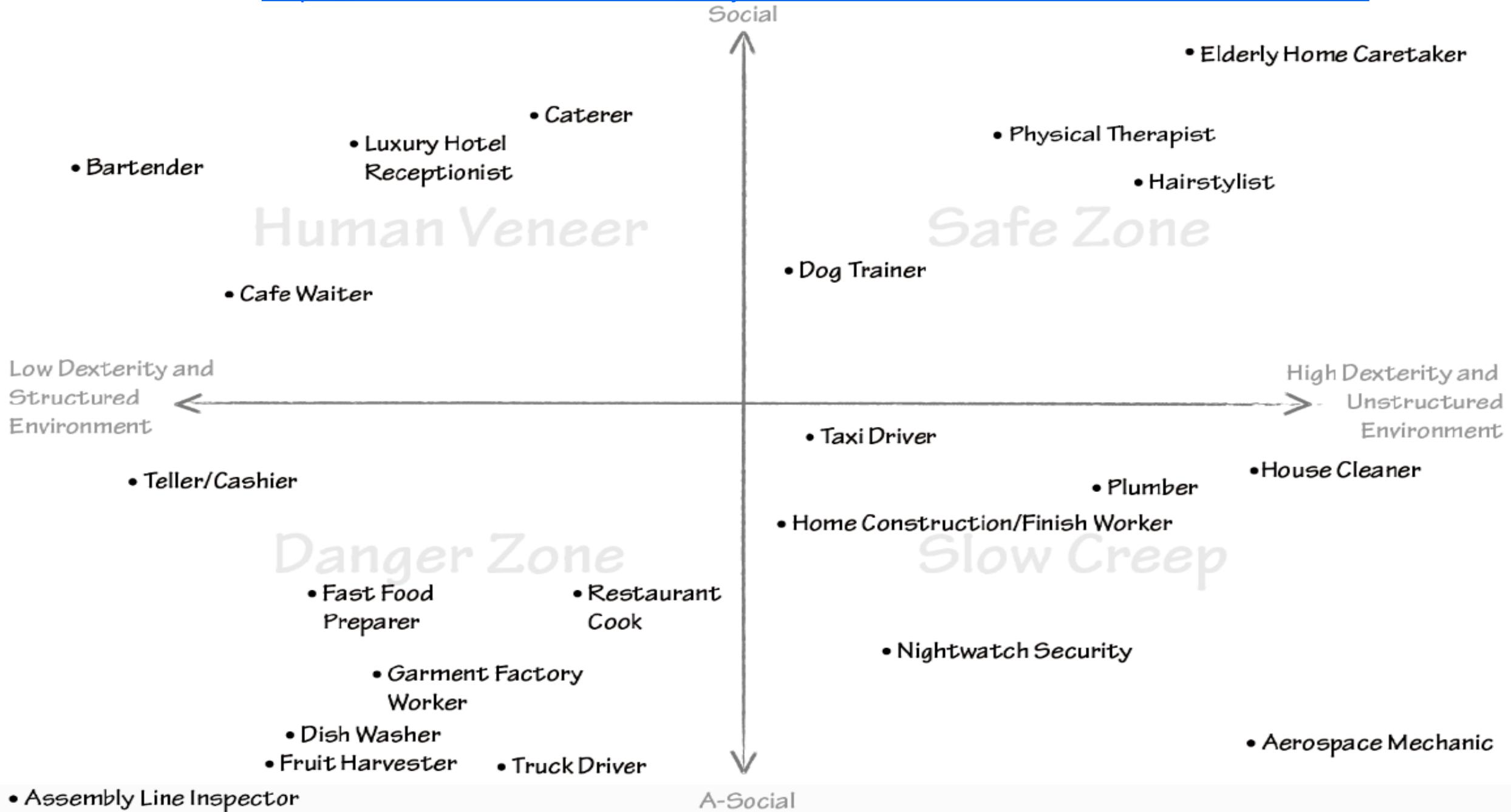
-Ginny Rometty, CEO IBM

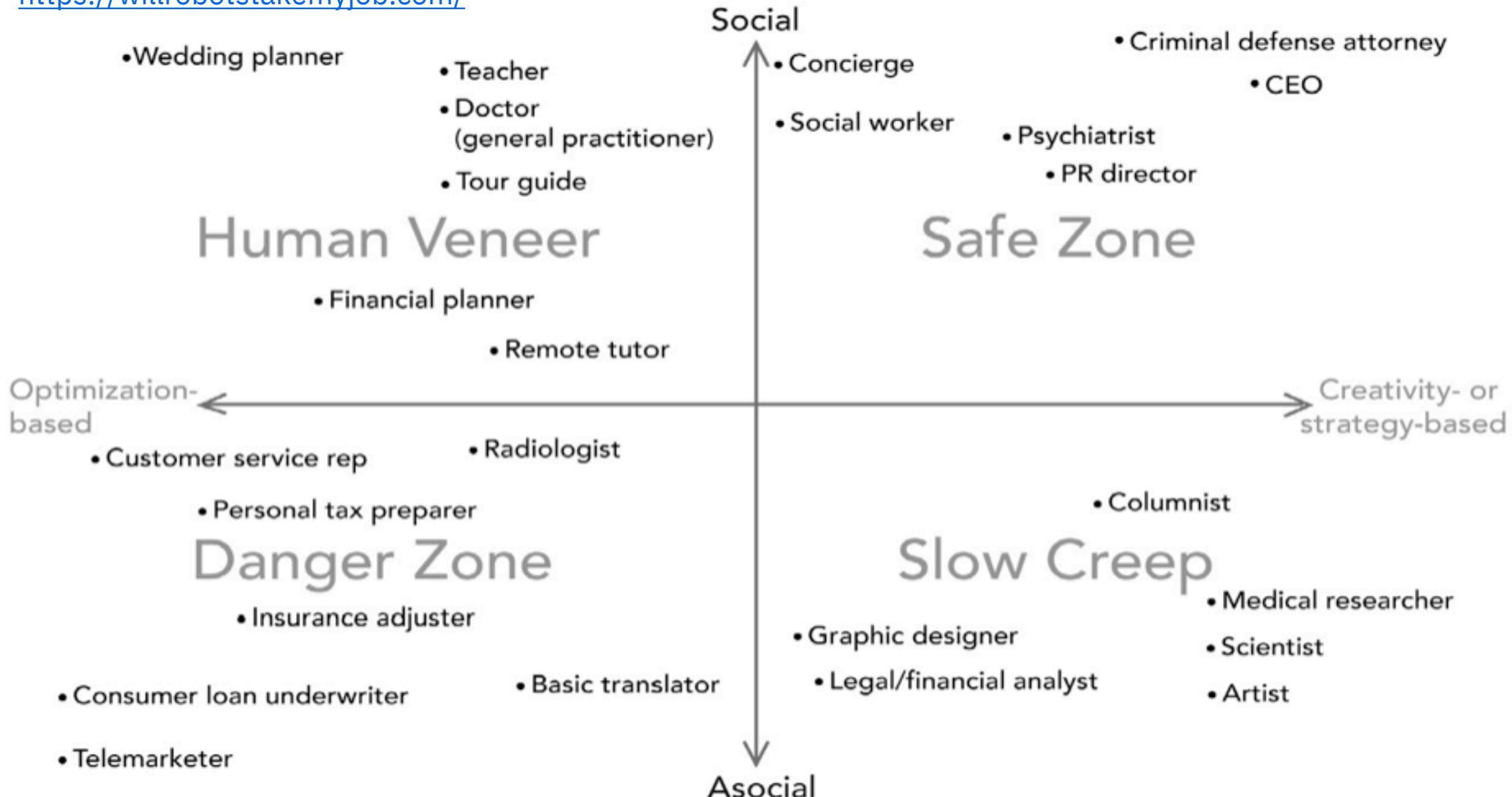


- Pattern identification
- Locating knowledge
- Eliminating bias
- Endless capacity



- Common sense
- Morals
- Imagination
- Compassion
- Dreaming





- 1.The purpose of AI is to augment human intelligence
- 2.Data and insights belong to their creator
- 3.AI systems must be transparent and explainable

Ethical use of AI



<https://www.technologyreview.com/f/614781/all-new-cellphone-users-in-china-must-now-have-their-face-scanned/>

- 1.The purpose of AI is to augment human intelligence
- 2.Data and insights belong to their creator
- 3.AI systems must be transparent and explainable

AI is used in many high-stakes decision making applications



Credit



Employment



Admission



Sentencing

What does it take to trust a decision made by a machine?



Ensure AI models are

- Free from bias
- Can be easily explained & understood by users
- Are auditable in business transactions

Claim Approval : Output

[Original Output](#)
[De-biased Output](#)
[Age](#)
[October 14, 2018](#)
[08:00](#)
[AM](#)
Only

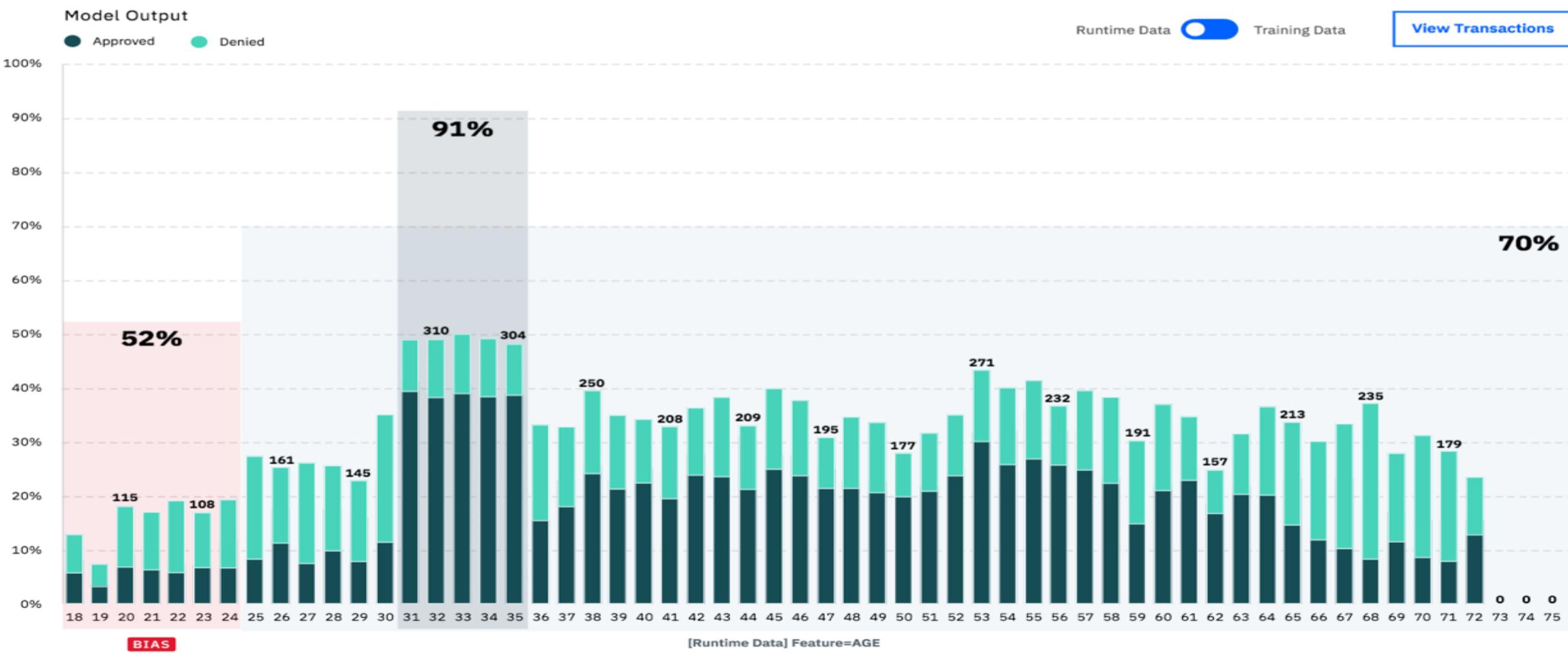
52% of the group **18 to 23**
received the outcome status=Approved

By comparison

91% of the group **31 to 35**
received the outcome status=Approved

Accuracy

88%
before de-bias



Claim Approval : Output

Original Output De-biased Output

Age

October 14, 2018

08:00

AM

After de-biasing

70% of the group **18 to 23**
received the outcome status=Approved

By comparison

91% of the group **31 to 35**
received the outcome status=Approved

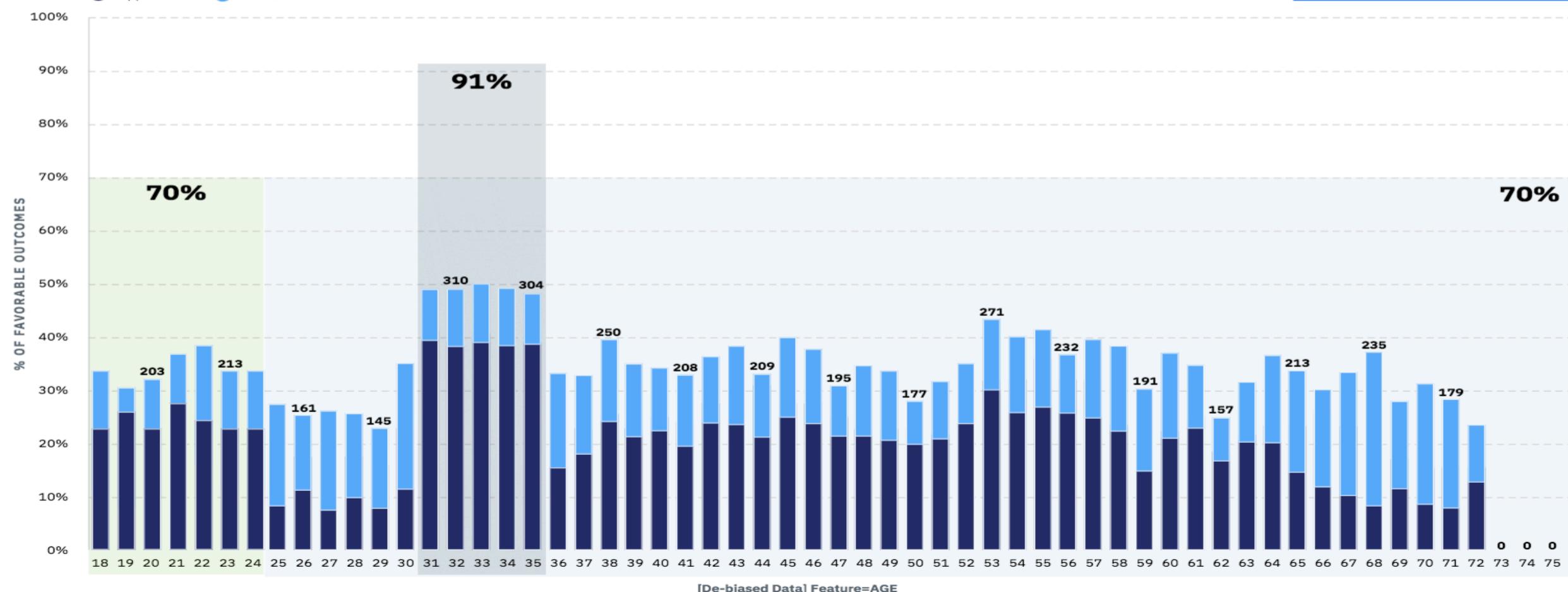
Accuracy

87%
after de-bias

De-biased Output

● Approved ● Denied

[View De-biased Data Set](#)



Explain a transaction

Last updated 11:00 PM CST

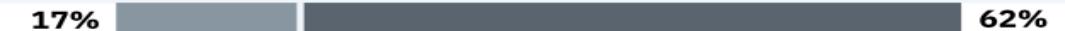
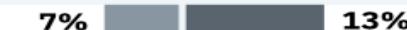
 CL-US-NY-1952

Recent transactions

CL-US-NY-1952	Finished	Just now
CL-US-NY-1900	Finished	30 min ago
CL-US-NY-1871	Finished	1 hour ago

Transaction: **CL-US-NY-1952**Deployment: **Fraud Detection**Model Name: **Fraud Model****NOT FRAUD****CONFIDENCE****FRAUD**

Factors contributing to a NOT FRAUD outcome

CAR BRAND : **BMW**RESPONSIBLE PARTY: **Self**CAR YEAR: **2007**CLAIM AMOUNT: **\$5,000-\$10,000**ACTUAL CLAIM AMOUNT: **\$7,000**POLICE REPORT: **Yes**

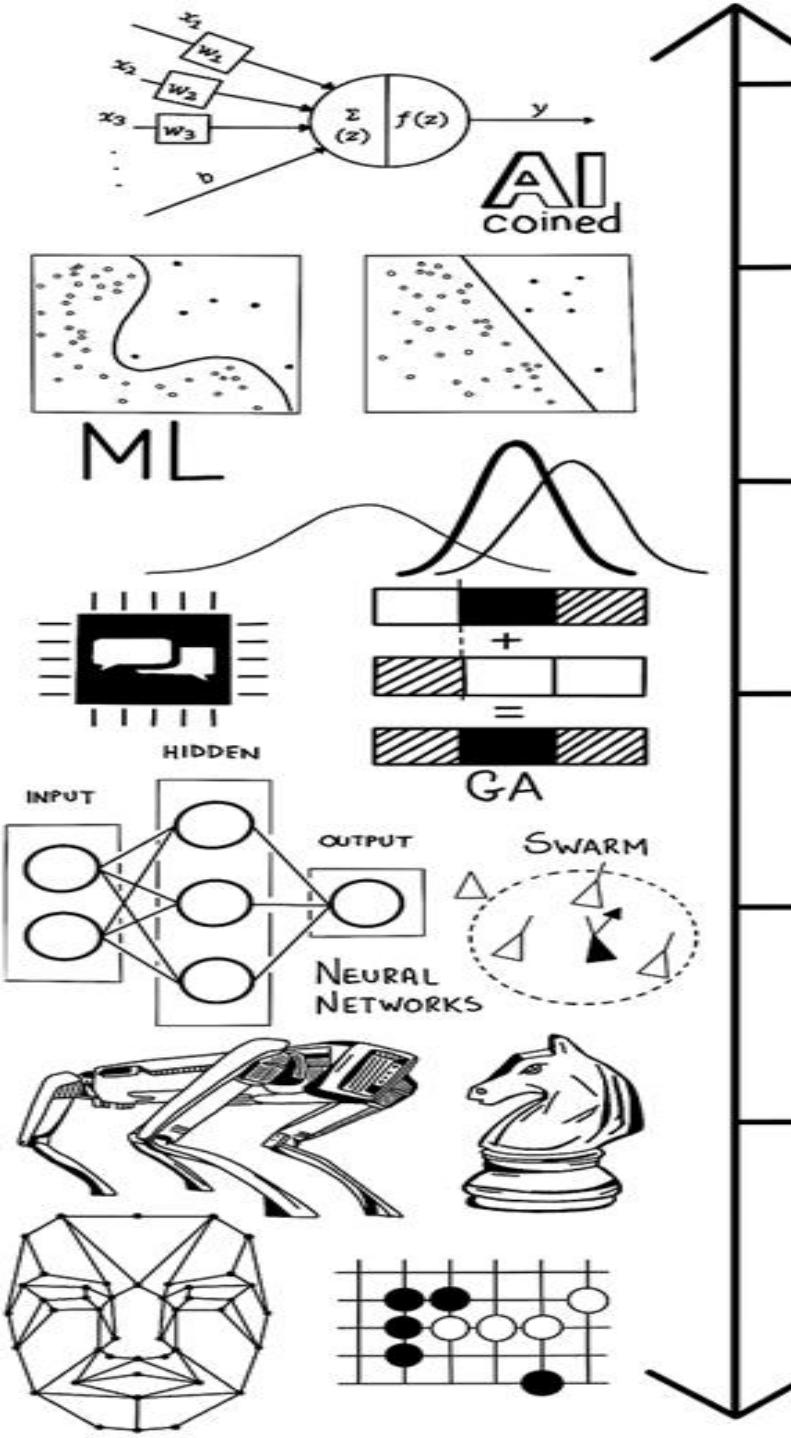


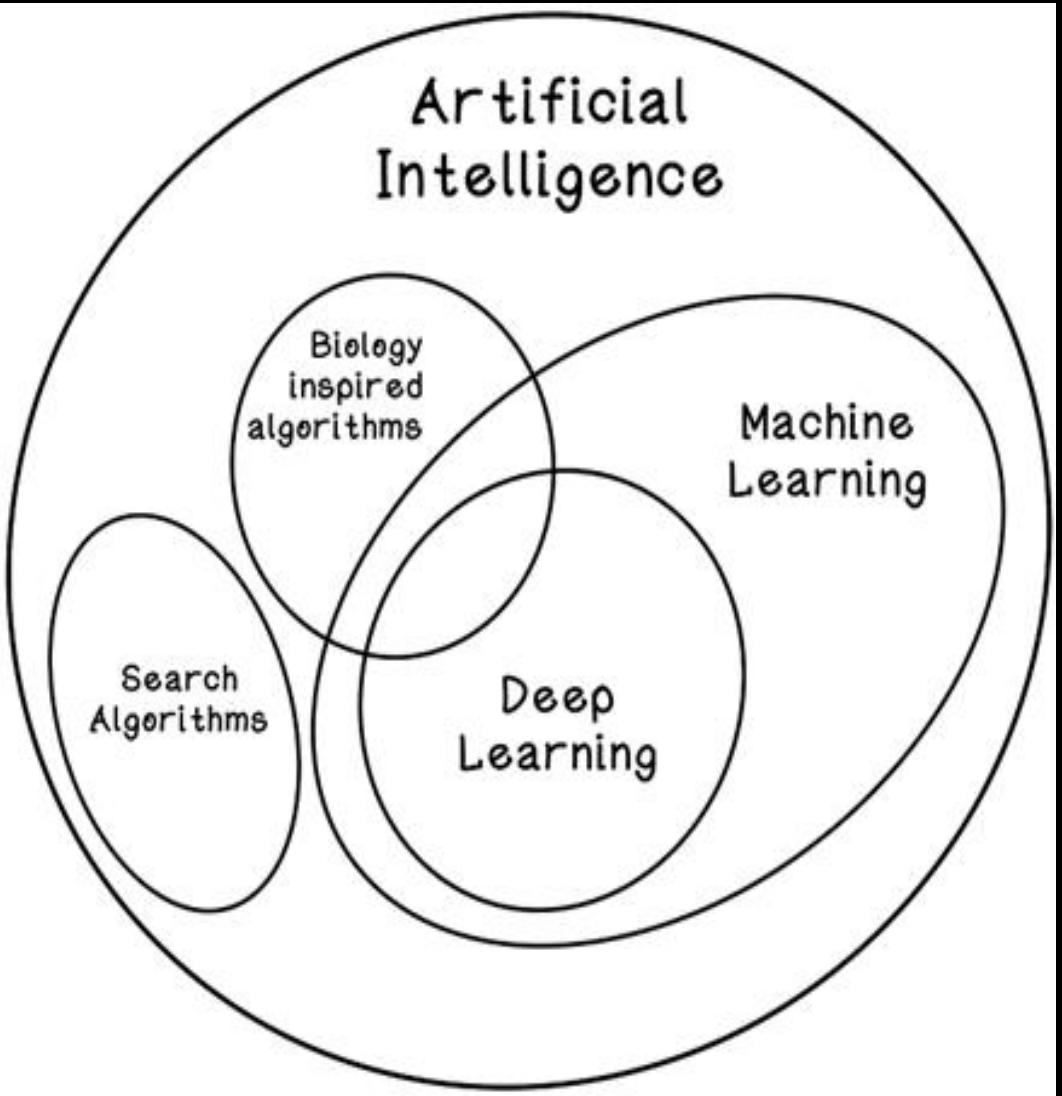
“With the debut of AI in Go games, I've realized that I'm not at the top even if I become the number one through frantic efforts,”

Takeaways AI lecture

1. Develop critical thinking skills & have your voice heard
2. When giving away your personal data, choose wisely
3. Educate yourself on AI & thrive in your profession

RECAP





Super Intelligence

Unknown



General Intelligence

Humans

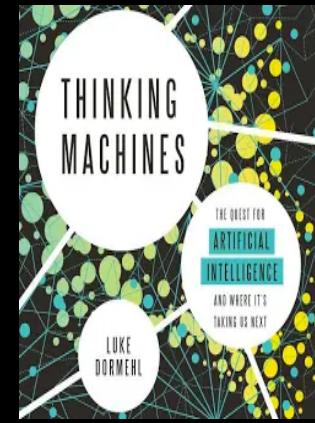
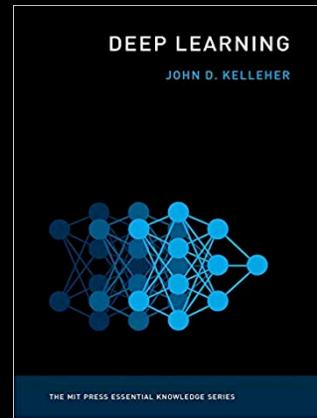
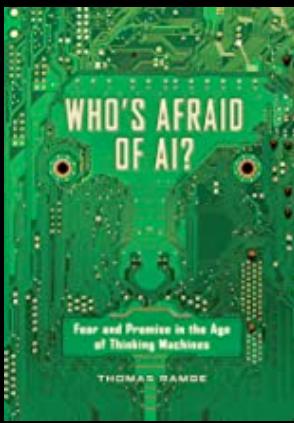
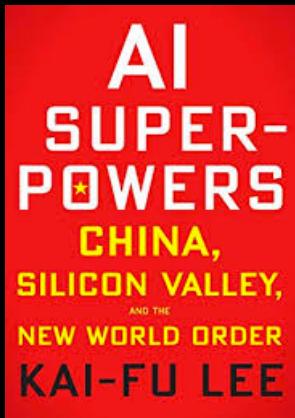


Narrow Intelligence

Pong playing program
Map routing program
Fraud detection program



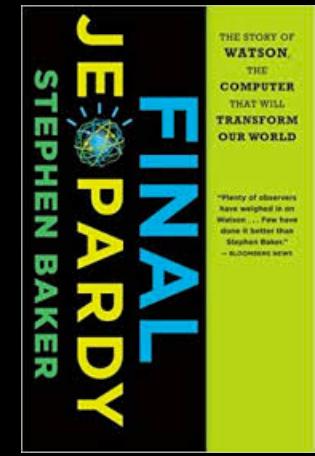
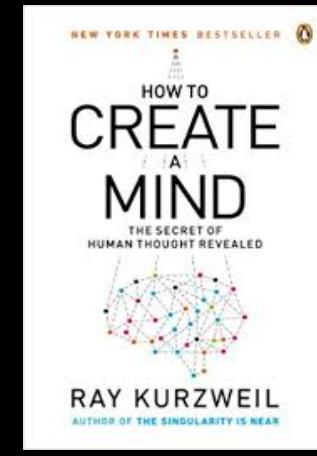
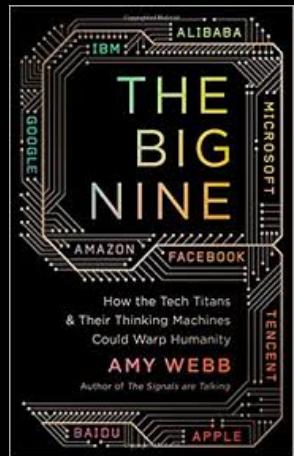
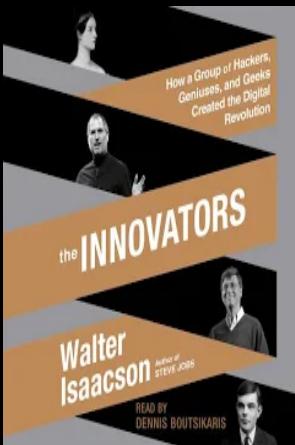
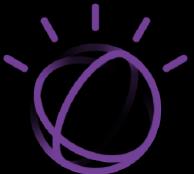
Q & A



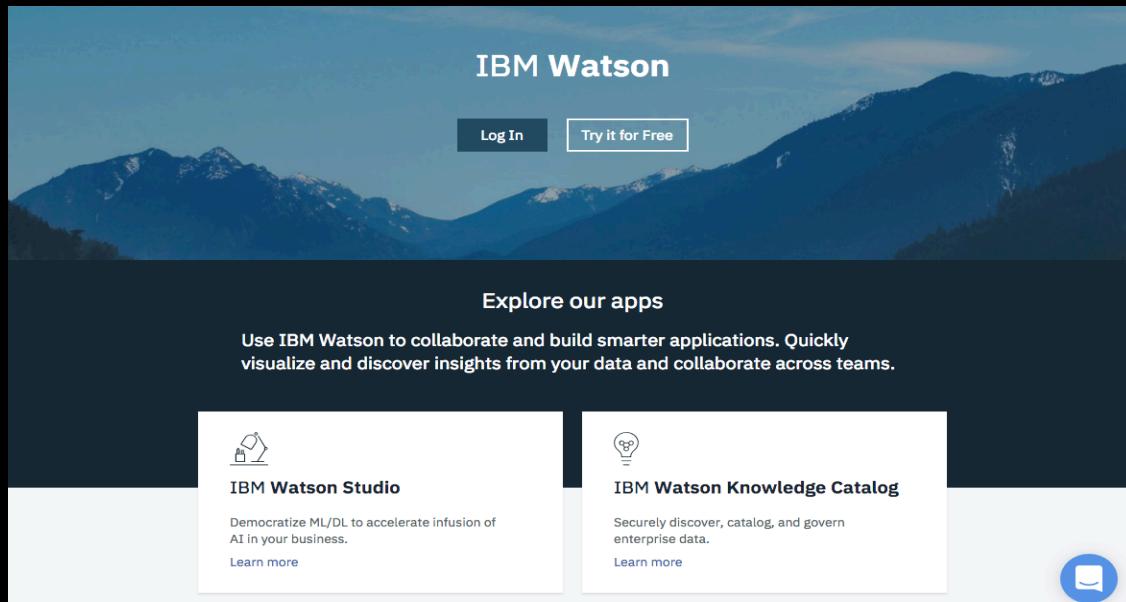
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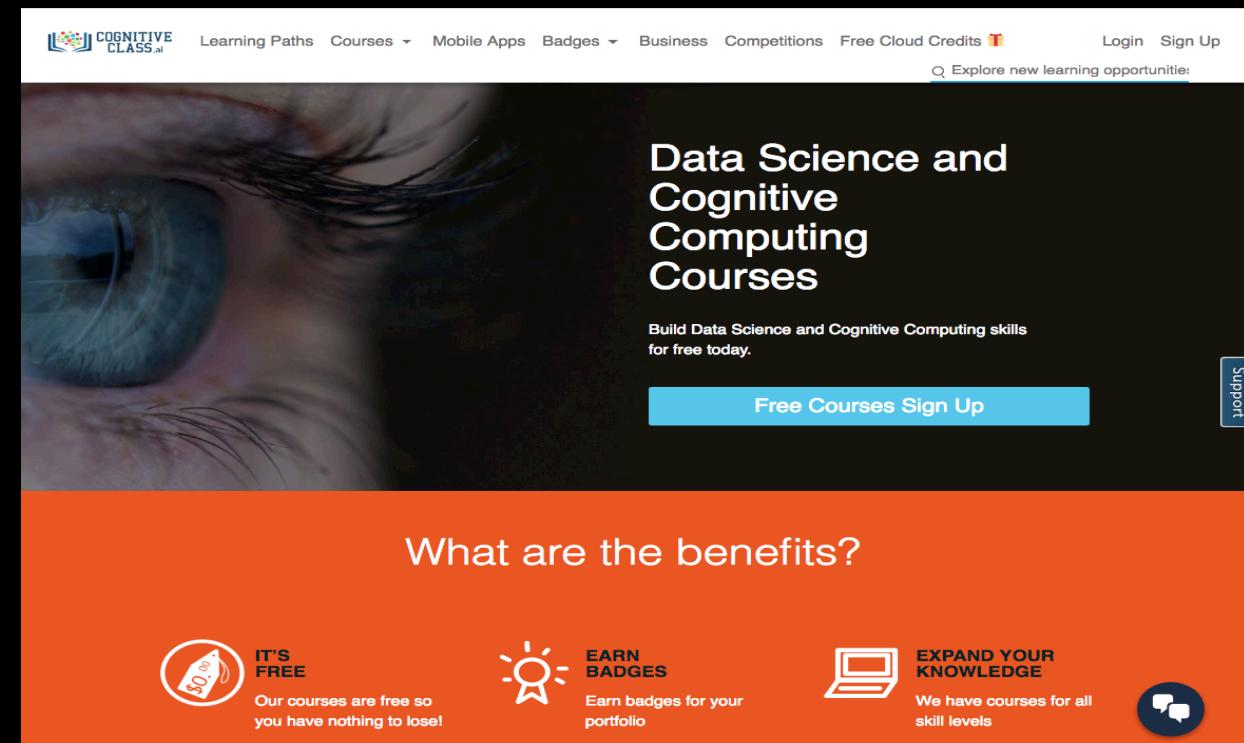


<https://dataplatform.ibm.com/>



The IBM Watson homepage features a large background image of mountains under a blue sky. At the top, the "IBM Watson" logo is displayed in white. Below it are two buttons: "Log In" and "Try it for Free". A dark overlay bar contains the text "Explore our apps" and a descriptive paragraph: "Use IBM Watson to collaborate and build smarter applications. Quickly visualize and discover insights from your data and collaborate across teams." Two main app cards are shown: "IBM Watson Studio" (with a paintbrush icon) and "IBM Watson Knowledge Catalog" (with a brain icon). Both cards include a brief description and a "Learn more" link.

<https://cognitiveclass.ai/>



The CognitiveClass.ai homepage has a dark header with the "COGNITIVE CLASS.ai" logo, navigation links for Learning Paths, Courses, Mobile Apps, Badges, Business, Competitions, and Free Cloud Credits, and buttons for Login and Sign Up. A search bar says "Explore new learning opportunities". The main visual is a close-up of a person's eye. To the right, a large section is titled "Data Science and Cognitive Computing Courses". Below it is a sub-section for "Build Data Science and Cognitive Computing skills for free today." A "Free Courses Sign Up" button is prominent. The bottom section, set against an orange background, is titled "What are the benefits?" and lists three items: "IT'S FREE" (with a money bag icon), "EARN BADGES" (with a lightbulb icon), and "EXPAND YOUR KNOWLEDGE" (with a laptop icon). A small "Support" button is visible in the bottom right corner.