

Understanding Big Data & AI

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Robo del siglo

<https://www.bbc.com/news/world-latin-america-28783027>

Entity Resolution

Entity Resolution at Degrees of Difficulty

<https://senzing.com>

Exactly
Same

Bob Jones
123455

Bob Jones
123455

Fuzzy

Bob Jones
123455

Robert T Jonnes
000123455

Incompatible
Features

Bob Jones
123455

Agenda



UNDERSTANDING BIG
DATA



ARTIFICIAL INTELLIGENCE
& BIG DATA



DEMO & CLOSING
THOUGHTS

“Every day, we create 2.5 quintillion bytes of data”



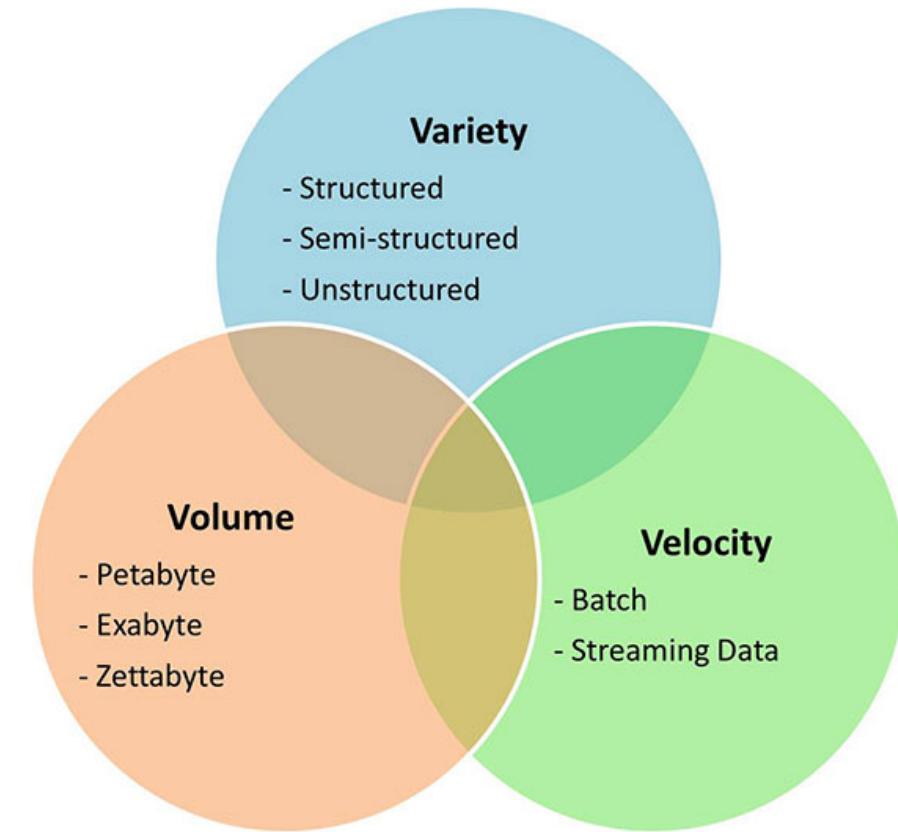
Estimates are that less than 0.5% of data is ever analyzed!

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}		

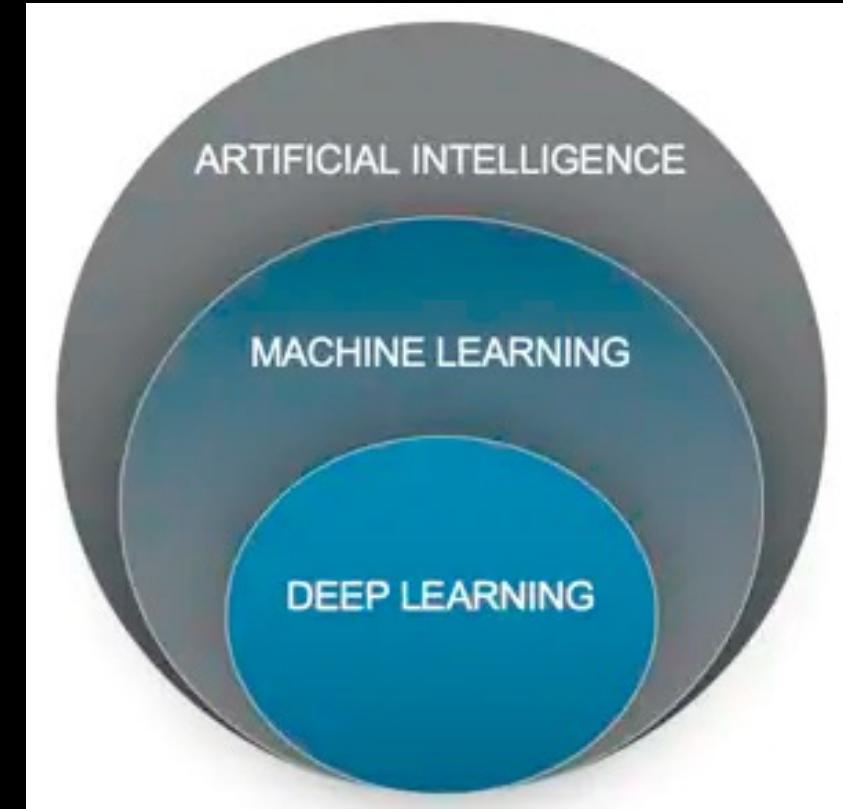
Big Data 3V Model



Agenda

- Understanding Big Data
- Artificial Intelligence & Big Data
- Demo & closing thoughts

Definitions



<https://www.ibm.com/cloud/blog/models-deployed-at-the-edge>

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?

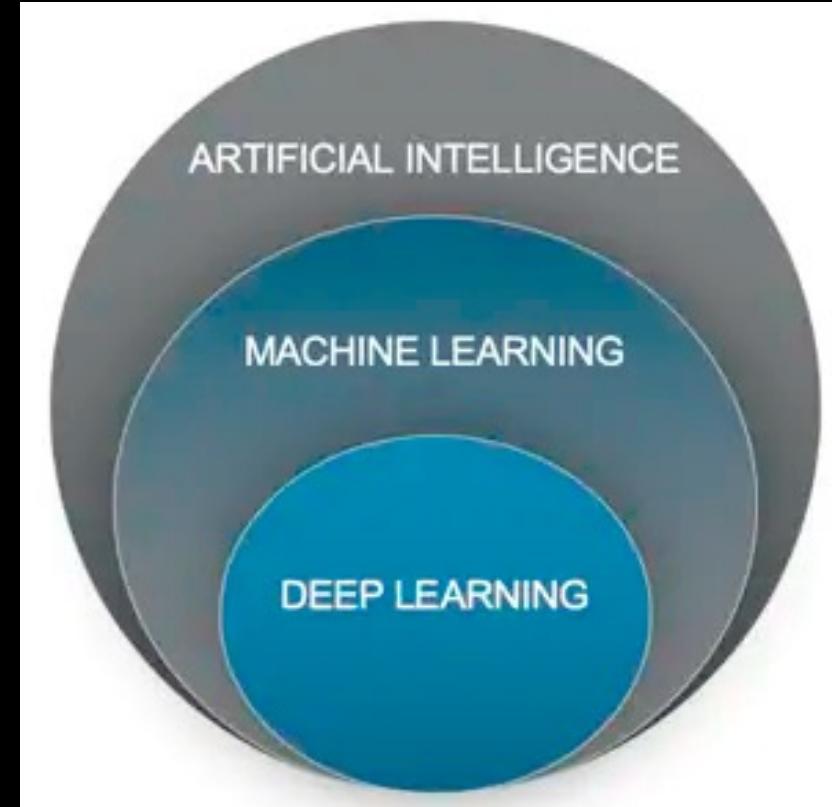
Artificial Intelligence | noun

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

Intelligence demonstrated
by machines

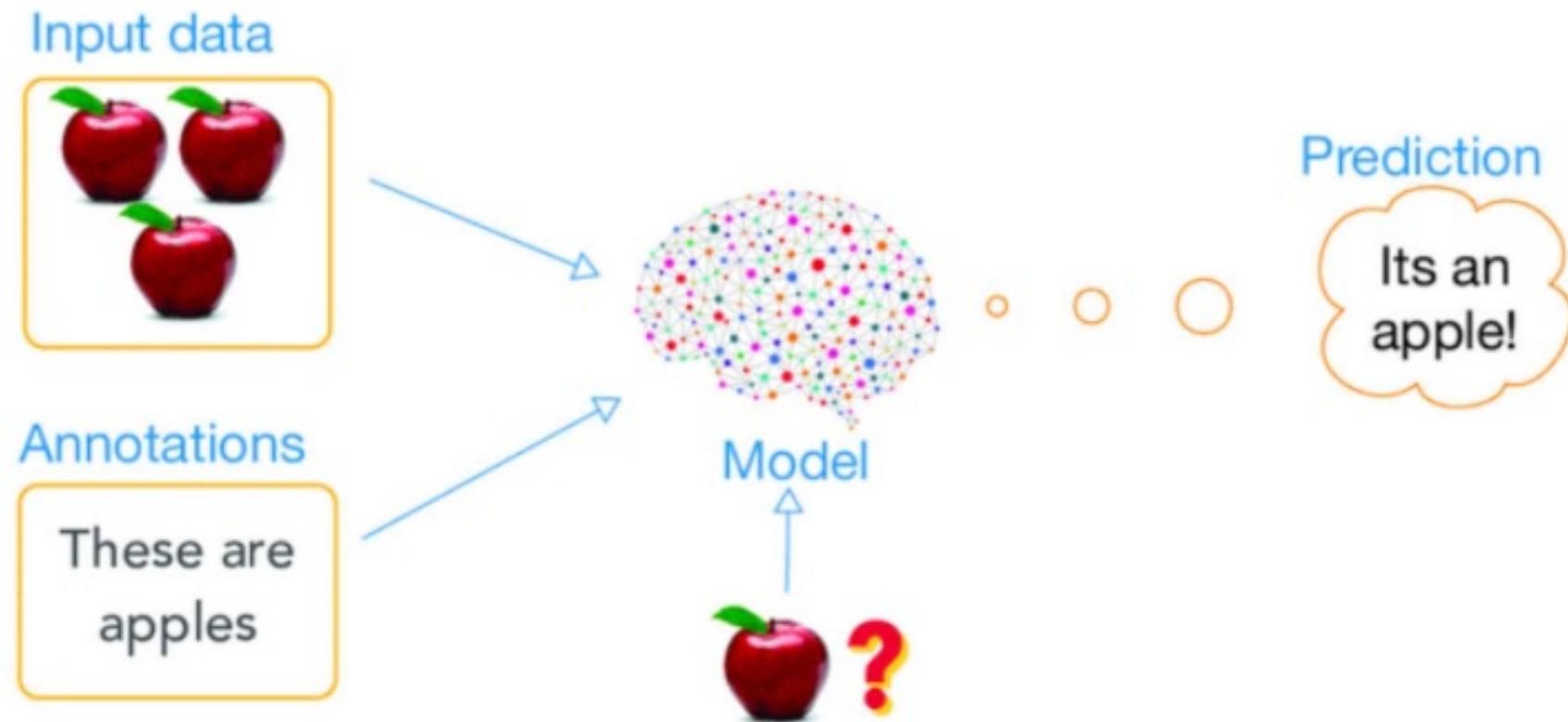
Definitions

- **AI**: Intelligence demonstrated by machines
- **ML**: Set of algorithms that allow computers to learn from (big) data
- **DL**: Set of learning techniques focused on models and neural networks



<https://blogs.nvidia.com/blog/2016/07/29/whats-difference-artificial-intelligence-machine-learning-deep-learning-ai/>

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

Why Machine Learning?

Traditional Programming



AI-Machine Learning



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

Intelligence demonstrated
by IC Students

Exercise One

PB & J Recipe

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 Two

A photograph of a highway scene. In the foreground, the side of a white truck is visible. In the middle ground, a two-lane highway curves to the left, with a yellow and black winding road sign on the left shoulder. Several other vehicles are on the road ahead. The background consists of a dense forest of green trees under a clear sky.

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)

Exercise Three

How is AI being used today?

AI is Everywhere

AUTOMATION



CONVERSATION



OPTIMIZATION



RECOMMENDING
AND INSIGHTS



PERSONALIZING



VISUAL RECOGNITION



Automating actions, processes, and alerts

Understanding text and answering questions in natural language

Analyzing data for patterns and outliers and deriving insights

Understanding needs and recommending solutions

Personalizing experiences

Recognizing objects in images and videos

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

© HBR.ORG

Natural Language Processing Demo

<https://www.ibm.com/demos/live/natural-language-understanding/self-service/home>

SAMPLE INDUSTRY DOMAINS

Legal Financial Media

TRY YOUR OWN

Input Text URL

In the internet age, compelling content is always just a click away. Living rooms boast audio-visual set-ups that can rival movie theaters on quality, while pay-per-view can bring world-class sports and music events into every home. These competing attractions make it more challenging than ever for live-event venues to fill their seats. Building Mercedes-Benz Stadium gave AMB Sports & Entertainment (AMBSE), which runs both the Atlanta Falcons and Atlanta United, the

■ Entities (Out of the Box Model)

Extraction

Classification

Linguistics

Custom

Entities

Keywords

Concepts

Relations

Name	Type
Benz Stadium	Facility
AMB Sports & Entertainment	Company
Atlanta Falcons	Organization
Atlanta	Location

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.

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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.

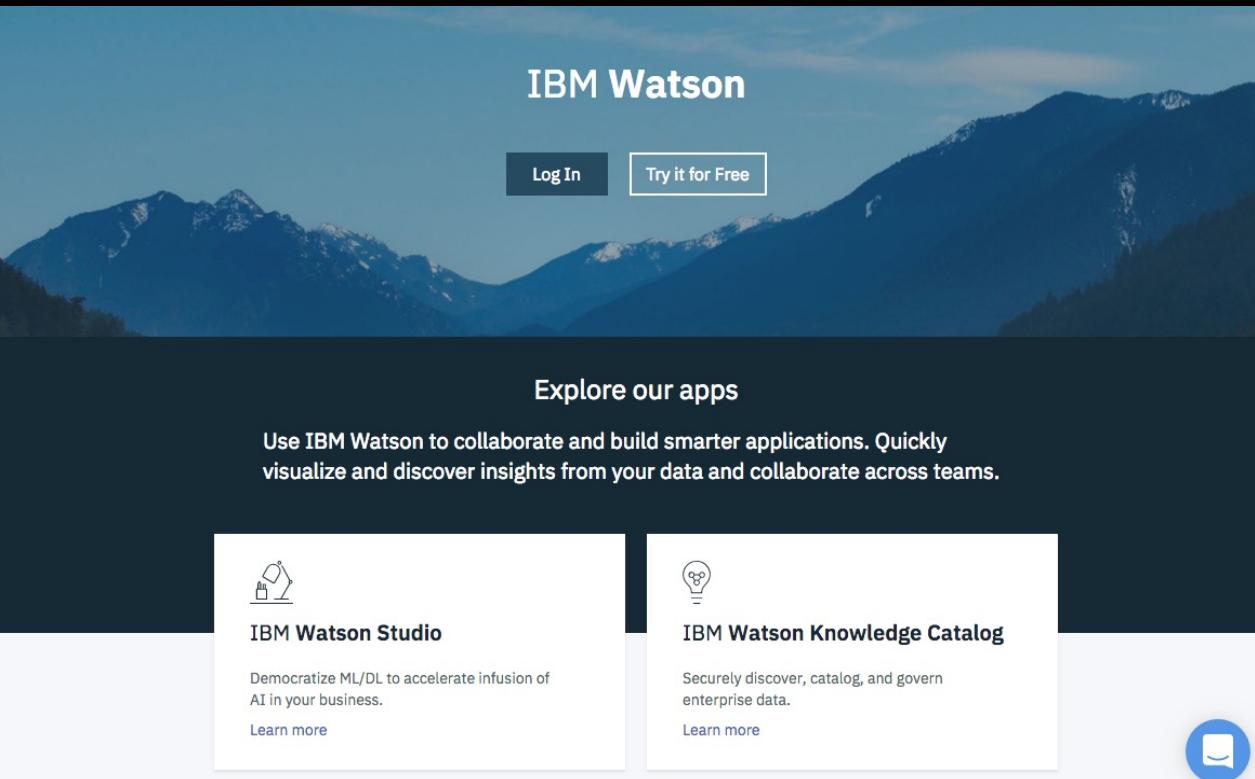
JE why?

 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.

Agenda

- Understanding Big Data
- Artificial Intelligence & Big Data
- Demo & closing thoughts

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

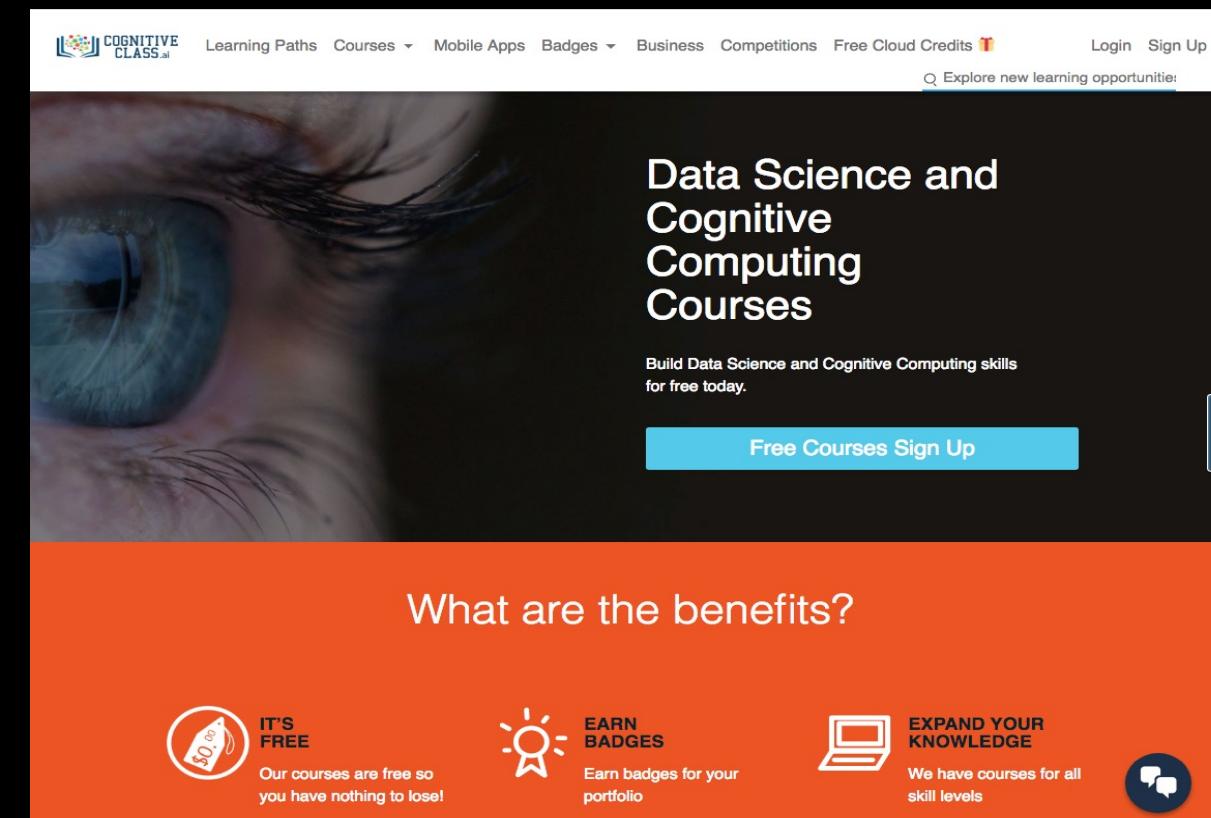


The IBM Watson homepage features a large background image of mountains under a blue sky. At the top, there are two buttons: "Log In" (dark blue) and "Try it for Free" (white). Below the header, the text "Explore our apps" is displayed. A sub-section titled "Use IBM Watson to collaborate and build smarter applications. Quickly visualize and discover insights from your data and collaborate across teams." is present. Two main app cards are shown: "IBM Watson Studio" (with a brief description and "Learn more" link) and "IBM Watson Knowledge Catalog" (with a brief description and "Learn more" link). A blue speech bubble icon is located at the bottom right of the white content area.

<http://cloud.ibm.com>

<https://github.com/jiportilla/CULecture>

<https://cognitiveclass.ai/>



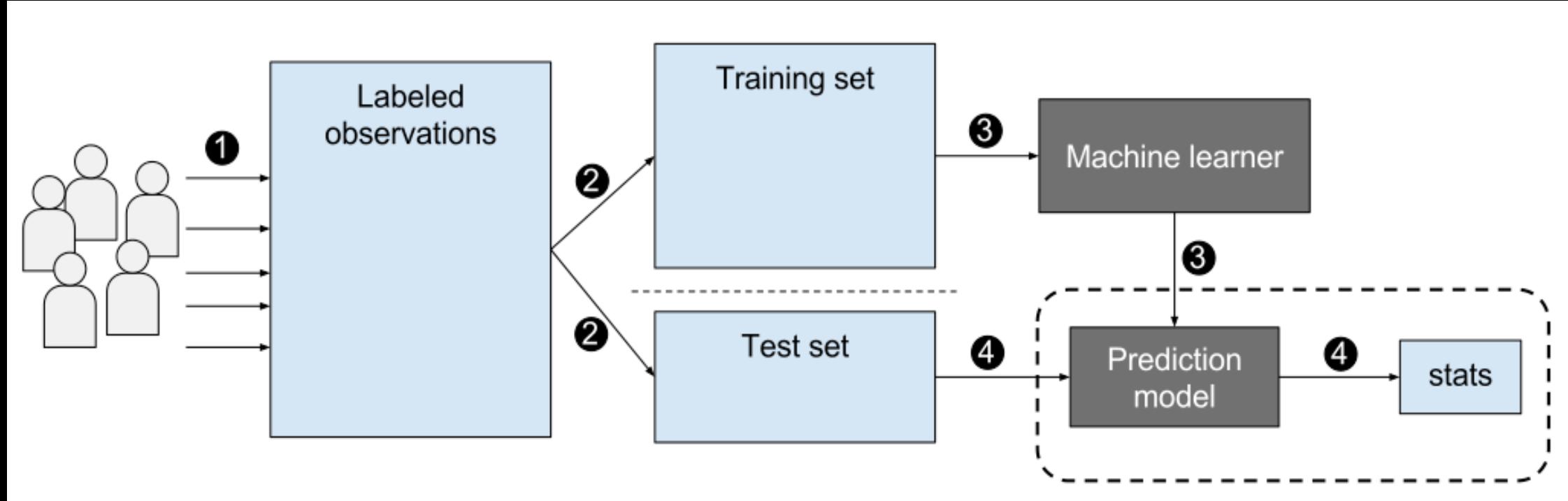
The CognitiveClass.ai homepage has a dark background featuring a close-up image of a person's eye. At the top, there is a navigation bar with links for "Learning Paths", "Courses", "Mobile Apps", "Badges", "Business", "Competitions", "Free Cloud Credits", "Login", and "Sign Up". A search bar is also present. The main title "Data Science and Cognitive Computing Courses" is prominently displayed on the right side. Below the title, a subtitle reads "Build Data Science and Cognitive Computing skills for free today." A blue "Free Courses Sign Up" button is located at the bottom right. The bottom section of the page is orange and contains three benefit icons: "IT'S FREE" (with a 50% off icon), "EARN BADGES" (with a sunburst icon), and "EXPAND YOUR KNOWLEDGE" (with a computer monitor icon). A small "Support" link is visible on the far right edge.



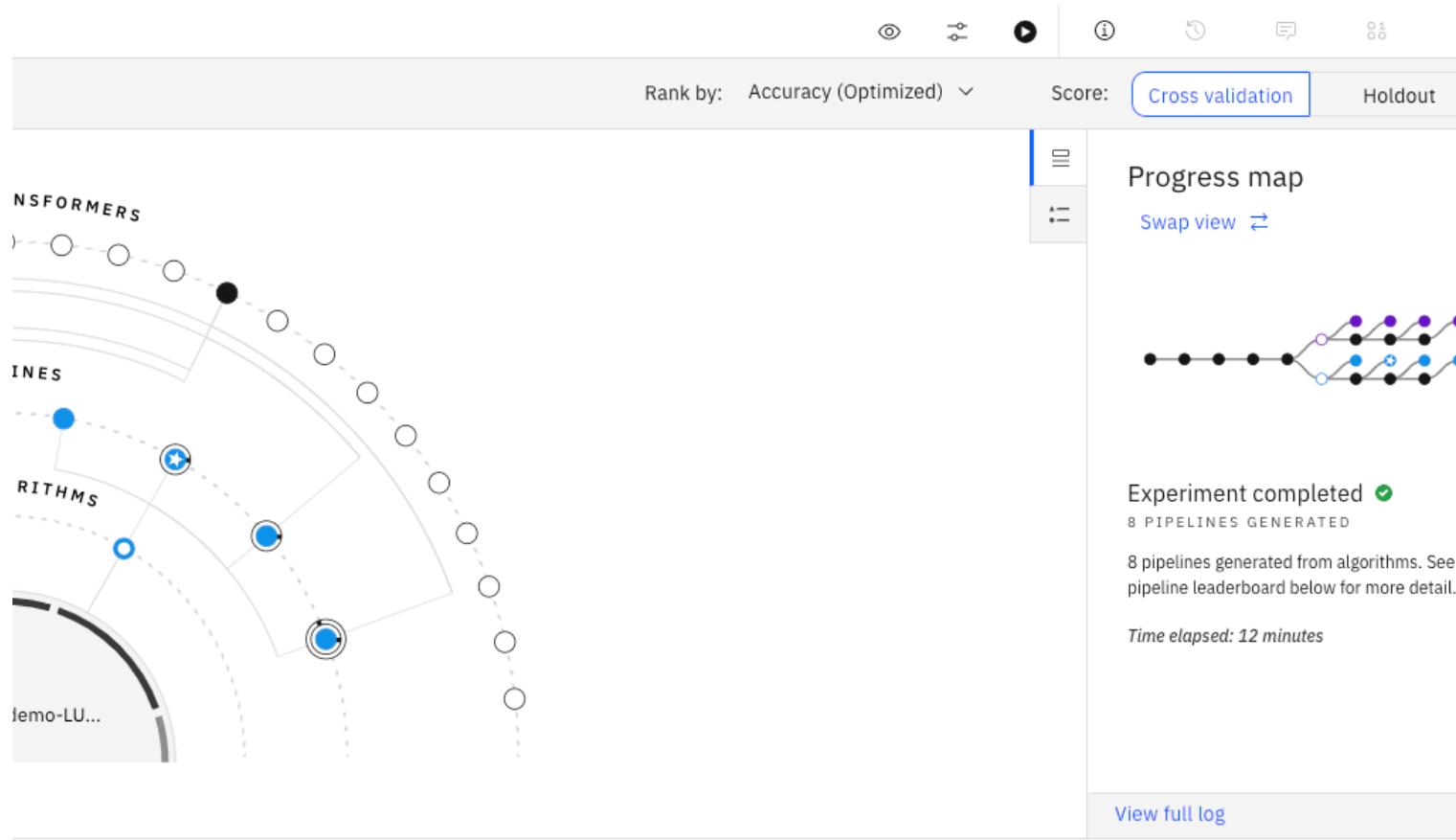
Telco customer churn
prediction

- ✓ Customer id
- ✓ Payment method
- ✓ Gender
- ✓ Marital Status
- ✓ Age
- ...
- ✓ Churn
(**Likely**, **Unlikely**)

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



Accuracy (Optimized)	Enhancements	Build time	Save as
0.975	HPO-1	00:01:00	Save as ▾
0.974	HPO-1 FE	00:05:31	

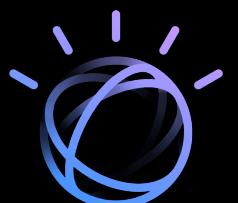
Supervised Machine Learning Demo



Closing Thoughts

Industry Principles for Trust and Transparency

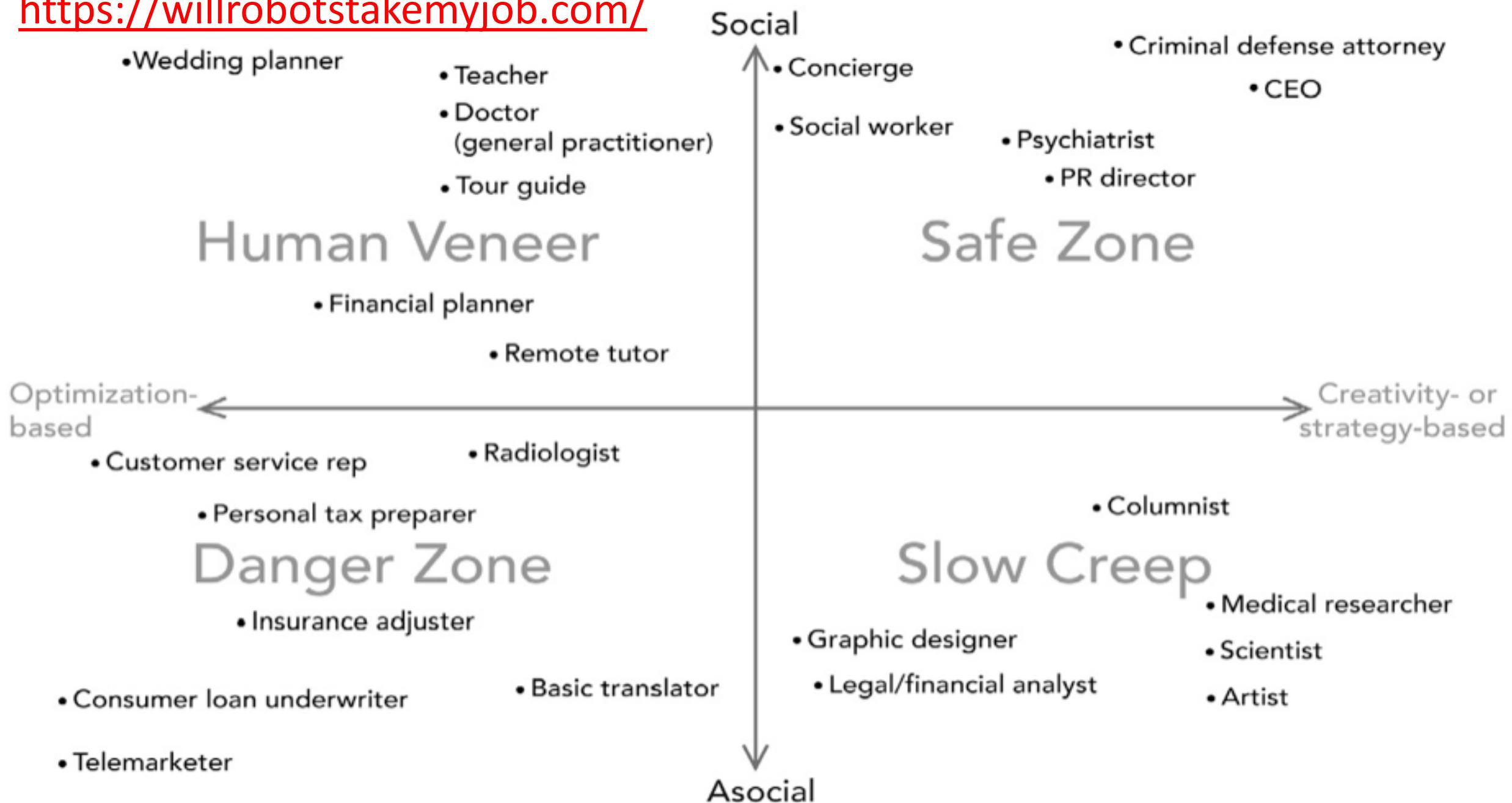
<https://www.ibm.com/downloads/cas/J45XZOAR>

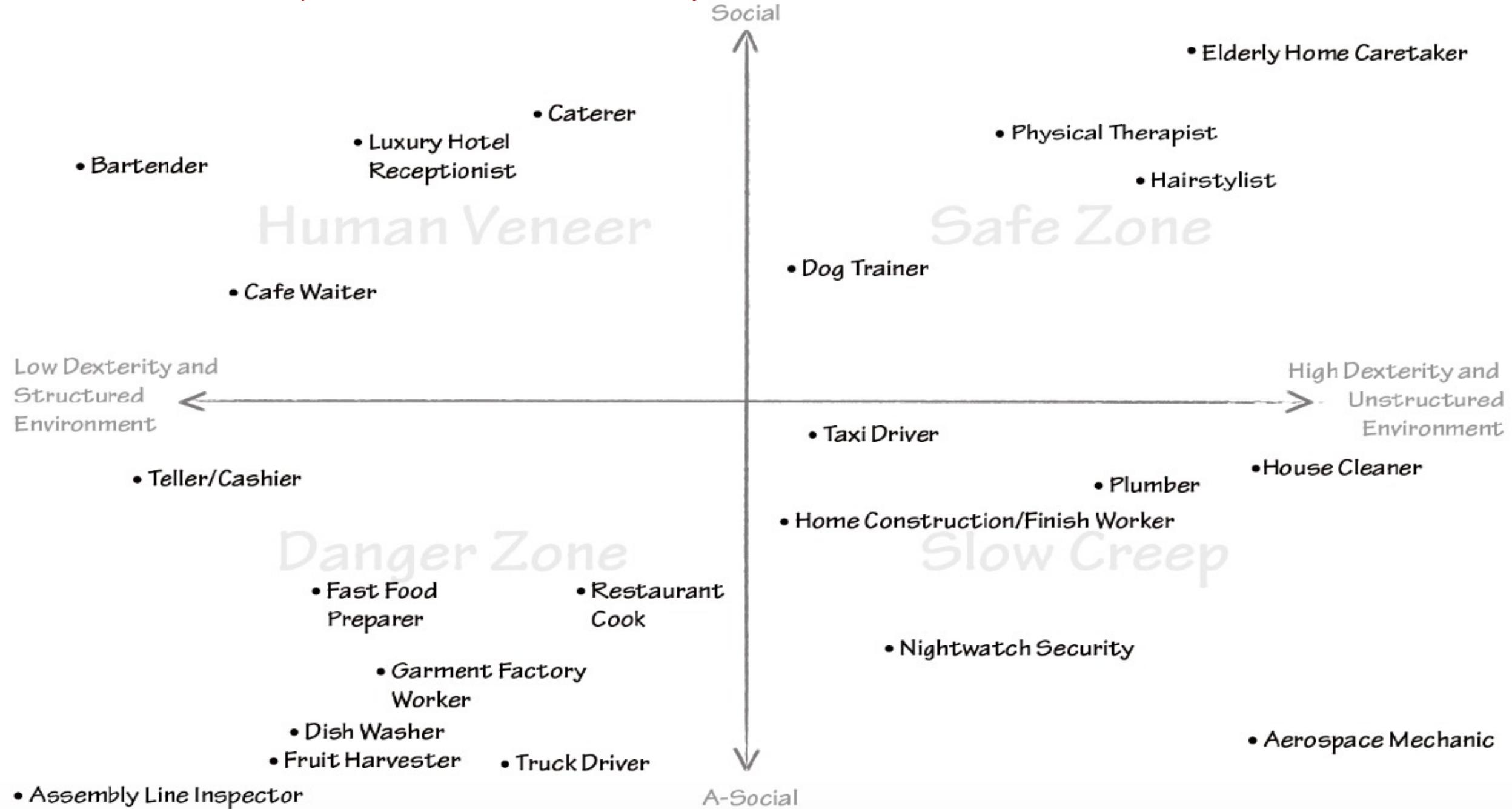


1.The purpose of AI is to augment
human intelligence

2.Data and insights belong to
their creator

3.AI systems must be transparent
and explainable





Takeaways AI lecture

Citizen AI:

Develop critical thinking skills, have your voice heard

<https://www.accenture.com/cz-en/insight-explainable-citizen-ai>

Big Data Advantage:

When giving away your personal data, choose wisely

<https://www.slideshare.net/RobertoVII/ai-and-big-data-for-business-and-people-advantage>

Intelligent Automation:

Educate yourself on AI, thrive in your profession

https://1.dam.s81c.com/m/3de136737e51fb20/original/IBM-Automation-Whitepaper_Final.pdf

Q&A

Resources

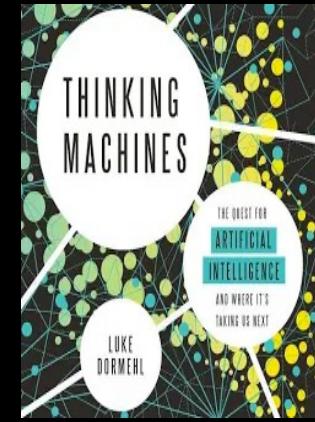
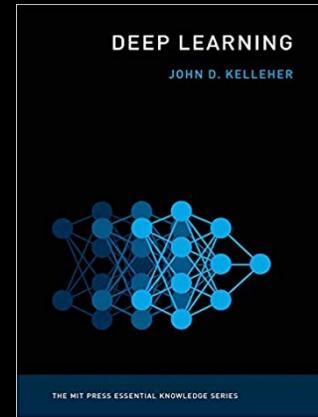
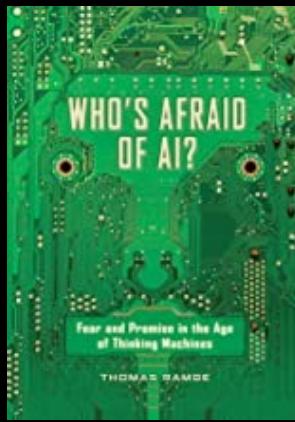
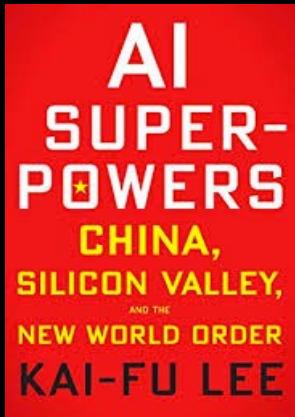
<https://cloud.ibm.com/>

<https://weather.com/coronavirus>

<https://github.com/jiportilla/CULecture>

<https://www.ibm.com/artificial-intelligence>

<https://www.ibm.com/watson/covid-response>



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