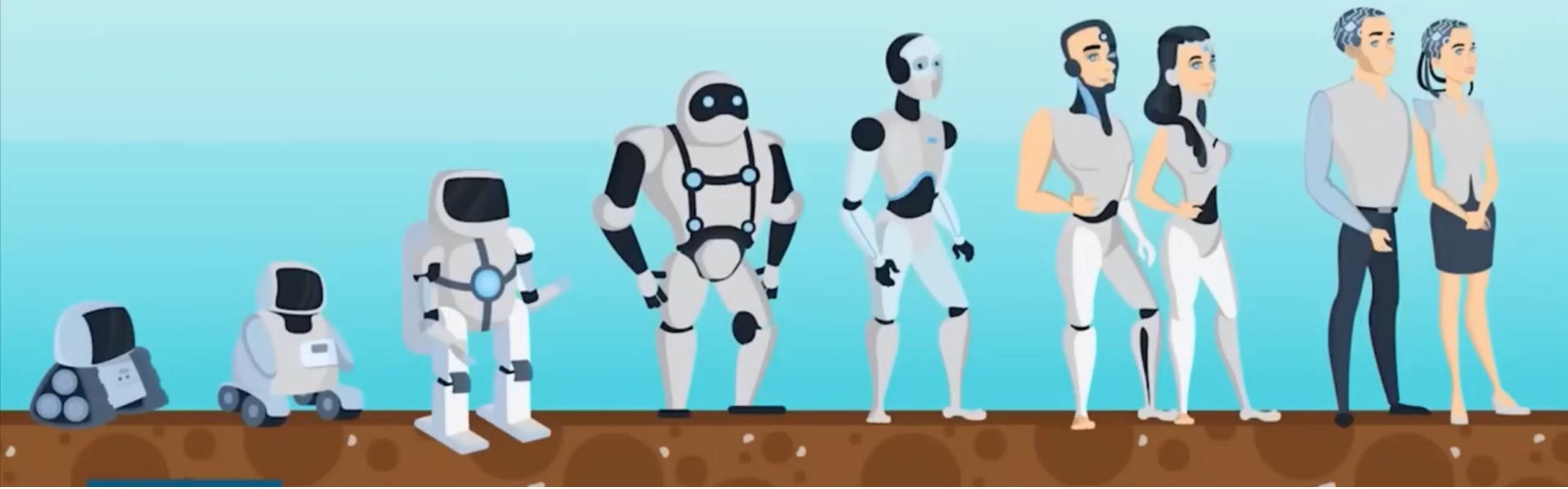


Introduction to Machine Learning

Dr. Yudhishtir Raut

Evolution & Future of Machines



What is Machine Learning?



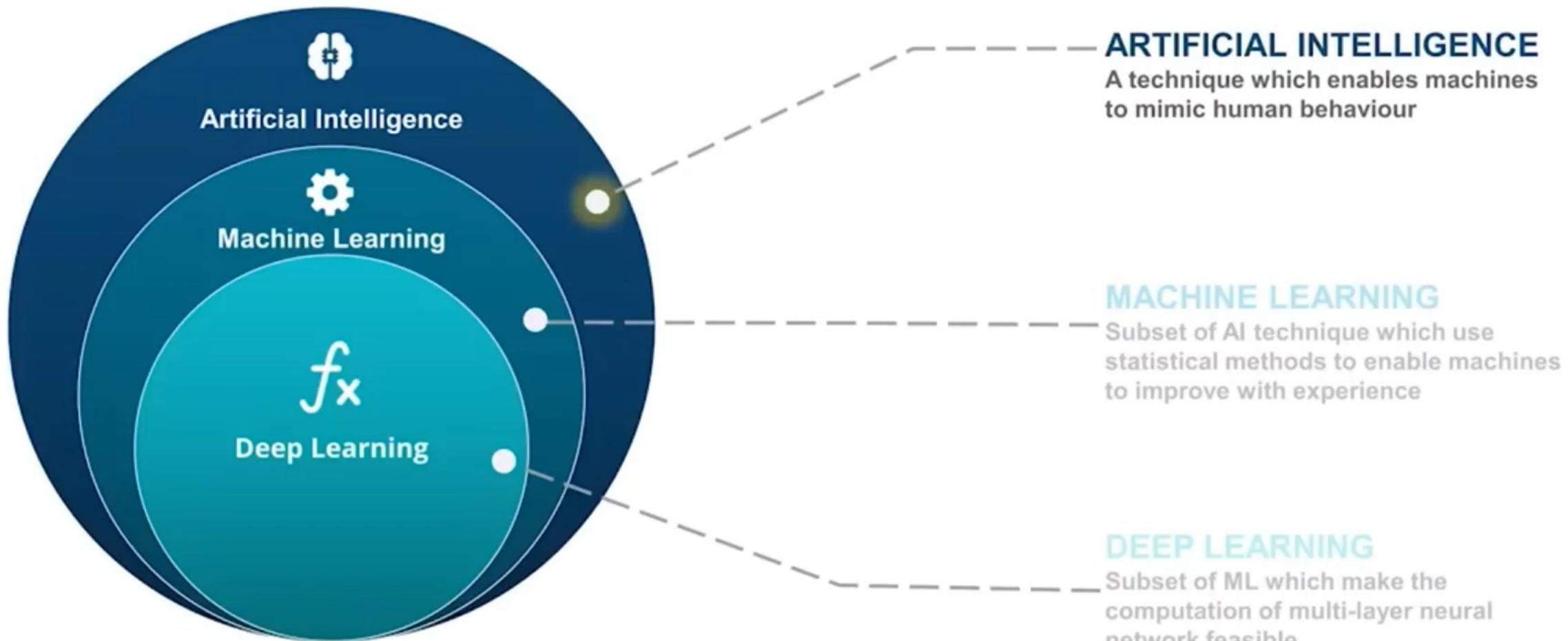
What is Machine Learning?

Machine Learning is a subset of artificial intelligence. It focuses mainly on the designing of systems, thereby allowing them to learn and make predictions based on some experience which is data in case of machines.

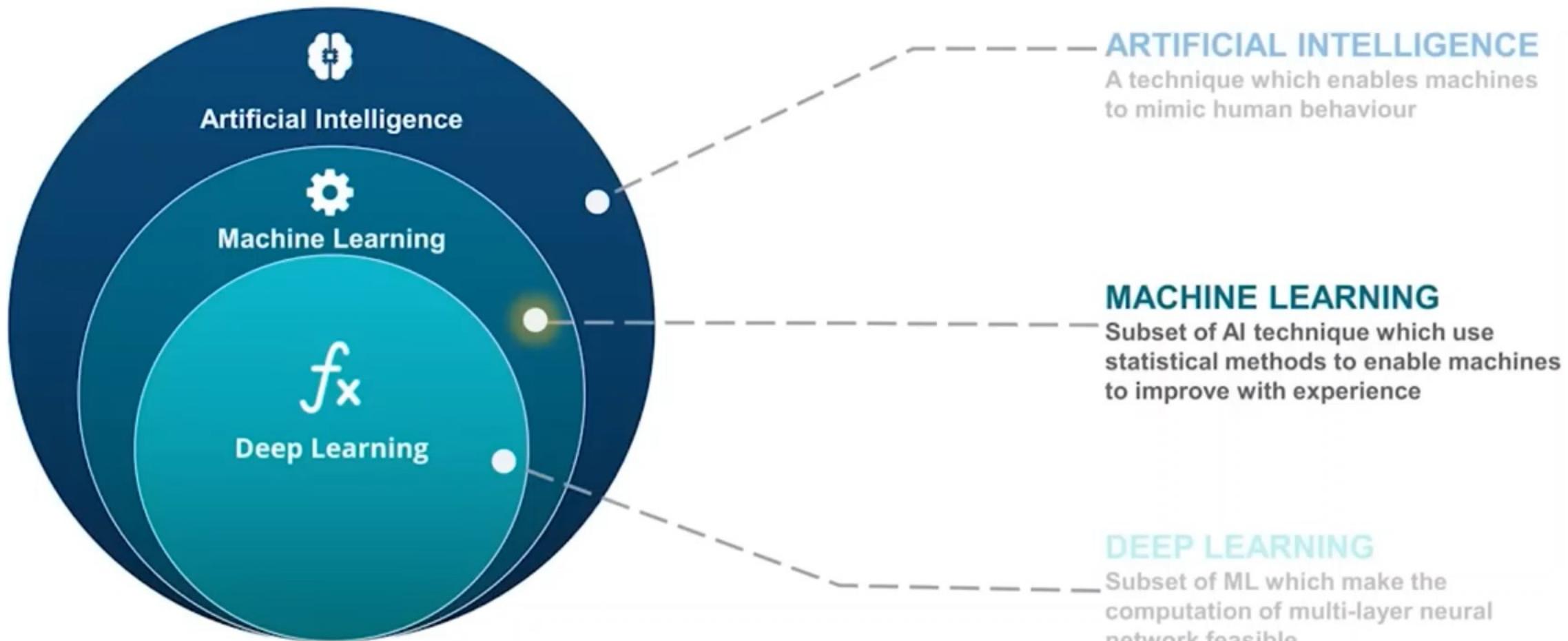
Learning?



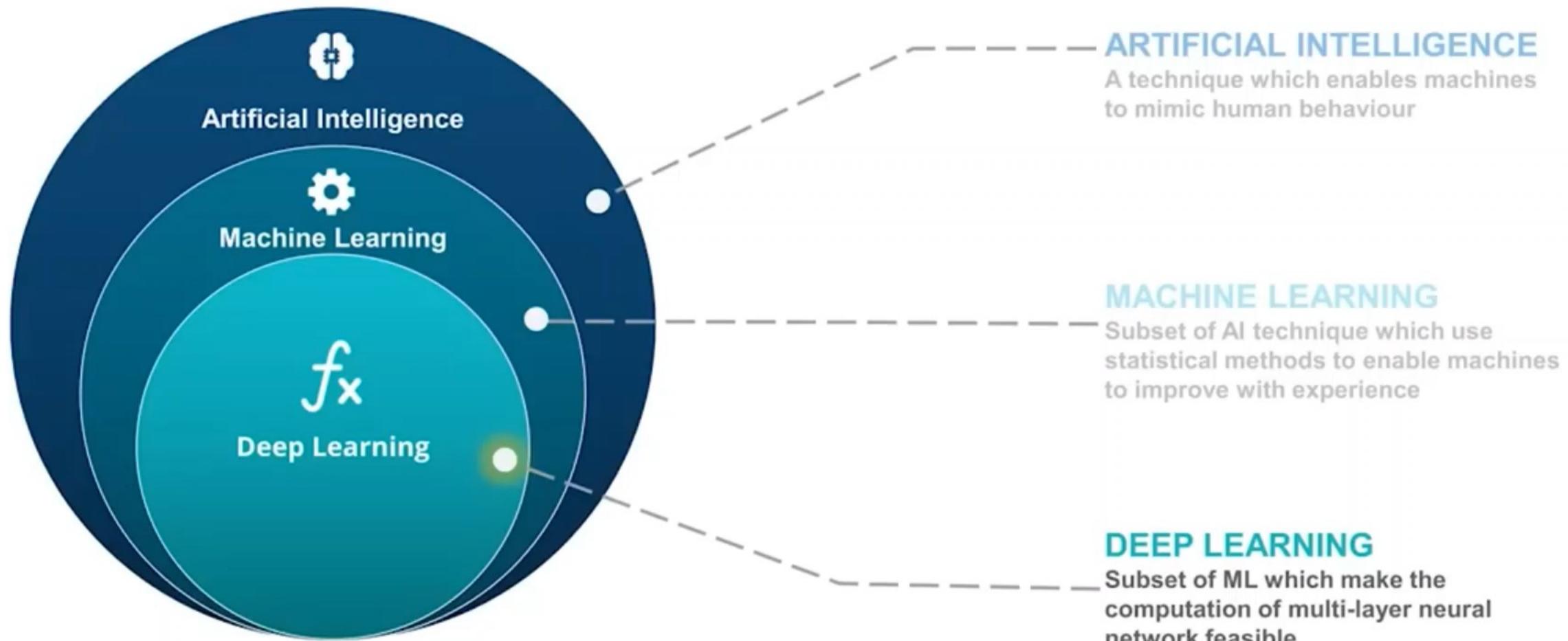
Biggest Confusion: AI vs ML vs Deep Learning



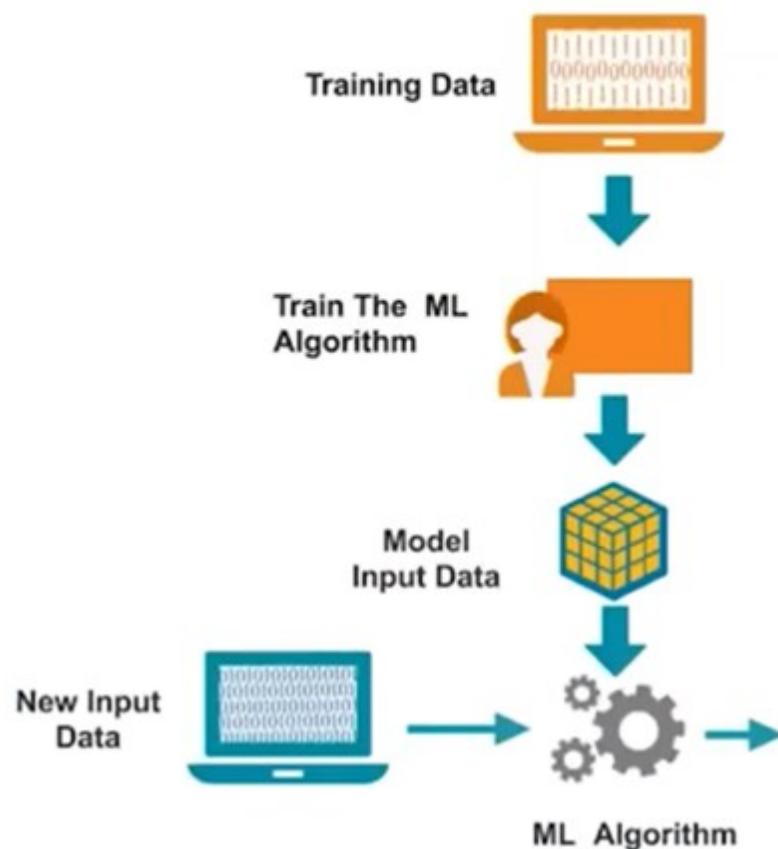
Biggest Confusion: AI vs ML vs Deep Learning



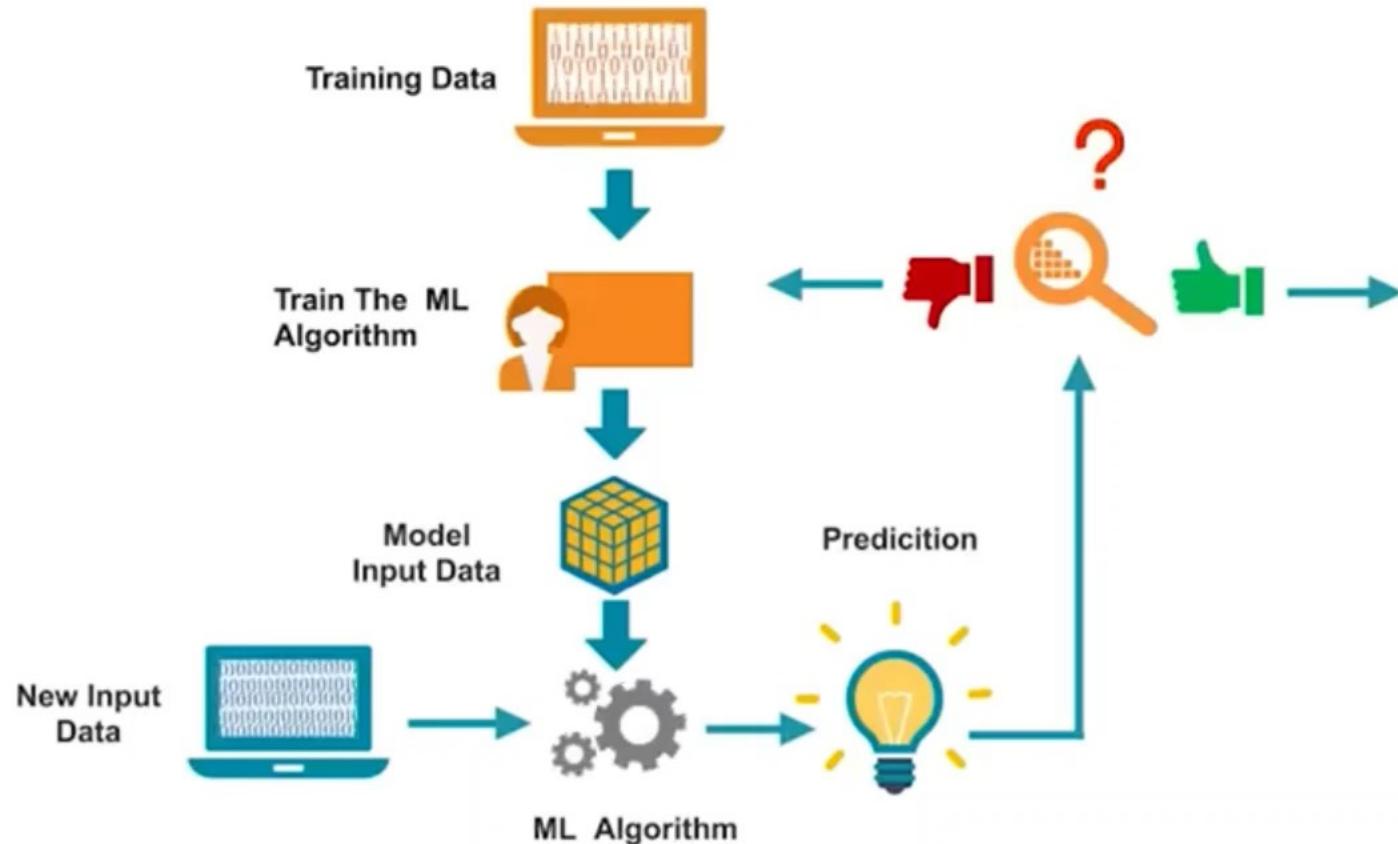
Biggest Confusion: AI vs ML vs Deep Learning



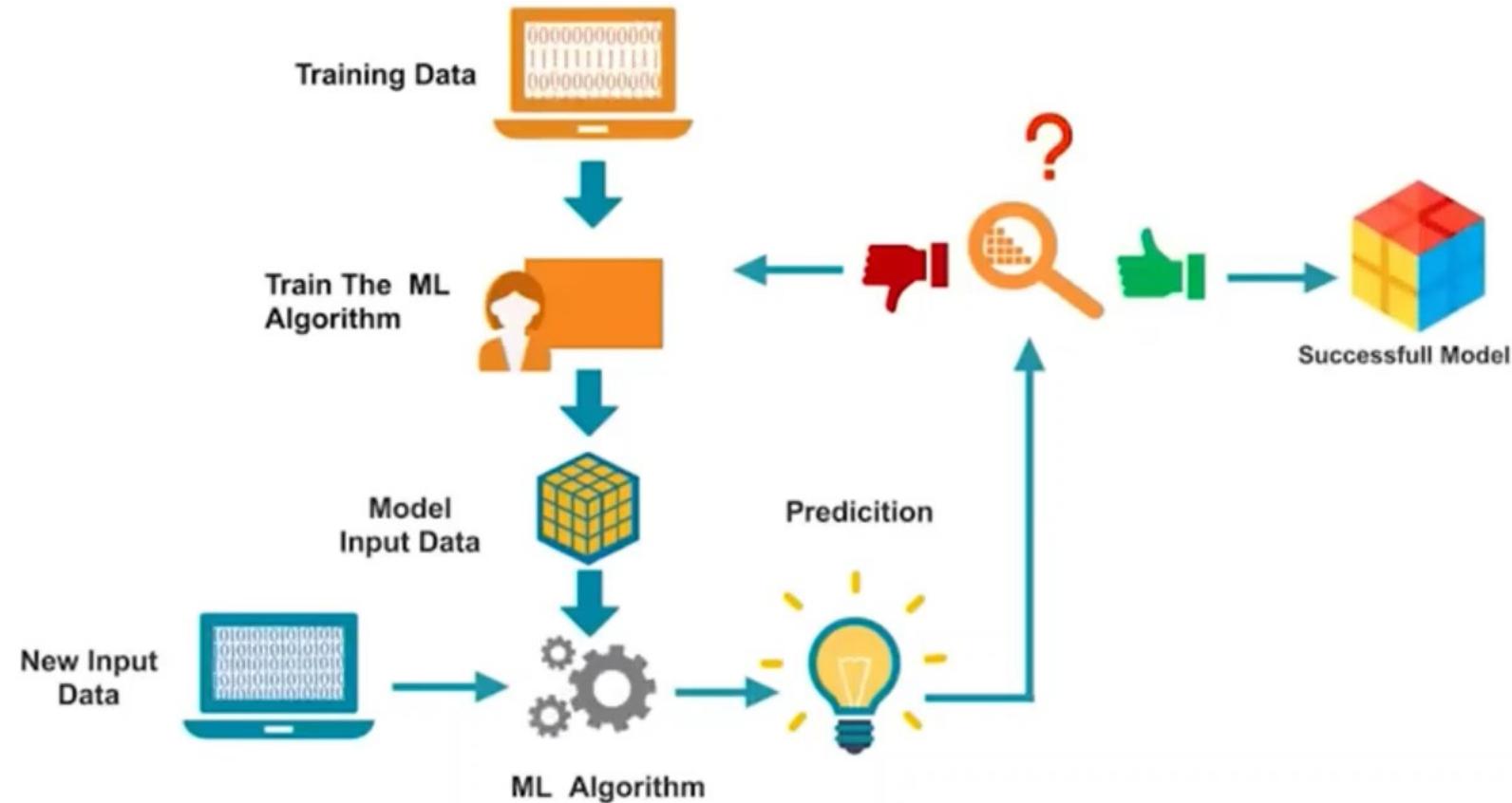
How does Machine Learning Work?



How does Machine Learning Work?



How does Machine Learning Work?



Machine Learning Types:

- **Supervised**
- **Unsupervised**
- **Reinforcement**

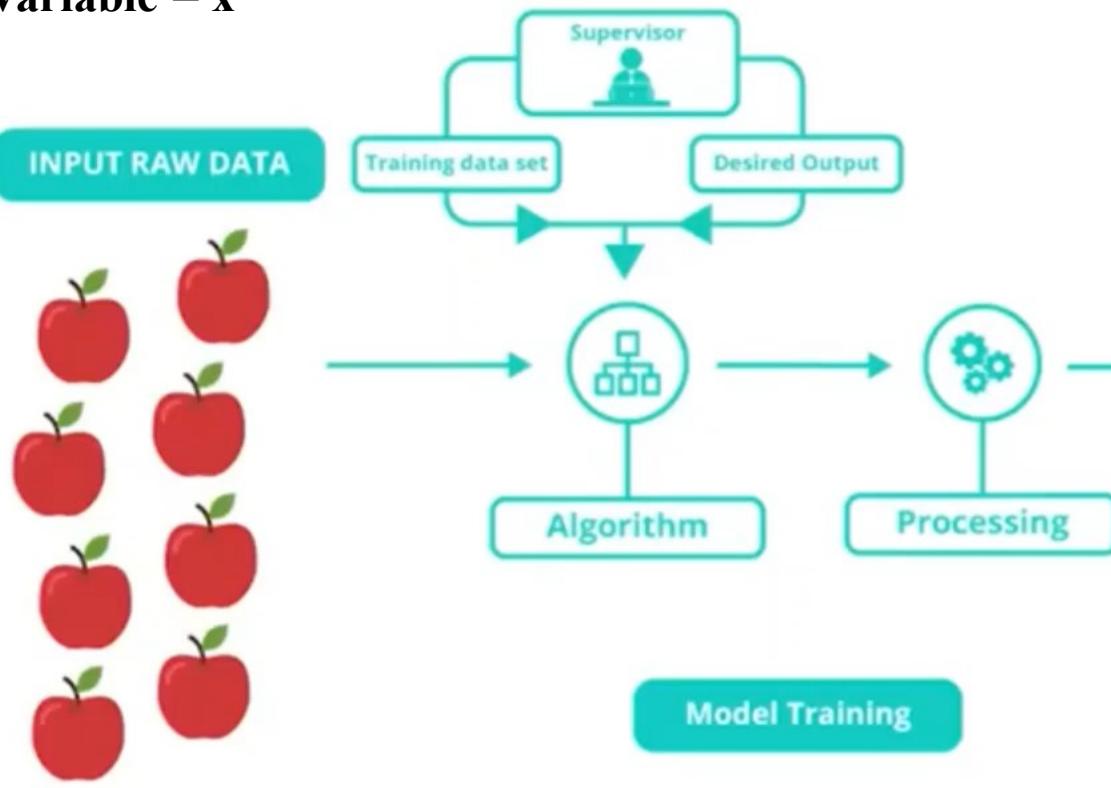


Supervised Machine Learning



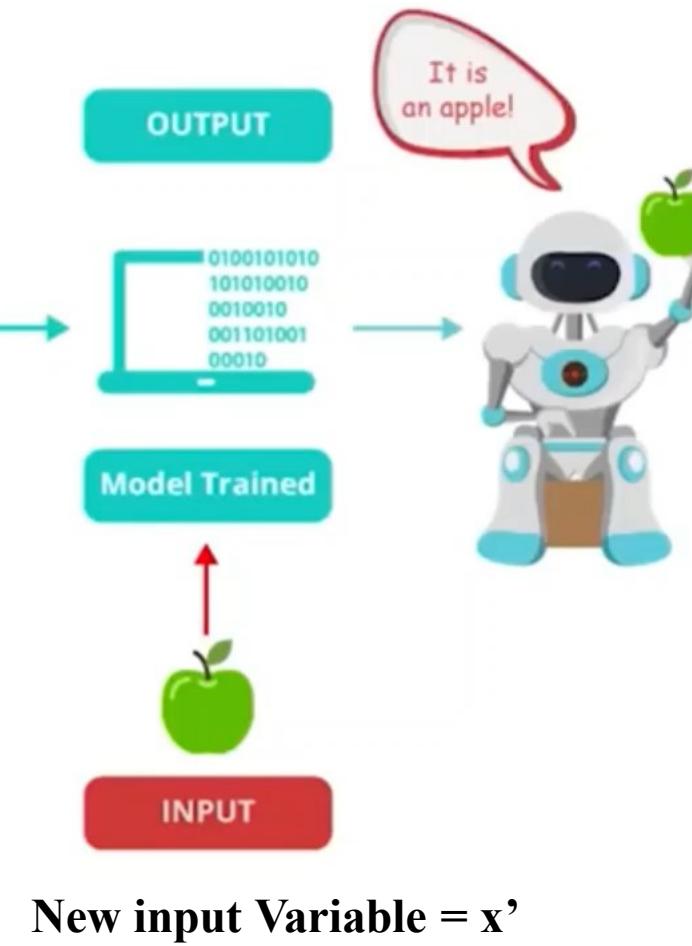
Machine Learning: Supervised

Input Variable = x



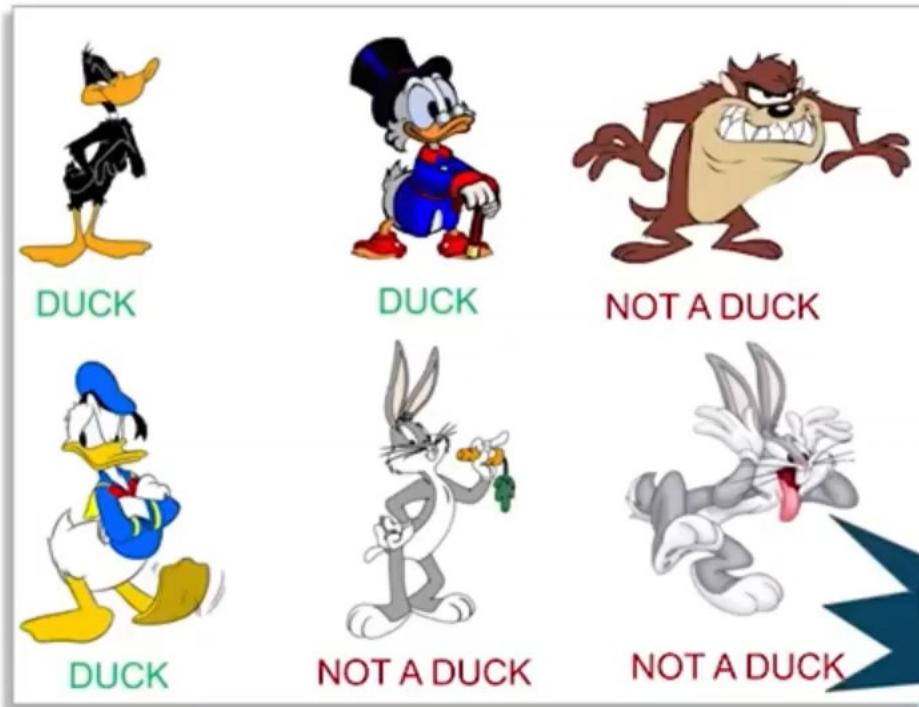
Build relationship/function
 $y=f(x)$

Input Variable = y



New input Variable = x'

Supervised Learning Example



Supervised
Learning

Predictive
Model

Predefined
Dataset



Predictive
Model

Is a DUCK

Supervised Learning Algorithms

Linear Regression



Support Vector Machines

Random Forest



Supervised Examples & Use Cases

Cortana

Weather forecast

Biometric

Bank: credit worthiness

Retail sector: Customer
will buy together?



Input Variable = x

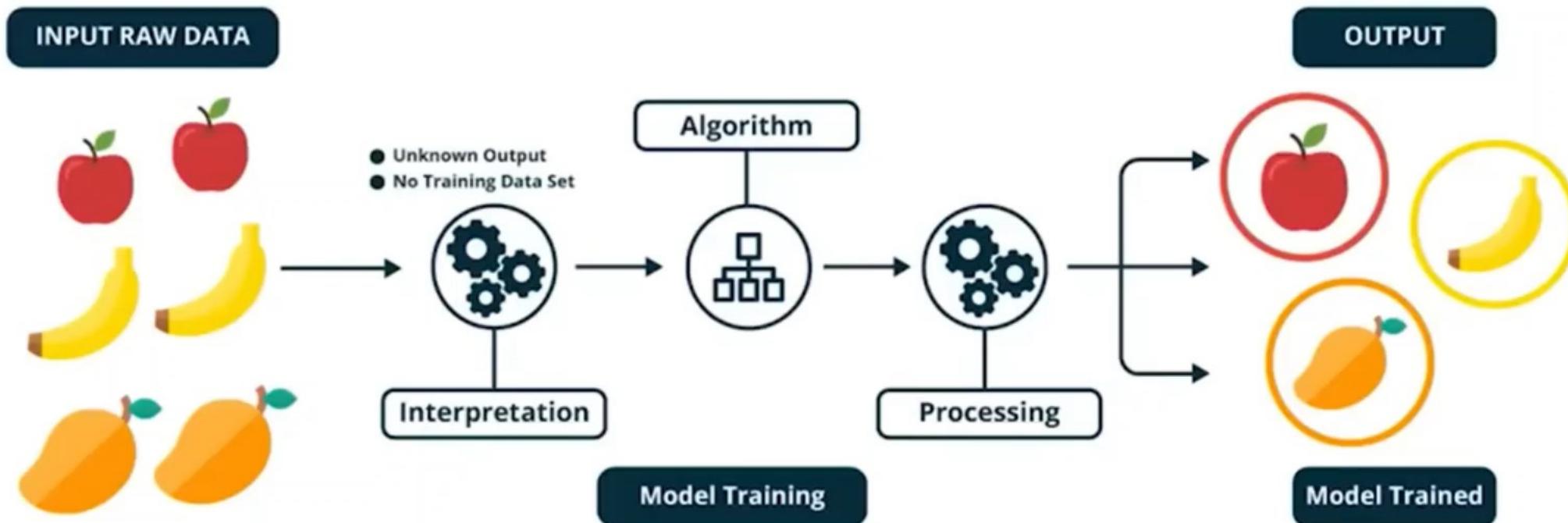
**No corresponding
output Variable = y**

Unsupervised Machine Learning

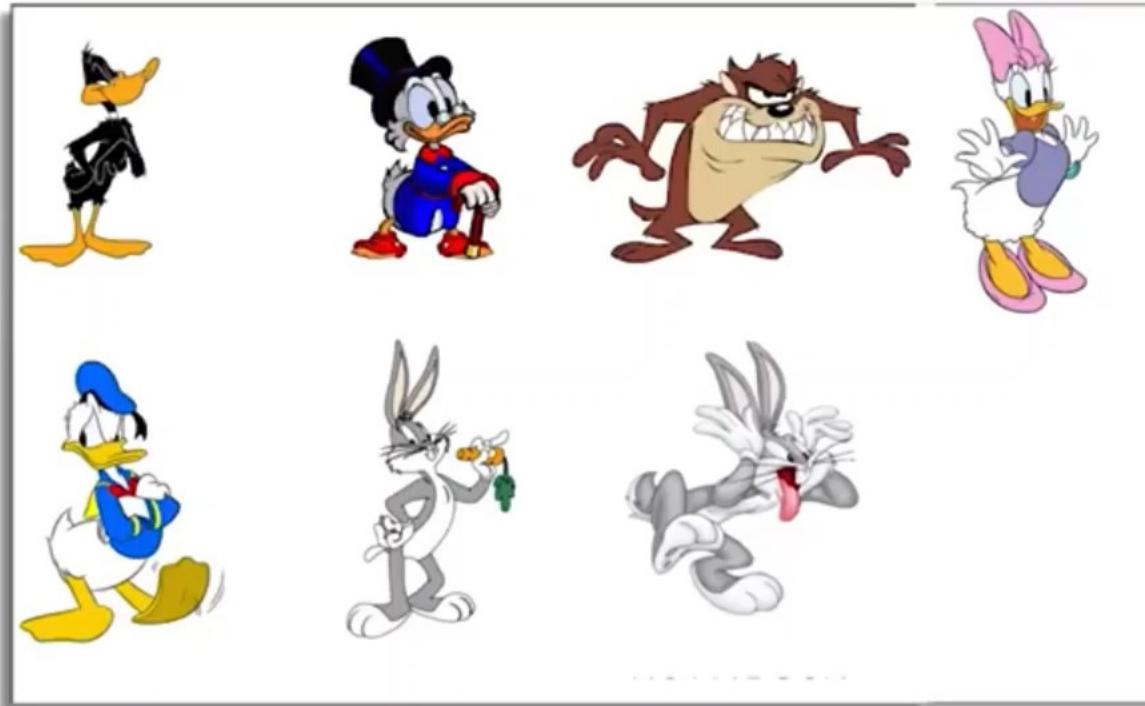
Goal of Unsupervised ML is to model the underlying structure or distribution in the data in order to learn more about the data.



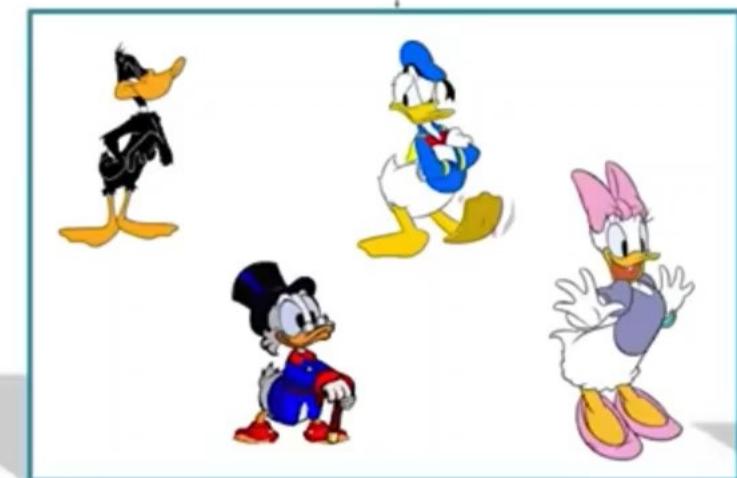
Machine Learning: Unsupervised



Machine Learning: Unsupervised



Unsupervised
Learning



Supervised Learning Algorithms

Apriori Algorithm



Hierarchical Clustering

K- Means Algorithm







A blurred background photograph of a grocery store aisle. A person's hands are visible on the handle of a shopping cart in the foreground. Shelves filled with various products are visible in the background.

Unsupervised Learning in Retail

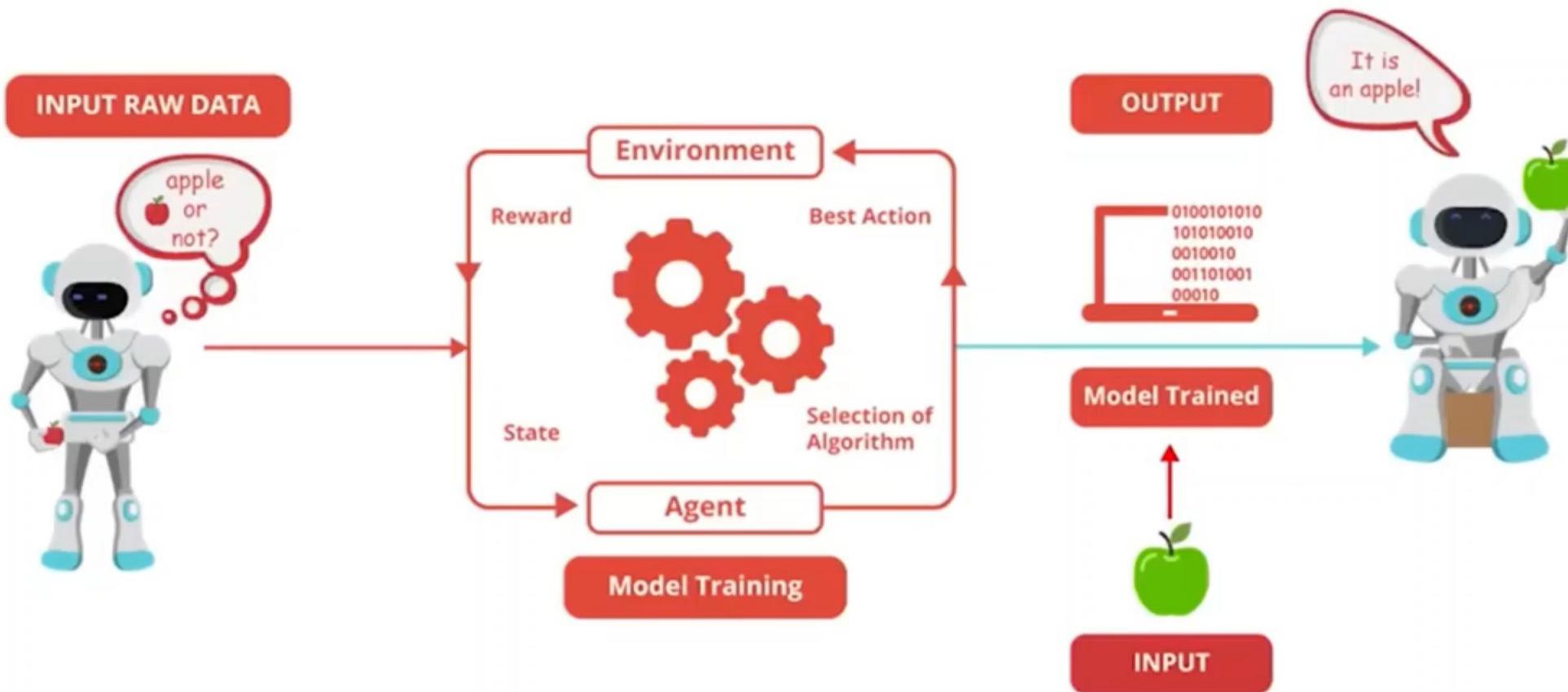
Recommend Products to Customers Based on Past Purchase

Reinforcement

Machine Learning



Machine Learning: Reinforcement

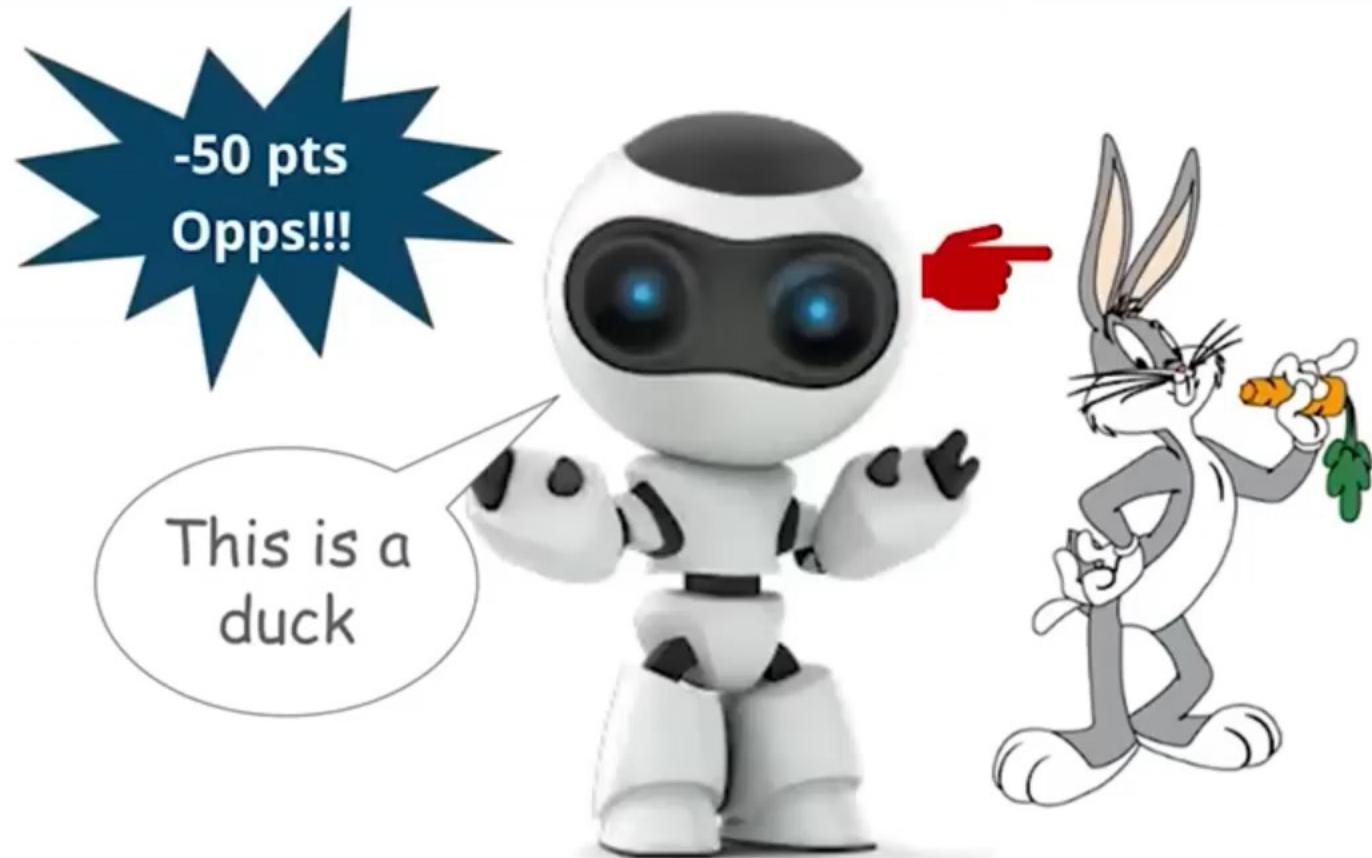


Machine Learning: Reinforcement



- 1 Observe
- 2 Select Action Using Policy

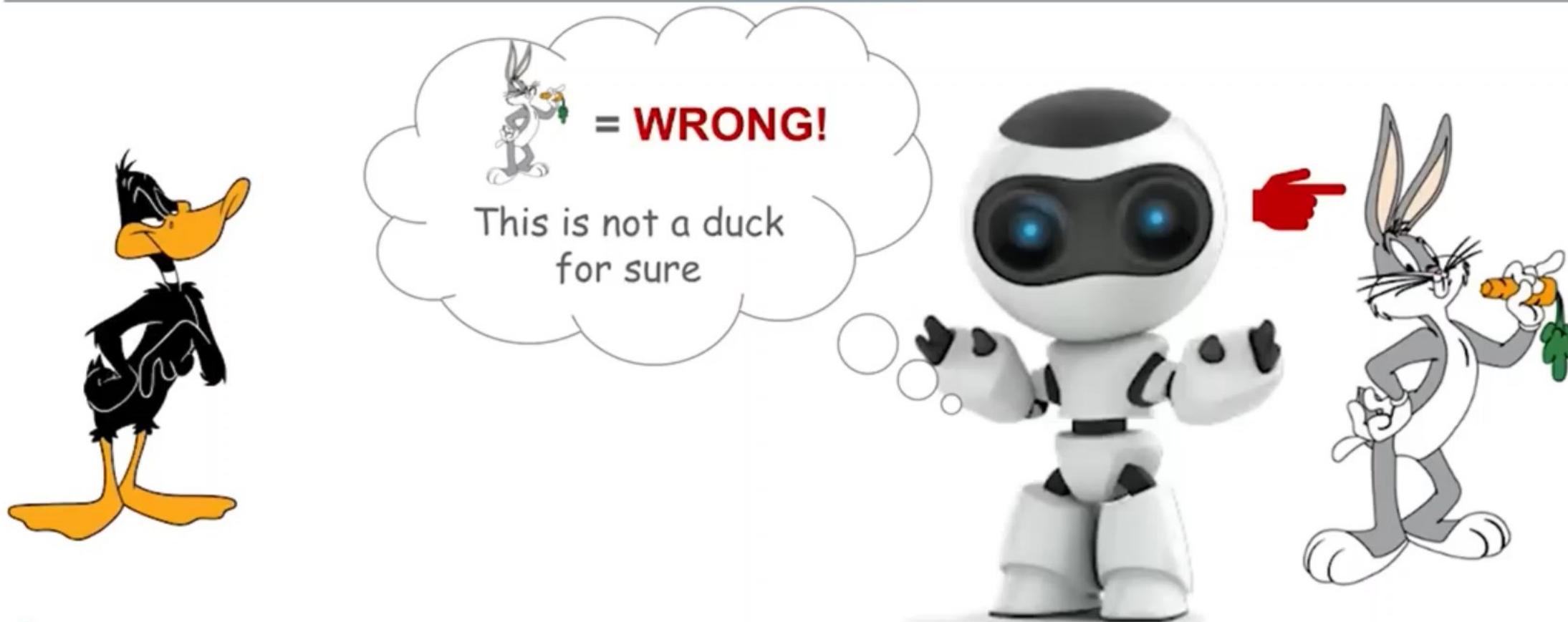
Machine Learning: Reinforcement



3 Action!

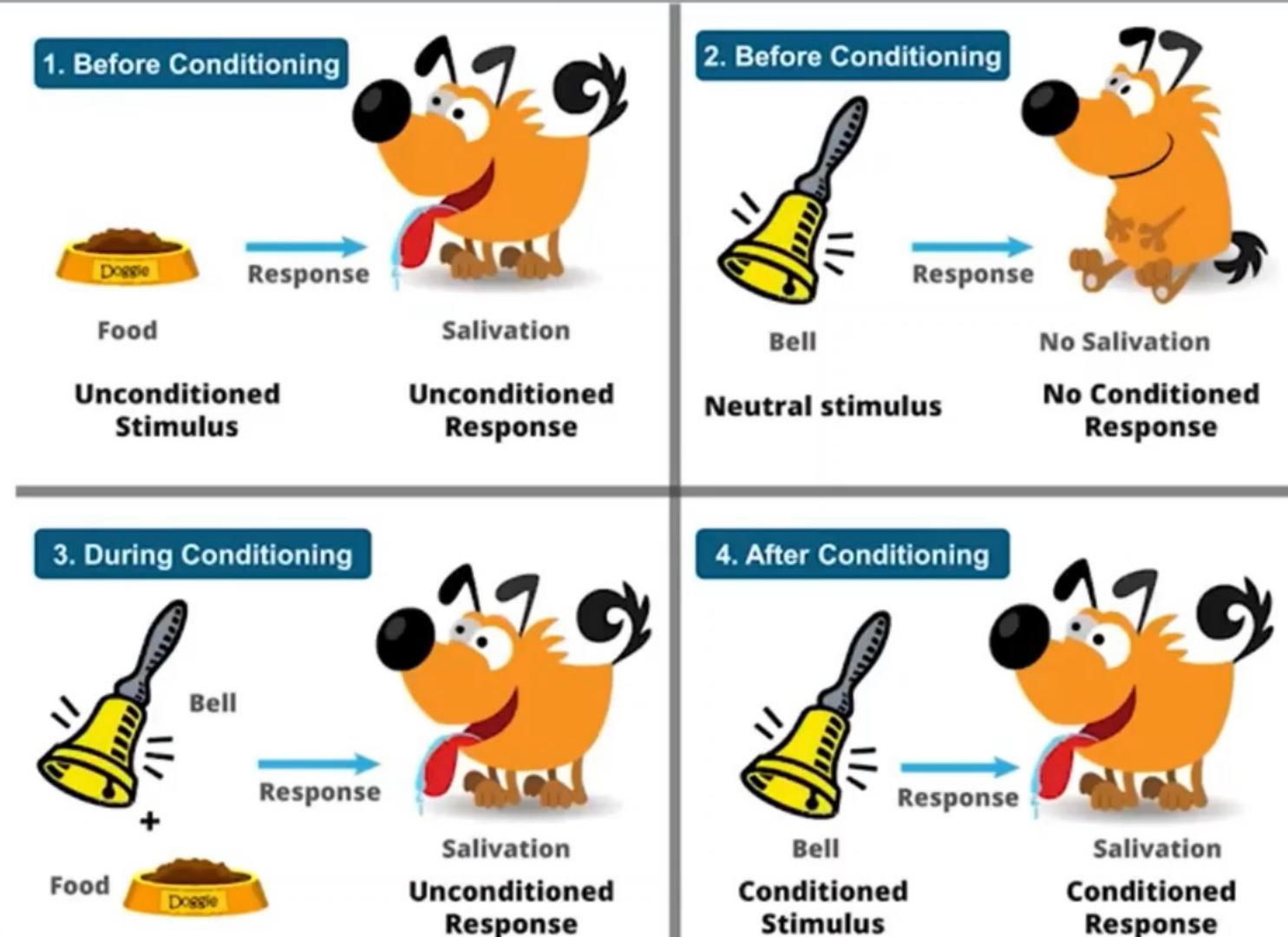
4 Get Reward or Penalty

Machine Learning: Reinforcement



- 5 Update Policy (learning step)
- 6 Iterate to get Optimal Policy

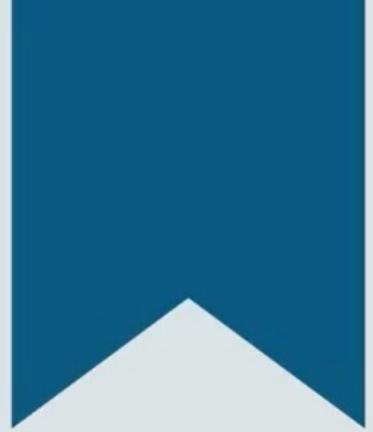
Reinforcement Training with Dog



A close-up, slightly blurred photograph of a shopping cart's handle and front basket. A person's hands are visible gripping the handle. In the background, shelves filled with various grocery items are visible, though out of focus.

Reinforcement Learning in Retail

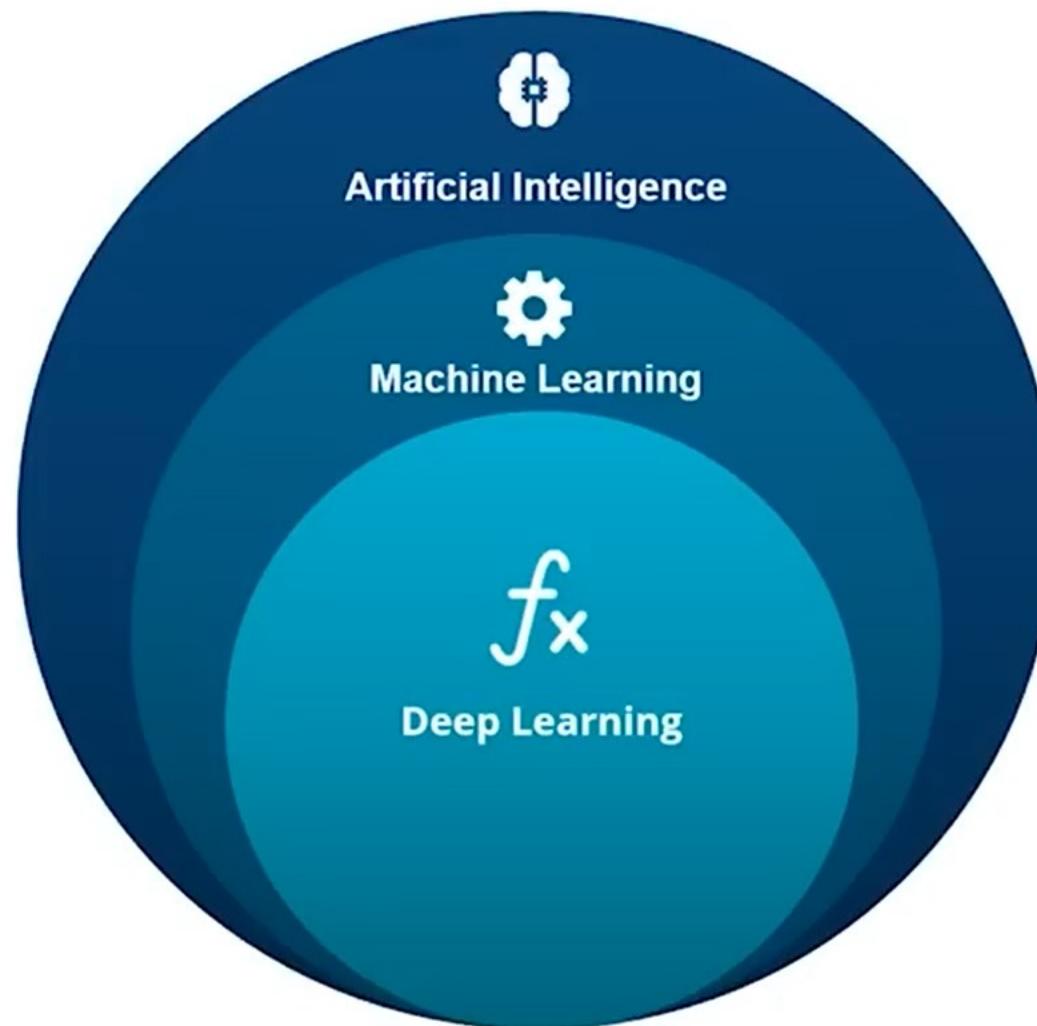
Reduce Excess Stock with Dynamic Pricing



02

AI vs Machine Learning vs Deep Learning

Biggest Confusion: AI vs ML vs Deep Learning



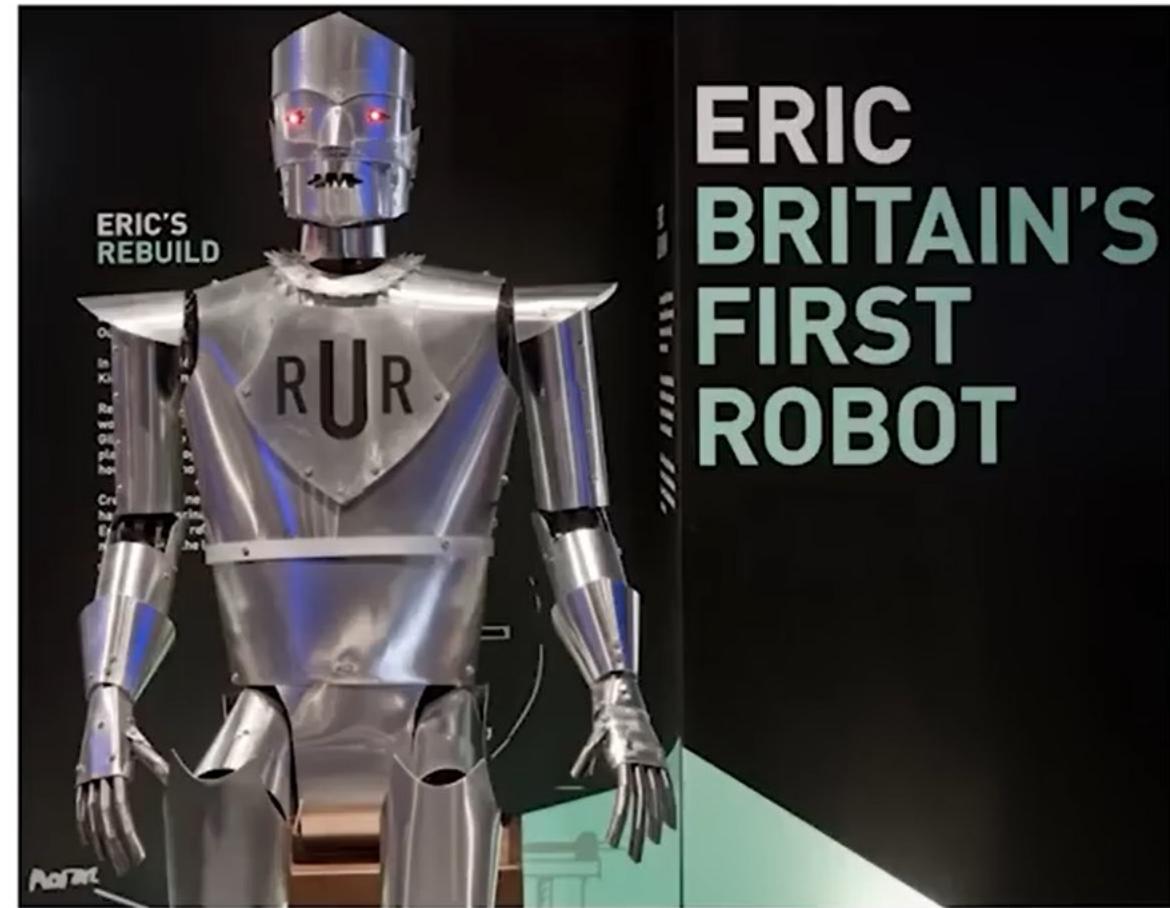
History of AI



1950s-1970s

Artificial Intelligence

The idea of Artificial Intelligence came into existence and the term AI was first coined in 1956



Its all about
BIG Data

44 ZB

By 2020

4.4
ZB

ice
water

- High end computational Power
- Large Storage
- 70% of enterprise will implement AI over the next 12 month

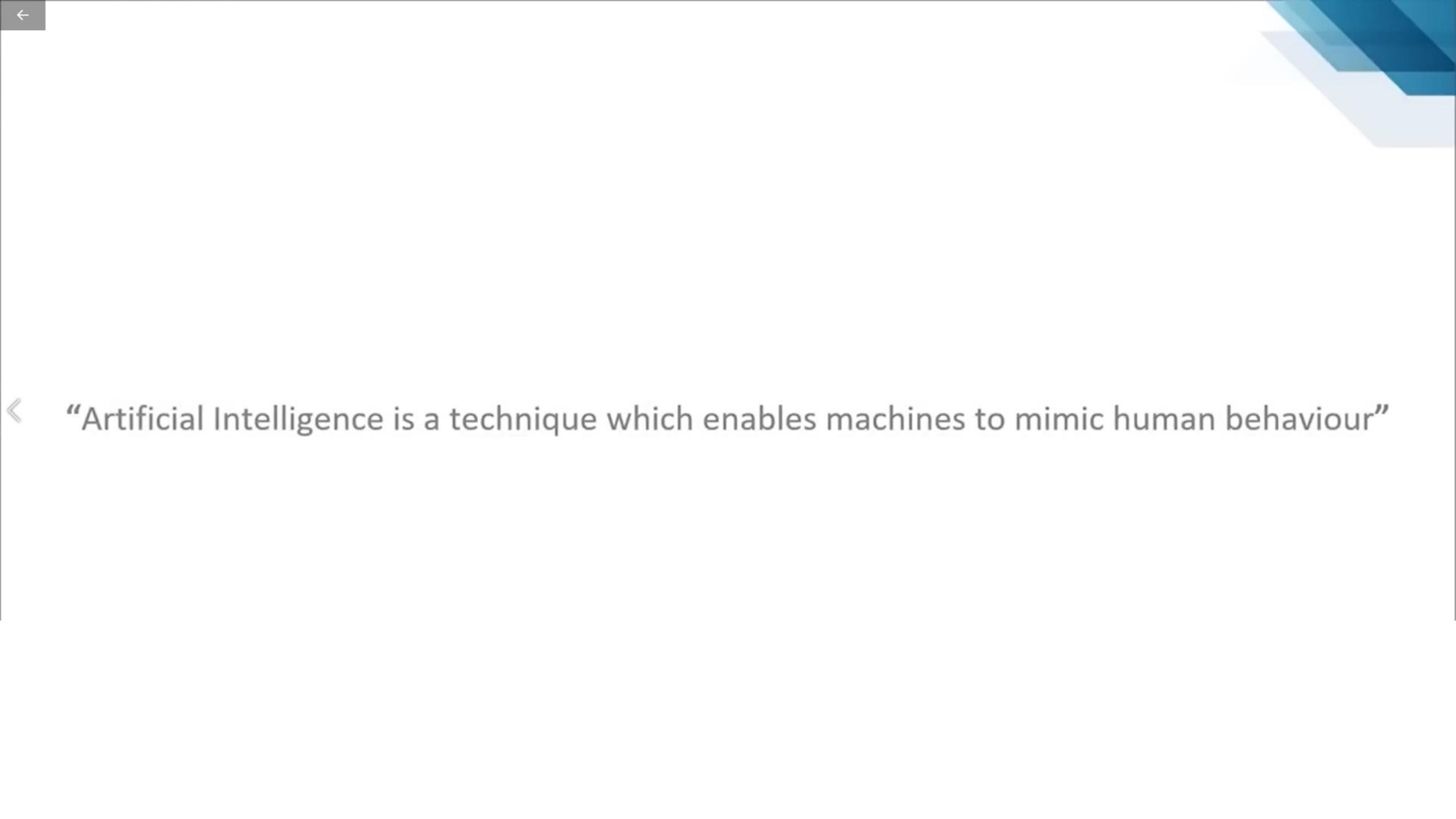
Its all about
BIG Data



The word "iceberg" is written in a large, bold, black font. The letters "ice" are positioned above the waterline, and the letters "berg" are submerged in the dark, choppy water below.



What is Artificial Intelligence?



“Artificial Intelligence is a technique which enables machines to mimic human behaviour”



"AI's gonna look back on us the same
way we look on fossils."

ex machina



Examples Of Artificial Intelligence



LEFT REARWARD VEHICLE CAMERA

MEDIUM RANGE VEHICLE CAMERA

Why Machine Learning was Introduced?

Statistics: How to efficiently train large complex models?

Computer Science & Artificial Intelligence: How to train more robust versions of the AI systems?

Neuroscience: How to design operational models of the brain?



Snapchat

Snapchat's filters use **augmented reality and machine learning** for your flower crowns selfies

What is Machine Learning?

Netflix

Netflix, the app that **knows what you want**

Snapchat

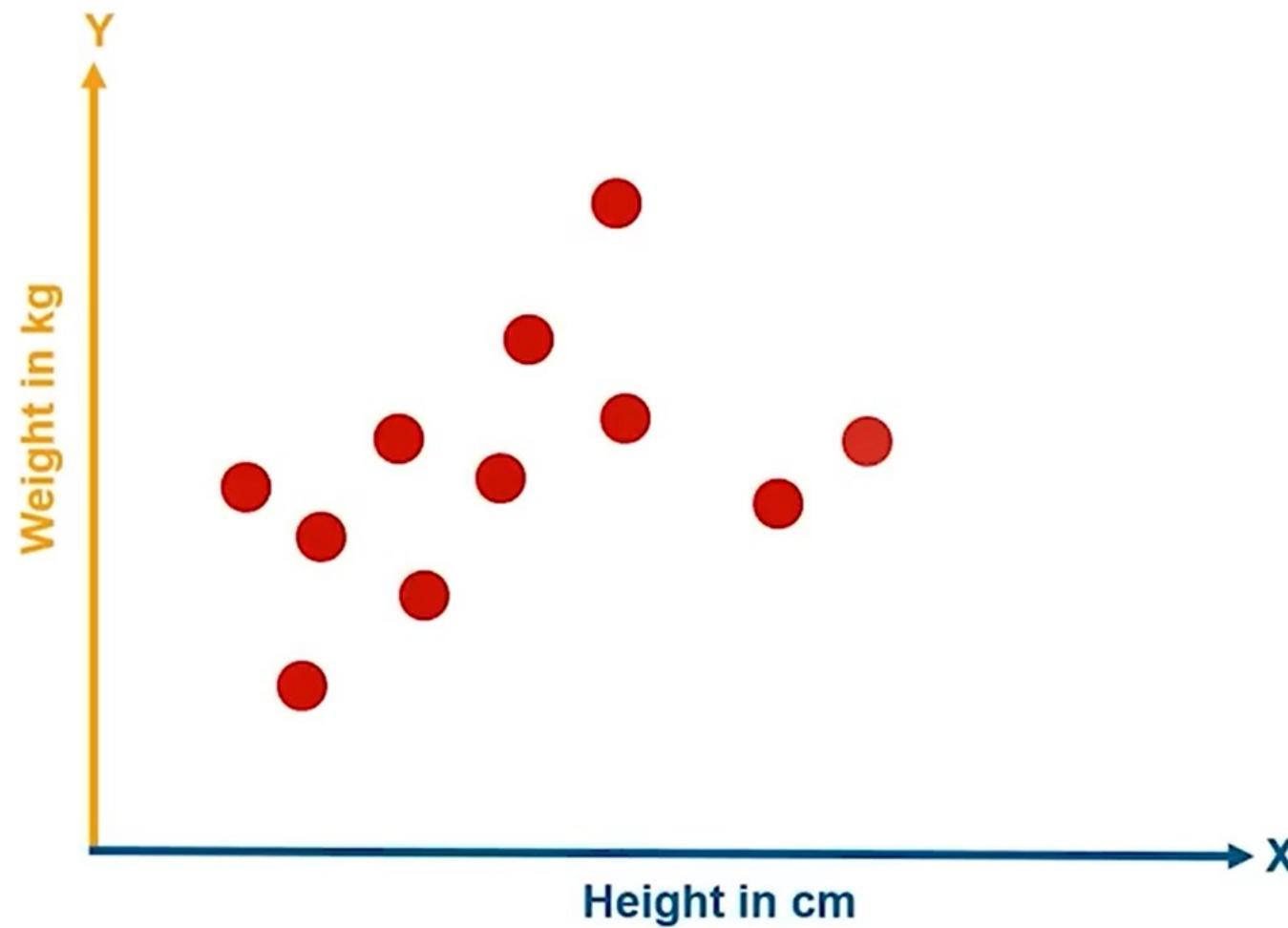
Snapchat's filters use **augmented reality and machine learning** for your flower crowns selfies

“Machine Learning is a subset of AI technique which use statistical methods to enable machines to improve with experience”

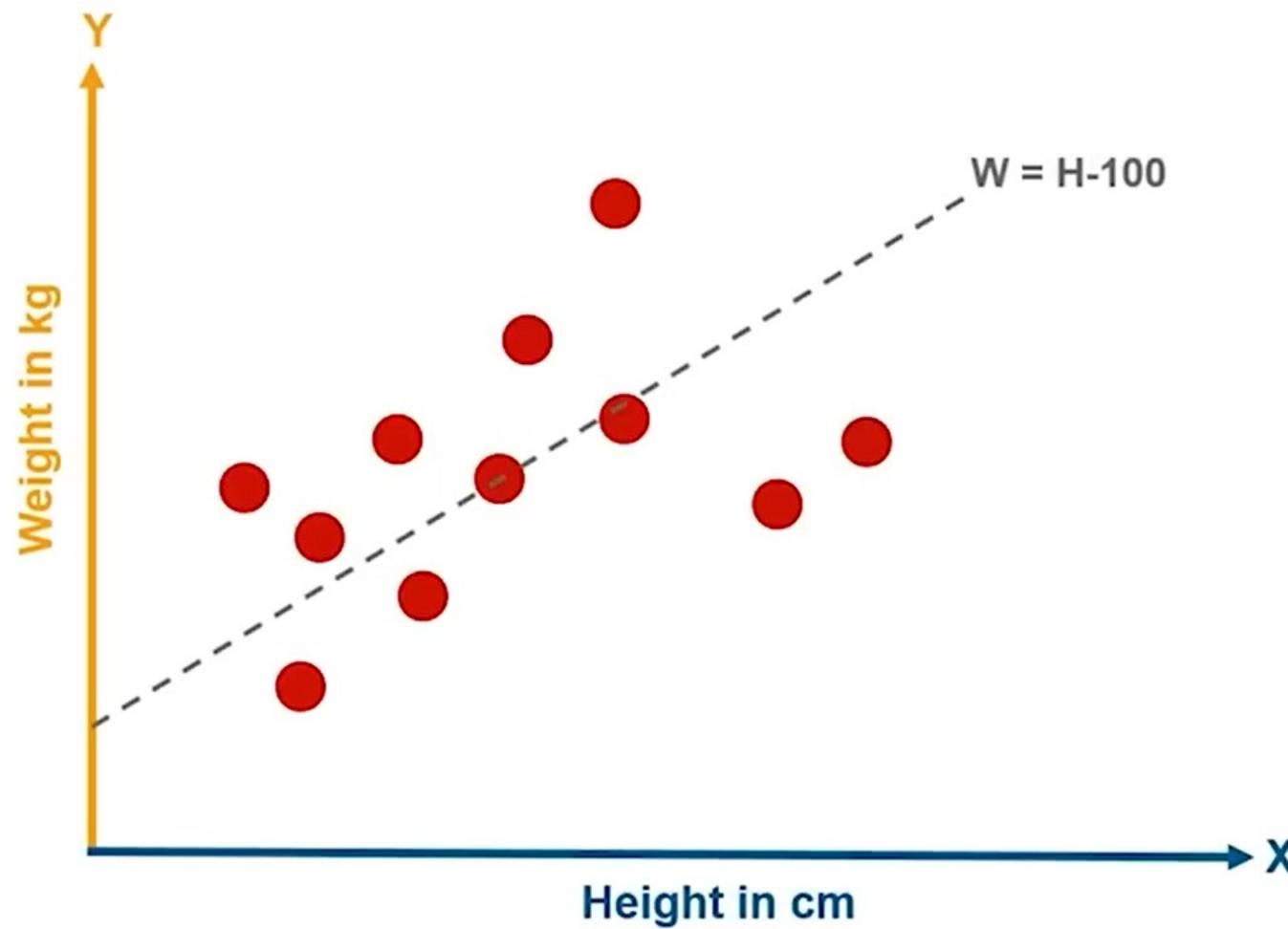
Netflix

Netflix, the app that **knows what you want**

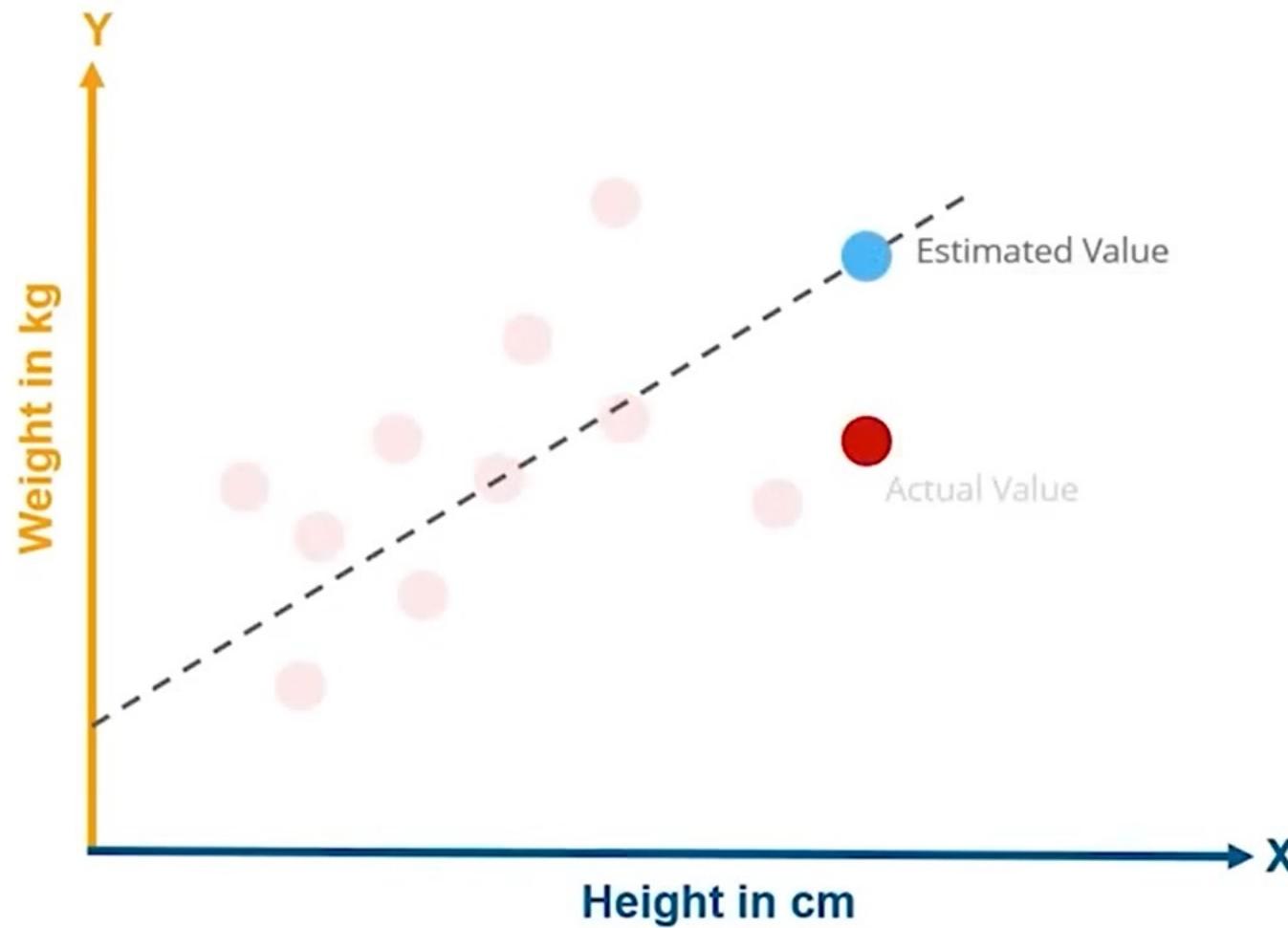
Example Of Machine Learning



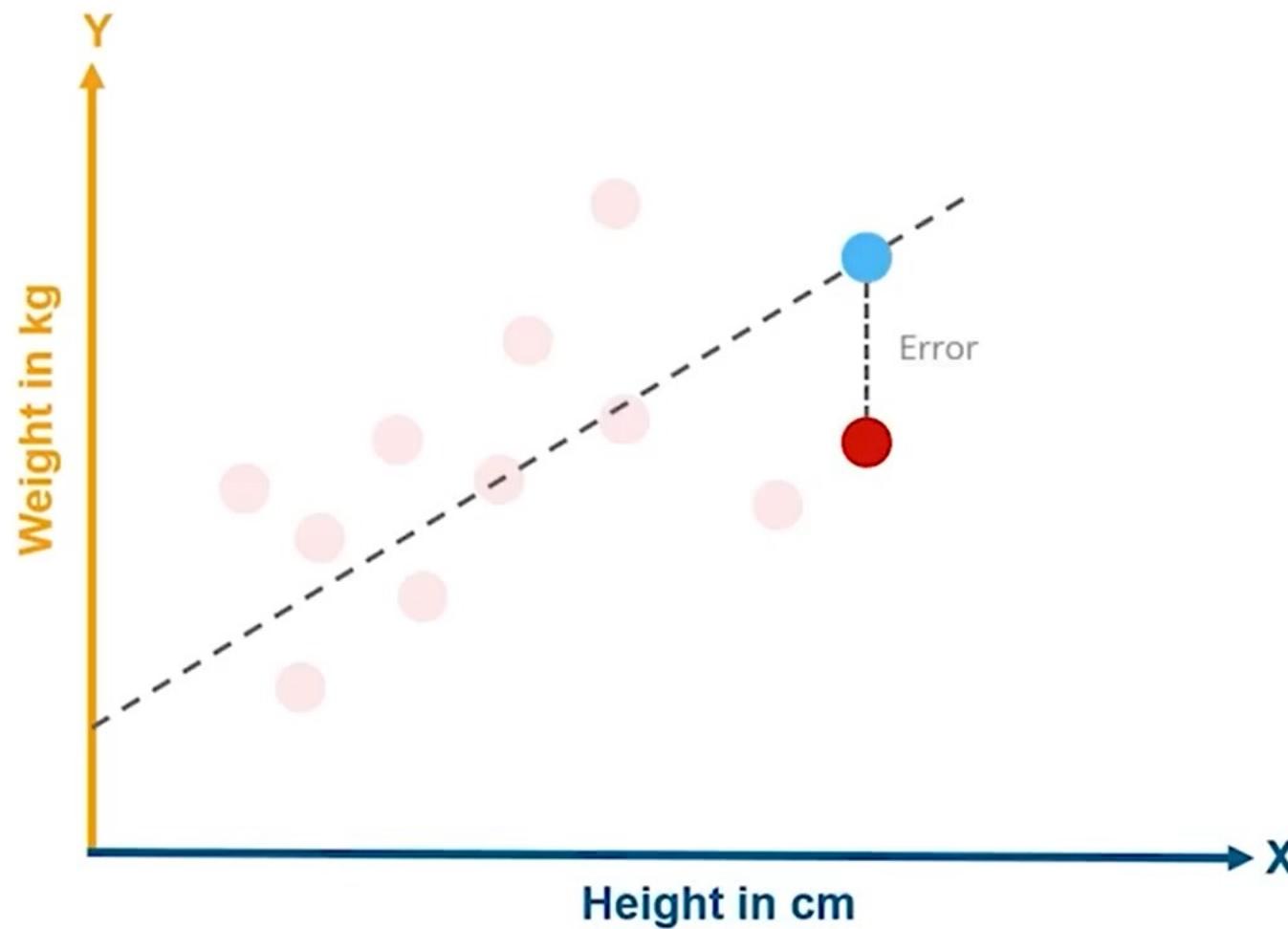
Example Of Machine Learning



Example Of Machine Learning



Example Of Machine Learning



Example Of Machine Learning





What is Deep Learning?





“Deep learning is a particular kind of machine learning that is inspired by the functionality of our brain cells called neurons which led to the concept of artificial neural network”

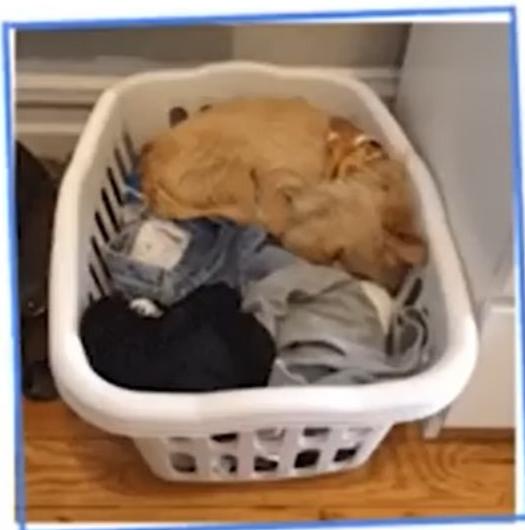


Example Of Deep Learning

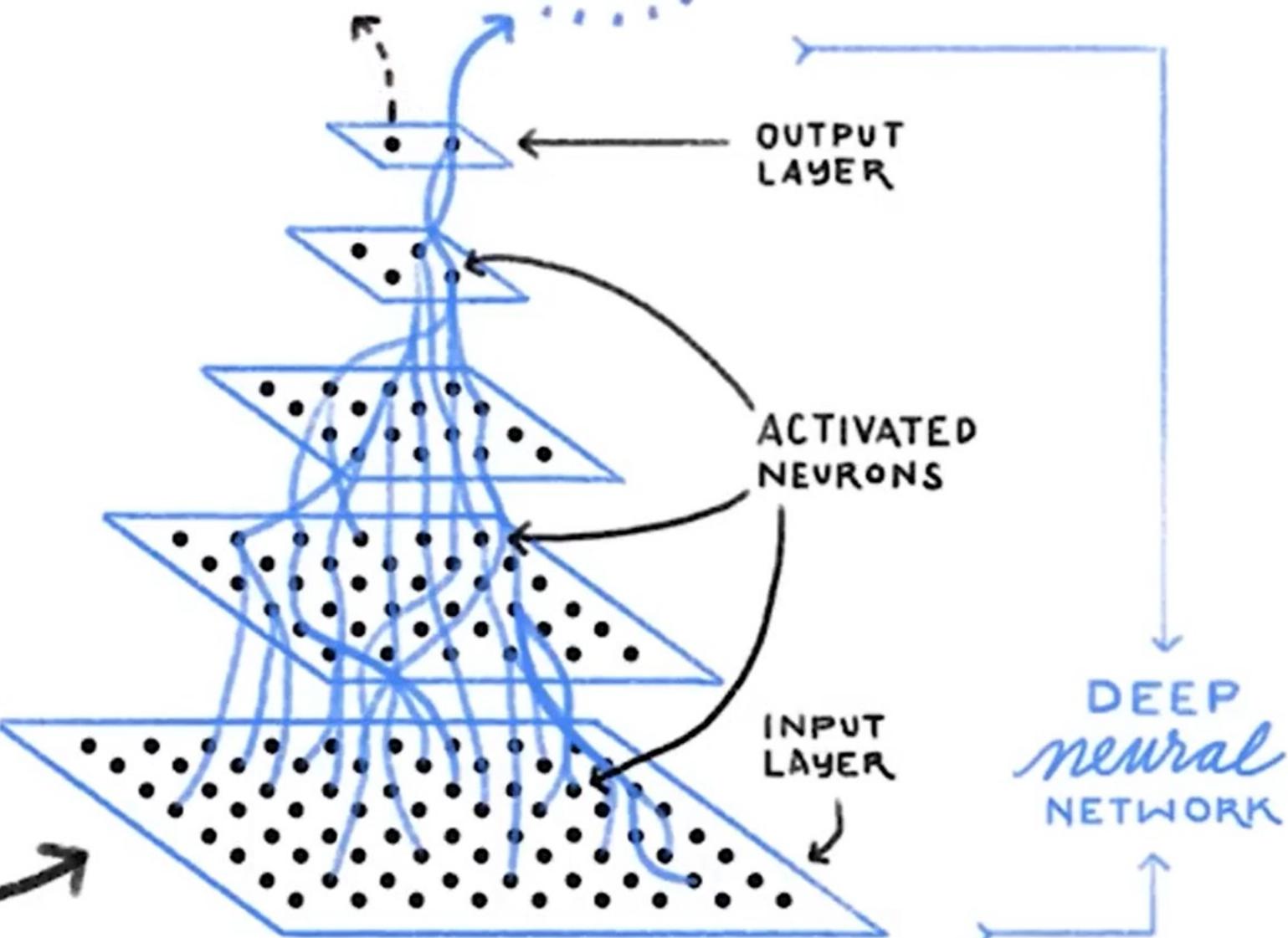


- Sides = 4 ✓
- Closed ✓
- Perpendicular ✓
- Equal Sides ✓

IS THIS A
CAT or DOG?

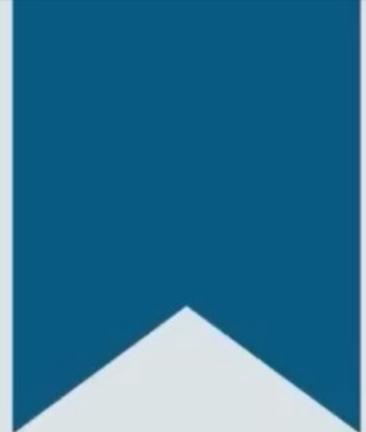


~~CAT~~ : DOG :



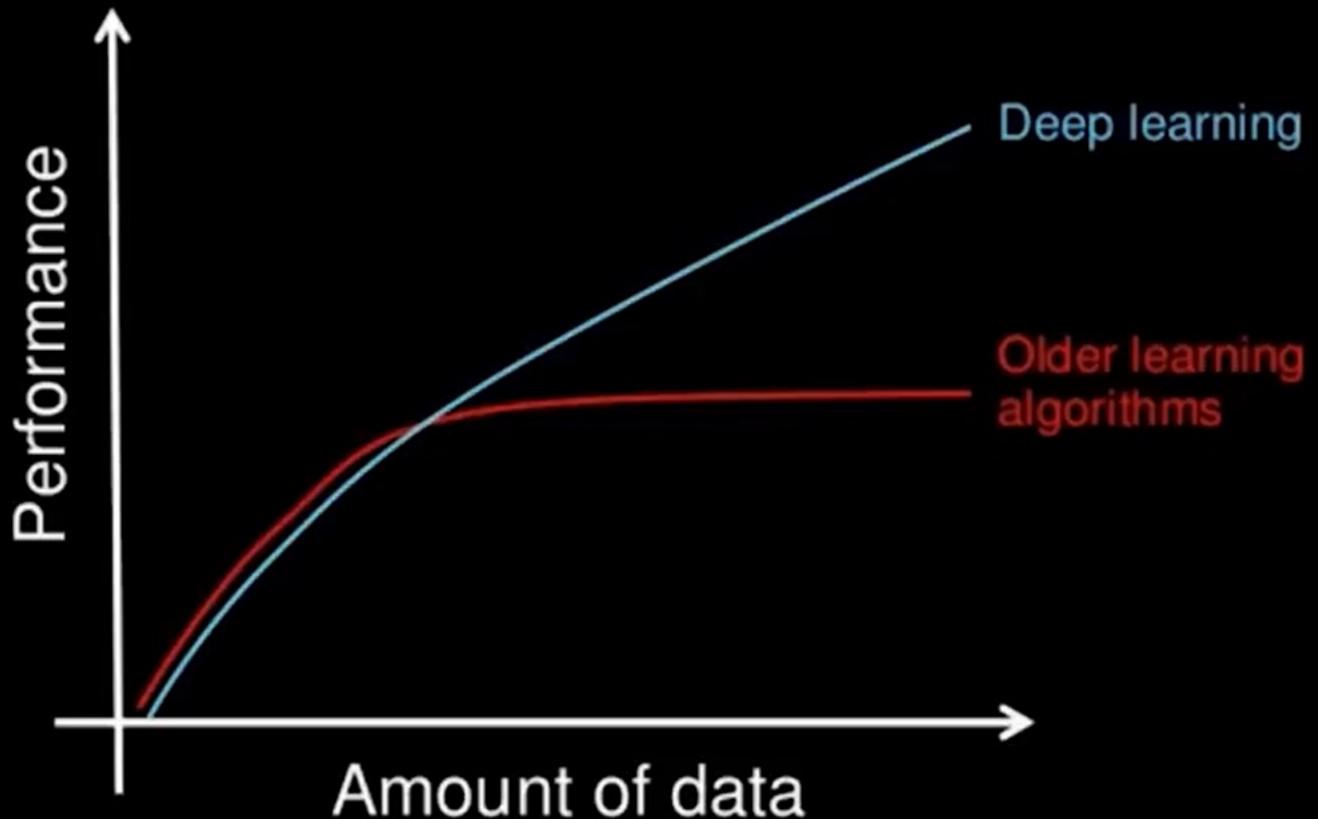


Machine Learning vs Deep Learning



Deep Learning **IS** Machine Learning

Data Dependency



How do data science techniques scale with amount of data?

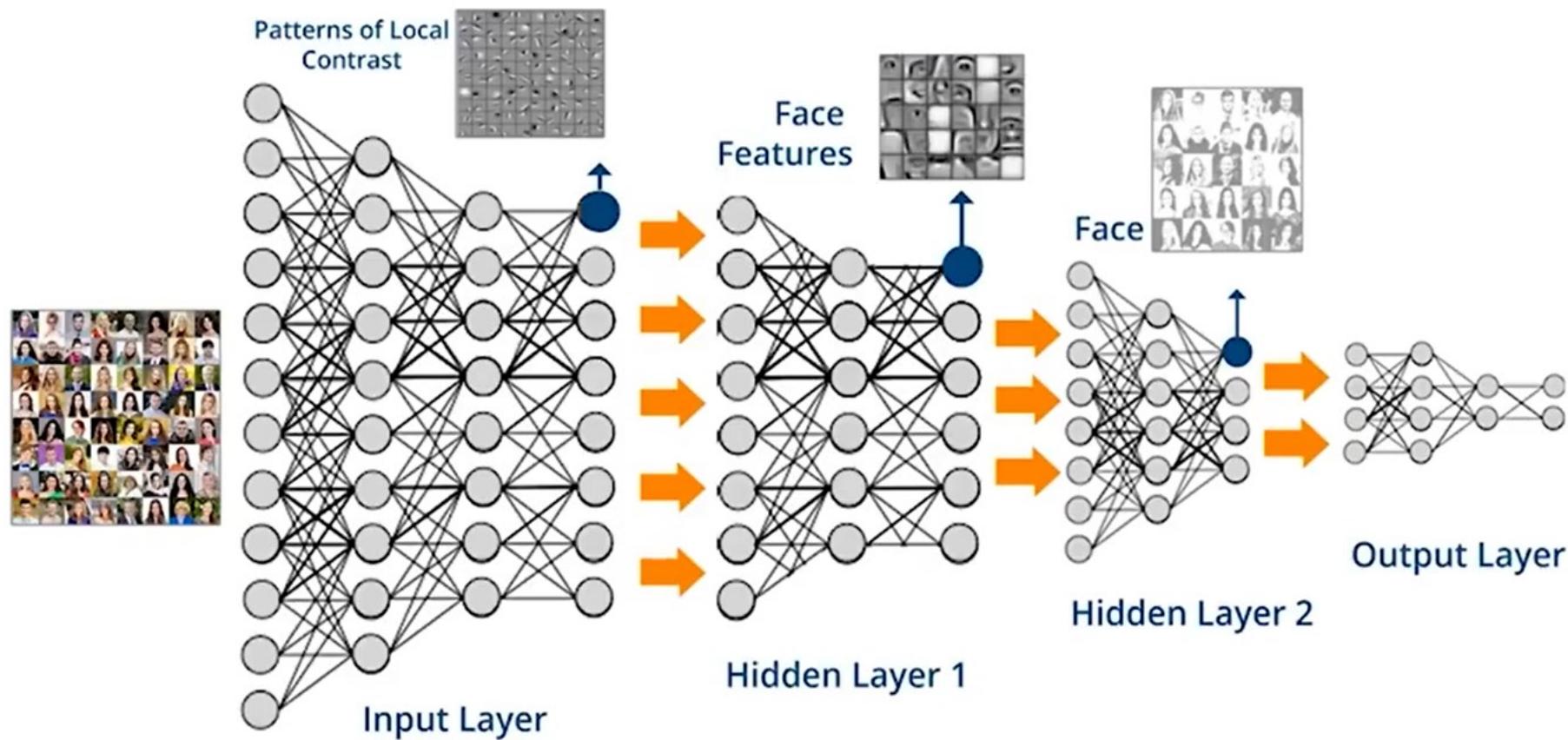


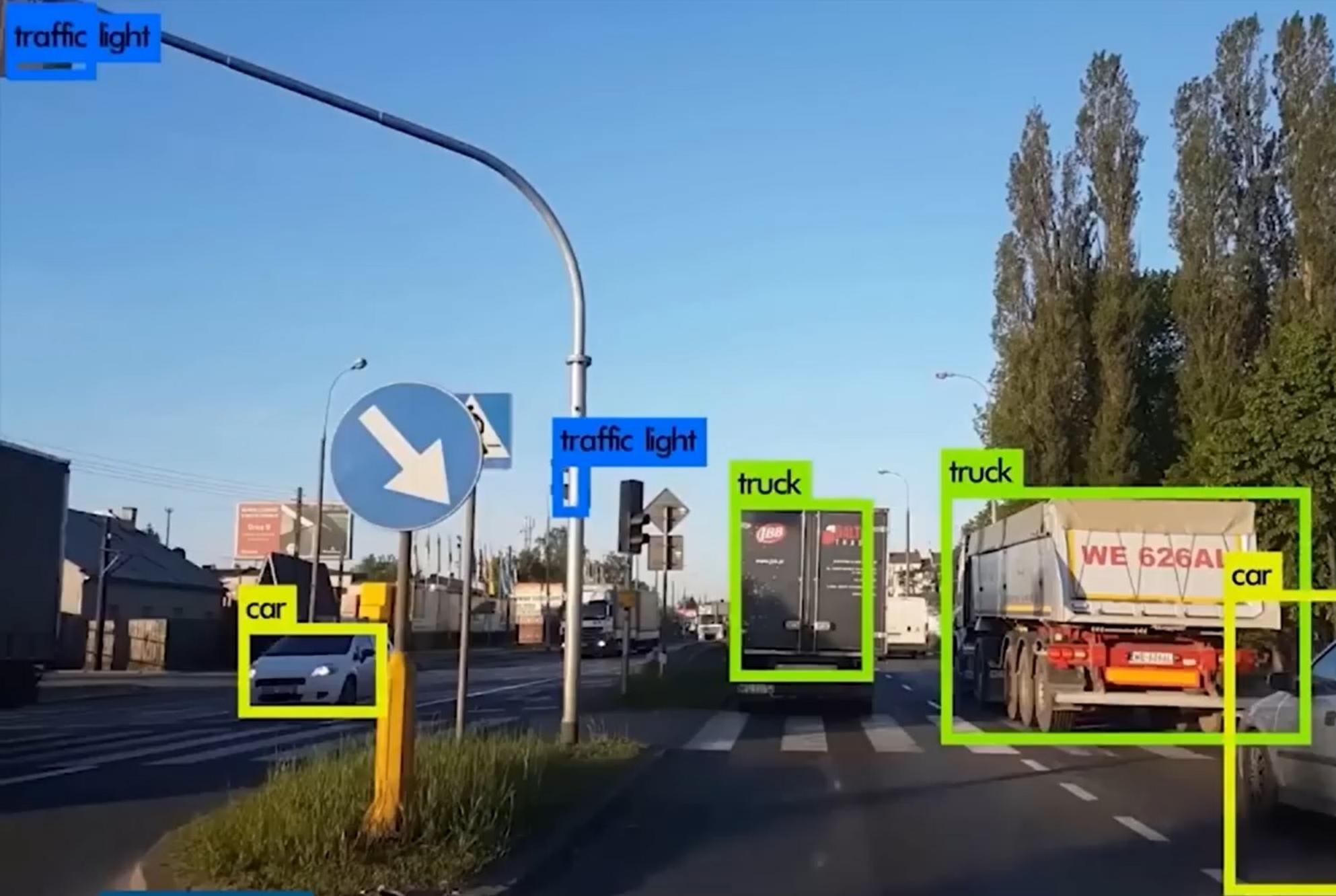
Machine Learning
vs Deep Learning

Hardware
Dependency

Machine Learning vs Deep Learning

Feature Engineering





Machine Learning
vs Deep Learning

Problem Solving Approach

Machine learning:
Breakdown the
problem into
subparts

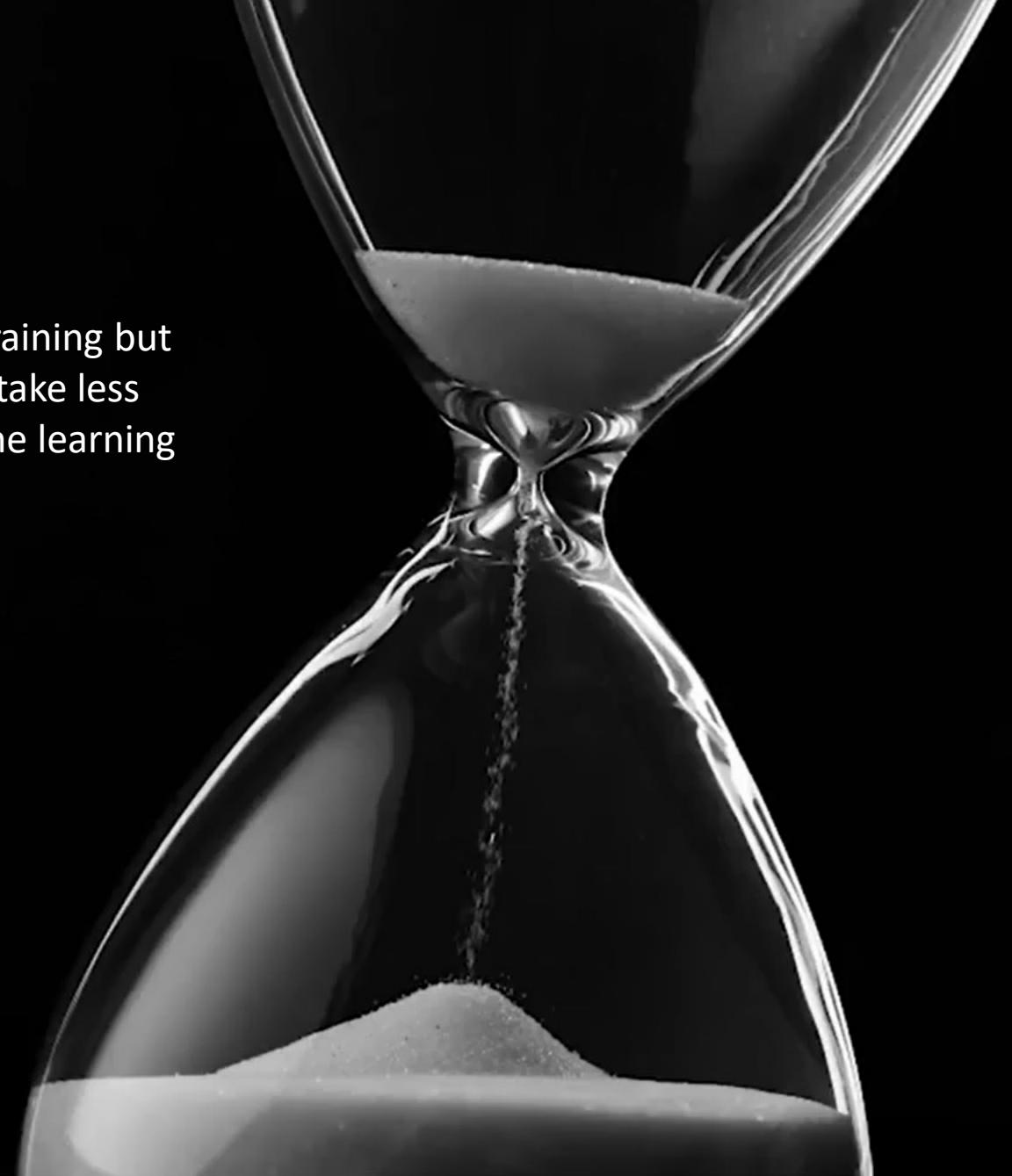
Deep learning
solves the
problem end to
end



Machine Learning vs Deep Learning

Execution Time

Deep learning takes time in training but when comes to testing it will take less time in comparison to machine learning



Summary

- Machine learning uses algorithms to parse data, learn from that data, and make informed decisions based on what it has learned
- Deep learning structures algorithms in layers to create an artificial “neural network” that can learn and make intelligent decisions on its own
- Deep learning is a subfield of machine learning. While both fall under the broad category of artificial intelligence, deep learning is usually what’s behind the most human-like artificial intelligence

History

IP[y]:



Installation

Anaconda Navigator

File Help

ANA CONDA NAVIGATOR

Upgrade Now Sign in to Anaconda Cloud Refresh

Applications on base (root) Channels

 jupyterlab 0.31.4 An extensible environment for interactive and reproducible computing, based on the Jupyter Notebook and Architecture. Launch	 jupyter notebook 5.4.0 Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis. Launch	 qtconsole 4.3.1 PyQt GUI that supports inline figures, proper multiline editing with syntax highlighting, graphical calltips, and more. Launch	 spyder 3.2.6 Scientific PYthon Development EnviRonment. Powerful Python IDE with advanced editing, interactive testing, debugging and introspection features Launch
 vscode 1.25.1 Streamlined code editor with support for development operations like debugging, task running and version control. Launch	 glueviz 0.13.3 Multidimensional data visualization across files. Explore relationships within and among related datasets. Launch	 orange3 3.13.0 Component based data mining framework. Data visualization and data analysis for novice and expert. Interactive workflows with a large toolbox. Launch	 rstudio 1.1.423 A set of integrated tools designed to help you be more productive with R. Includes R essentials and notebooks. Launch

Documentation Developer Blog Feedback

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Conda

Files

Labels

Badges

- License: proprietary - Continuum Analytics, Inc.
- Home: <https://github.com/ContinuumIO/navigator>
- Documentation: <https://docs.continuum.io/anaconda/navigator>
- 116036 total downloads
- Last upload: 1 month and 22 days ago

Installers

conda install

linux-64	v1.9.6
win-32	v1.9.6
win-64	v1.9.6
linux-32	v1.9.6
osx-64	v1.9.6

To install this package with conda run:

```
conda install -c anaconda anaconda-navigator
```

Description

Anaconda Navigator is a desktop graphical user interface included in Anaconda that allows you to launch applications and easily manage conda packages, environments and channels without the need to use command line commands.

Installation

Anaconda Navigator

File Help

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Home Environments Projects (beta) Learning Community Documentation Developer Blog Feedback

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IP[y]y 4.3.1 PyQt GUI that supports inline figures, proper multiline editing with syntax highlighting, graphical calltips, and more.

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