03 The Age of Artificial Intelligence A.I

Topic Outline

- ○ Big Data, in essence

- ○ Data Policy Motivation

- ○ How does A.I. learn?

- ○ Walkthrough of Artificial Intelligence Advances
  - ● Levels of AI
  - ● Types of learning

The Age of A.I.

*The **human brain** provide much inspiration on the **development of Artificial Intelligence**.*

Frankenstein

Introduction to the age of A.I.

When did AI Start?

- Artificial Intelligence 1950s - 1980s

- Machine Learning 1980s - 2010

- Deep Learning 2010 - Now

Introduction to the age of A.I.

Artificial Intelligence
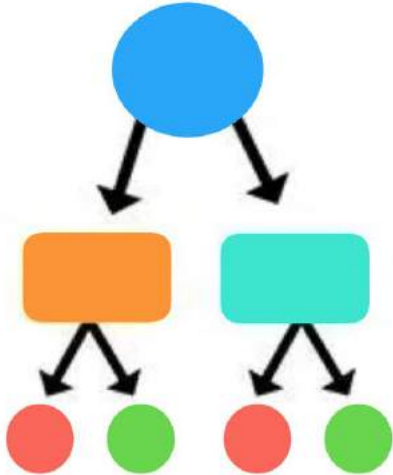
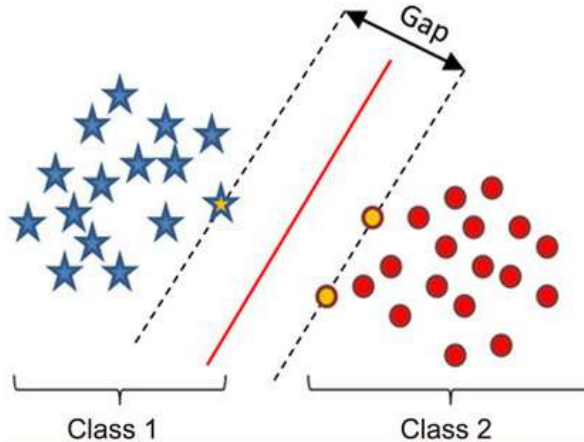Any technique which enable computers to mimic human behaviour

Introduction to the age of A.I.
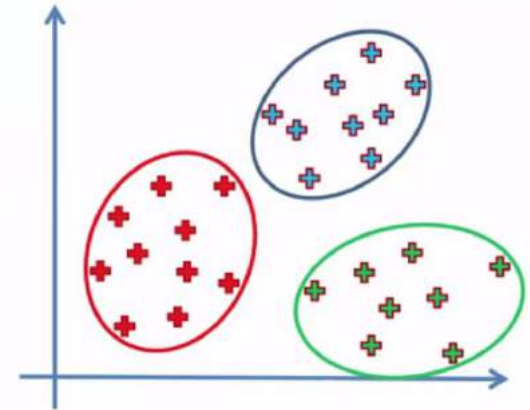
Machine Learning

Subset of AI techniques which use statistical methods to enable machines to improve with experience

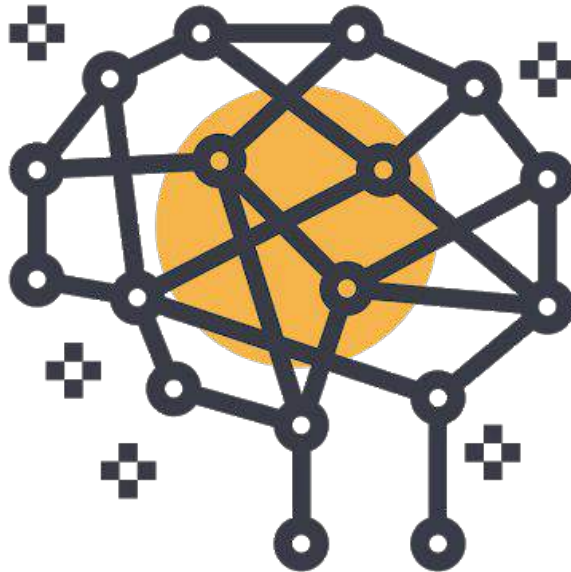**Decision Tree**

Support Vector Machine

K means clustering

Deep Learning

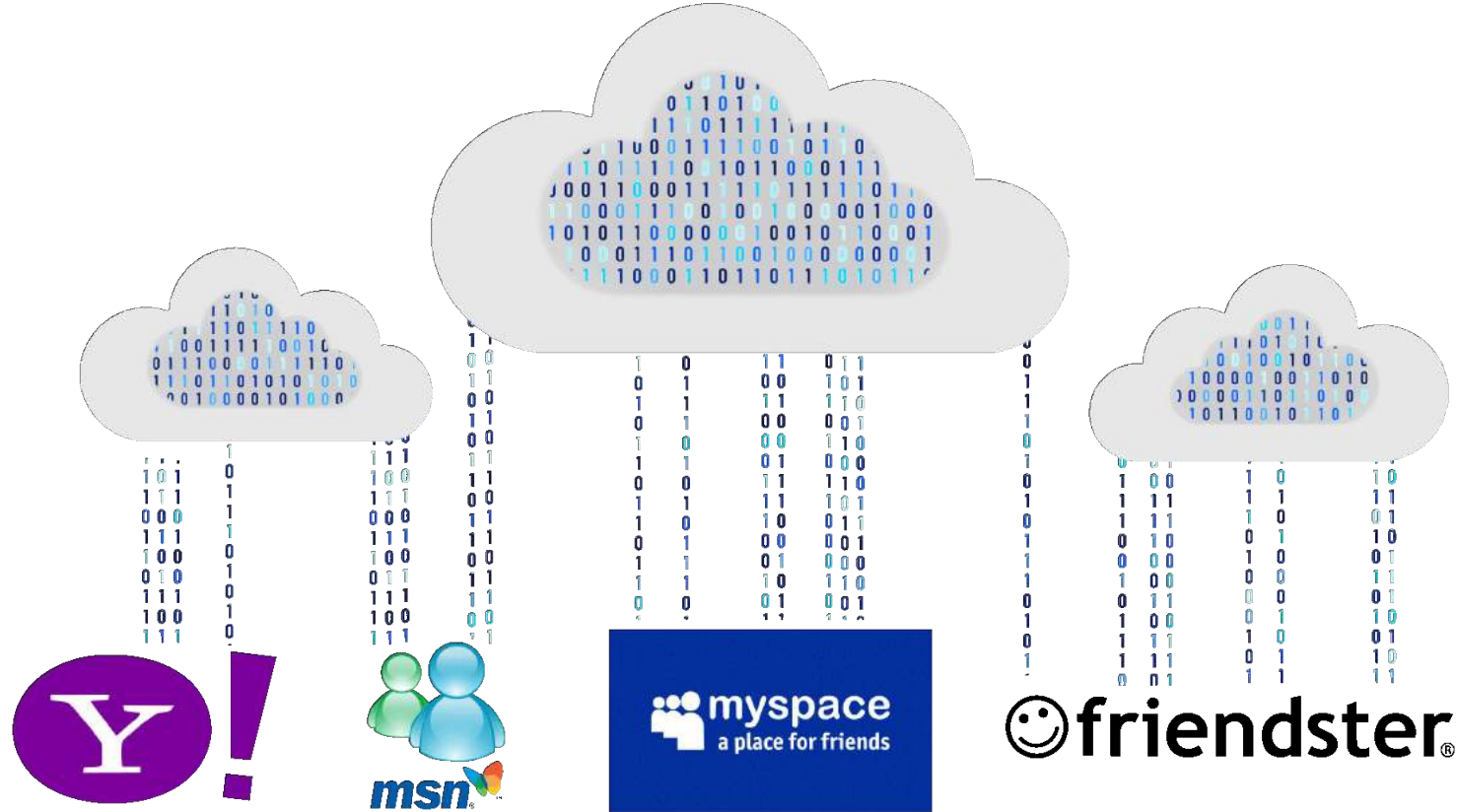Subset of ML which make the computation of multi-layer neural networks feasible

Big Data, in essence
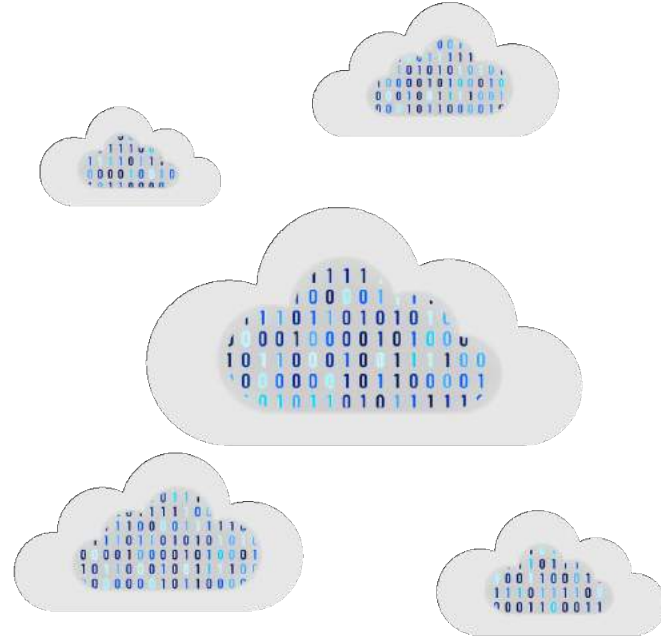
Big Data, in essence

Big Data, in essence

THEN

NOW

Big Data, in essence

Too much data is **time-consuming** to look into

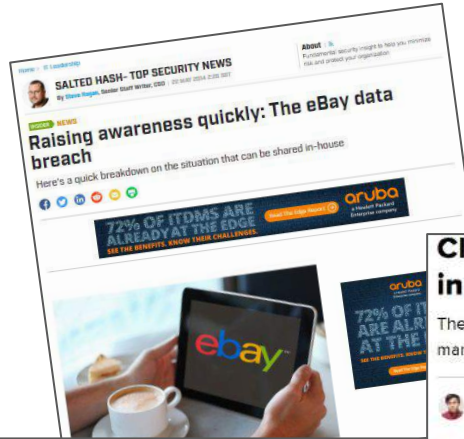# Big Data, in essence

Algorithms are developed to make sense of the data

Data Policy **Motivation**

Data Policy Motivation

Data Policy Motivation

Data Policy Motivation

Data Policy **Motivation**

Source:

Data Policy **Motivation**

Astro suffers another data breach, in the midst of informing affected customers

By SHARMILA NAIR

TECH

Thursday, 22 Aug 2019
4:20 PM MYT

Astro claims that its customers' financial data is not compromised in this breach. — Astro

Data **Protection**

- A great need to protect *personal data* and *sensitive data*

- Data protection is part of *data management* within an organization

Is your data protected?

GDPR
- General Data Protection Regulation, the core of Europe's digital privacy legislation - It ensure that the data protection shields are build into products from the beginning stage of development

PDPA
- Personal Data Protection Act of Malaysia, enforced by PDPD - The main responsibility of this department is to oversee the processing of personal data of individuals involved in commercial transactions by User Data that is not misused and misapplied by the parties concerned.

GDPR **Penalty**

UK GDPR	- With DPA (Data Protection Act 2018) - Both set maximum fine of £17.5 million or 4% of annual global turnover
EU GDPR	- Set a maximum fine of €20 million (about £18 million) or 4% of annual global turnover

Resources: https://www.itgovernance.co.uk/dpa-and-gdpr-penalties

GDPR **Benefits**

ONE
Easier business
process automation

TWO
Increased trust
and credibility

THREE
A better understanding
of the collected data

FOUR
Improved data
management

FIVE
Protected and enhanced
enterprise and brand
reputation

SIX
An even privacy
playing field

Personal Data **Protection Act**

Personal Data Protection Act

Industry Code of Practice

Code for Practice for Banking and Financial Sector 2017	Personal Data Protection Code for Practice for Utilities Sector (Electricity) 2017
Code for Practice on Personal Data Protection for Insurance and Takaful Industries in Malaysia 2017	Personal Data Protection Code of Practice for the Communications Class Data Users 2017

Personal Data Protection

Personal Data Protection Regulations 2013	Personal Data Protection (CLass of Data Users) Order 2013	Personal Data Protection (Registration of Data User) Regulations 2013
Personal Data Protection (Fees) Regulations 2013	Personal Data Protection (Compounding of Offenses) Regulations 2016	Personal Data Protection (Class of Data Users) (Amendment) Order 2016

Personal Data Protection Act

- A fine not exceeding **RM 200,000** and/or *imprisonment not exceeding 2 years* for failure to comply with an enforcement notice or failure to process sensitive personal data in accordance with the PDPA.
- A fine not exceeding **RM 500,000** and/or *imprisonment not exceeding 3 years* where a person who belongs to a specified class of data user, processes personal data without a certificate of registration.
- A fine not exceeding **RM100,000** and/or *imprisonment not exceeding 1 year* where a data user fails to comply with provisions of the codes of practice (which have legal force).
- A fine not exceeding **RM500,000** and/or *imprisonment for a term not exceeding three years* where a data user continues to process personal data after the data user's registration has been revoked.
- A fine not exceeding **RM200,000** and/or *imprisonment for a term not exceeding two years* where a person fails to surrender the certificate of registration to the PDPC when required to in accordance with the PDPA.
- A fine not exceeding **RM100,000** and/or *imprisonment for a term not exceeding one year* where a data user continues processing personal data after a data subject has withdrawn his consent by notice in writing to the processing of his personal data.
- A fine not exceeding **RM200,000** and/or *imprisonment for a term not exceeding two years* where a data user fails to comply with the requirement of the PDPC to cease processing the personal data of the data subject in a manner that is causing or is likely to cause substantial damage or distress to the data subject or another person.
- A fine not exceeding **RM200,000** and/or *imprisonment for a term not exceeding two years* where a data user fails to comply with the requirement of the PDPC to cease the processing of personal data for the purposes of direct marketing.
- A fine not exceeding **RM200,000** and/or *imprisonment for a term not exceeding two years* where a data user fails to comply with the directions stipulated in the enforcement notice issued by the PDPC.
- A fine not exceeding **RM300,000** and/or *imprisonment for a term not exceeding two years* where a data user transfers personal data outside Malaysia, except to approved places which may be published in the Gazette; and
- A fine not exceeding **RM500,000** and/or *imprisonment for a term not exceeding three years* where a person knowingly or recklessly collects or discloses personal data held by the data user or procures the disclosure to another person of personal data held by the data user without the consent of the data user.

references: https://www.dataguidance.com/notes/malaysia-data-protection-overview
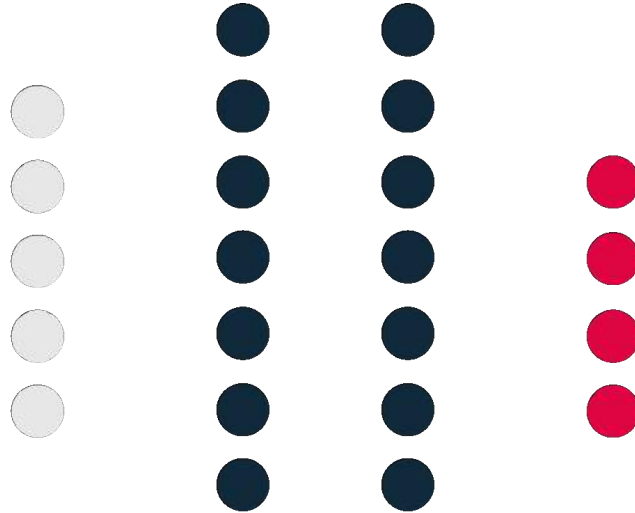
How does **A.I.** Learn ?

How does **A.I.** learn?

What's AI in your devices?

Neural networks were invented to mimic how the human brain works
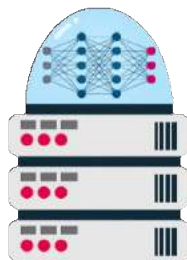
Note: *Neural network often referred to as model*

A.I. in various forms surrounding us

Web Applications

Smart Car

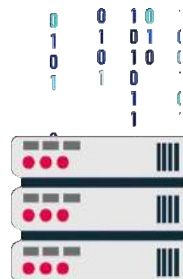Smart Watch

Mobile

Server

Drone

Walkthrough of **Artificial Intelligence** Advances

1955 - Term "Artificial Intelligence" was Born

Term 'artificial intelligence' is coined by computer scientist, John McCarthy to describe "the science and engineering of making intelligent machines"

https://www.artificial-solutions.com/blog/homage-to-john-mccarthy-the-father-of-artificial-intelligence

2012 – True power of Deep Learning was unveiled to the world

IMAGENET Large Scale Visual Recognition Challenge (ILSVRC)

- By 2015, an AI algorithm surpassed human accuracy for image recognition...
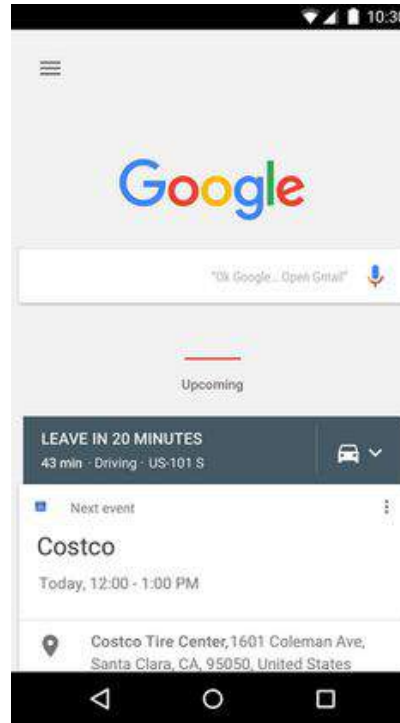

Airplane

Car

Person

Quick question:
Do you think electrical devices are spying on us?

2011 - 2014: Personal Assistants

https://en.wikipedia.org/wiki/Google_Now, http://www.rocketinsights.com/work/alexa/
https://www.fastcompany.com/1788343/9-great-things-ask-siri-now-and-2012
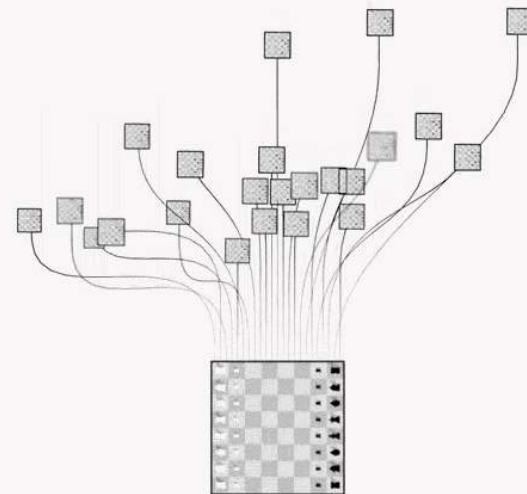
2016 - AlphaGo

2017 - AlphaGo Zero

https://deepmind.com/blog/article/alphago-zero-starting-scratch
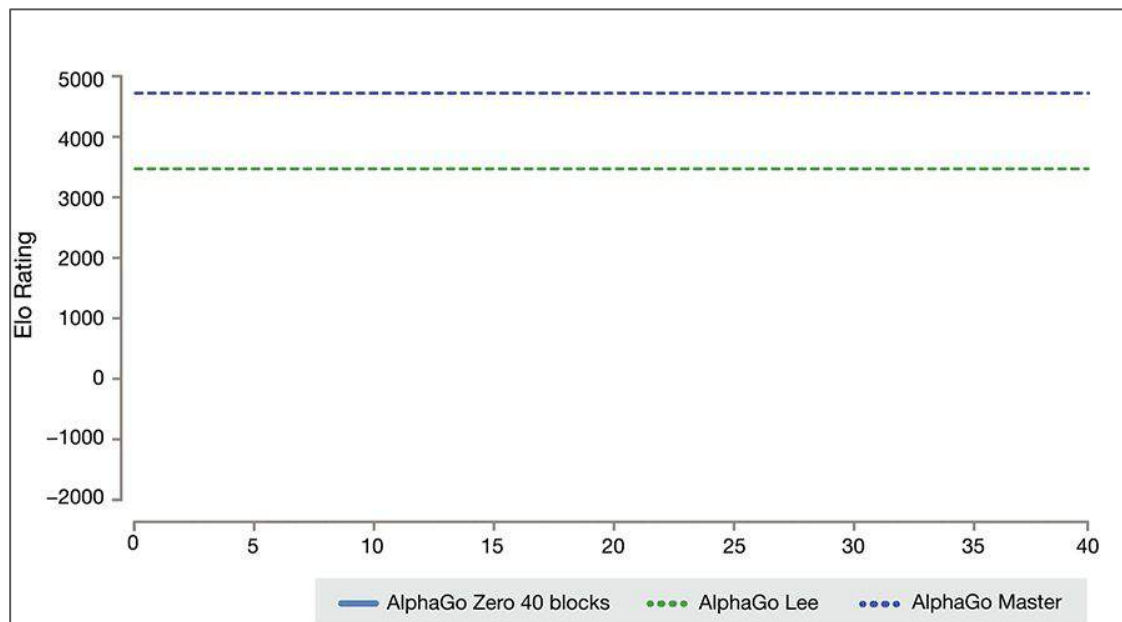
2018 - Google Duplex, AI Assistant

2019 - AI to Generate Human Faces

Alibaba LuBan (鲁班)

- AI-based Graphic Design Tool
- Design 8,000 different banners every second.
- 2016: Generated over 170 million banners on Single's Day event
- 2017: Generated 400 million banners in 10 days only = 100 designers working non-stop for 150 years (assuming: 20 min per design)

轻松

https://medium.com/@rexrothX/ai-visual-design-is-already-here-and-it-wont-hesitate-to-take-over-your-petty-design-job-934d756db82e

What **Industry Experts** Say about AI?

AI is probably the most important thing humanity has ever worked on.

Sundar Pichai
CEO of Google

I believe that artificial intelligence represents the greatest opportunity in human history.

KAI-FU LEE
CEO of Sinovation Ventures

Levels of AI

| Weak AI |
| --- |
| Low level tasks, require human attendance. |
| Specialise in one area and solve only one problem. |
| - Siri picks up keywords to execute a task. (Voice Assistant)
- Alexa, Cortana |

Levels of AI

Strong AI
Medium-level tasks, mimics human intelligence or behaviours
Computer that is smart as human
- Image and facial recognition technology

Levels of AI

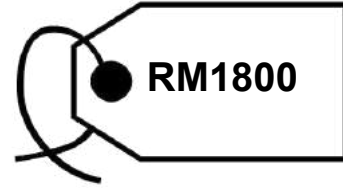| Super AI |
|---|
| Surpasses human intelligence and abilities |
| More than what human can do |
| - Basically an imaginary AI (does not exist yet) |
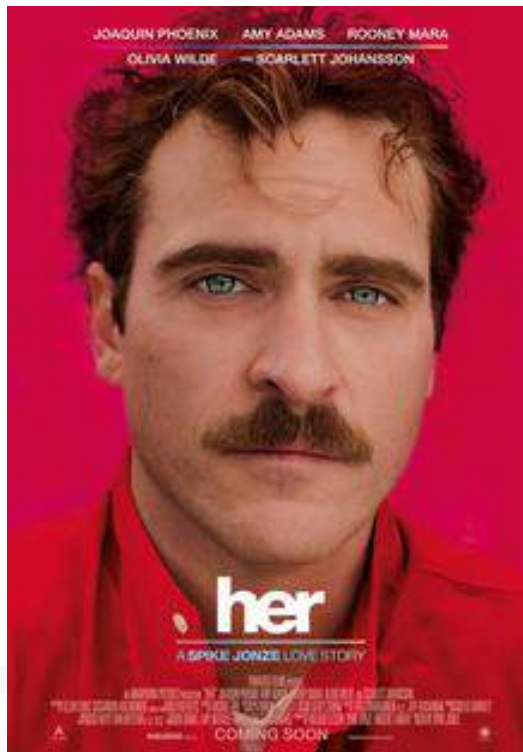
Quiz? Is this an application of A.I or not?

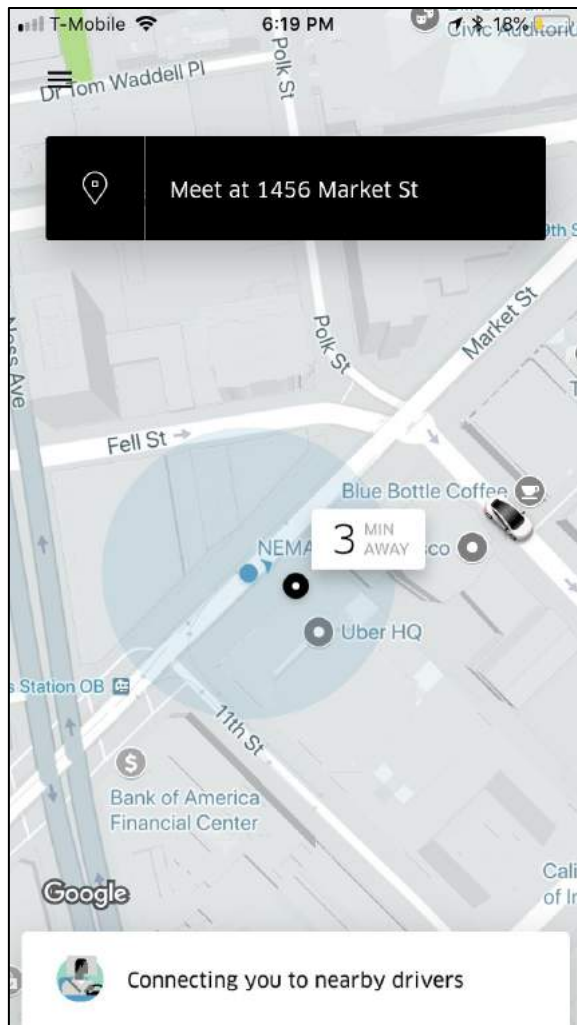# Is this an application of A.I?

Face Filter Applications

Is this an application of A.I?

Supersonic hair dryer from a renowned brand with automatic temperature control

RM1800

Is this an application of A.I?

Estimated Time of Arrival from rider's service

Is this an application of A.I?
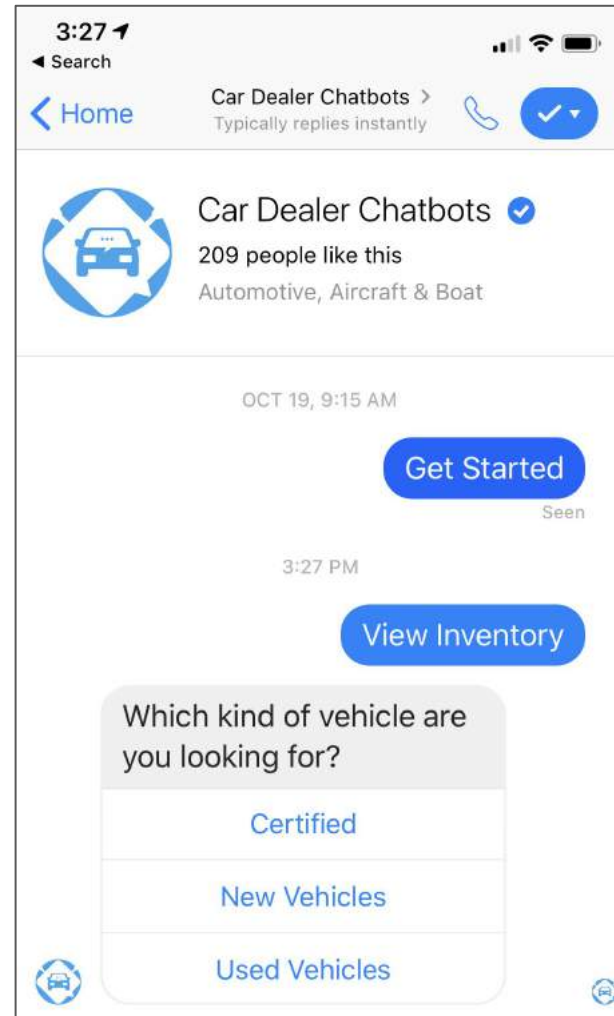
Recommendation System

Is this an application of A.I?

Attendance and Temperature Measuring Functionality

Is this an application of A.I?

Question Answering System
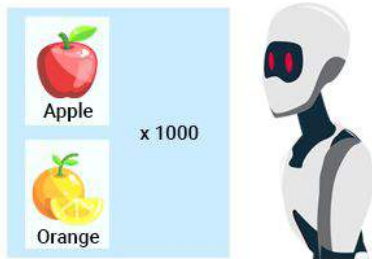
Types of Learning

SUPERVISED LEARNING

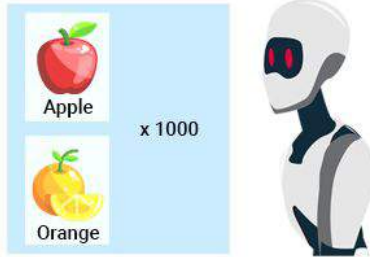Learning from labeled data

Apple

x 1000

Orange

A machine is trained on 1000 images of apples and oranges to identify type of fruit in new images.

Types of Learning

SUPERVISED LEARNING

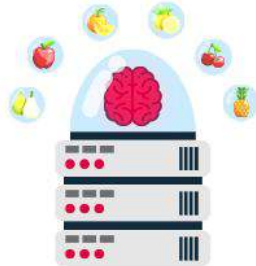Learning from labeled data

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UNSUPERVISED LEARNING

Provide data without labels

Clustering of data following the distribution of data.
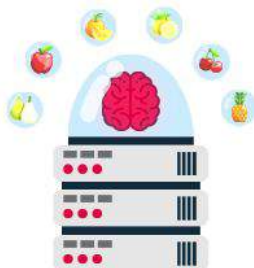
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SEMI-SUPERVISED LEARNING

Provide small amount of data with labels, others without labels

Use labeled data to split partitions. Unlabeled data will be labeled according to the partitions.

Types of Learning

SUPERVISED LEARNING

Learning from labeled data

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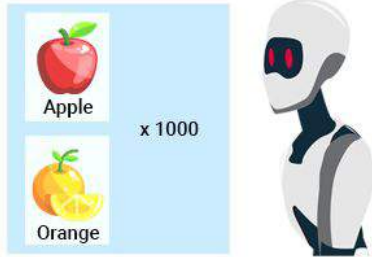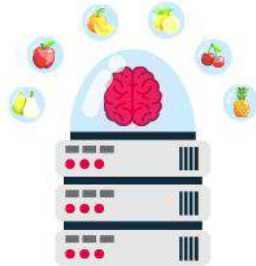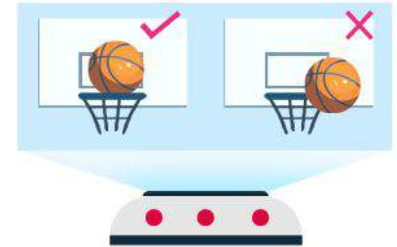Provide small amount of data with labels, others without labels

Use labeled data to split partitions. Unlabeled data will be labeled according to the partitions.

REINFORCEMENT LEARNING

Software agents take actions to maximise cumulate award

A machine is rewarded when throws a ball into basket, otherwise get punished.

Topic Summary

- ○ **Big data** is a huge pool of data that is managed and leveraged with the help of **algorithms**.

- ○ It is vital for individuals and organizations to **protect personal data** and **sensitive data**.

- ○ Data is interpreted in the form of **binary values** by the AI systems.

- ○ **AI** has come a long way and is already being **implemented in many forms around us**.