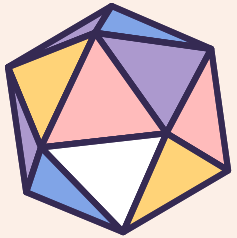
Module 1

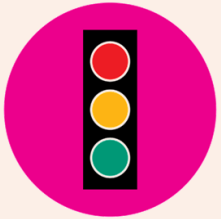
Introduction to Sentiment Analysis with Machine Learning

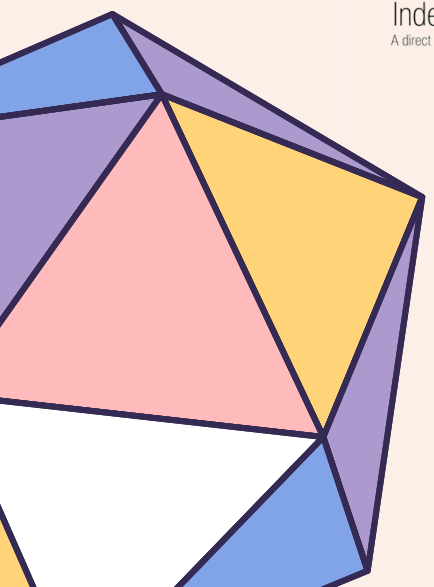
Try Decoding the Hidden Message

Icon
A graphic image



Index
A direct link





Symbol
A learned relation

How you know the answers?

In this lesson, we will learn about…

1.1

History

1.2

Future

1.1 History of Machine Learning

next...

How does human learn?

Observation

Past Experience

How does machine learn?

Machine Learning: Definition

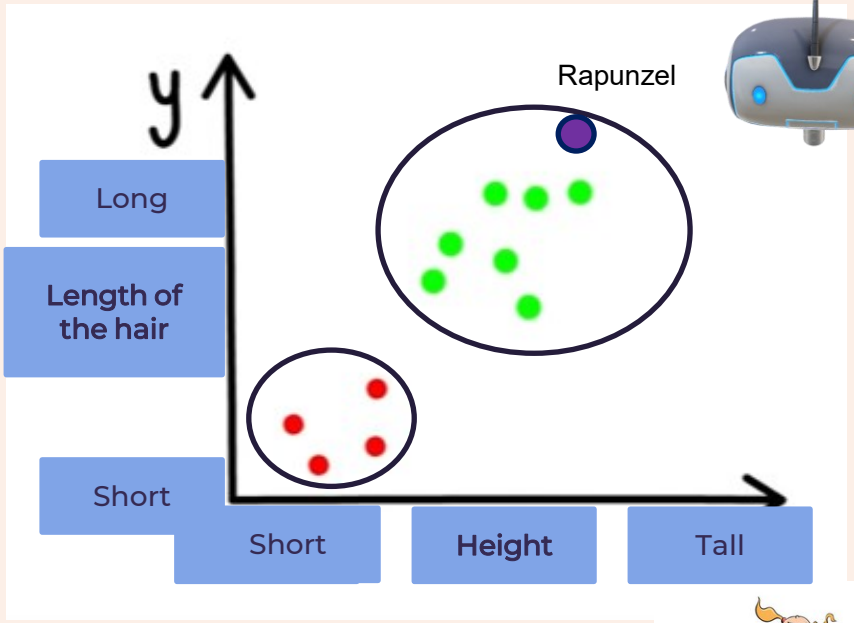
Machine Learning is a set of methods that can automatically **detect patterns** in data, and then **use the uncovered patterns to predict future data**, or to perform other kinds of decision making under uncertainty

---by Kevin P. Murphy

Definition of Machine Learning

- Machine Language (ML)
  - the field of computer science related to the development and use of algorithms to enable machines to learn from what they are doing and become better over time.
  - Although there is a large overlap between ML and artificial intelligence, they are not the same.
  - ML algorithms are an integral part of data science.

Me



Rapunzel

Rapunzel: Tall with long hair

My ex-gfs

Features/ independent variables **Label**

Height	Length of the hair	Preferability (yes/ no)
1.70	12”	No
1.50	5”	Yes
1.75	20”	?

Prediction

Google is Using Machine Learning to Predict the Likelihood of a Patient's Death – with 95% Accuracy!

PRANAV DAR, JUNE 19, 2018

Overview

- The AI research team at Google has developed a model that can predict the likelihood of a patient's death
- The AI is powered by neural networks and uses a ton of variables like the patient's old medical history, age and combines that with scribbled doctor's notes and PDFs
- Google tested the final model on 200,000+ patients and used over 46 billion data points
- The final model came up with an almost 95% accuracy when predicting patient outcomes

What are the possible features?

Features:

- Gender
- Age
- Previous diagnosis
- Present signs
- Lab results

Machine Learning (example)

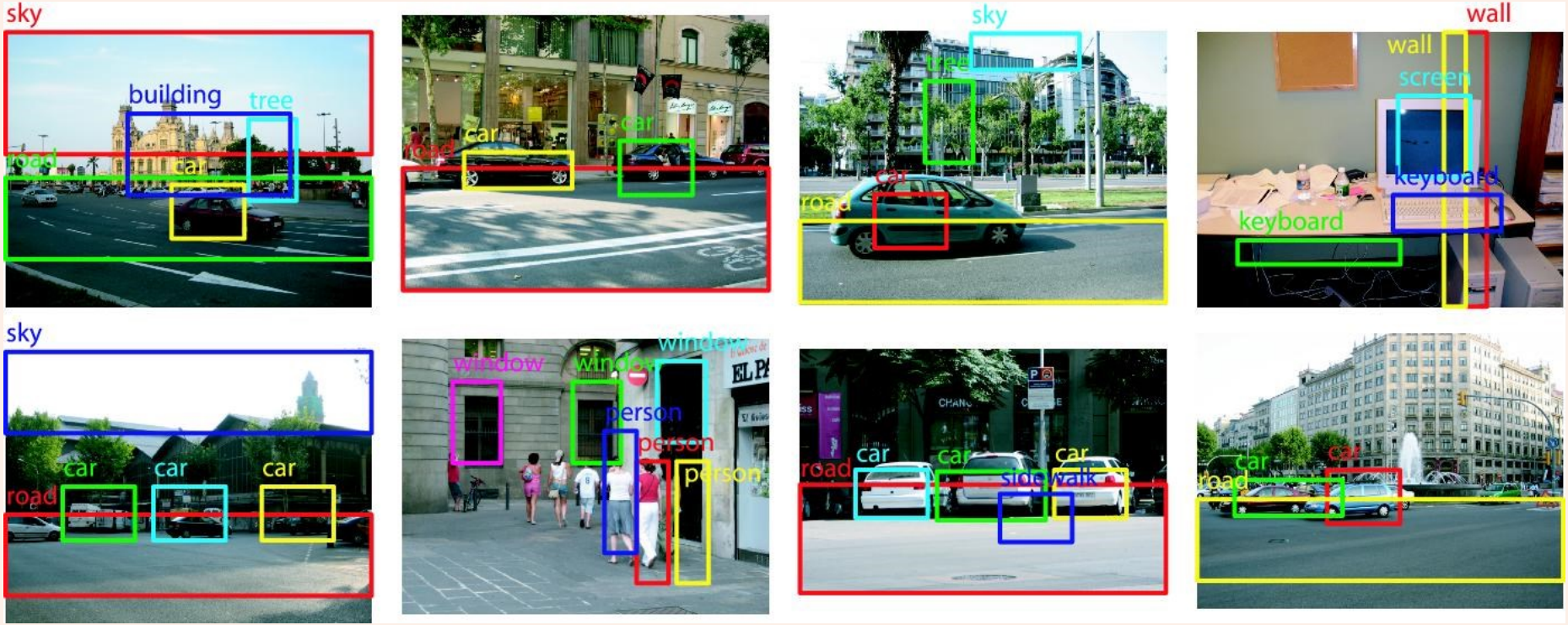
What are these letters?

Optical Character Recognition (OCR)

Machine Learning (example)

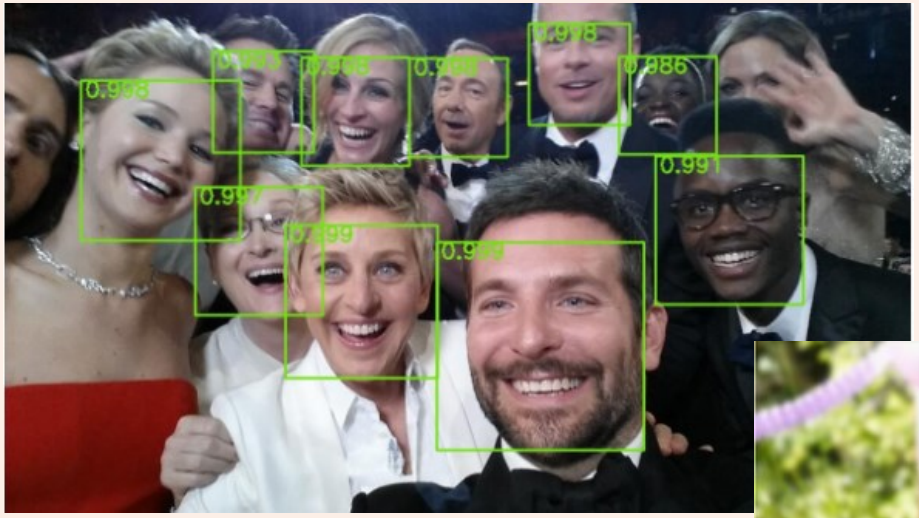
Classifying flower

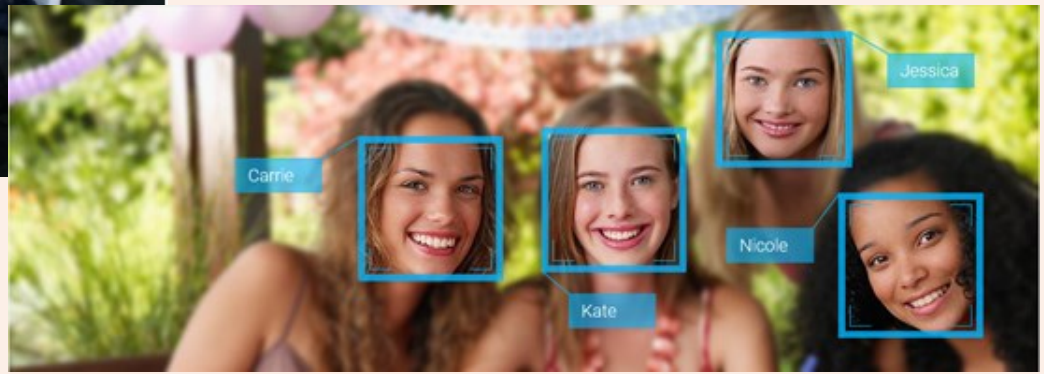
Machine Learning (example)



Object Classification

Machine Learning (example)





Face detection and recognition

History of Machine Learning

- Machine learning came about in the 1950s and involved systems that were based on rules to process various types of information, requiring a lot of programming from the developer.
- Also, their use was limited to a very specific domain and their evolution would be limited once they were deployed.
- As time went by and more applied research was done on the machine learning field, more sophisticated and more agile systems came about, the most notable of which were the Artificial Neural Networks (ANNs) that were very popular in the 1990s.

History of Machine Learning

- With the development of more and more tools, machine learning grew to be a very practical field with many real-world applications

- This was often referred to as pattern recognition and still remains a very important aspect of data analysis, especially non-statistical data analysis.

Part 1: Supervised learning

- Supervised Learning
    - The data are labelled with pre-defined classes. It is like that a “teacher” gives the classes (supervision).

I do not know!

Now, I know better!

X (Features) | y (Label)

Colour	Size	Fruit
Red	Big	Apple
Orange	Big	Orange
Red	Small	Grapes
Red	Big	Apple
Orange	Big	Orange

Supervised Learning

Fruit X

Apple

Features

- Red
- Big

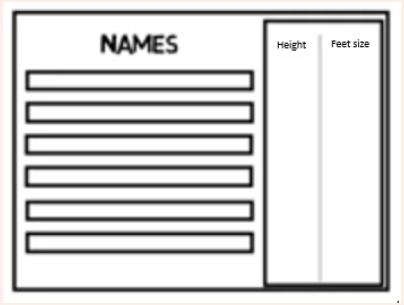
Model

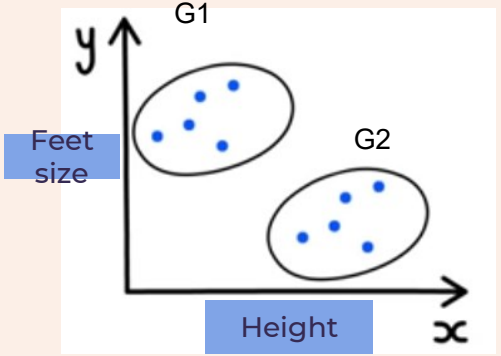
Labelled Data

Part 2: Unsupervised Learning

- Class labels of the data are unknown.
- Goal: Given a set of data, the task is to establish the existence of classes or clusters in the data.
- Clustering
    - Finding association (in features)
    - Dimension reduction
    - Sometimes called knowledge discovery
- Algorithms: K-means, Mean Shift, Gaussian Mixture Model

Unsupervised Learning





NO Labelled Data

Categorized into two groups.

History of Machine Learning

- Machine learning has come a long way since its invention.
- In a way, it has followed the development of computers and the science that accompanies this technology.
- However, machine learning applies to a variety of machines:
  - stationary computers
  - robots
  - mobile devices (the most representative of which is the Smartphone, which makes use of pattern recognition and clustering among other machine learning techniques), and even cars.

LEFT REARWARD VEHICLE CAMERA
MEDIUM RANGE VEHICLE CAMERA
RIGHT REARWARD VEHICLE CAMERA
MOTION FLOW
LANE LINES
LANE LINES
ROAD FLOW
IN-PATH OBJECTS
ROAD LIGHTS
OBJECTS
ROAD SIGNS

1.2 Future of Machine Learning

next...

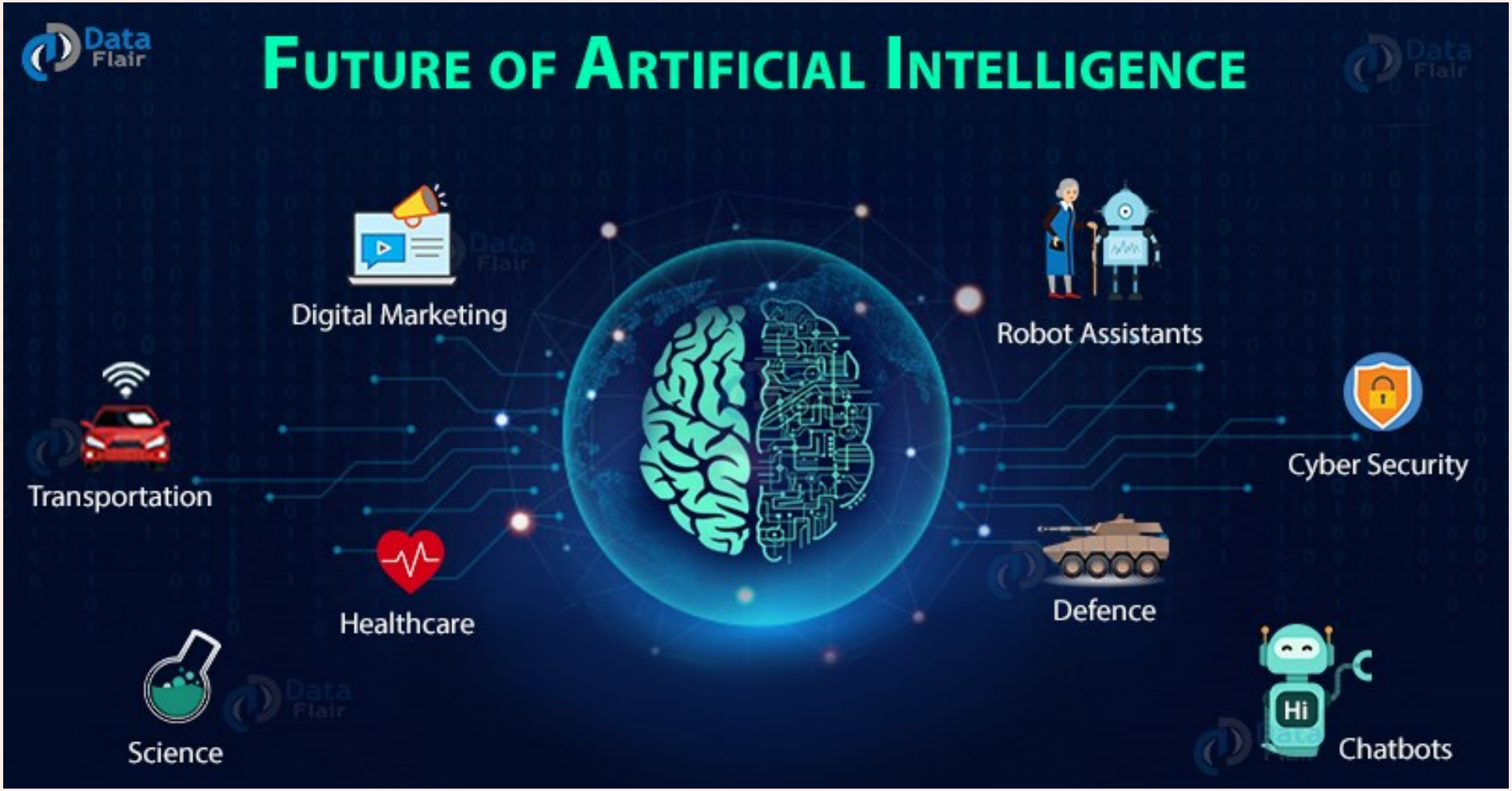
Future of Machine Learning

difficult to infer on the future of such a sophisticated (complex) discipline, especially when the corresponding technology that employs it is changing so rapidly.

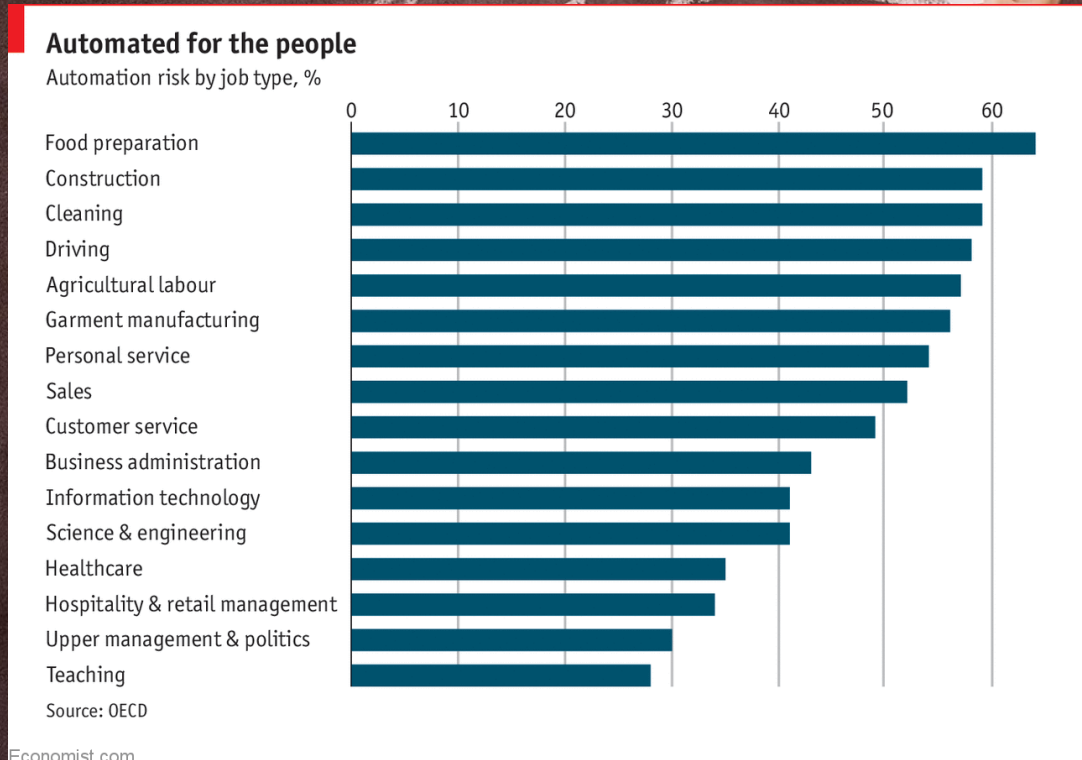
However, we expect to see machine learning branching out in various directions as it is already quite diverse

One direction of machine learning, which could prove to be a major branch, is algorithms that are optimized for smaller devices such as smart watches and phones.

Future of Artificial Intelligence



What jobs will be replaced by AI?



Discussion:
We'll use AI/ML to replace human workers.

You have learned about…

1.1

History

1.2

Future

Coming up next...

Supervised VS Unsupervised