

# Artificial Intelligence

Henley Business School, University of Reading

**DR VARUN OJHA**

Lecturer, Computer Science

[v.k.ojha@reading.ac.uk](mailto:v.k.ojha@reading.ac.uk)



Thinking Humanly

Thinking Rationally

Artificial  
Intelligence

Acting Humanly

Acting Rationally

# Alan Turing

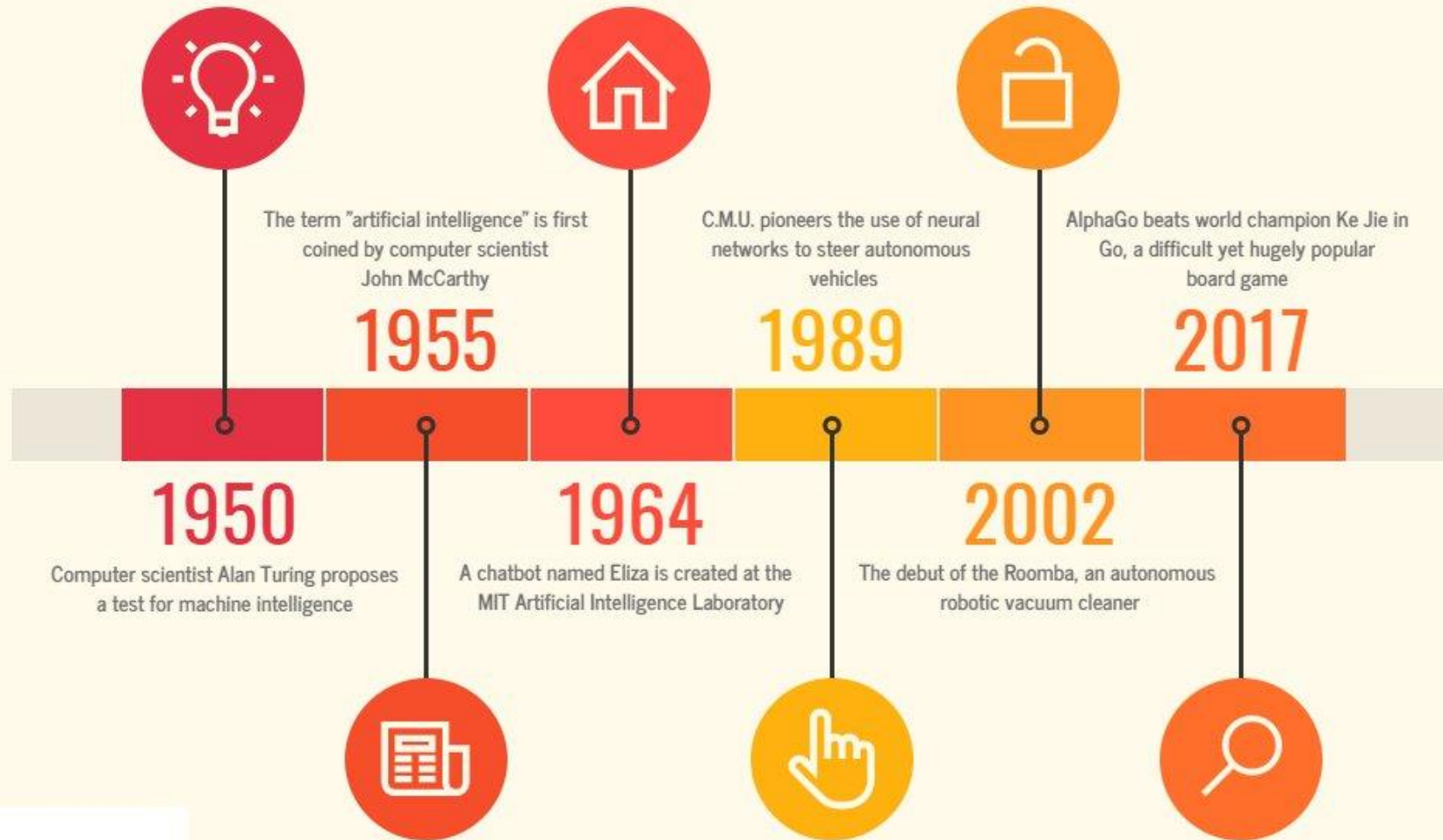
23 June 1912 – 7 June 1954

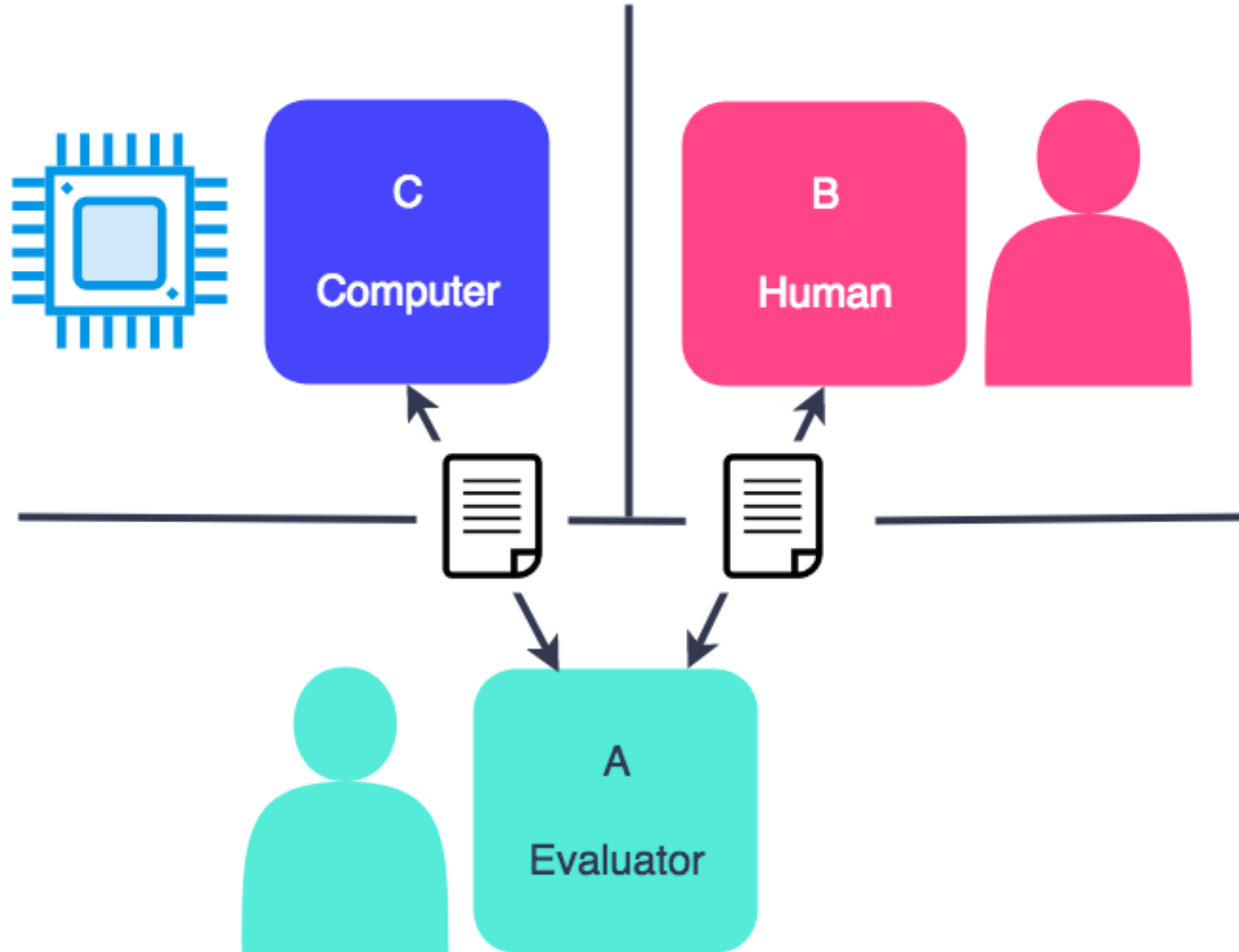
Consider as the Father of Computer  
Science and Artificial Intelligence



# 7 Decades of Artificial Intelligence History

Artificial Intelligence, or AI, is revolutionizing industries. Business executives, managers, and analysts worldwide see it as strategic priority in an ever shifting Information Age. Here is a timeline of six of AI's big moments.





# The Turing test

# Artificial Intelligence (AI)

to create intelligent machine that  
**think** (react) and **act** (work) like  
human beings

# AI need to have:

natural language processing

knowledge representation

automated reasoning

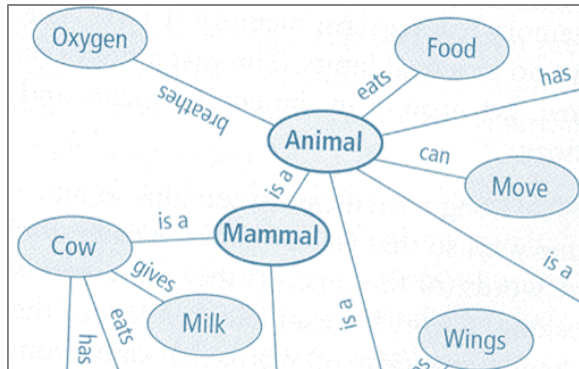
machine learning

computer vision

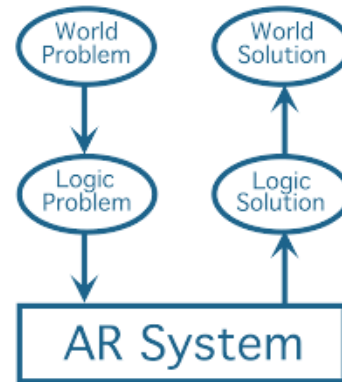
robotics

logic

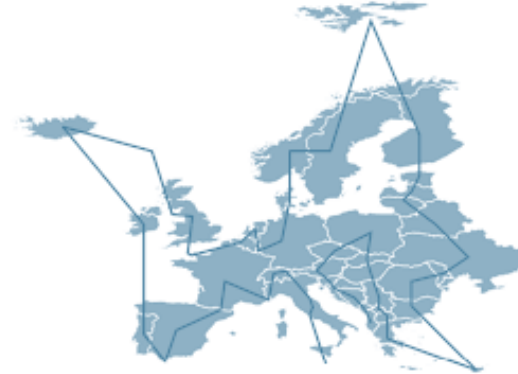
# What Does AI Really Do?



Knowledge Representation



Automated reasoning



Planning



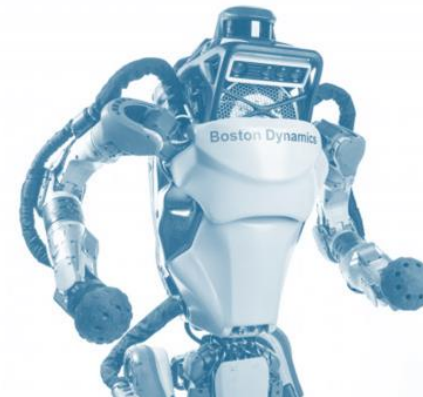
Machine Learning



Natural language understanding



Machine vision



Robotics



Web Search



# Buzzwords

Artificial Intelligence

Internet of Things

Data Mining

Industry 4.0

Deep Learning

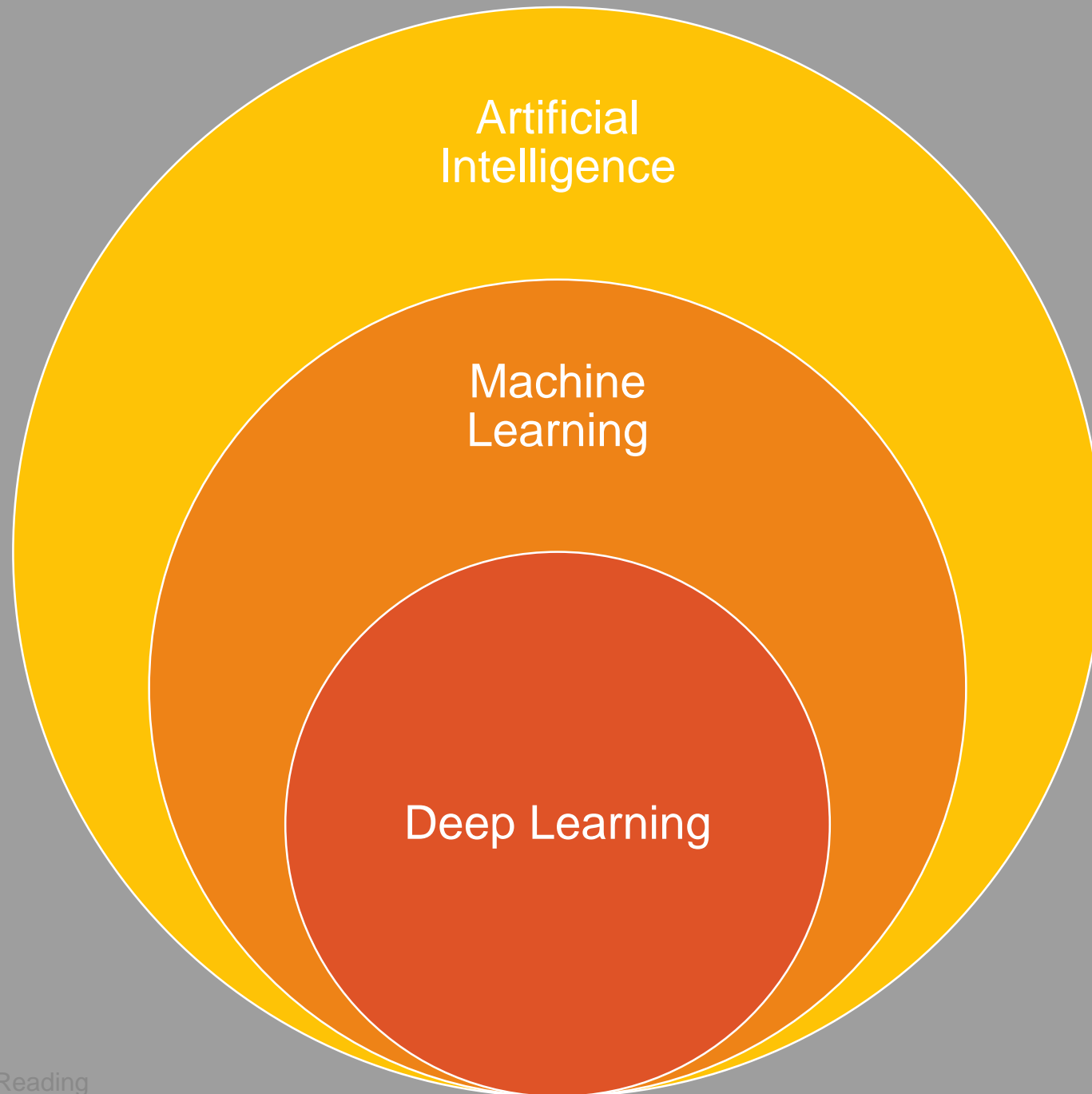
Blockchain

Cloud Computing

Big Data

Machine Learning

Data Science



# Data Science

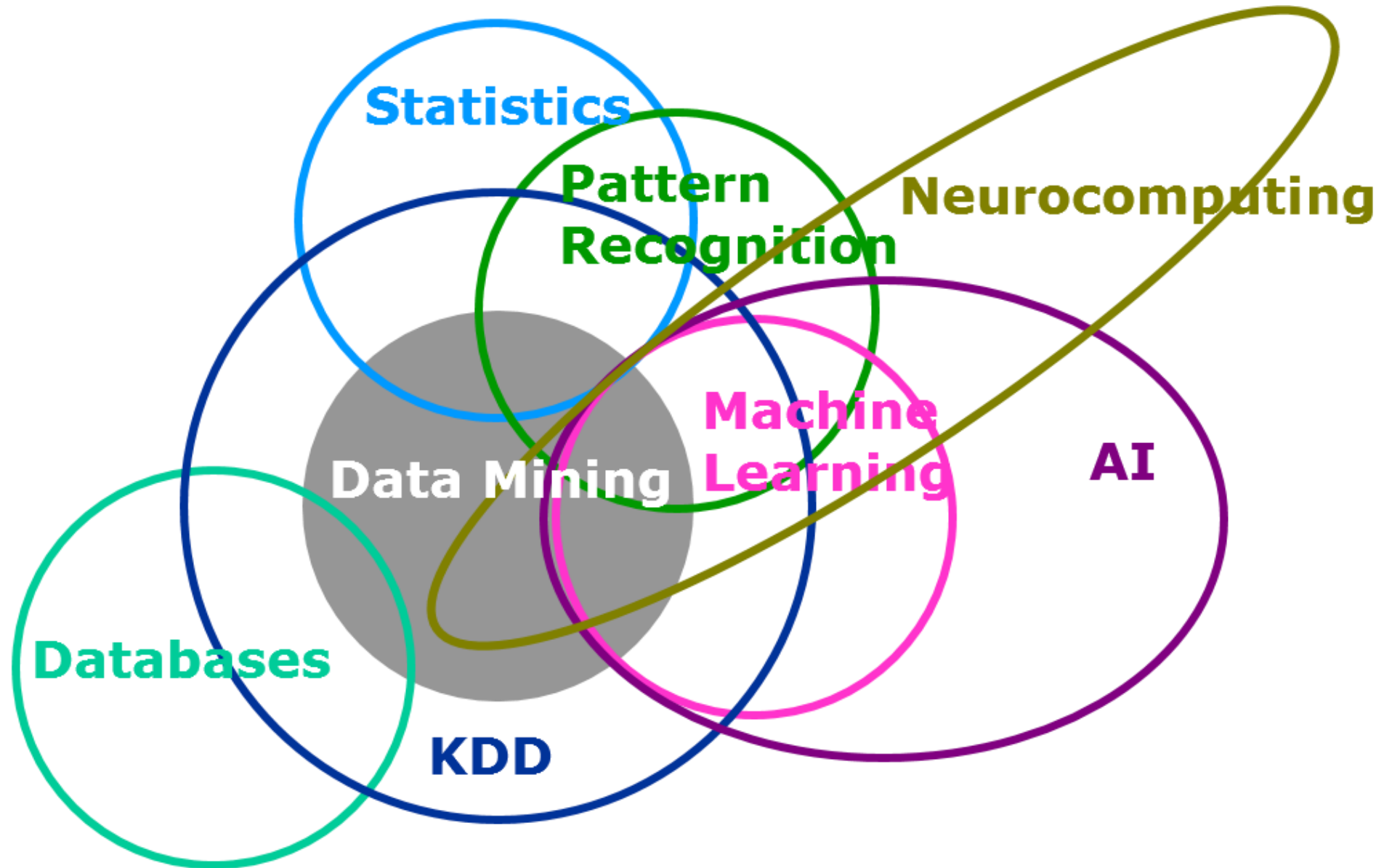
Multidisciplinary field for the use of scientific method to extract knowledge and insights from data sets

# Data Mining

Field of study for the Knowledge discovery processes to find pattern and trend in large data sets

# Big Data

Field of study for the analysing extremely large datasets to find pattern and trend in large data sets



# Cloud Computing

Use of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer.

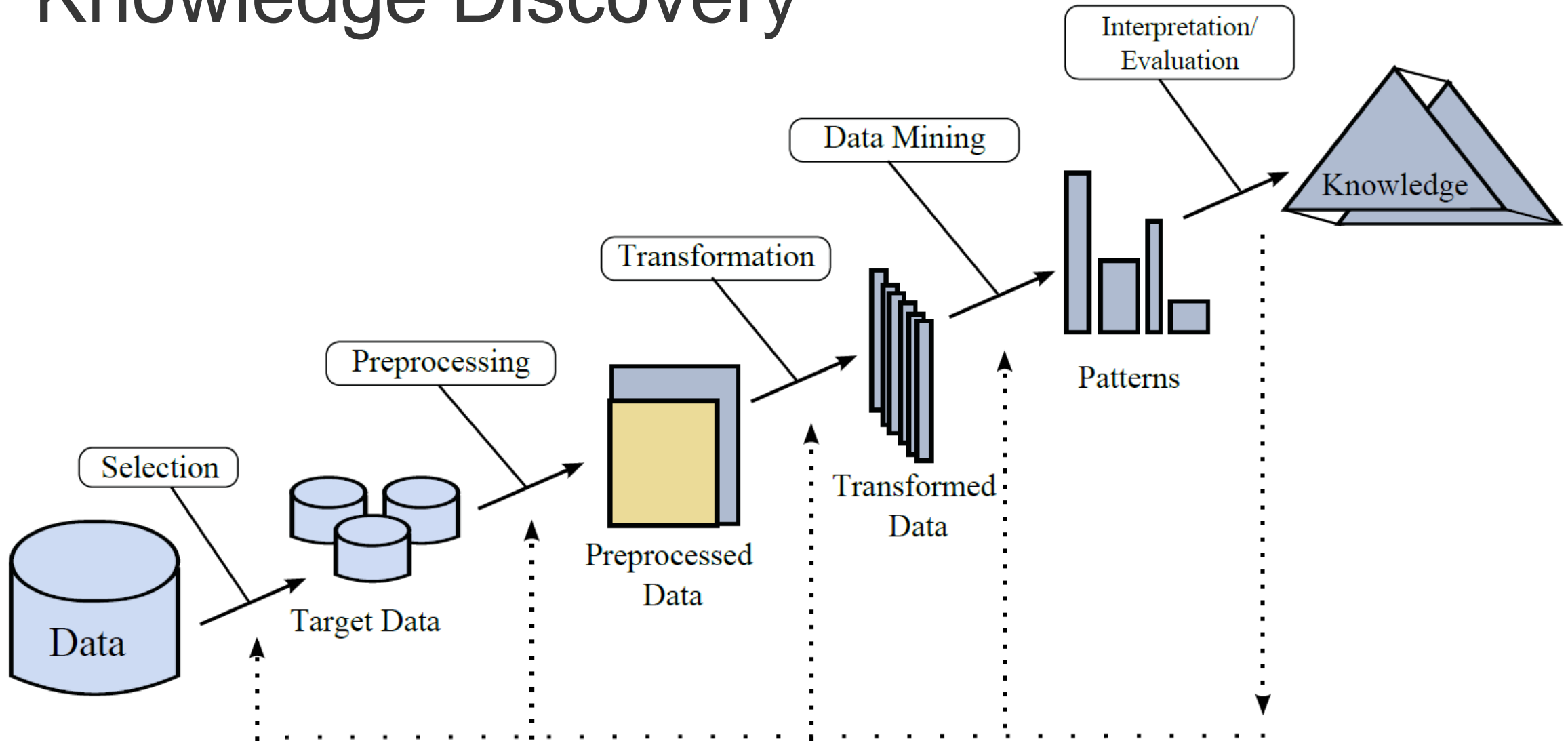
# Internet of Things

Network of devices such as vehicles, and home appliances that contain electronics, software, sensors which allows these things to connect, interact and exchange data

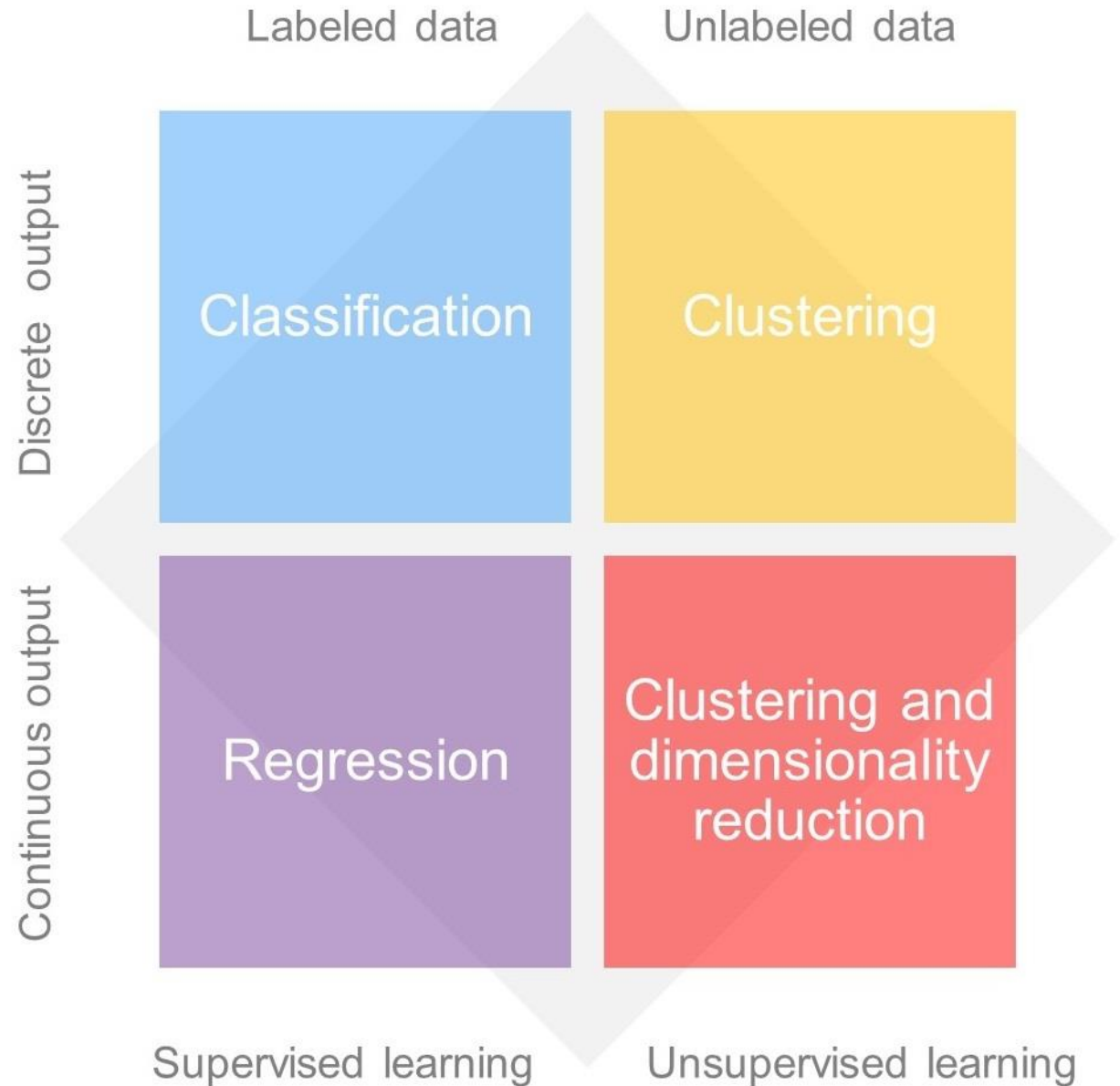
# Blockchain

It is a growing list of records (called BLOCKS) that are linked (CHAIN) using cryptography. Blockchain is resistant to modification of data.

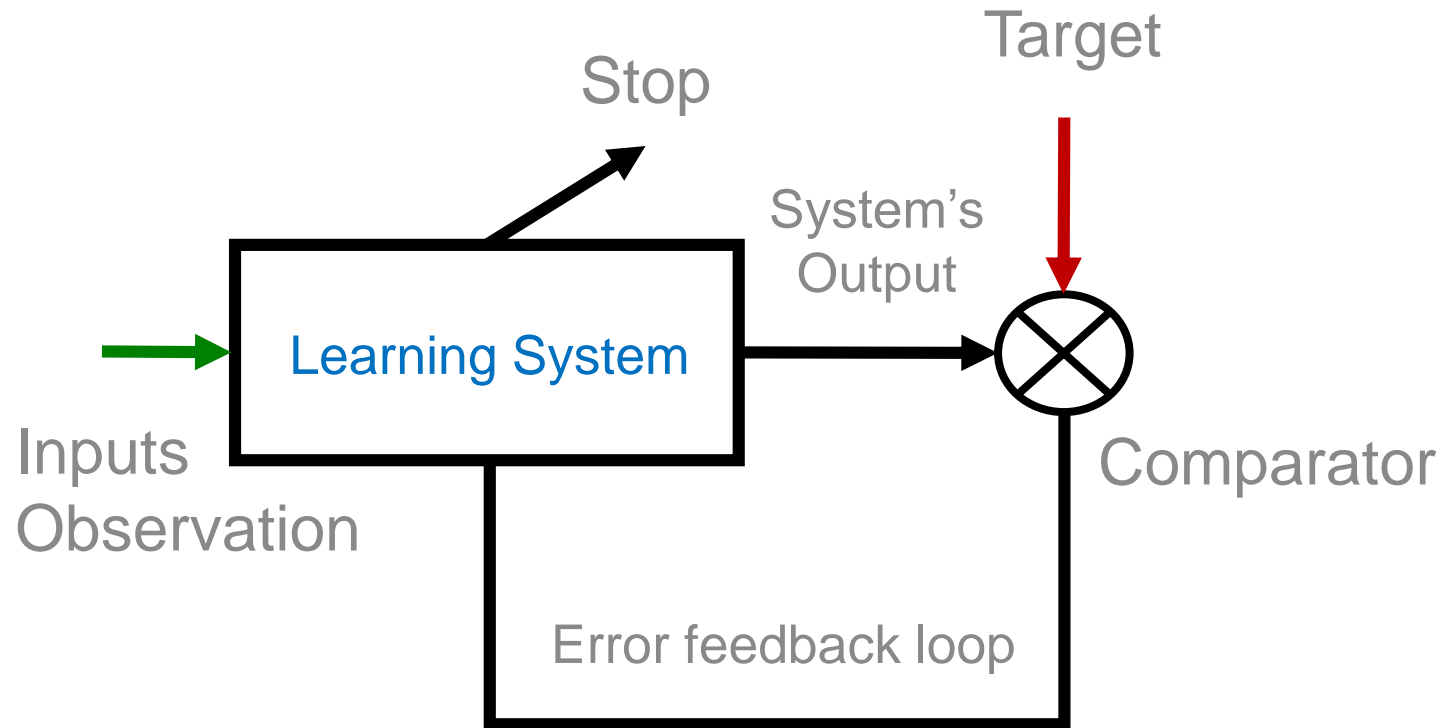
# Knowledge Discovery



# Paradigms of extracting Knowledge from data



# Learning



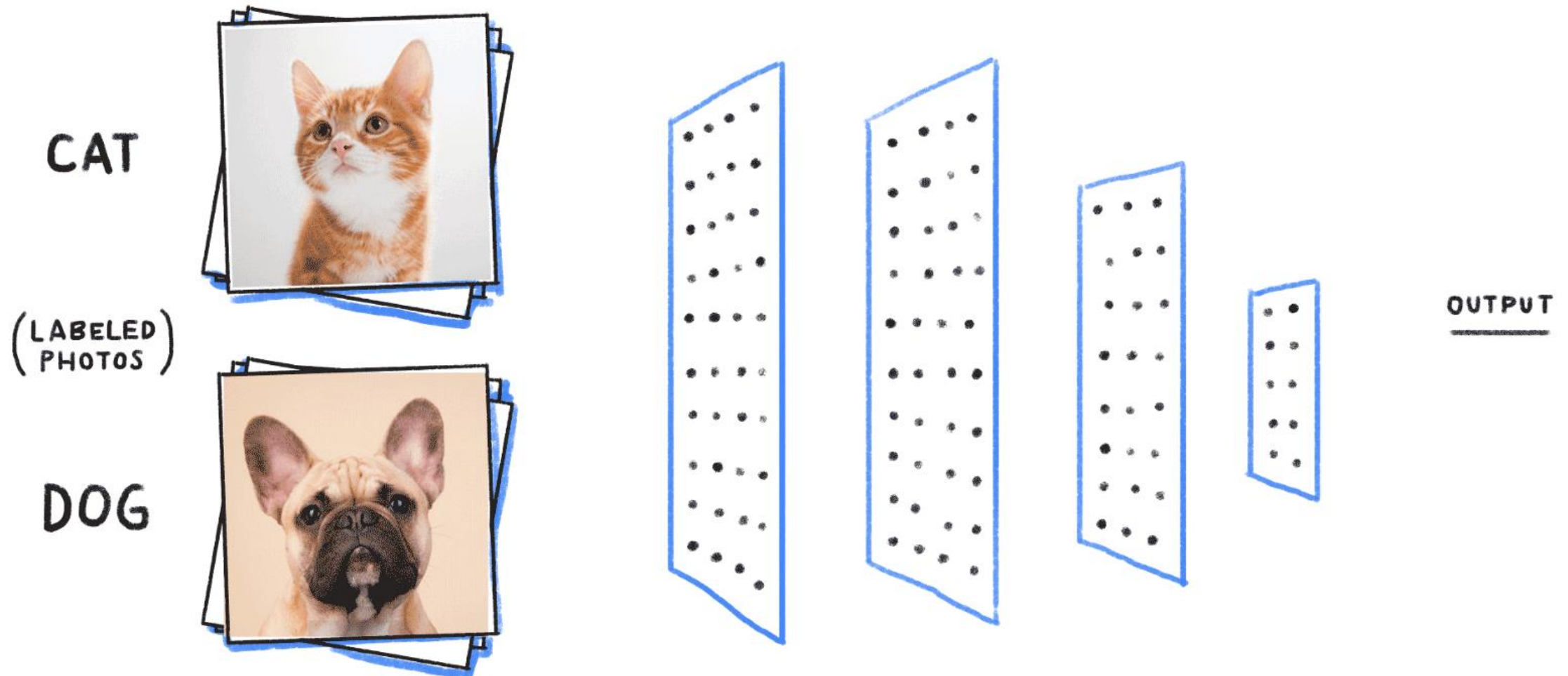
## Learning Cycle:

- Input (Continuous input)
- Target (Known output)
- Output (System's output)
- Feedback Loop (Training iteration)
- Learning System (Model)
- Stop (When to stop learning)

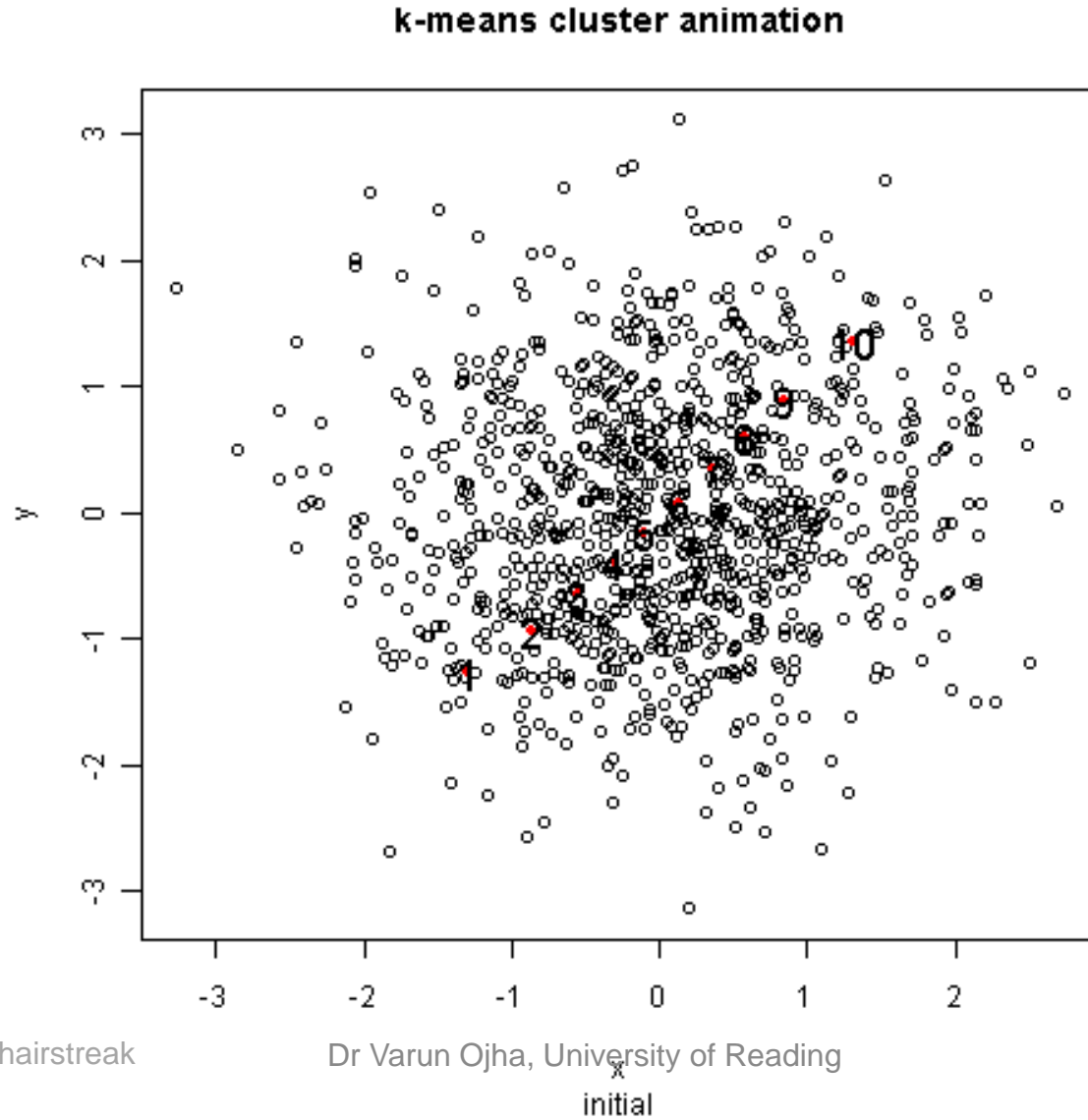


# Supervised Learning

Source: <https://becominghuman.ai/building-an-image-classifier-using-deep-learning-in-python-totally-from-a-beginners-perspective-be8dbaf22dd8>



# Unsupervised Learning



The Amazon Alexa logo, featuring the word "amazon" in black and "alexa" in blue, with a curved arrow underneath "amazon" pointing to "alexa".

amazon alexa

# Amazon Alexa

**Alexa is implementing self-learning techniques to better understand users**

Source:

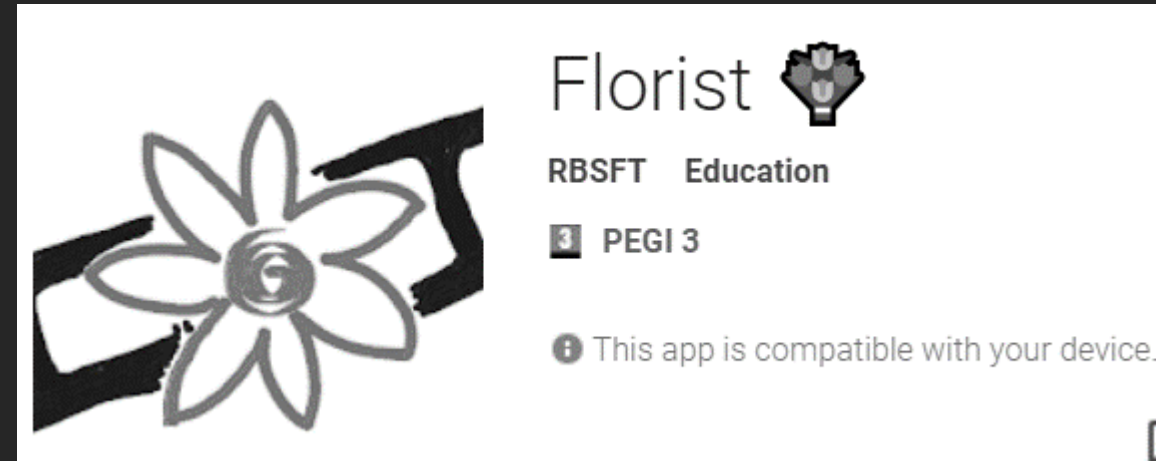
<https://www.theverge.com/2018/12/7/18130635/amazon-alexa-skills-contextual-awareness-ai>

Video Source:

<https://www.youtube.com/watch?v=1HYyhwE2EvQ>

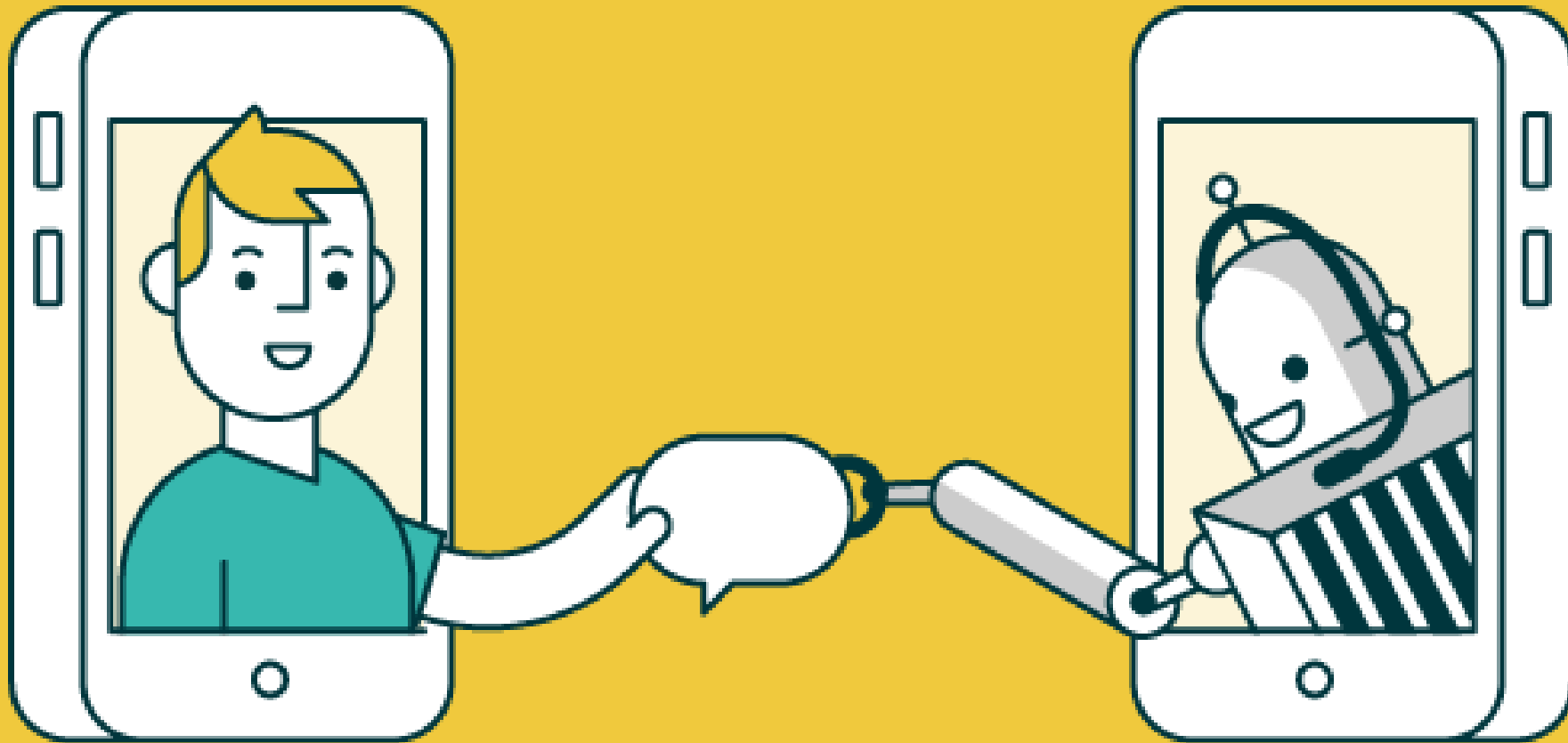


# Android App

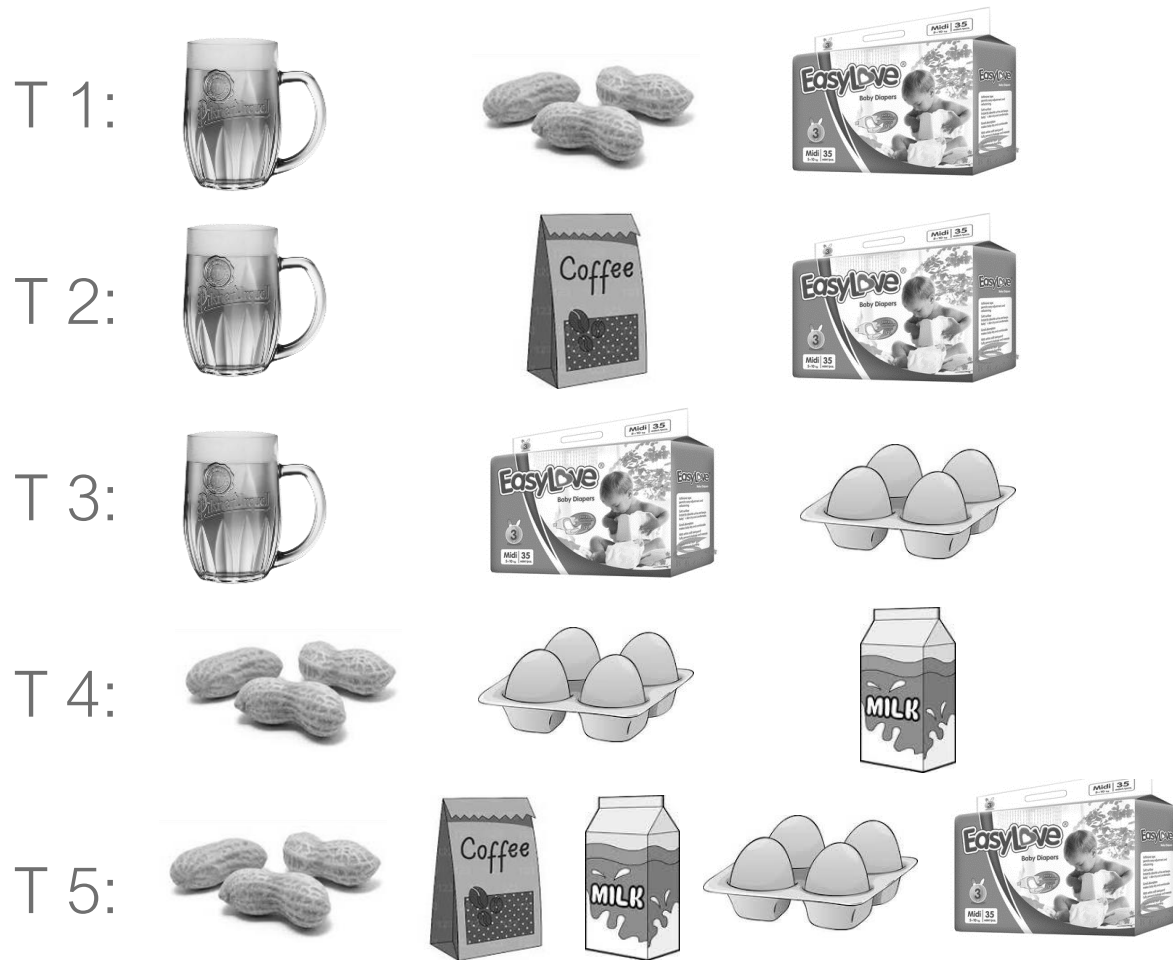


Video Source: [https://youtu.be/9TVS\\_3BCBhI](https://youtu.be/9TVS_3BCBhI)

# Chatbots



# Product recommendation



Associated Rule Mining: to find frequent pattern (rule) in dataset. (The Impossible Correlation - 1992)

- **IF** someone buy an item X **THEN** what is the possibility that the person will buy the item Y
  - So compute  $X \rightarrow Y$  (Support, Confidence)
  - Support: The probability that transaction contain both X and Y
  - Confidence: The conditional probability that the transaction containing X also contain Y.
  - **Beer  $\rightarrow$  Diapers (60%, 100%)**
  - **Diapers  $\rightarrow$  Beer (60%, 75%)**



# Fraud Detection

Detect unusual transaction



# Trend/ Forecast

1 Pound sterling equals

# 1.30 United States Dollar

10 Mar, 13:02 UTC · Disclaimer

1

Pound sterling ▼

1.30

United States Dolla ▼





Machine learning market worth **8.81** billion USD by 2022

Day-to-day use of machine learning:

**NETFLIX**

**Netflix** learns users preference and provides very personalized content to the user.



**SnapChat**

**SnaptChat** uses a pre-trained machine learning model and image processing to apply various filters on users' face.

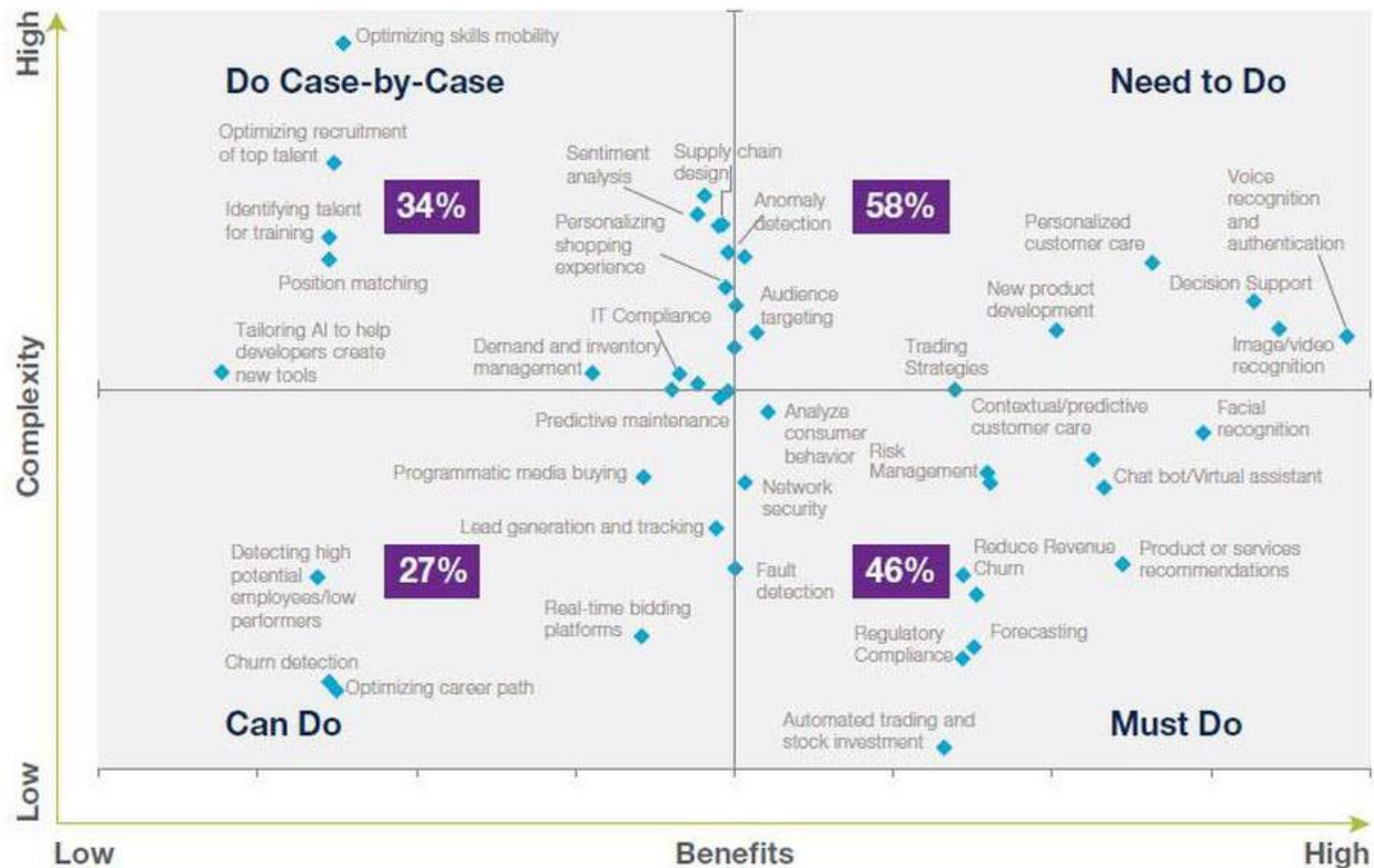


Do I also need to mention **Email Spam filtering?**



# 84% of marketing organizations are implementing or expanding AI and machine learning in 2018

Source: <https://www.forbes.com/sites/louiscolombus/2018/02/25/10-ways-machine-learning-is-revolutionizing-marketing/#424658015bb6>



SOURCE: TURNING AI INTO CONCRETE VALUE: THE SUCCESSFUL IMPLEMENTERS' TOOLKIT, CAPGEMINI CONSULTING. 2017. (PDF, 28 PP., NO OPT-IN).

# Machine Learning Is Revolutionizing Marketing

- Customer churn analysis
- Price optimization
- Demand forecasting
- Fine-tuning propensity models by customer and product line segmentation
- Lead scoring accuracy improvement: predict ideal customer profiles
- Identifying and defining the sales projections of specific customer segments

# Forbes

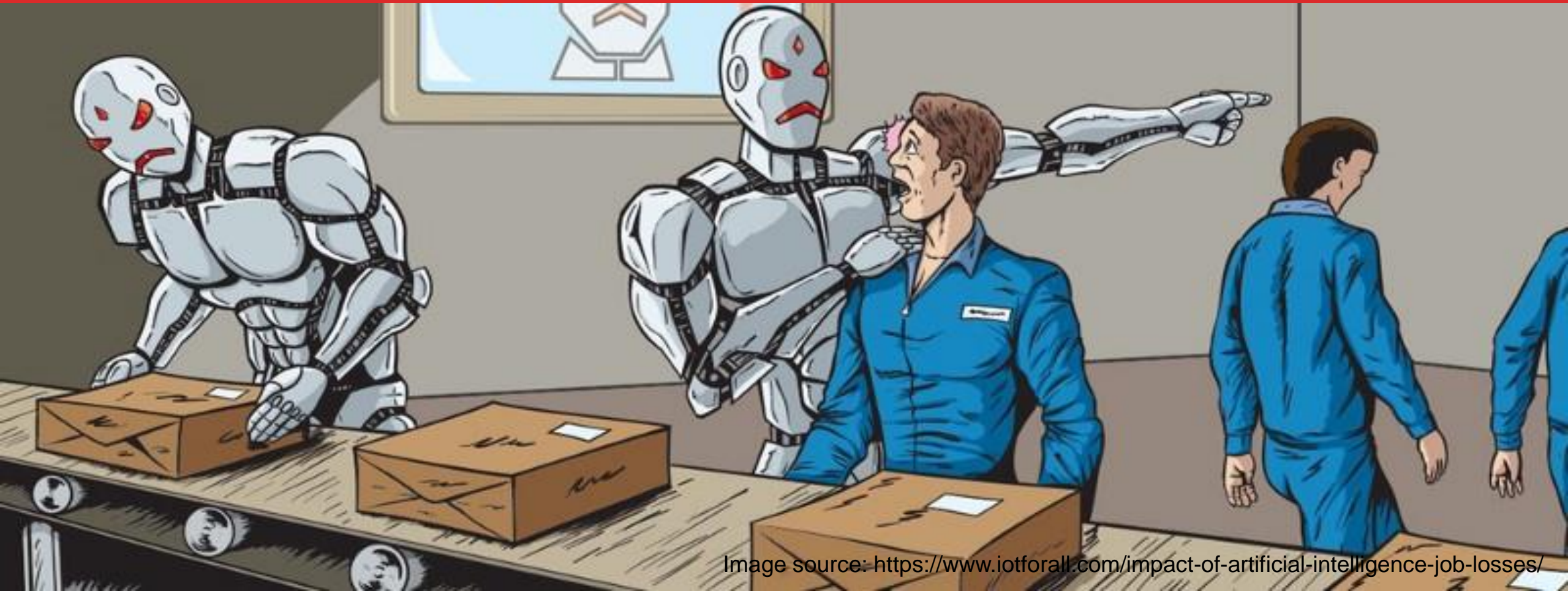
Article Source:

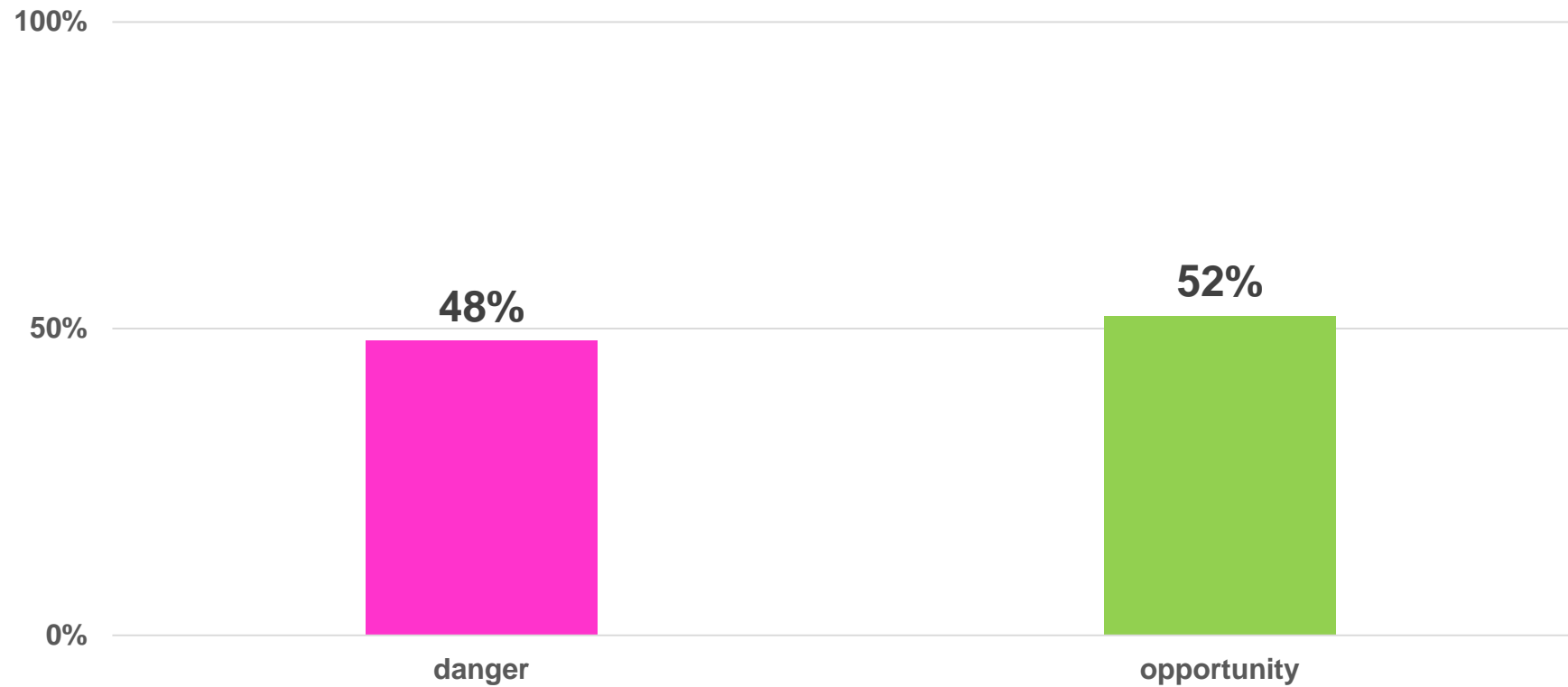
<https://www.forbes.com/sites/louiscolombus/2018/02/25/10-ways-machine-learning-is-revolutionizing-marketing/#282c30d75bb6>



# Will robots and AI take your job? The economic and political consequences of automation

Darrell M. West · Wednesday, April 18, 2018



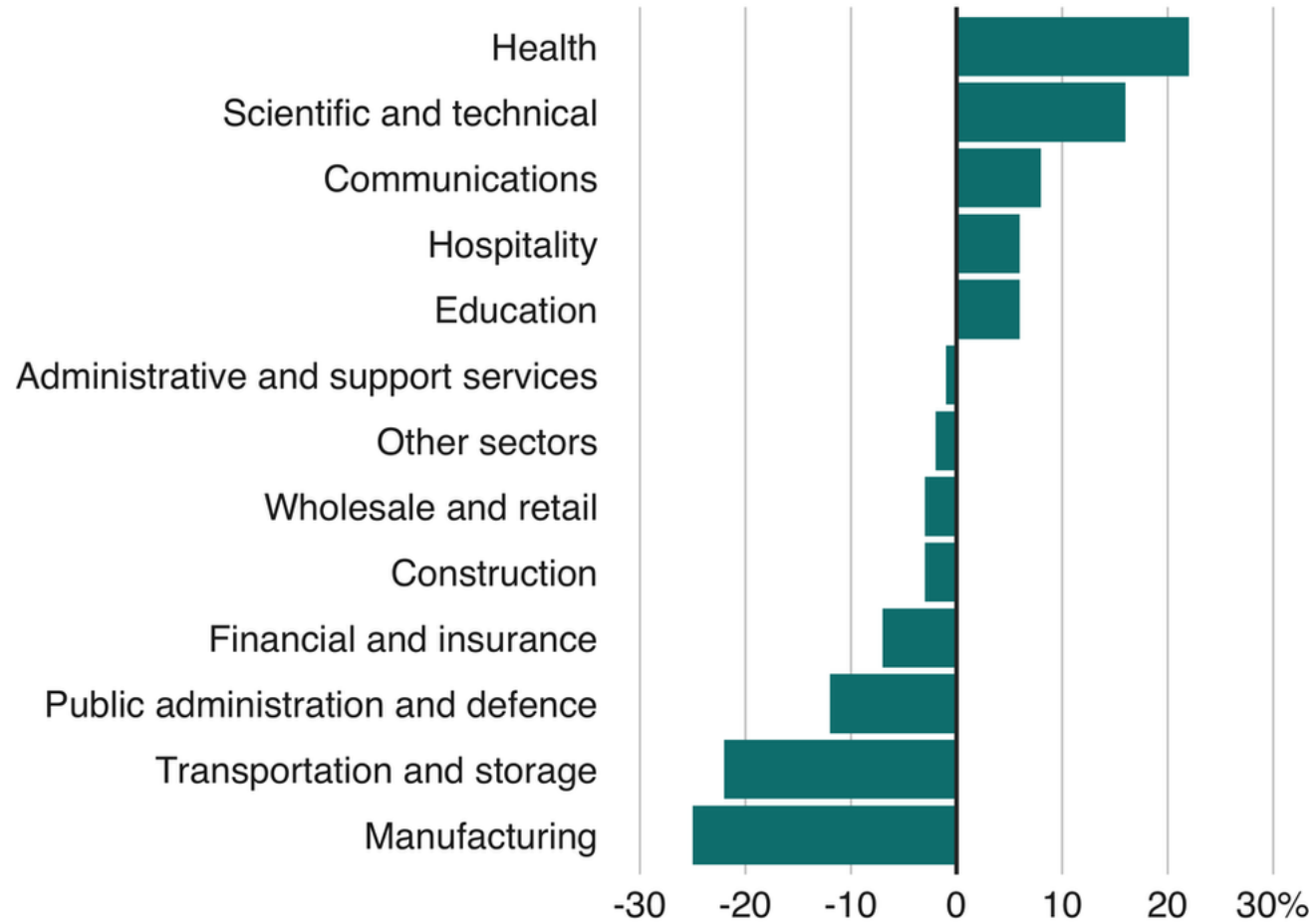


48% experts envision a future in which robots and digital agents have displaced significant numbers job loss

52% experts expect that technology will *not* displace more jobs than it creates by 2025

## How AI could change the job market

Estimated net job creation by industry sector, 2017-2037



Source: PwC



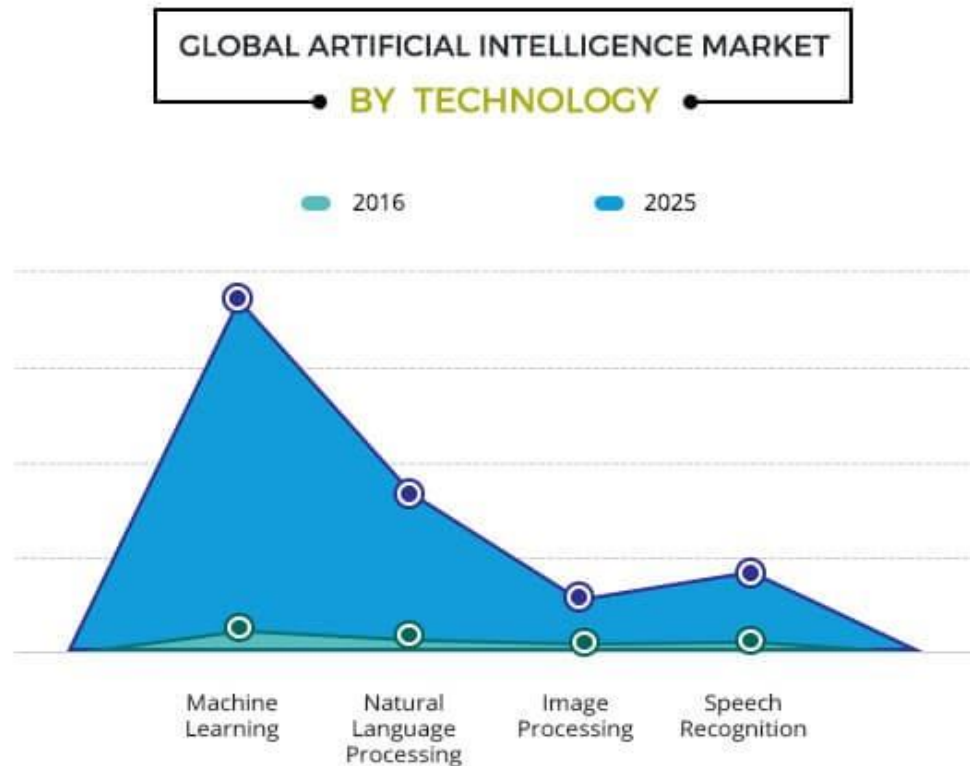
# Jobs AI could Replace

1. Telemarketing
2. Bookkeeping Clerks
3. Compensation and Benefits Managers
4. Receptionists
5. Couriers
6. Proofreaders
7. Computer Support Specialists
8. Market Research Analysts
9. Advertising Salespeople
10. Retail Salespeople

Source: <https://blog.hubspot.com/marketing/jobs-artificial-intelligence-will-replace>

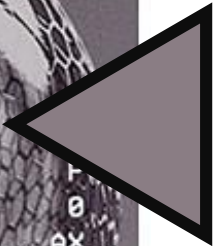
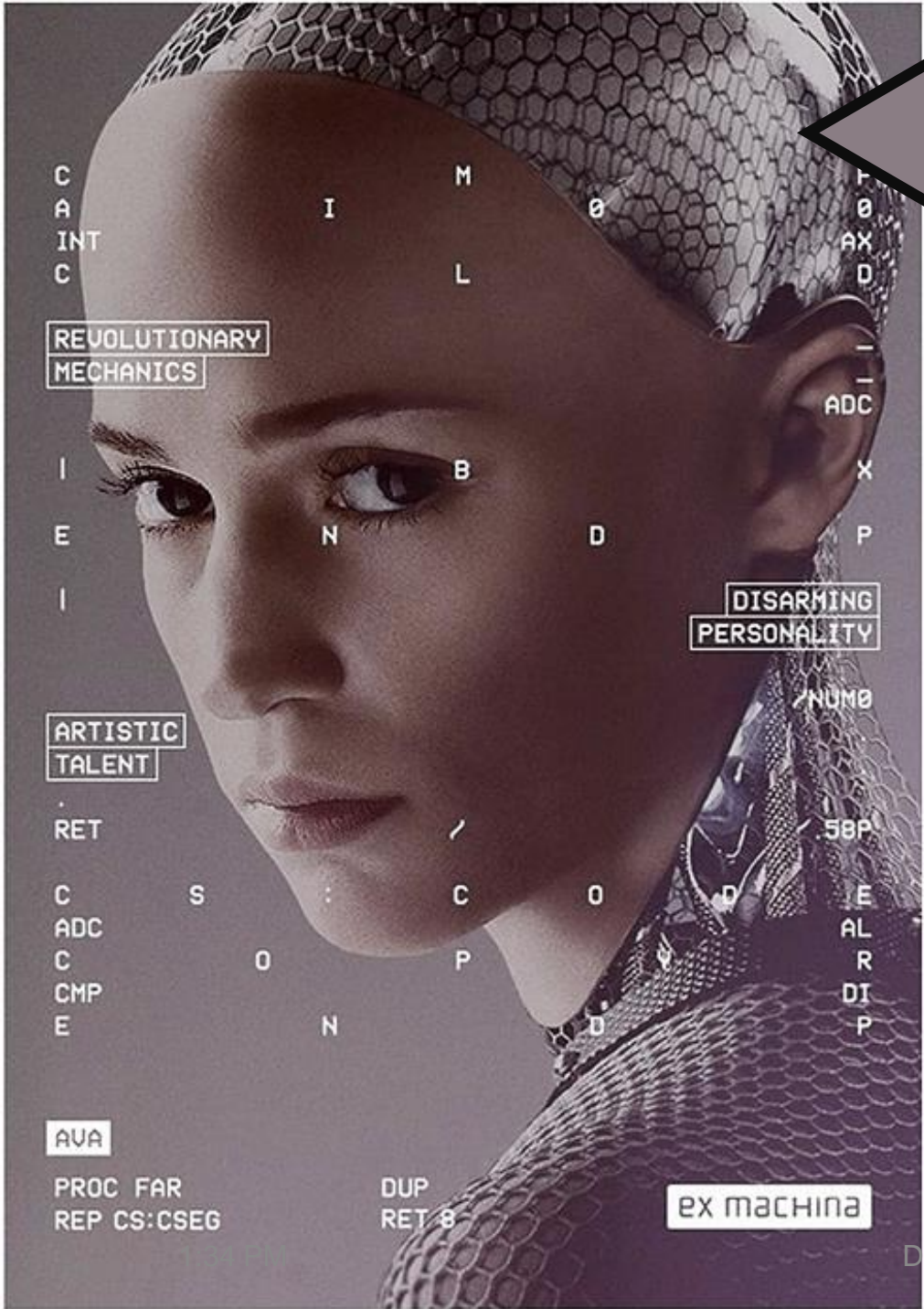


# Which AI will be used most



**MACHINE LEARNING** is projected as one of the most lucrative segments.

Source: <https://www.alliedmarketresearch.com/artificial-intelligence-market>



# The Goal

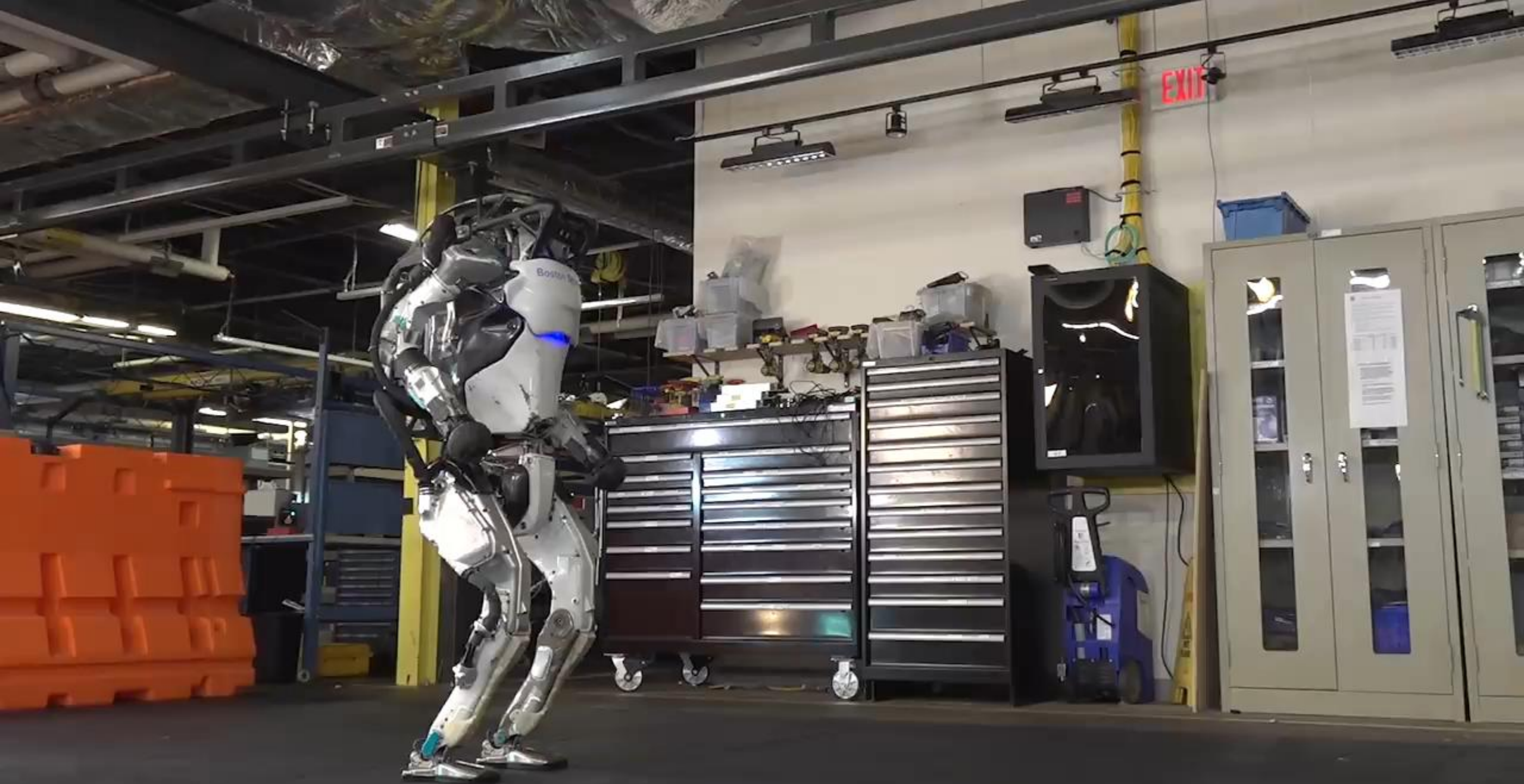
But busy in...

Puppy  
or  
muffin?



source: boredpanda.com





# Narrow AI vs General AI

Source: <https://hackernoon.com/general-vs-narrow-ai-3d0d02ef3e28>, Video Source: <https://www.youtube.com/watch?v=QOCQAtwdKqQ>

Do you believe that AI is an existential threat to humanity?

Noam Chomsky  
Philosopher

# Thank You

v.k.ojha@reading.ac.uk