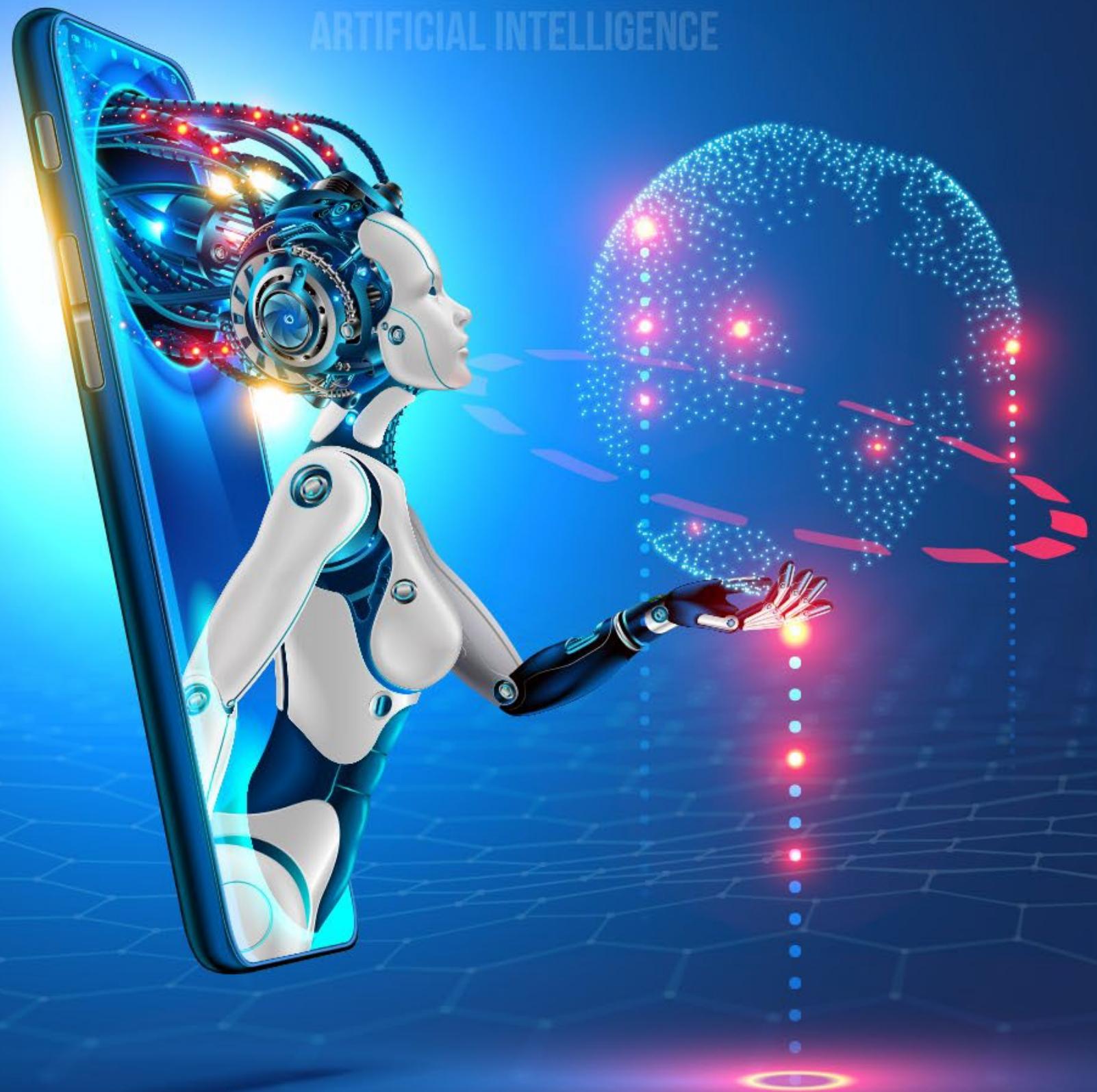


DATA AND  
ARTIFICIAL INTELLIGENCE



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Machine Learning Certification Training

# DATA AND ARTIFICIAL INTELLIGENCE



## Introduction to Artificial Intelligence and Machine Learning

## Concepts Covered



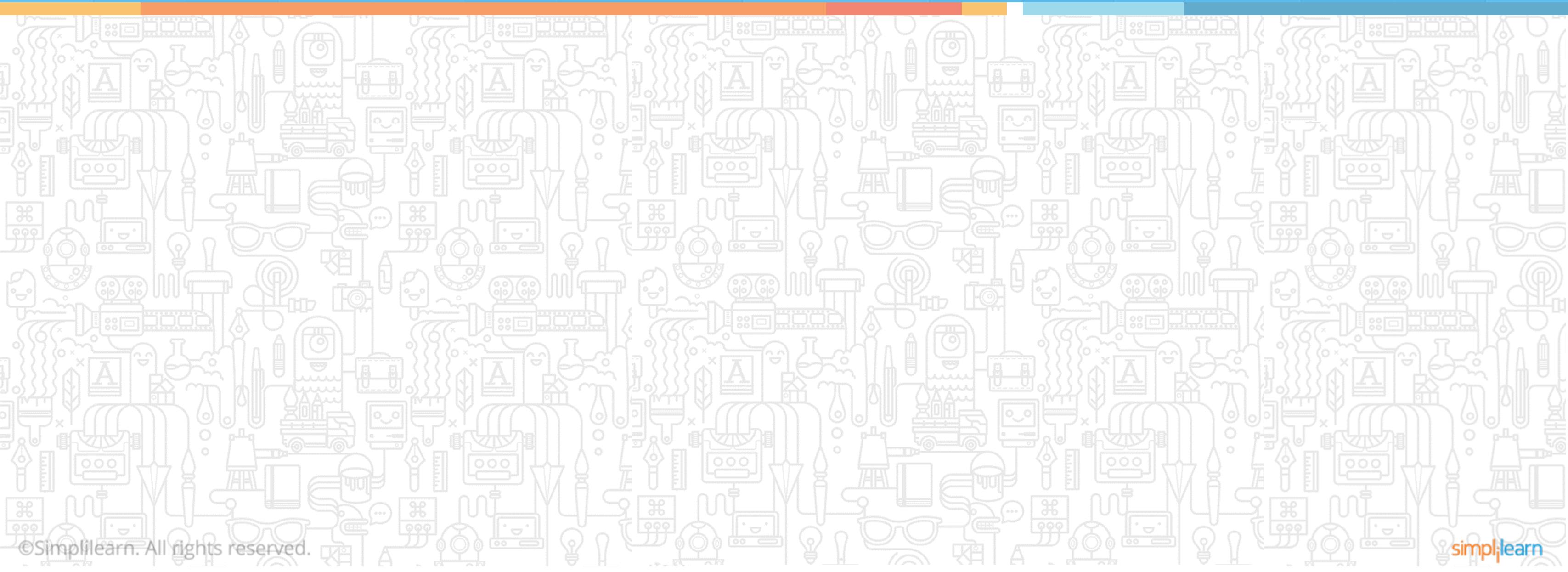
- ✓ Machine Learning Techniques
- ✓ Applications of Machine learning

# Learning Objectives

- 
- ✔ Define Artificial Intelligence (AI) and understand its relationship with data
  - ✔ Define Machine Learning (ML) and understand its relationship with artificial intelligence and data science
  - ✔ Understand machine learning approach
  - ✔ Identify the applications of machine learning

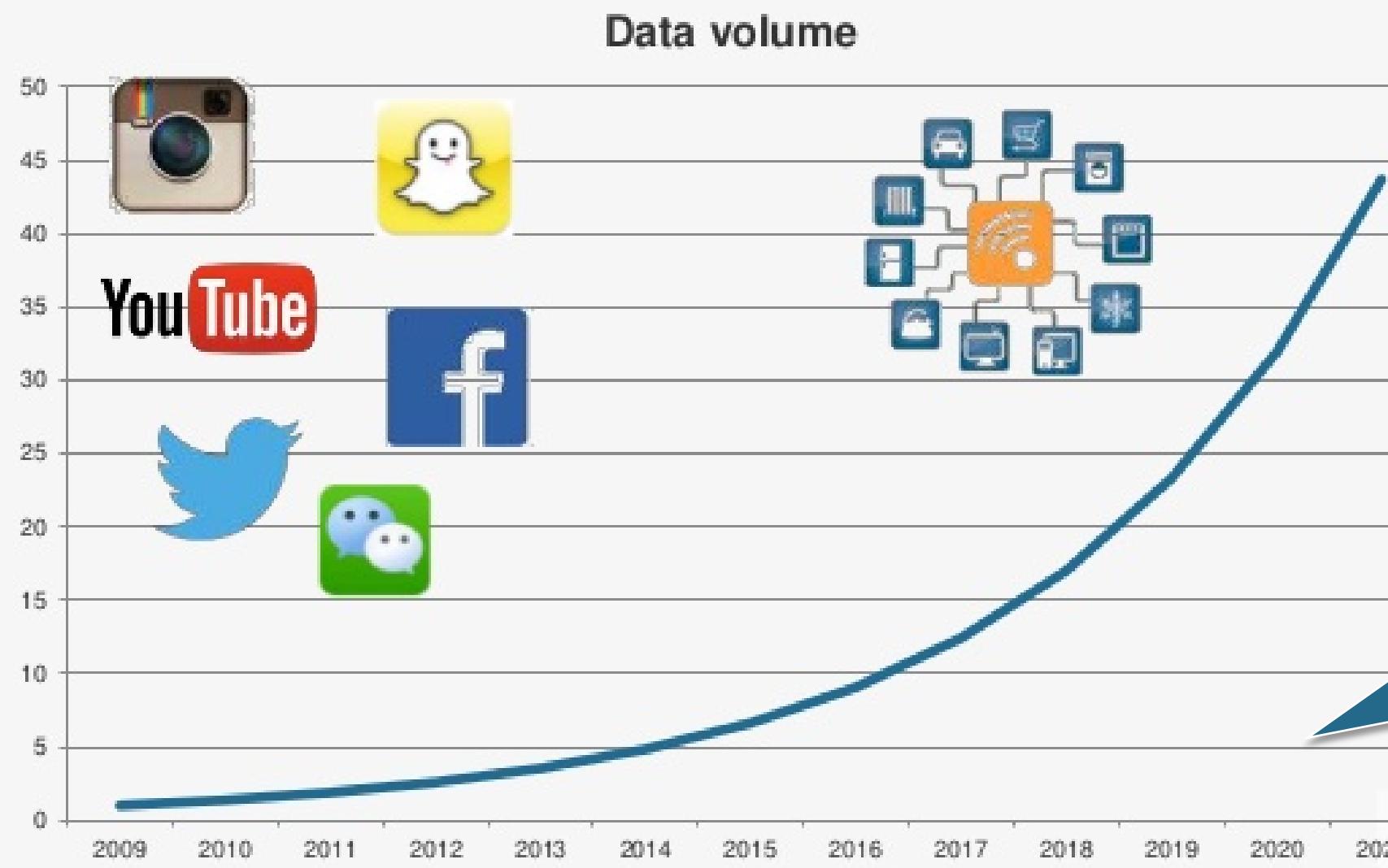
# Introduction to Artificial Intelligence and Machine Learning

## Topic 1: Emergence of Artificial Intelligence



# Data Economy

44Zb of data by 2020 – 44x in 11 years

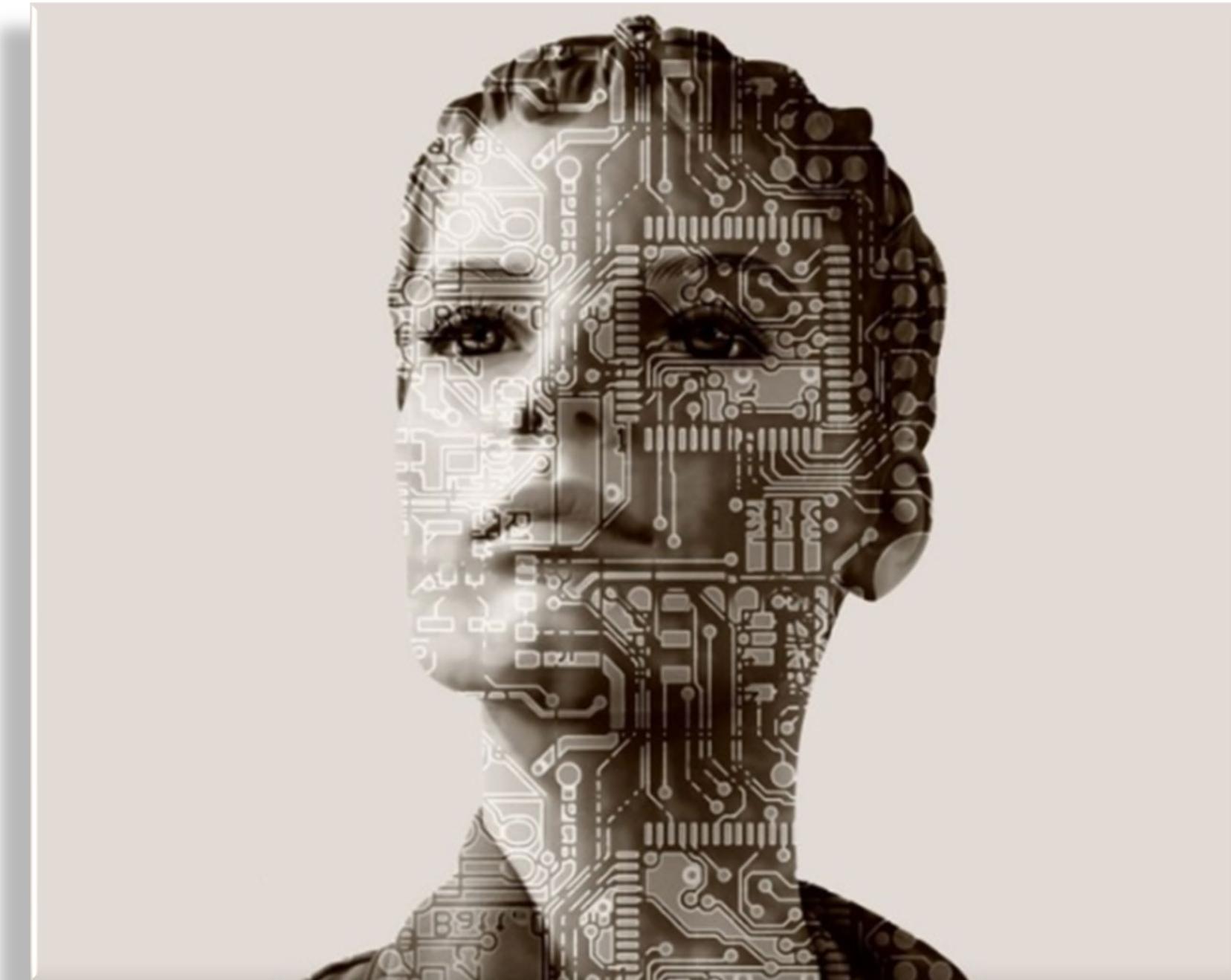


Explosion of data has given rise to a new economy and there is a constant battle for ownership of data between enterprises to derive benefits from it.



# Emergence of Artificial Intelligence

Science associated with data is going toward a new paradigm where one can teach machines to learn from data and derive a variety of useful insights giving rise to Artificial Intelligence.



# Definition of Artificial Intelligence

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“

Artificial Intelligence refers to intelligence displayed by machines that simulates human and animal intelligence.

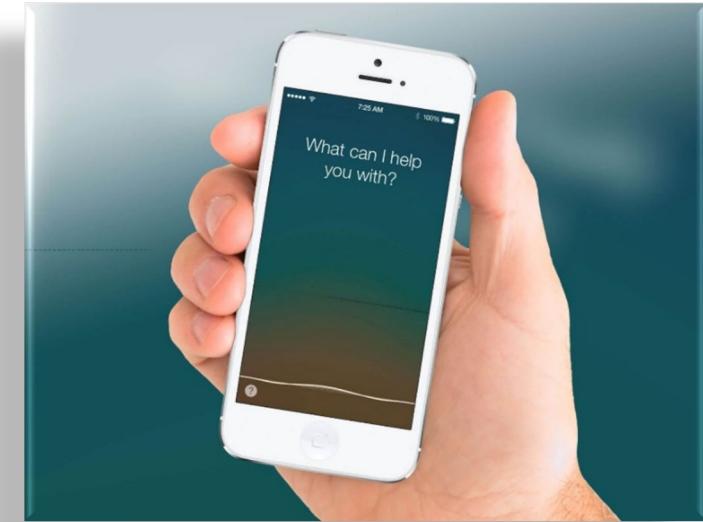
”

# Artificial Intelligence in Practice

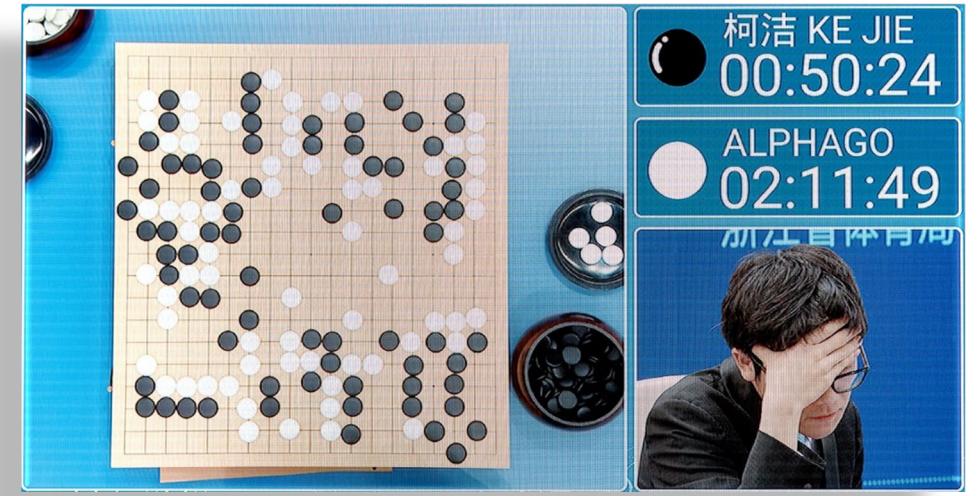
AI is redefining industries by providing greater personalization to users and automating processes.



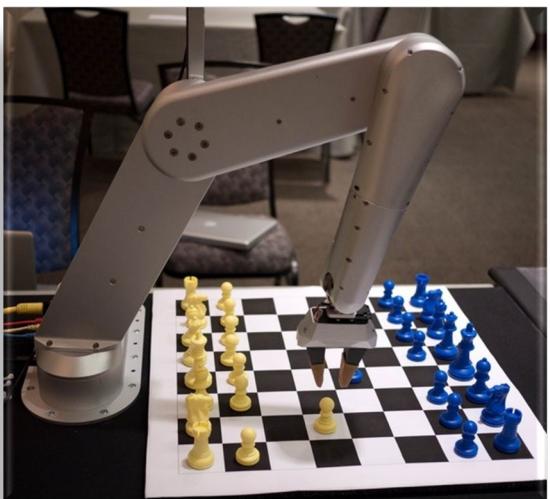
**Self-driving cars**



**Siri(iPhone)**



**Google's AlphaGo**



**Chess**



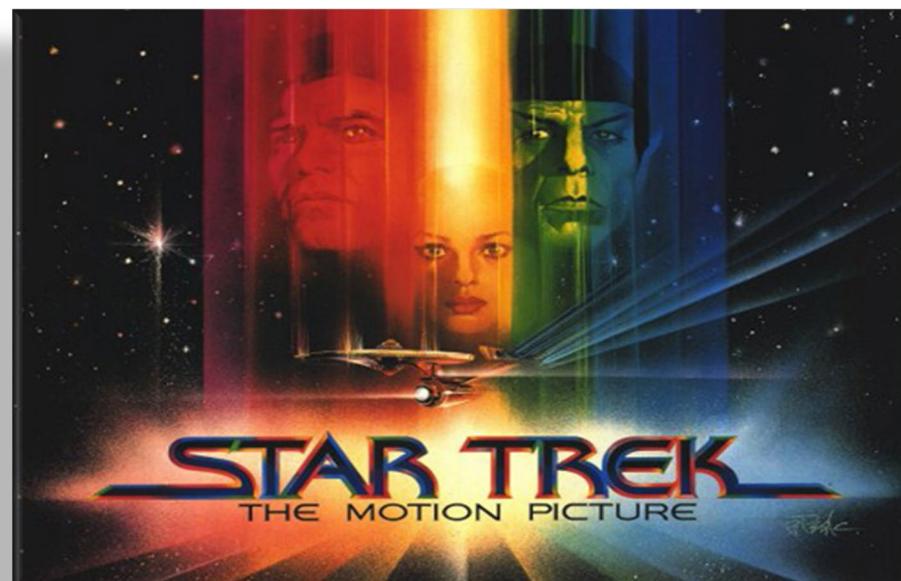
**Amazon ECHO**



**Concierge robot from IBM Watson**

# Sci-Fi Movies with the Concept of AI

Few AI films spanned through the decades that reflect the everchanging spectrum of our emotions regarding the machines we have created



# Data Facilitates in Recommendations

Amazon collects data from users and recommends the best products according to the user's buying/shopping pattern.

amazon **Added to Cart** Cart subtotal (1 item): **\$17.96**  
To qualify for **FREE Shipping**, add **\$7.04** of eligible items. Details

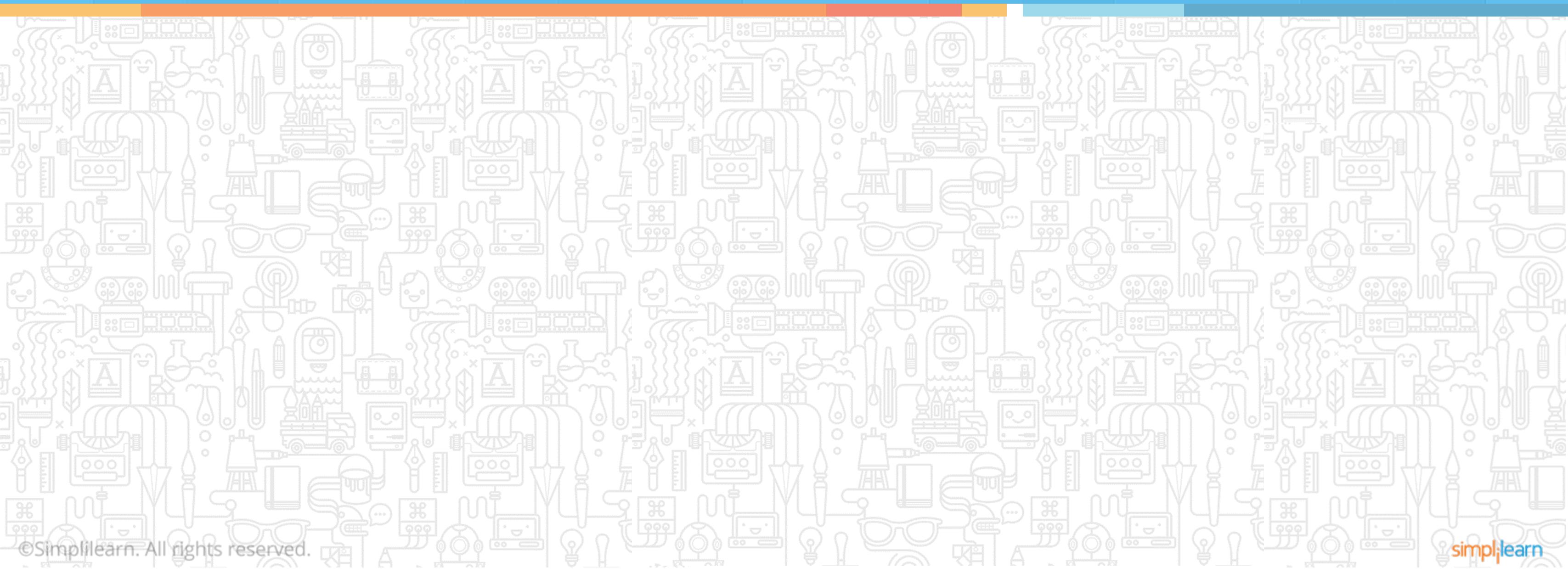
Cart Proceed to checkout (1 item)

Customers who bought *Origin: A Novel* also bought

The image shows four book covers side-by-side. From left to right: 1. 'Inferno' by Dan Brown, featuring a circular portrait of Leonardo da Vinci and a map of Florence. 2. 'The Lost Symbol' by Dan Brown, showing a red rose over a map of Washington D.C. 3. 'Deception Point' by Dan Brown, depicting a lighthouse on a snowy mountain peak. 4. 'Don't Let Go' by Harlan Coben, with a yellow background and a small figure standing on a path.

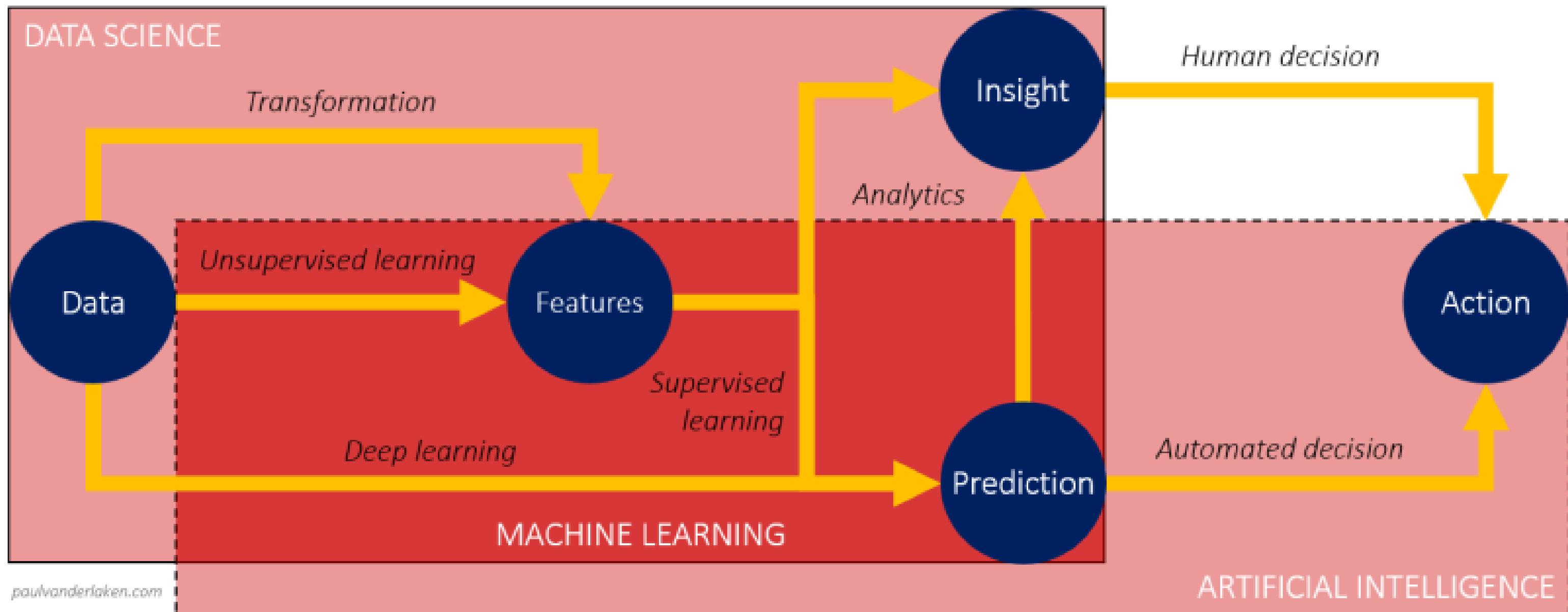
# Introduction to Artificial Intelligence and Machine Learning

## Topic 2: Relationship between AI, ML, and Data Science

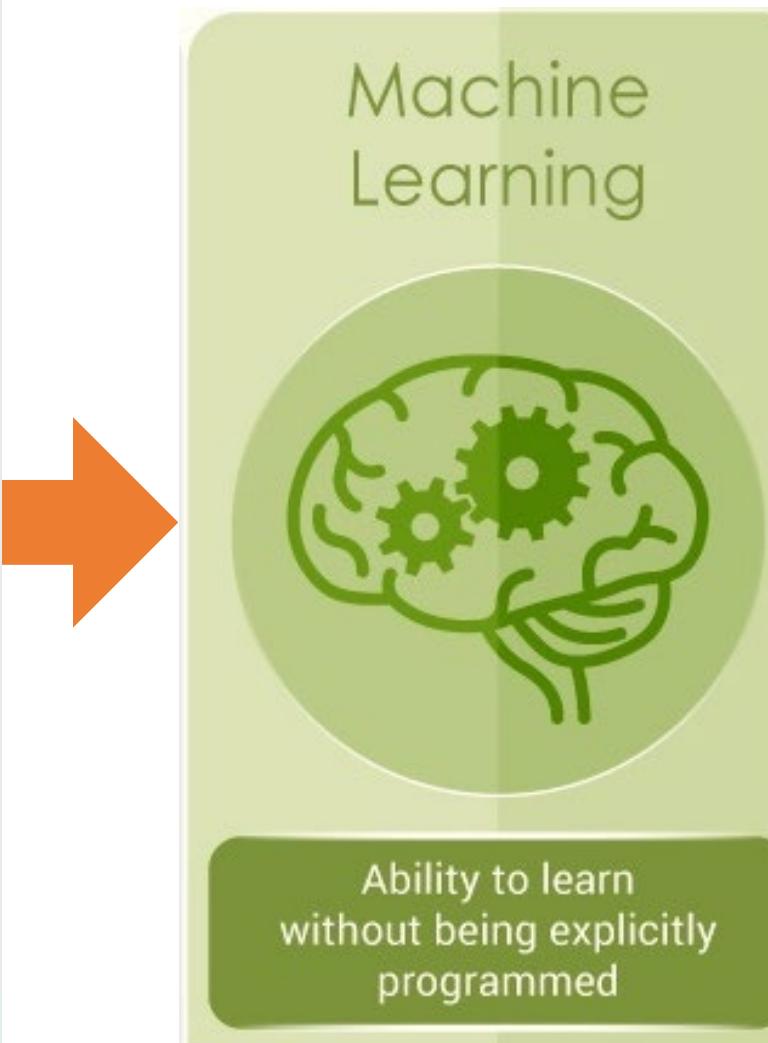
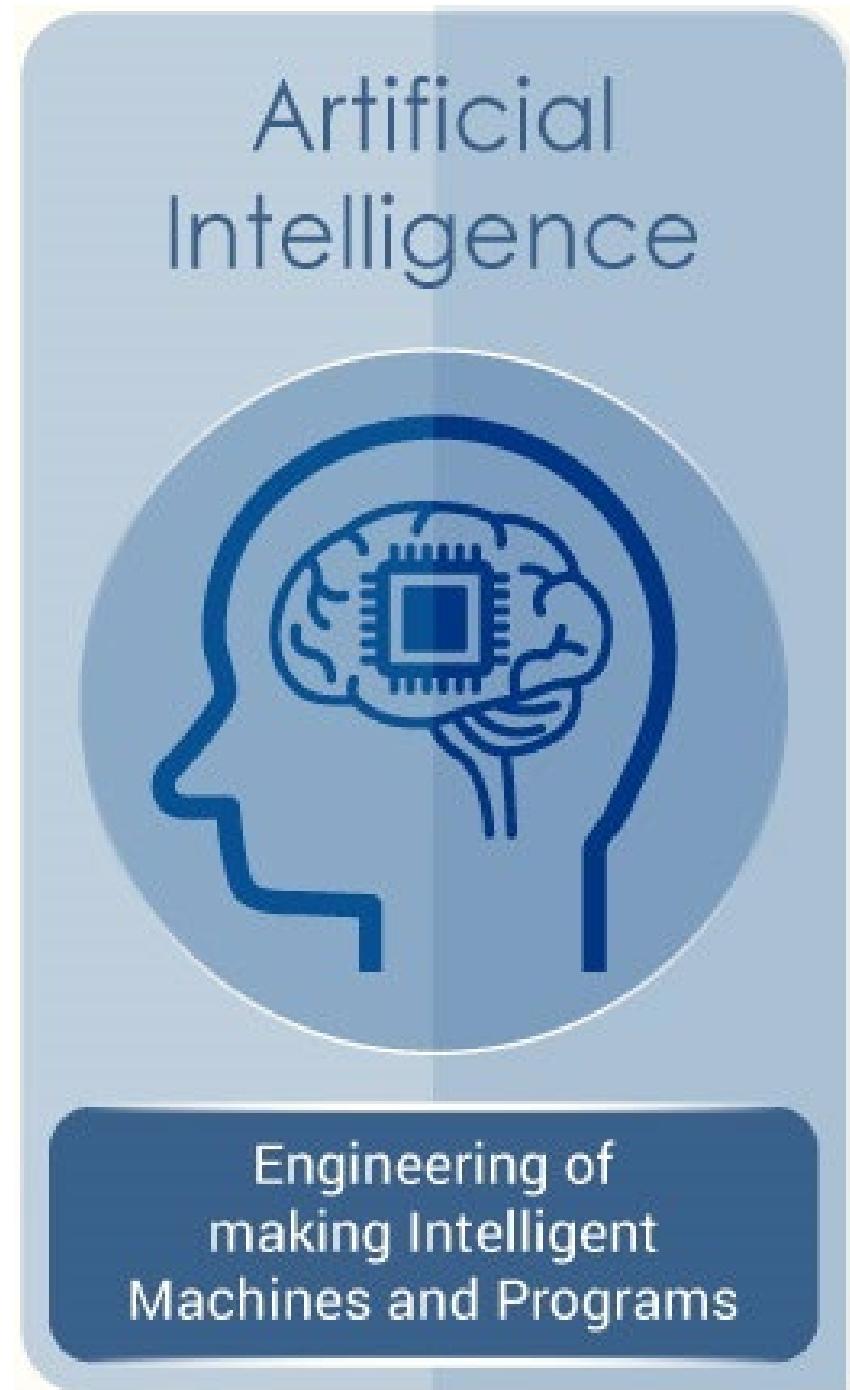


# Relationship between Artificial Intelligence, Machine Learning, and Data Science

Even though the terms data science, machine learning, and artificial intelligence (AI) fall in the same domain and are connected to each other, they have their specific applications and meaning.



# Relationship between Artificial Intelligence and Machine Learning



**“**  
*Machine Learning is an approach or subset of Artificial Intelligence that is based on the idea that machines can be given access to data along with the ability to learn from it.*  
**”**

# Definition of Machine Learning

---

“

The capability of Artificial Intelligence systems to learn by extracting patterns from data is known as Machine Learning.

”

# Features of Machine Learning



01

It uses the data to *detect patterns* in a dataset and *adjust program actions accordingly*

It *focuses on* the *development of computer programs* that can teach themselves to *grow and change* when *exposed to new data*

02



03

It enables computers to *find hidden insights* using *iterative algorithms* *without being explicitly programmed*

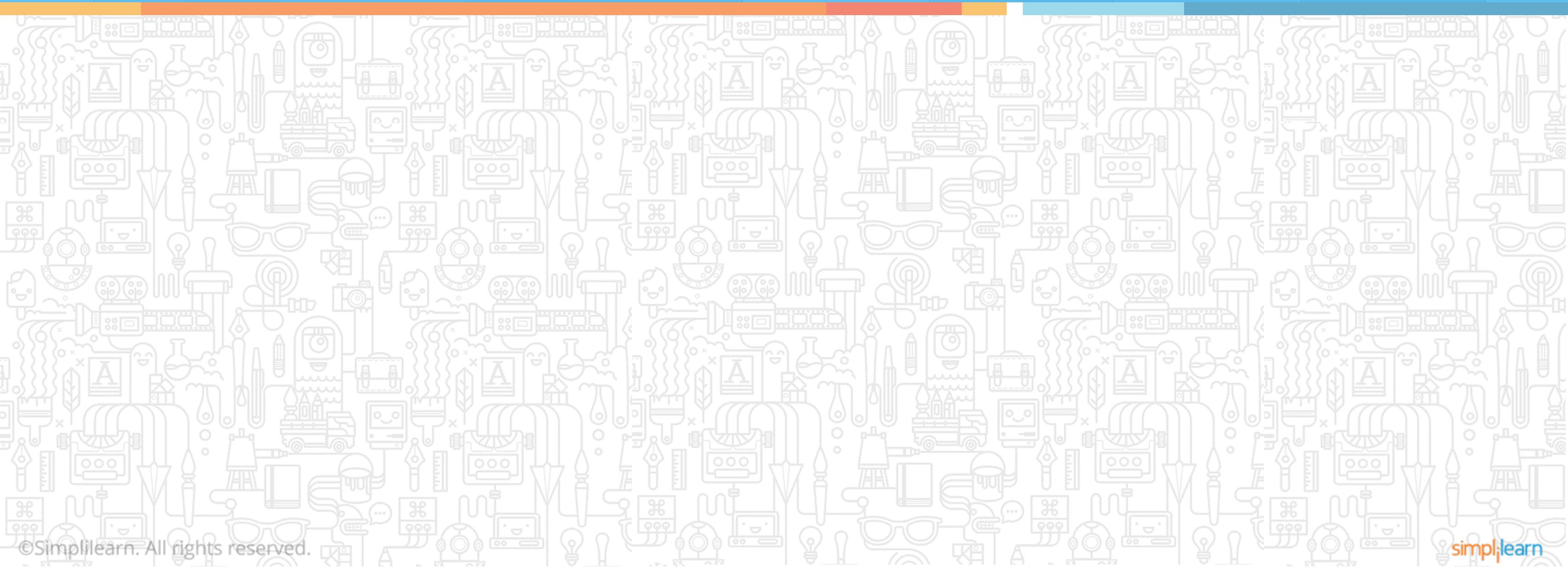
It *automates analytical model building*

04



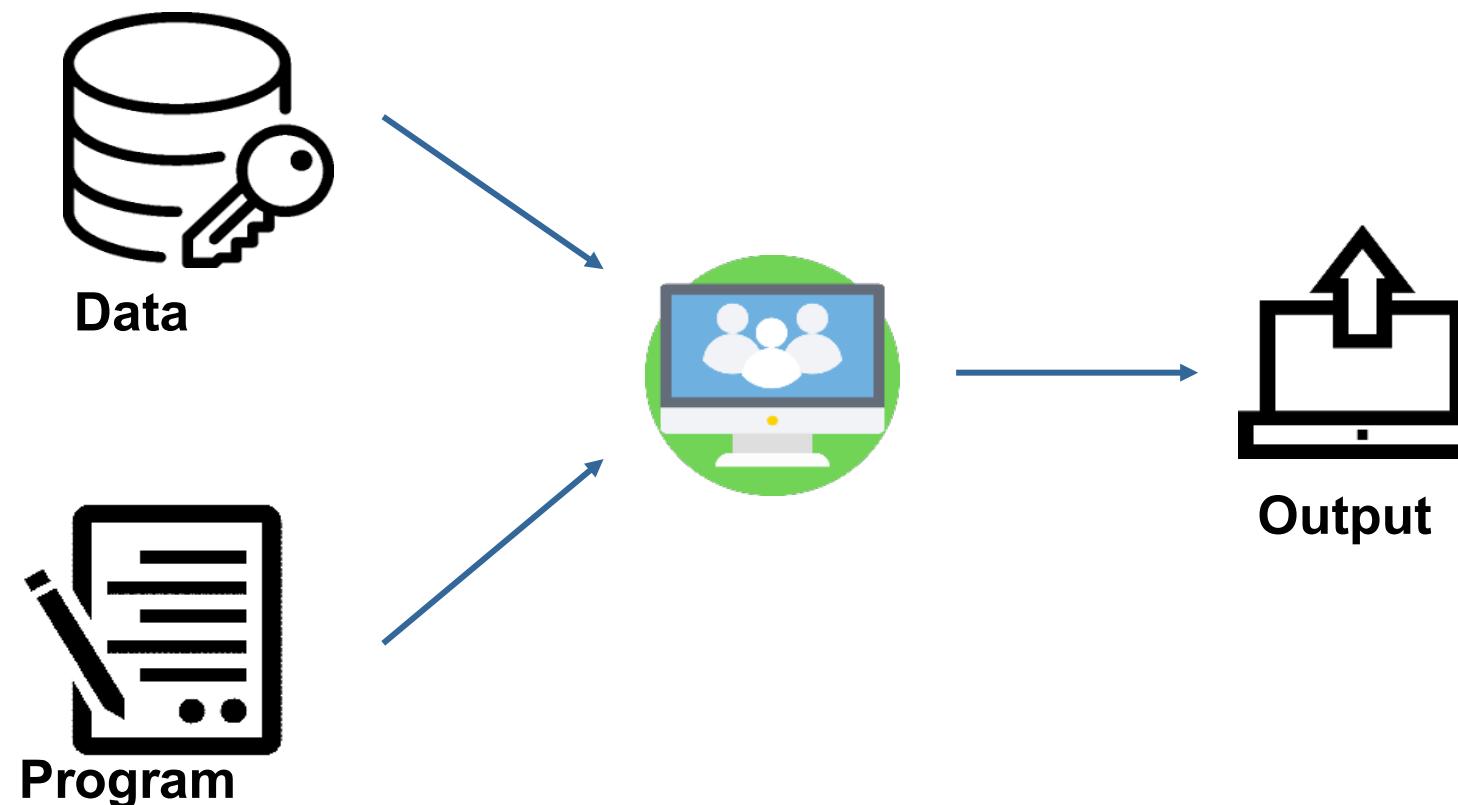
# Introduction to Artificial Intelligence and Machine Learning

## Topic 3: Machine Learning Approach

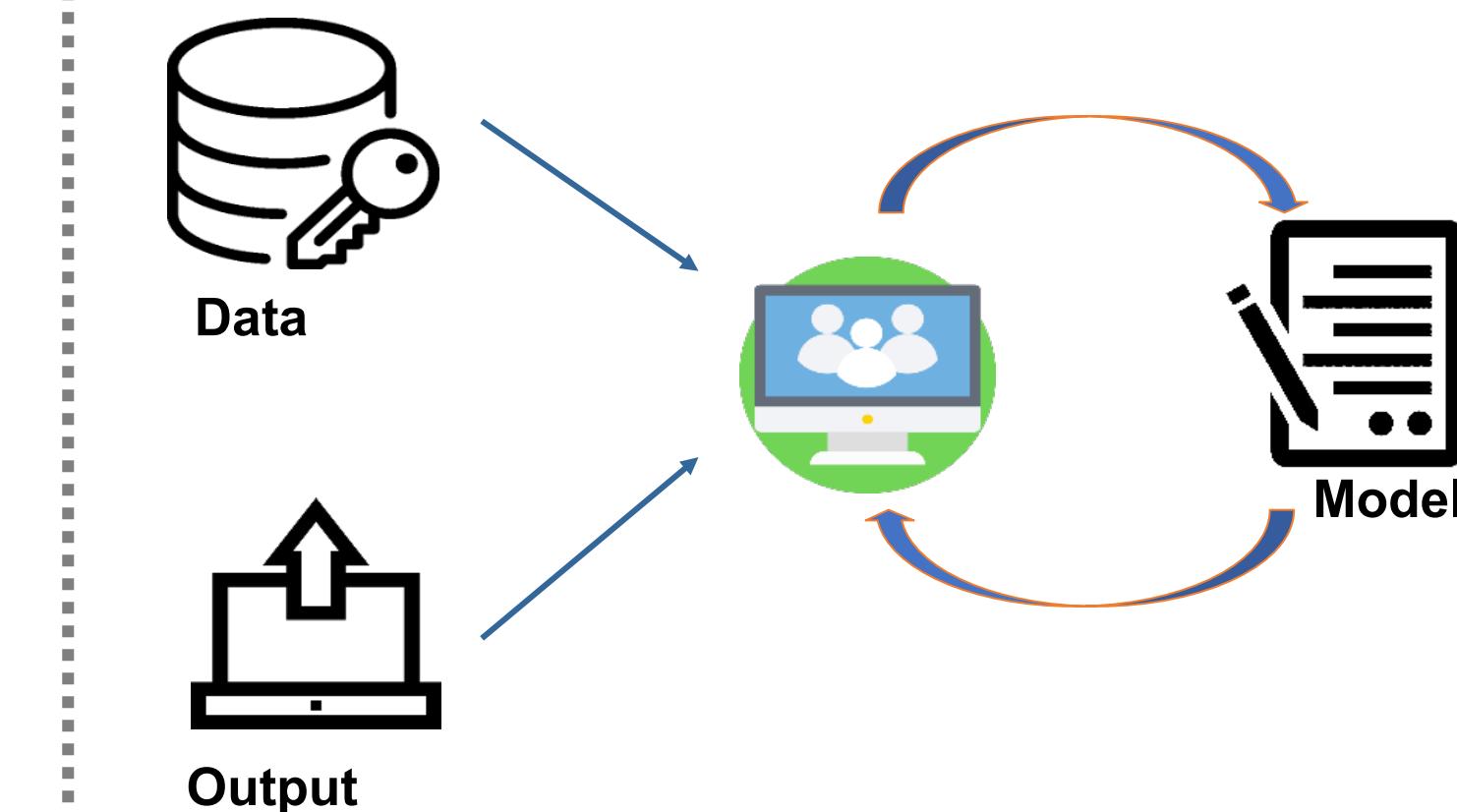


# Traditional Approach vs. Machine Learning Approach

**Traditional Programming:** Data and program is run on the computer to produce the output

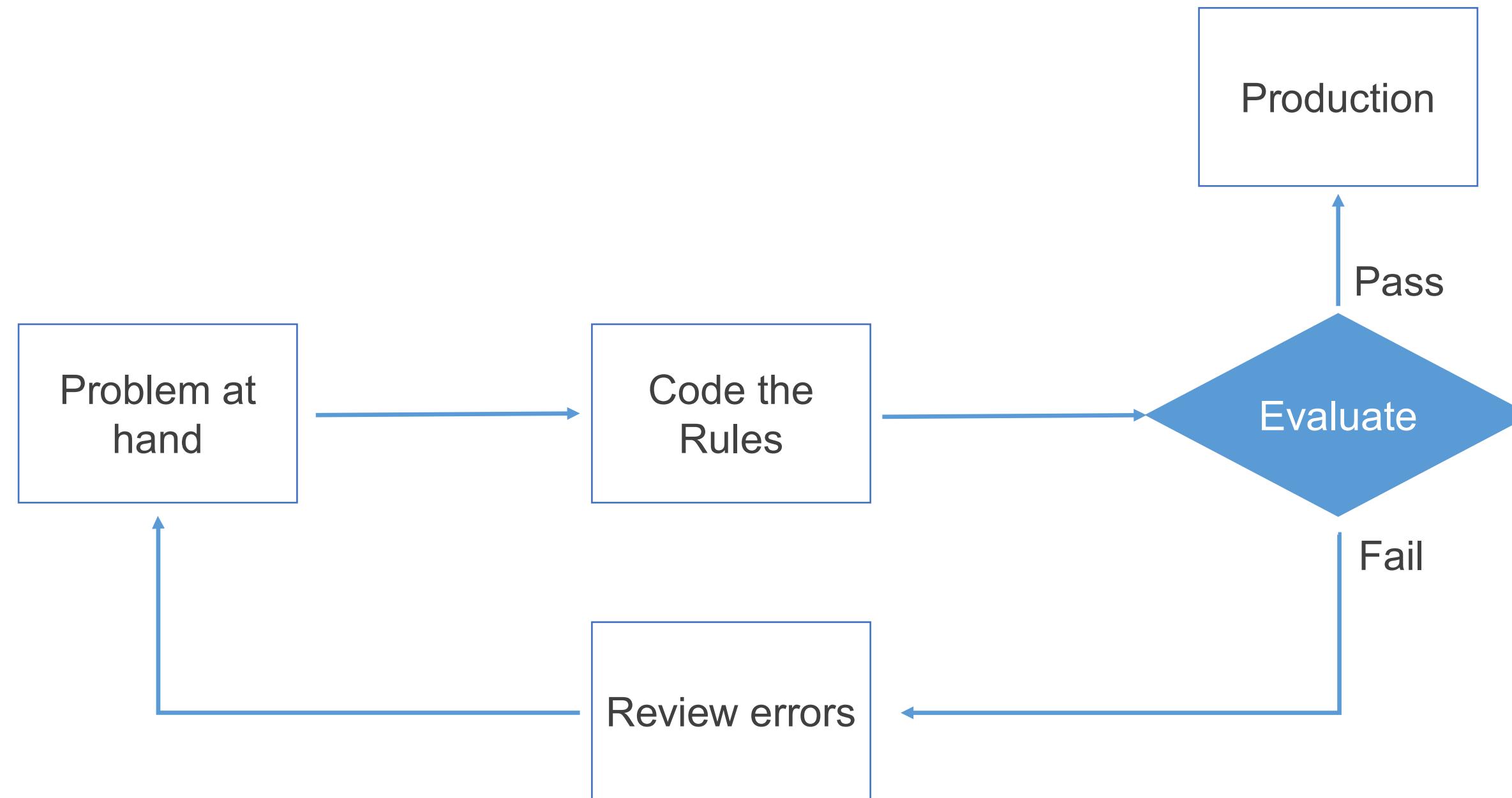


**Machine Learning:** Data and output is run on the computer to create a program



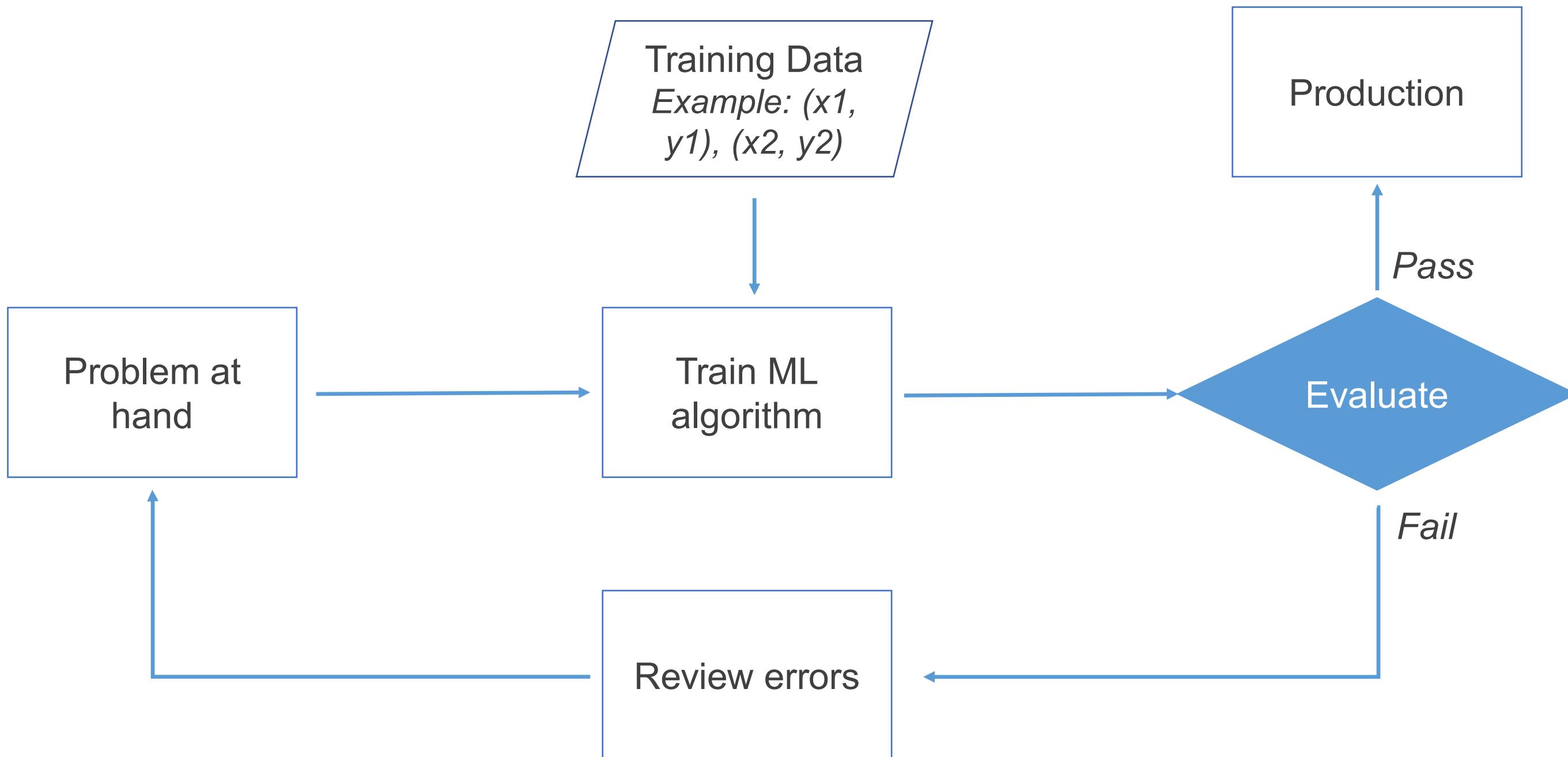
# Traditional Approach

*Traditional programming relies on hard-coded rules.*



# Machine Learning Approach

*Machine Learning relies on learning patterns based on sample data.*



# Relationship between Machine Learning and Data Science

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Data Science and Machine Learning go hand in hand. Data Science helps evaluate data for Machine Learning algorithms.



# Relationship between Machine Learning and Data Science

---



Data science is the use of statistical methods to find patterns in the data.

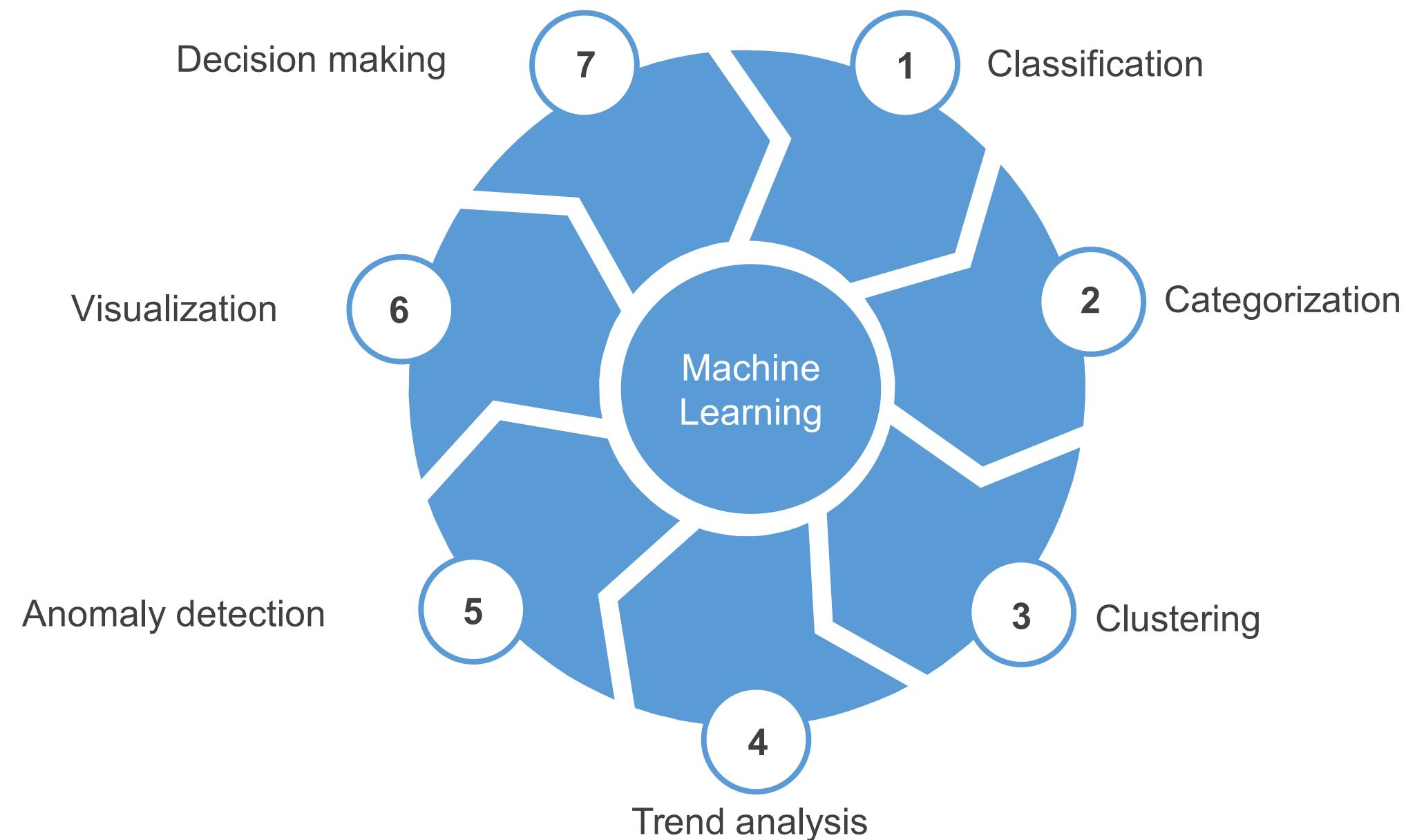
Statistical machine learning uses the same math and techniques as data science.

These techniques are integrated into algorithms that learn and improve on their own.

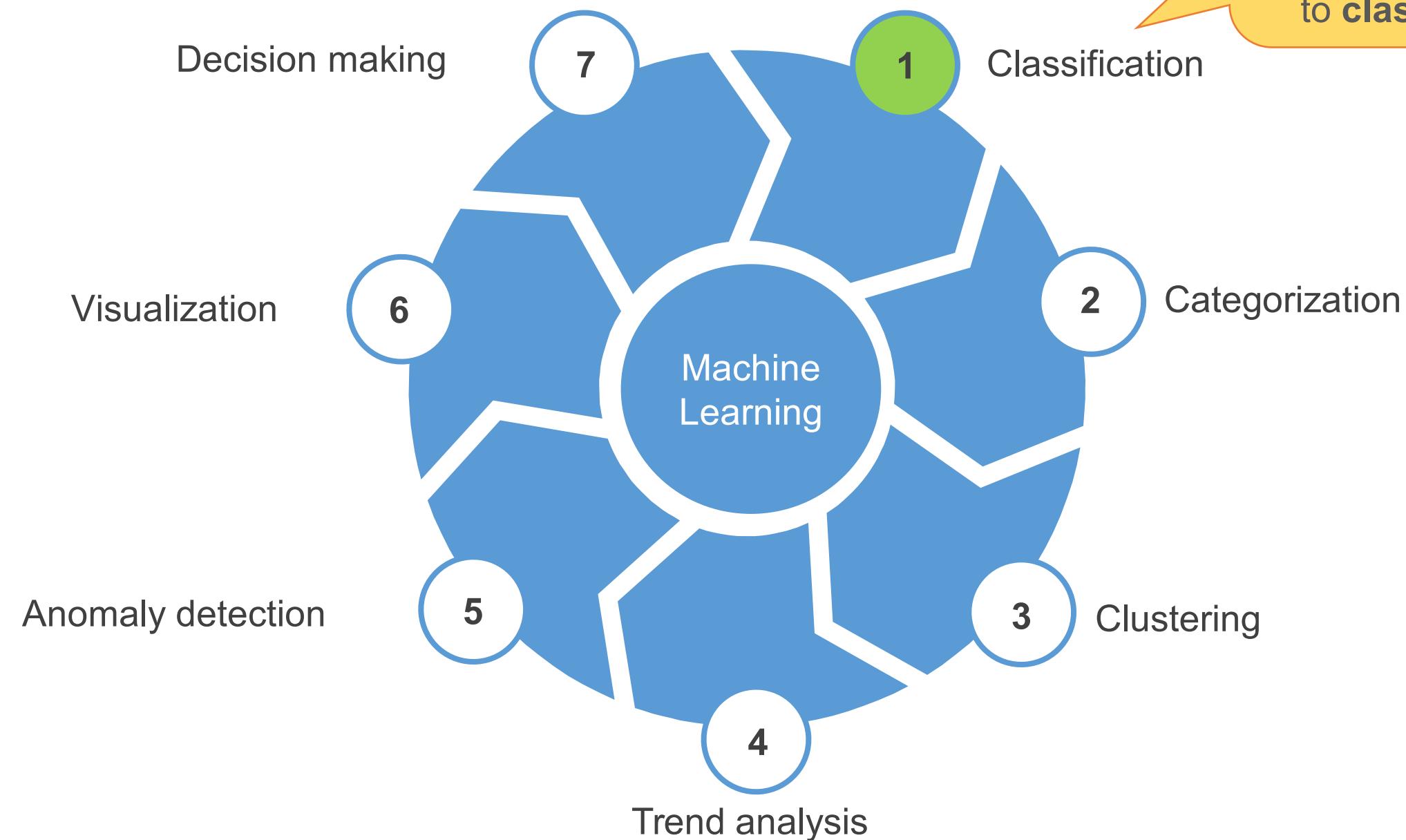
Machine Learning facilitates Artificial Intelligence as it enables machines to learn from the patterns in data.

# Machine Learning Techniques

Machine Learning uses a number of theories and techniques from Data Science:

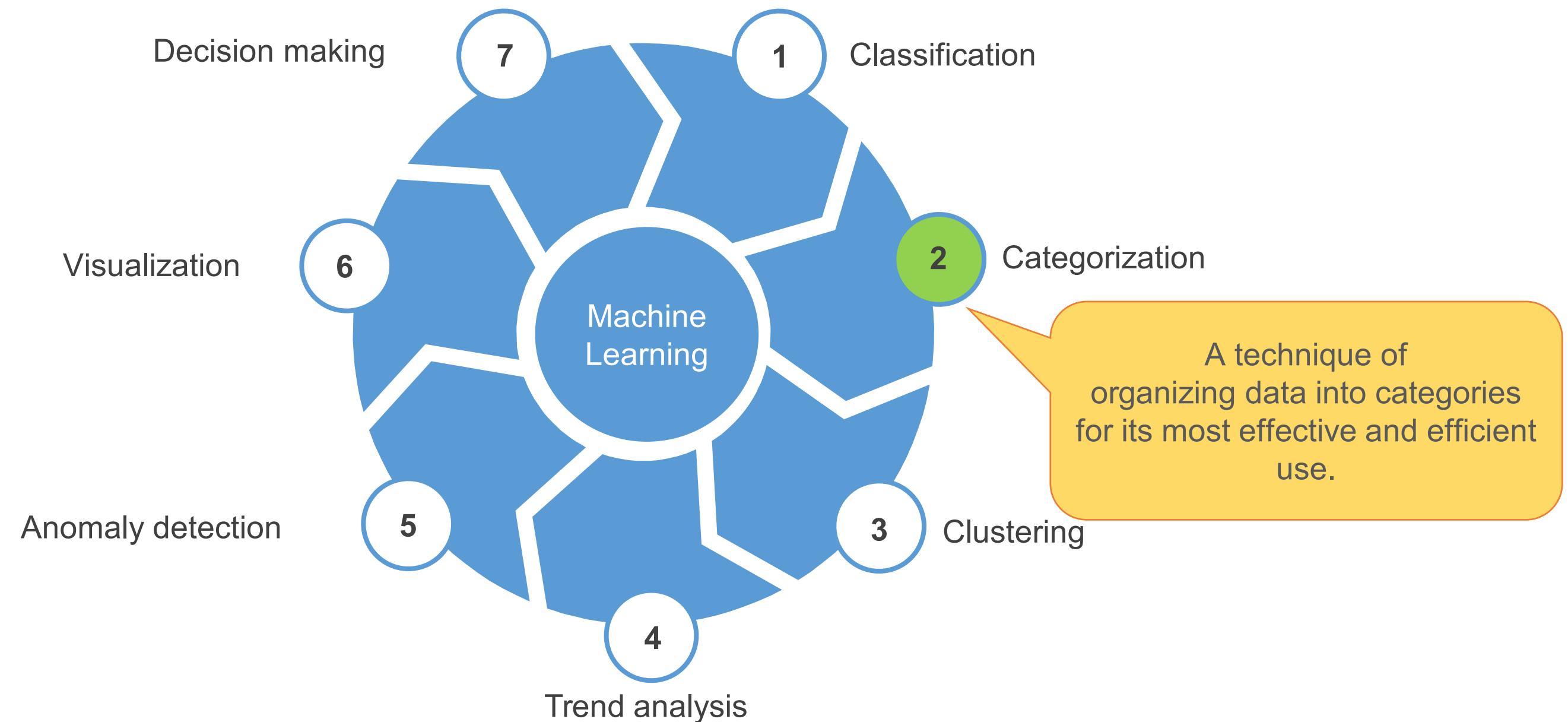


# Machine Learning Techniques

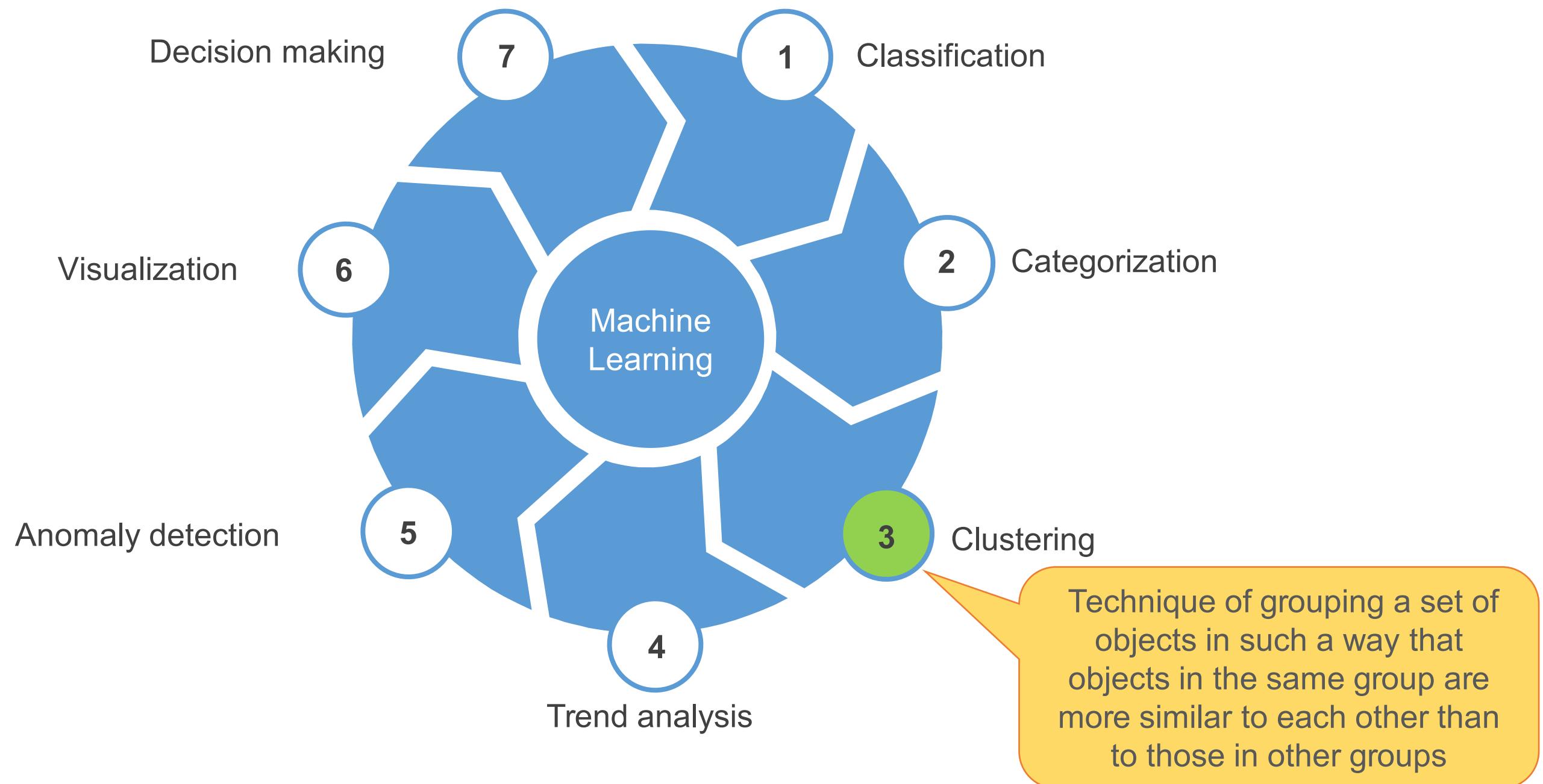


**classification** is a technique in which the computer program learns from the data input given to it and then uses this **learning** to **classify** new observation

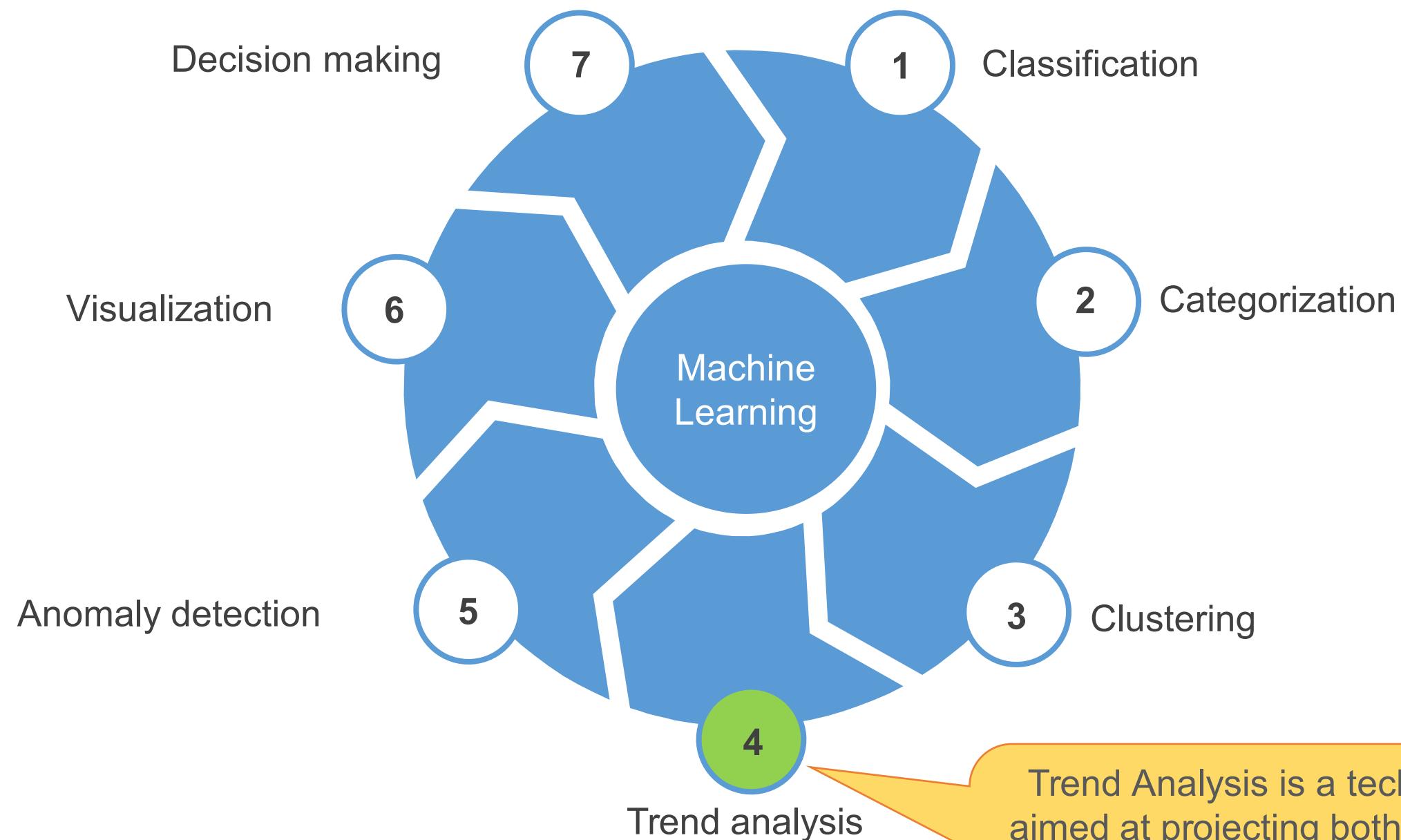
# Machine Learning Techniques



# Machine Learning Techniques

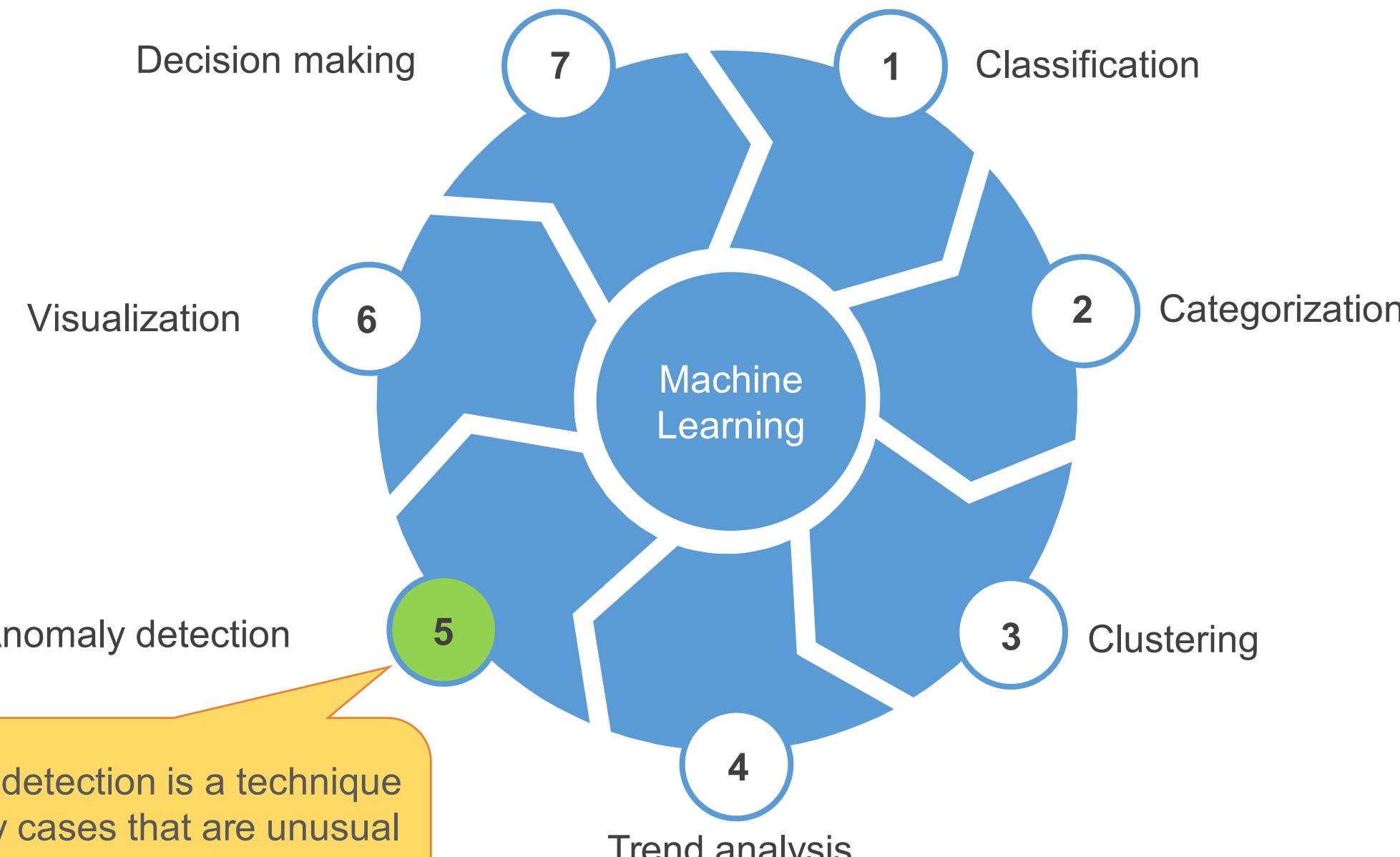


# Machine Learning Techniques



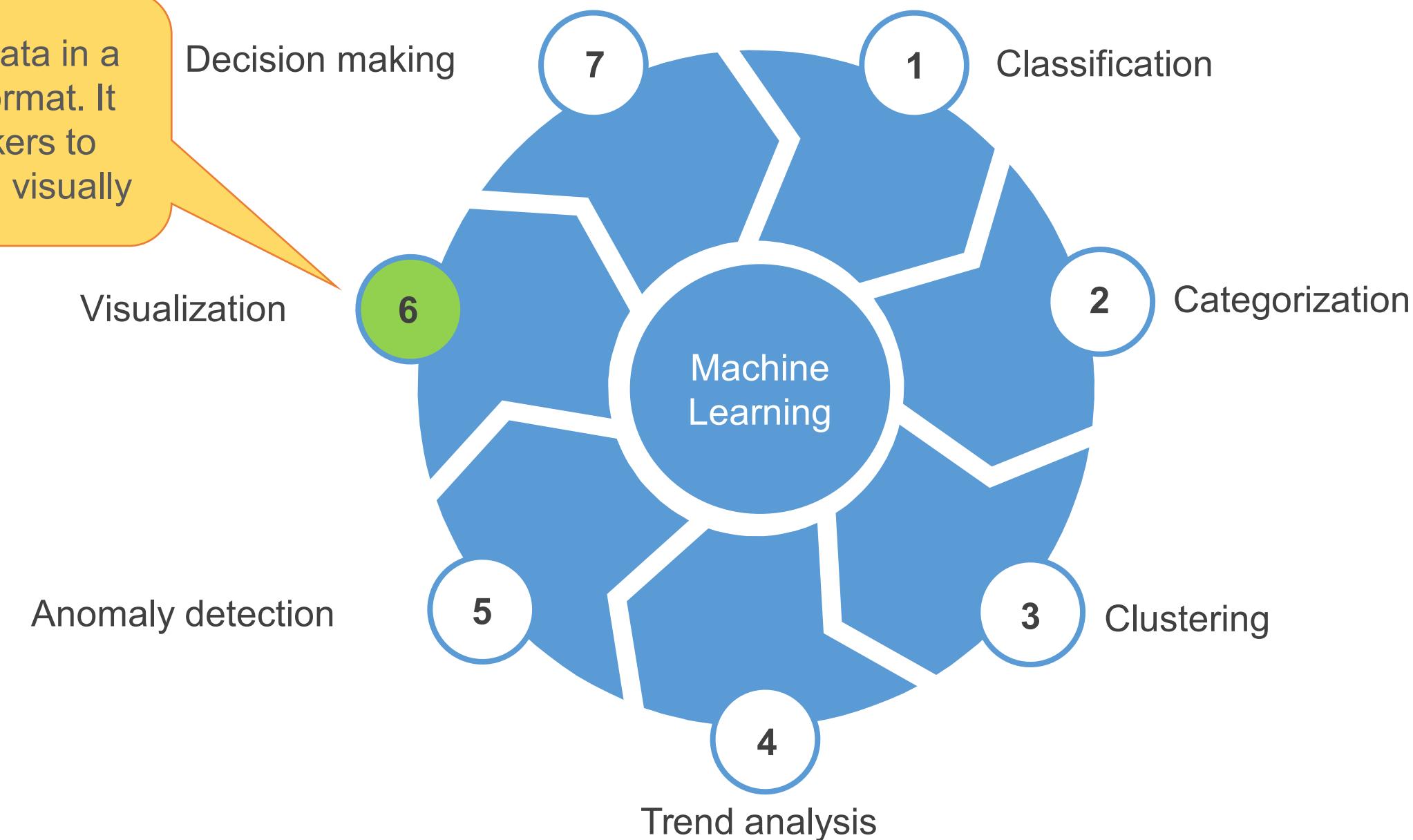
Trend Analysis is a technique aimed at projecting both current and future movement of events through use of time series data analysis

# Machine Learning Techniques



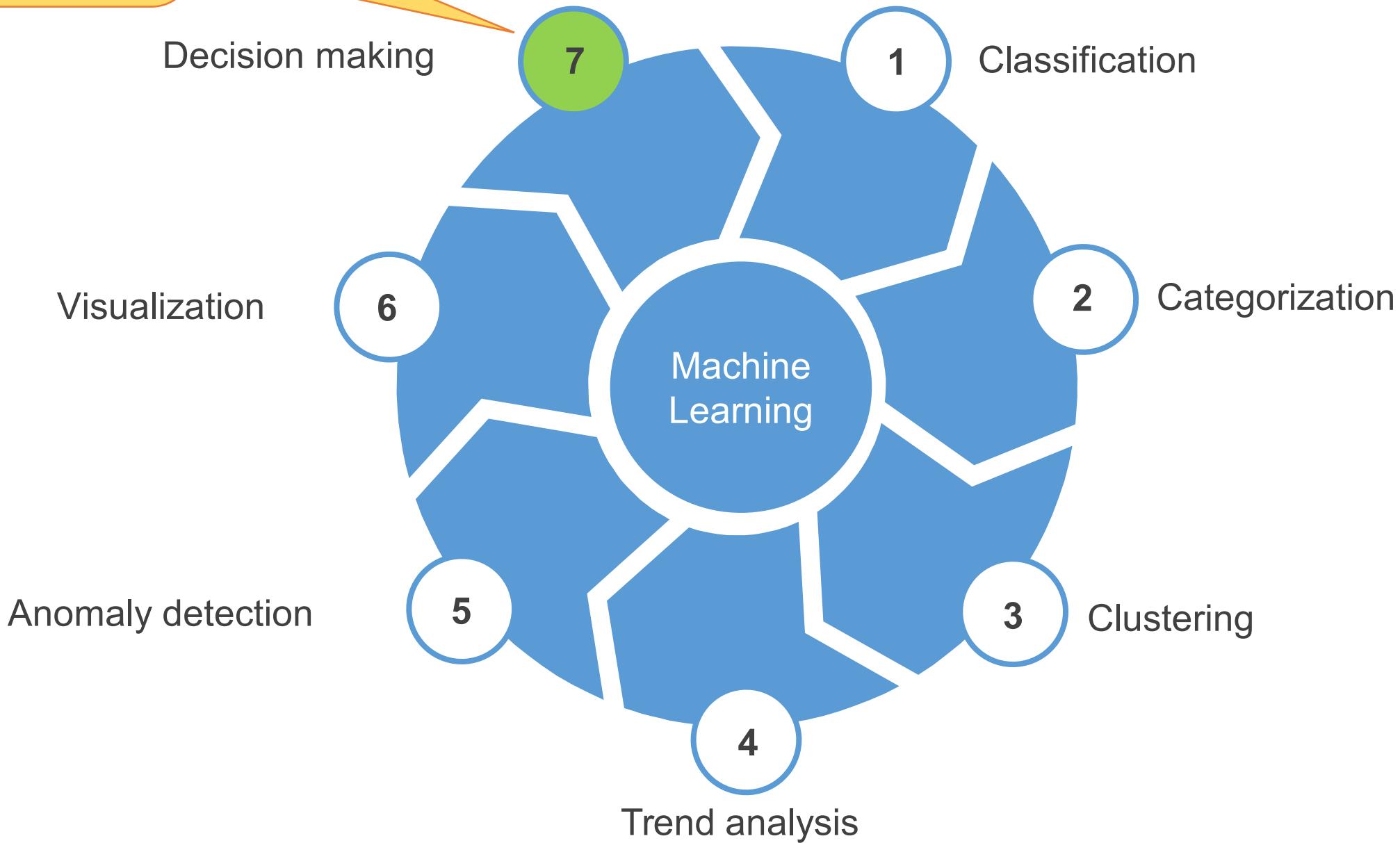
# Machine Learning Techniques

Technique to present data in a pictorial or graphical format. It enables decision makers to see analytics presented visually



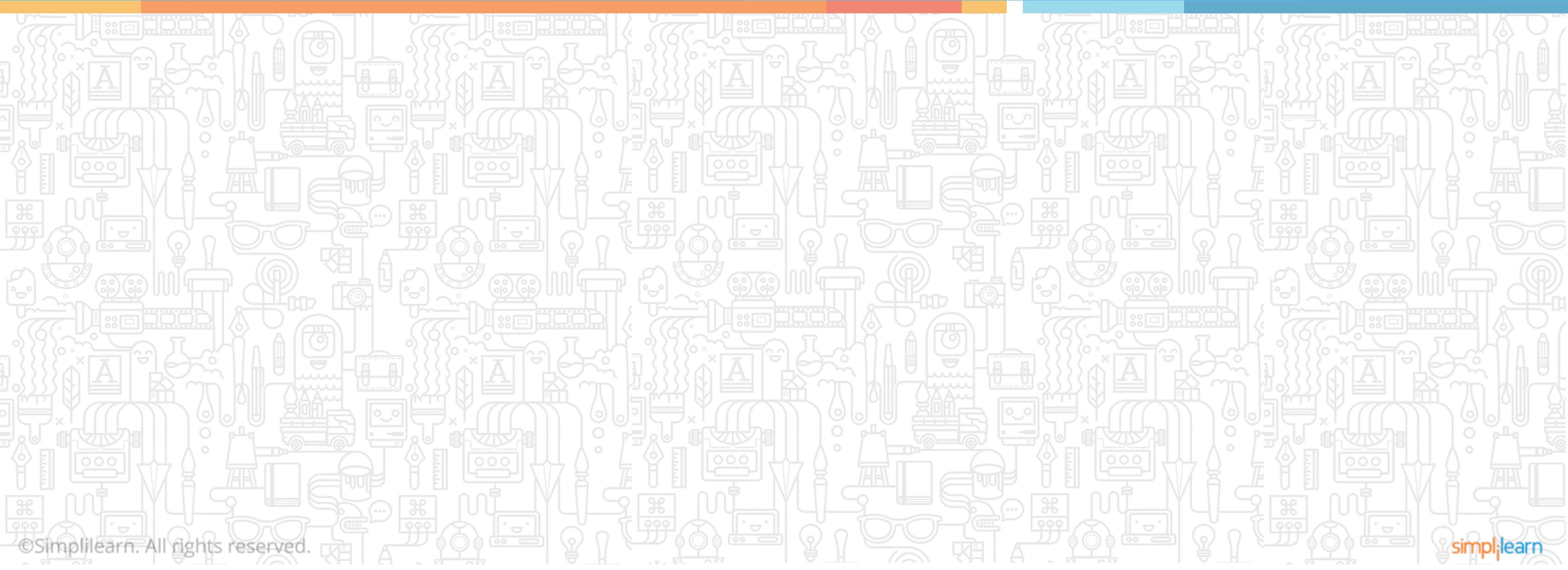
A technique/skill which provides you with the ability to influence managerial decisions with data as evidence for those possibilities

# Machine Learning Techniques



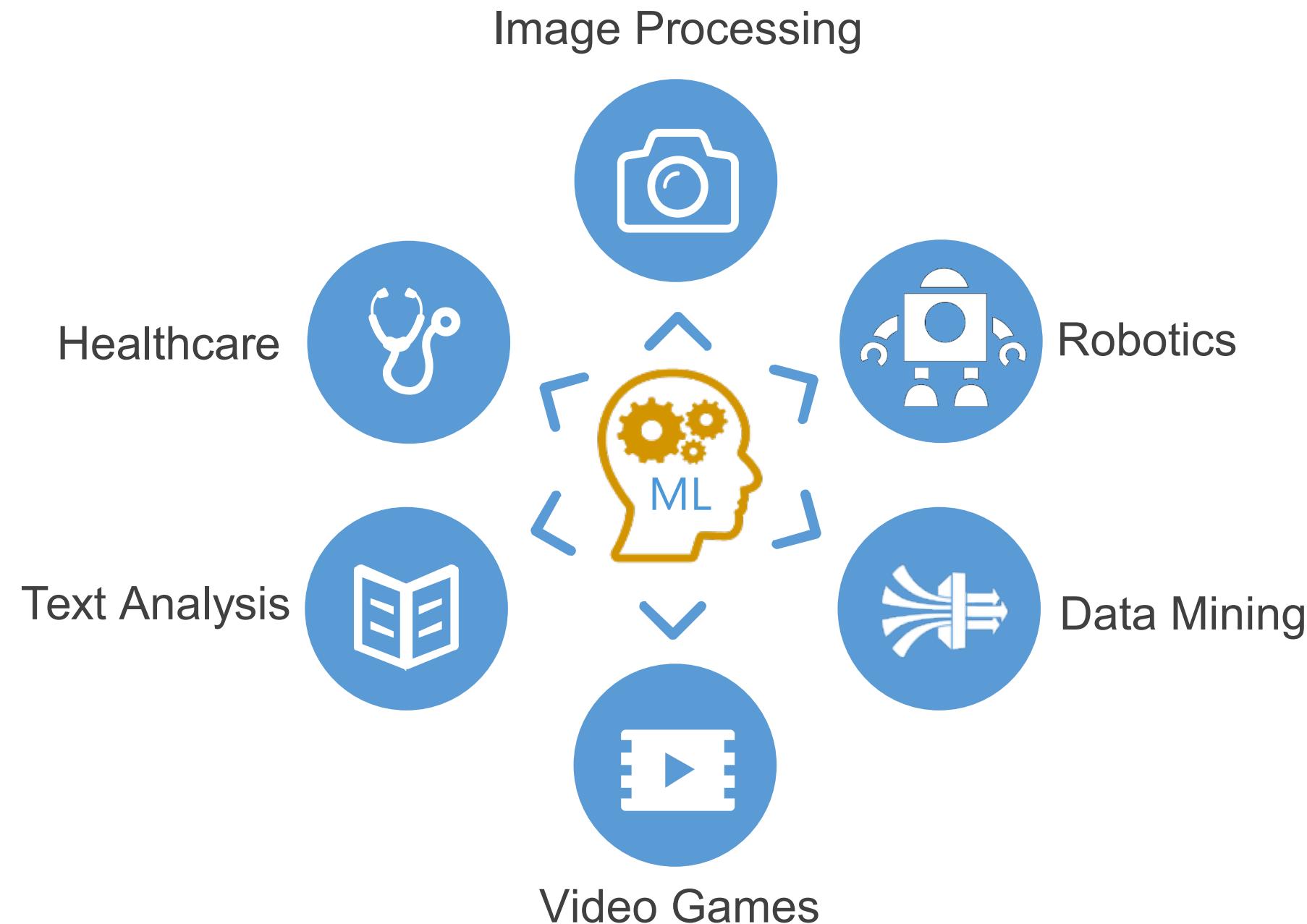
# Introduction to Artificial Intelligence and Machine Learning

## Topic 4: Applications of Machine Learning



# Applications of Machine Learning

Artificial intelligence and Machine learning are being increasingly used in various functions such as:

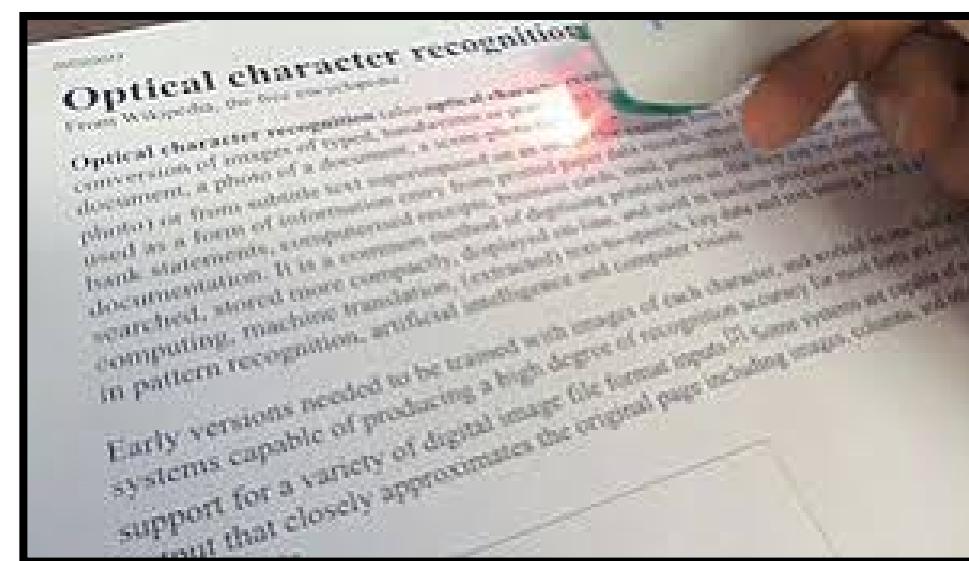


# Applications of Machine Learning

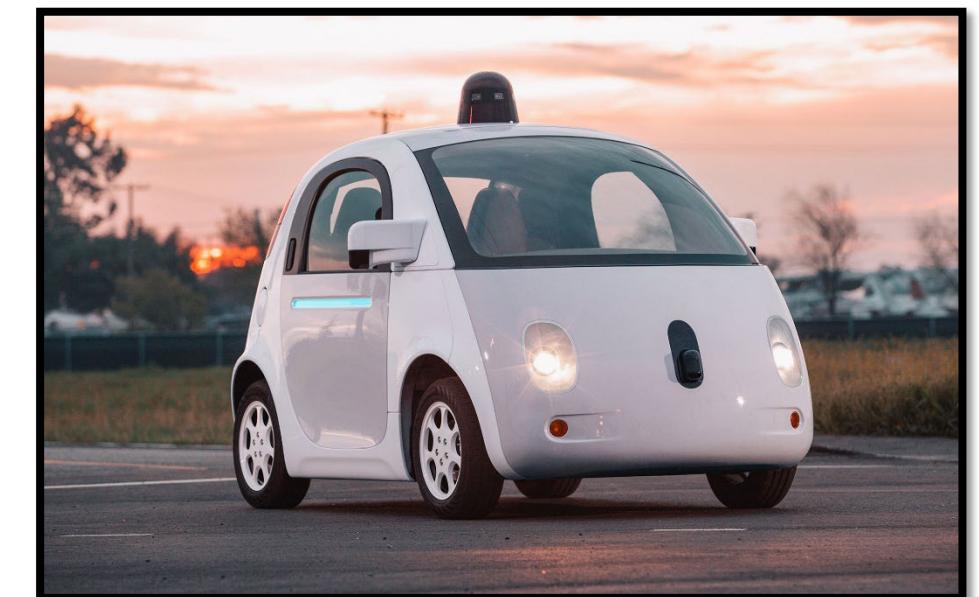
## Image Processing



Image tagging and recognition



Optical Character Recognition (OCR)

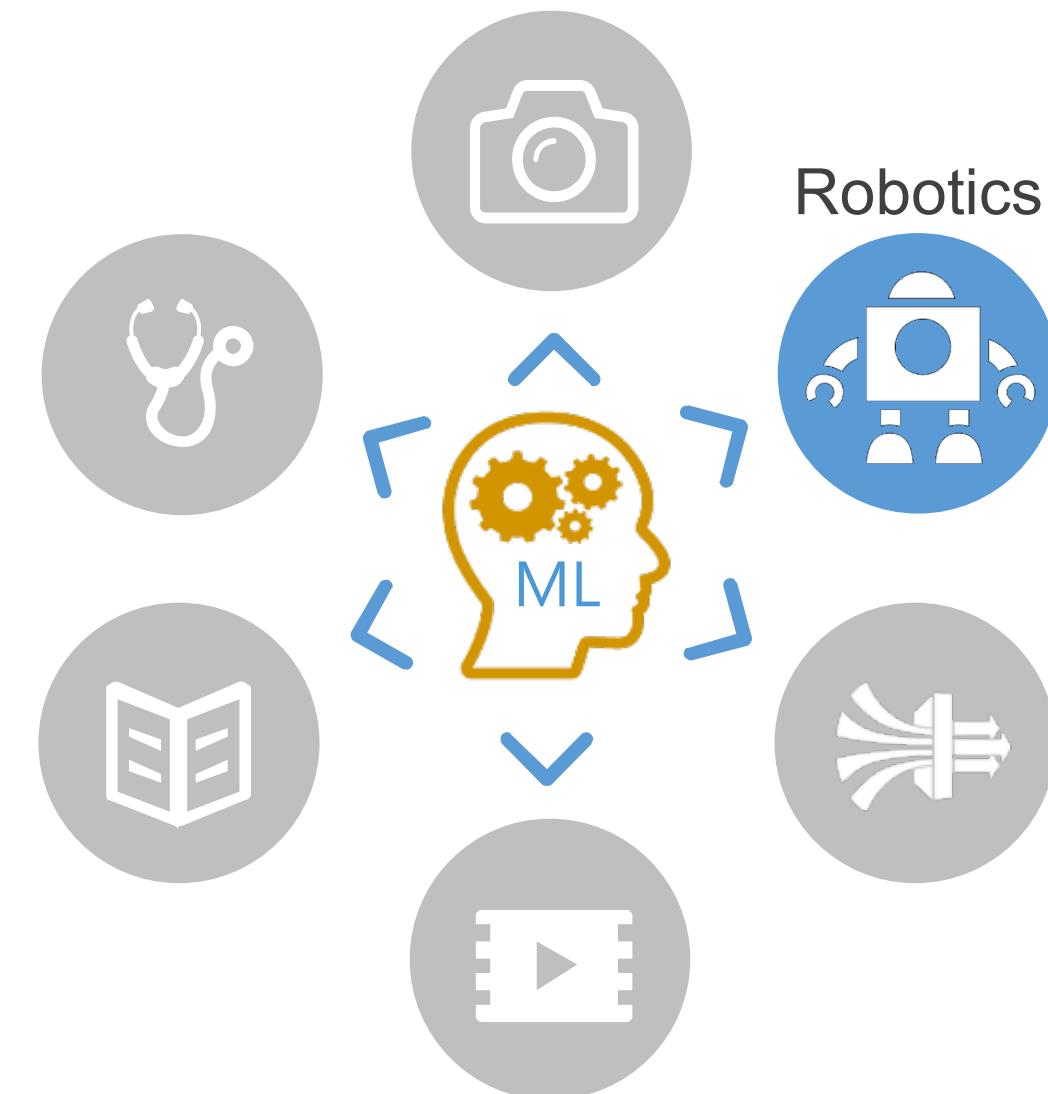


Self-driving cars

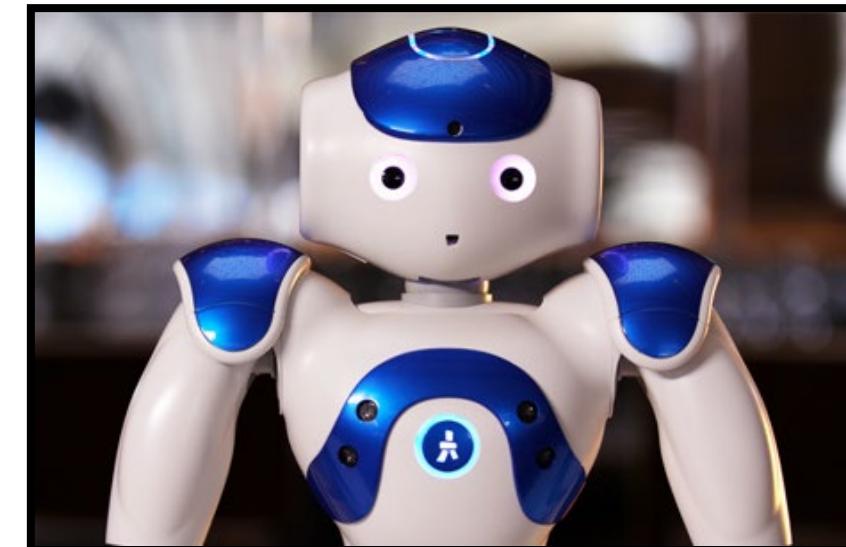
Sources: Quora, documentarytube,  
Wikipedia

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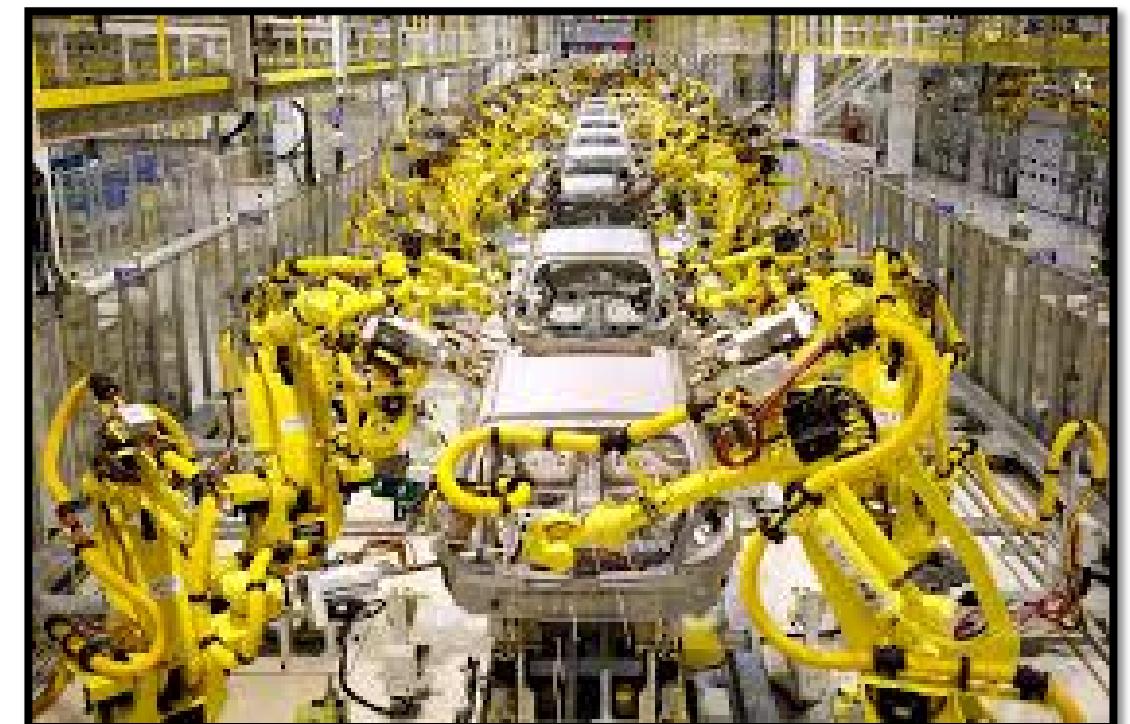
# Applications of Machine Learning



Human simulation

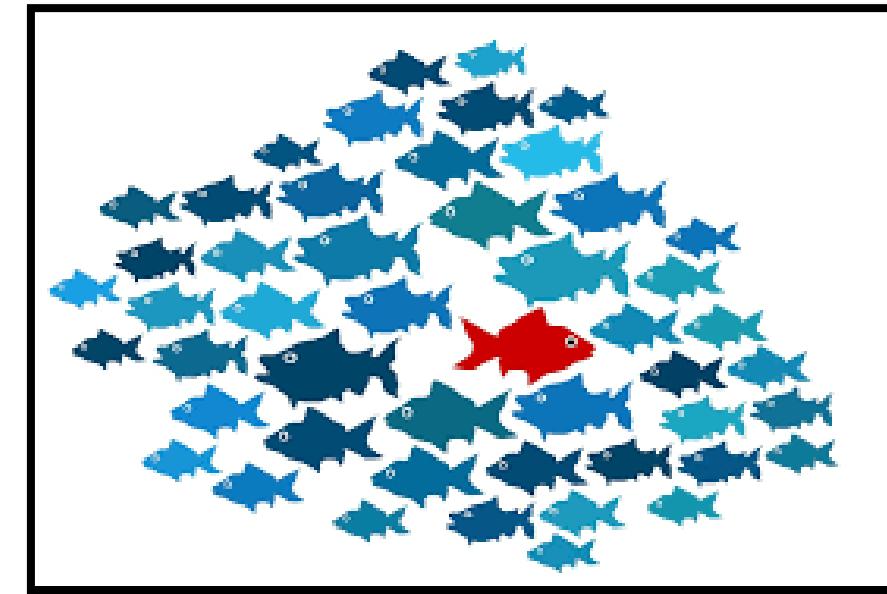


Humanoid Robot

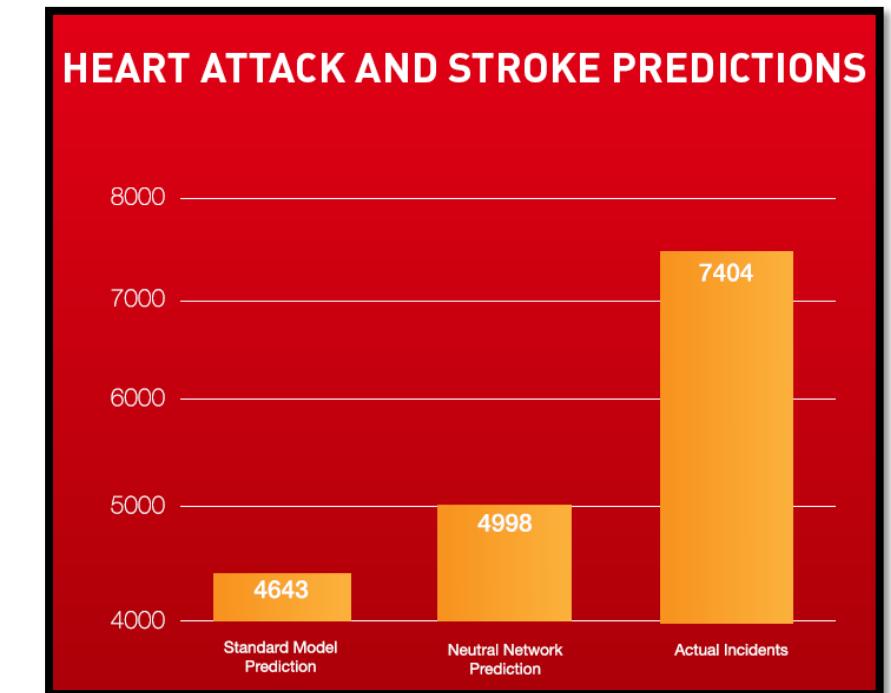


Industrial robotics

# Applications of Machine Learning



Anomaly detection



Grouping and Predictions

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Cart Proceed to checkout (1 item)

Customers who bought *Origin: A Novel* also bought

DAN BROWN  
#1 WORLDWIDE BESTSELLER  
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DAN BROWN  
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*The Lost Symbol*

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#1 NEW YORK TIMES BESTSELLING AUTHOR OF THE DA VINCI CODE  
*DECEPTION POINT*

HARLAN COBEN  
#1 NEW YORK TIMES BESTSELLING AUTHOR OF *MURDER*  
*DON'T LET GO*

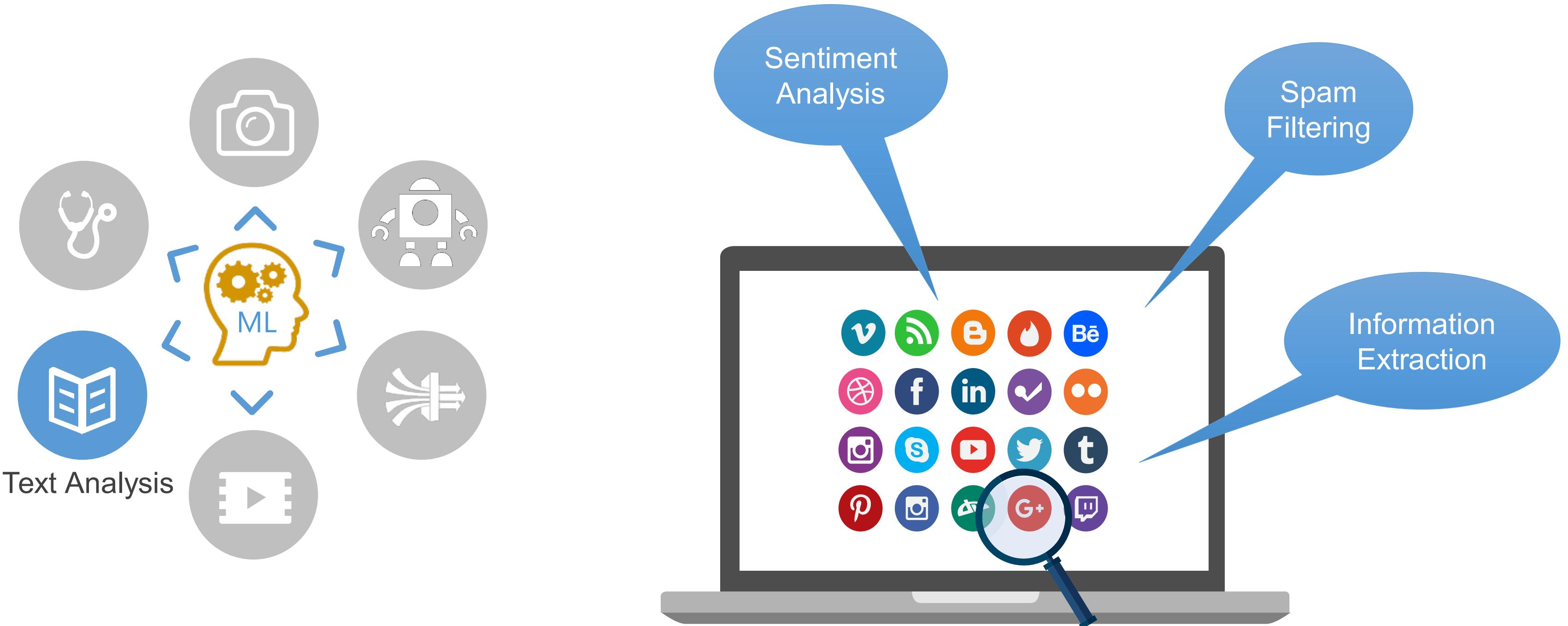
Association rules

# Applications of Machine Learning

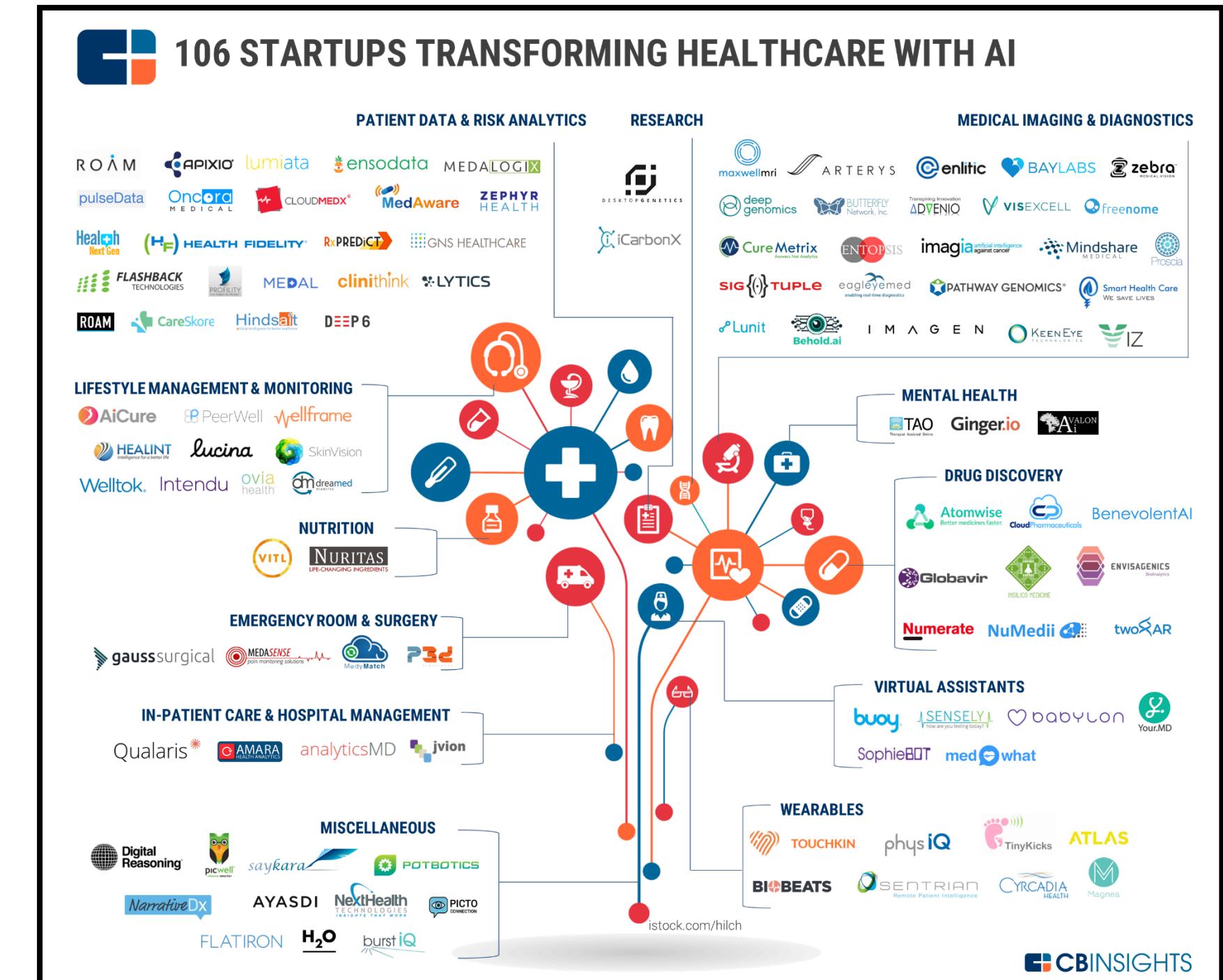


Some games implement reinforcement learning

# Applications of Machine Learning



# Applications of Machine Learning



# Key Takeaways



Now, you are able to explain:

- ➊ The explosion of data has given rise to a new economy known as the data economy.
- ➋ AI refers to the intelligence in machines that simulates human intelligence.
- ➌ The capability of AI systems to learn by extracting patterns from data is known as machine learning.
- ➍ Statistical machine learning uses the same math and techniques as data science.
- ➎ Artificial intelligence and Machine learning are being increasingly used in various functions such as image processing, text analysis, healthcare, data mining, robotics, and video games.



## Knowledge Check



Knowledge  
Check

1

**Machine Learning is \_\_\_\_\_**

- a. An autonomous acquisition of knowledge through the use of algorithms
- b. An autonomous acquisition of knowledge through the use of manual programs
- c. A selective acquisition of knowledge through the use of computer programs
- d. A selective acquisition of knowledge through the use of manual programs



## Machine Learning is \_\_\_\_\_

- a. An autonomous acquisition of knowledge through the use of algorithms
- b. An autonomous acquisition of knowledge through the use of manual programs
- c. A selective acquisition of knowledge through the use of computer programs
- d. A selective acquisition of knowledge through the use of manual programs



The correct answer is

**a . An autonomous acquisition of knowledge through the use of algorithms**

**Machine learning is an autonomous acquisition of knowledge through the use of algorithms.**

Knowledge  
Check

2

## What is the difference between traditional programming and machine learning?

- a. Traditional programming is based on permutations and combinations, whereas machine learning uses traditional analytics.
- b. Traditional programming considers output of the program to generate code, whereas machine learning uses data and program to generate output.
- c. Traditional programming uses software programs, whereas machine learning uses hardware solutions.
- d. Traditional programming uses hard-coded rules to make decisions, whereas machine learning learns from data.



## What is the difference between traditional programming and machine learning?

- a. Traditional programming is based on permutations and combinations, whereas machine learning uses traditional analytics.
- b. Traditional programming considers output of the program to generate code, whereas machine learning uses data and program to generate output.
- c. Traditional programming uses software programs, whereas machine learning uses hardware solutions.
- d. Traditional programming uses hard-coded rules to make decisions, whereas machine learning learns from data.



The correct answer is **d. Traditional programming uses hard-coded rules to make decisions, whereas machine learning learns from data.**

**Traditional programming uses hard-coded rules to make decisions, whereas machine learning learns from data by extracting patterns from it.**



# Thank You