

Machine Learning

Lesson 1: Introduction to Artificial Intelligence and Machine Learning



Concepts Covered

- ✓ Machine Learning Techniques
- ✓ Applications of Machine learning



Learning Objectives

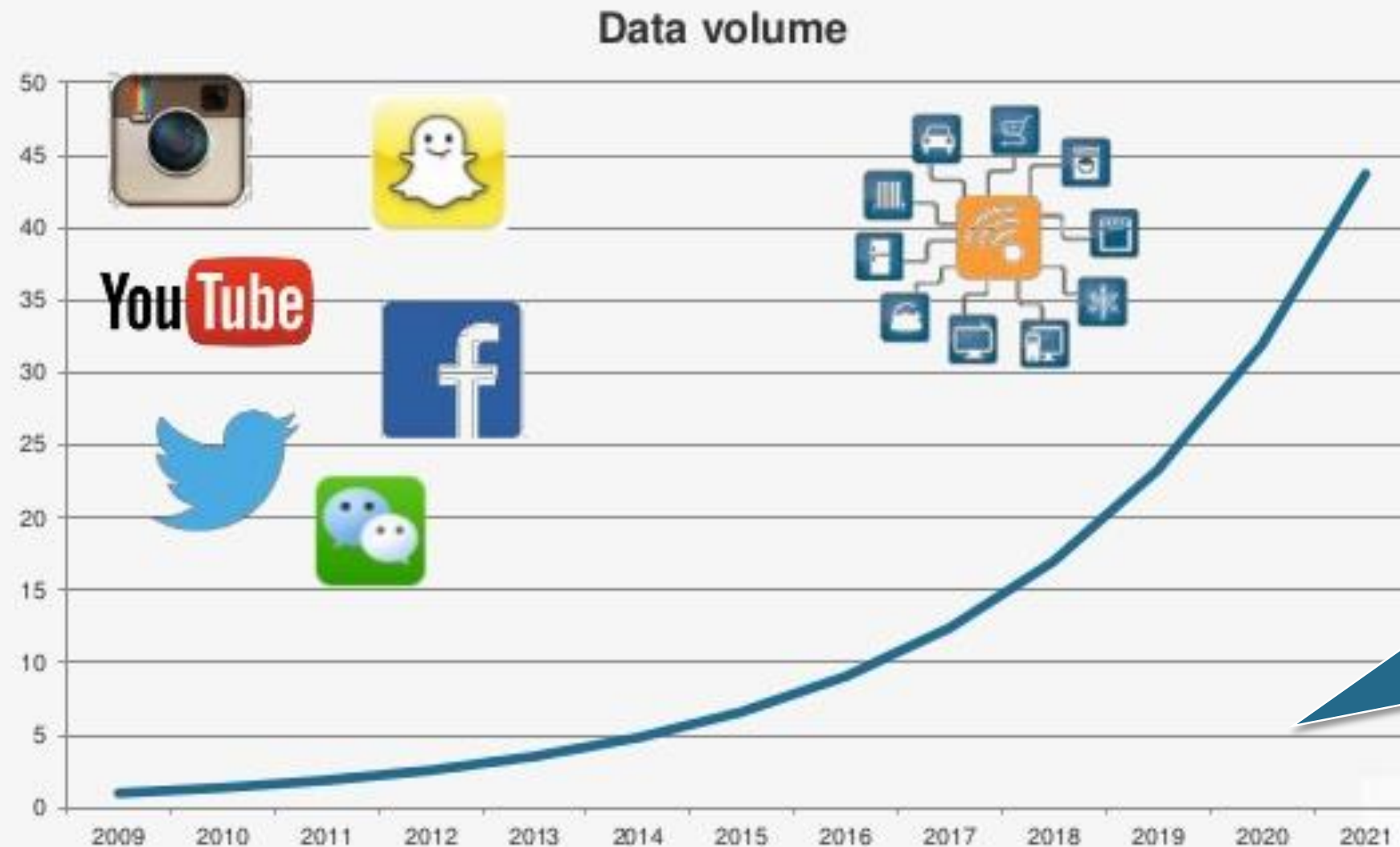


- ✓ Define Artificial Intelligence (AI) and understand its relationship with data
- ✓ Define Machine Learning (ML) and understand its relationship with artificial intelligence and data science
- ✓ Understand machine learning approach
- ✓ Identify the applications of machine learning

Topic 1: Emergence of Artificial Intelligence

Data Economy

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



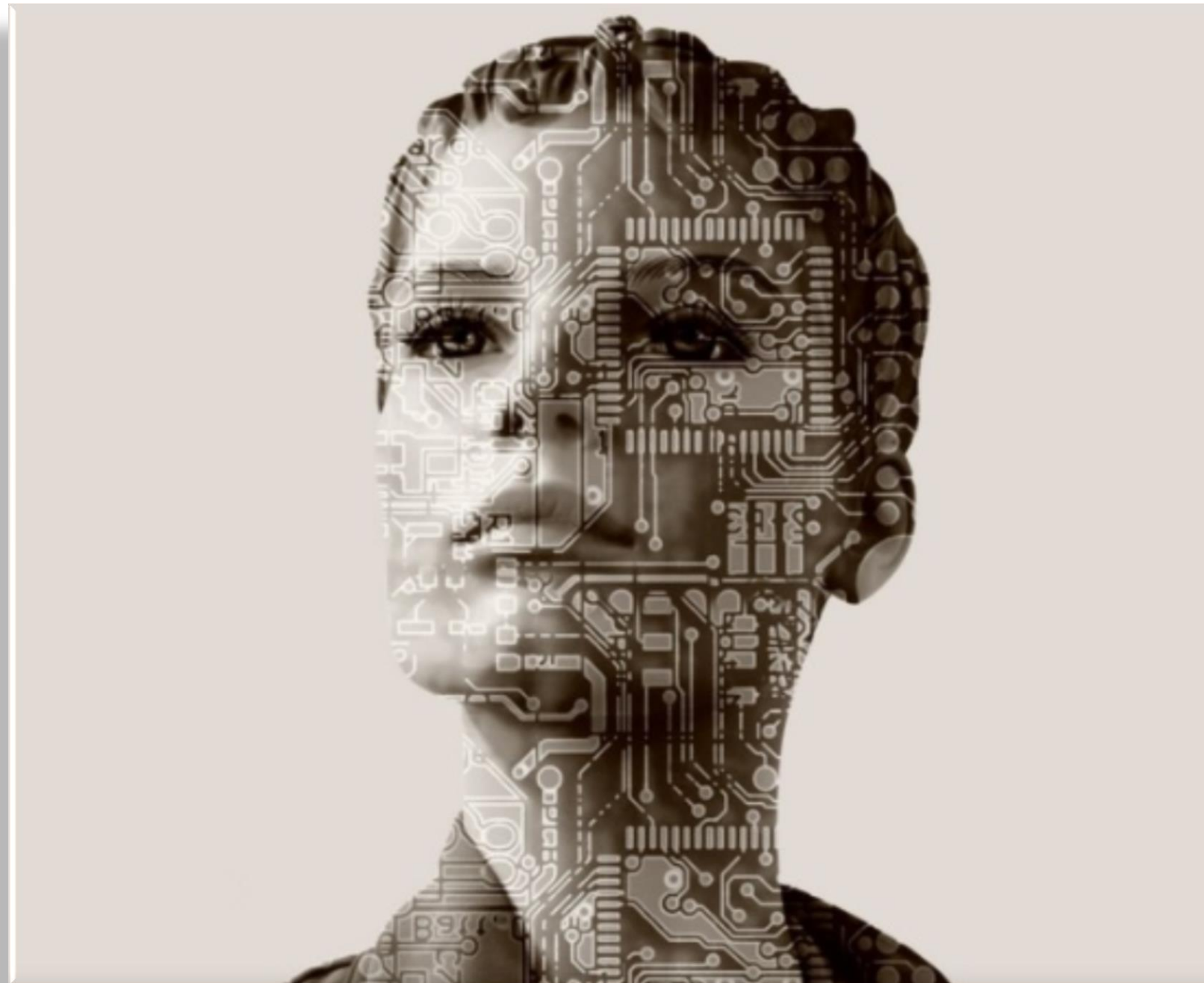
Sources: IDC, Azeem Azhar analysis



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

“

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

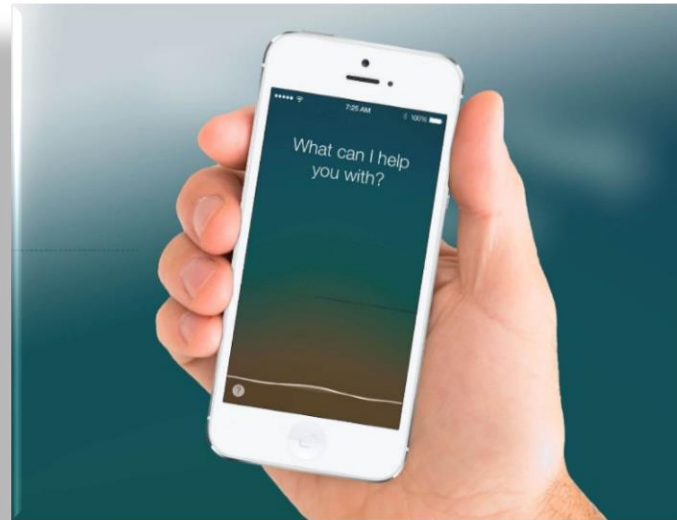
”

Artificial Intelligence in Practice

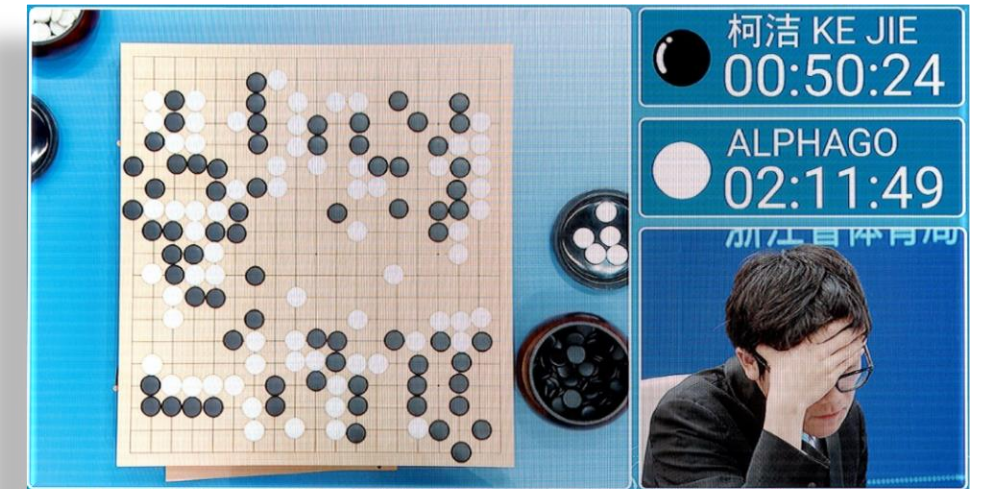
AI is redefining industries by providing greater personalization to users and automating processes.



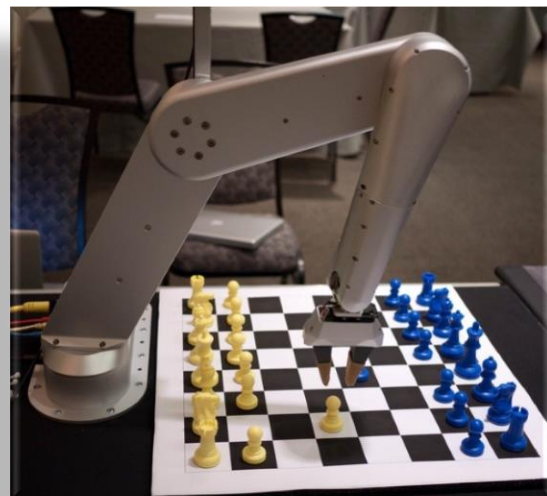
Self-driving cars



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.



Added to Cart

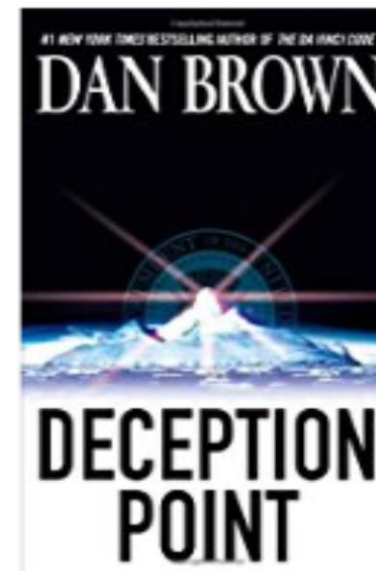
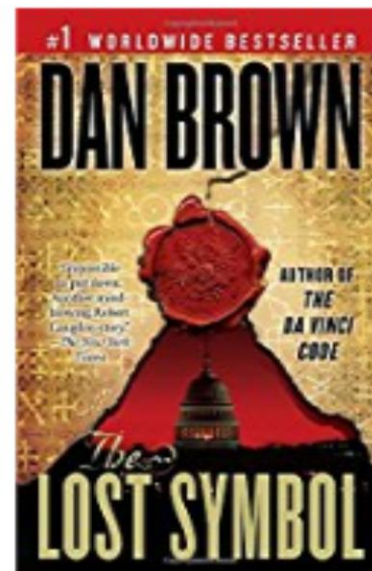
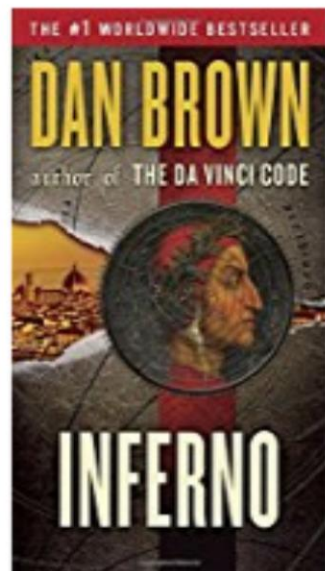
Cart subtotal (1 item): **\$17.96**

To qualify for **FREE Shipping**, add **\$7.04** of eligible items. [Details](#)

Cart

Proceed to checkout (1 item)

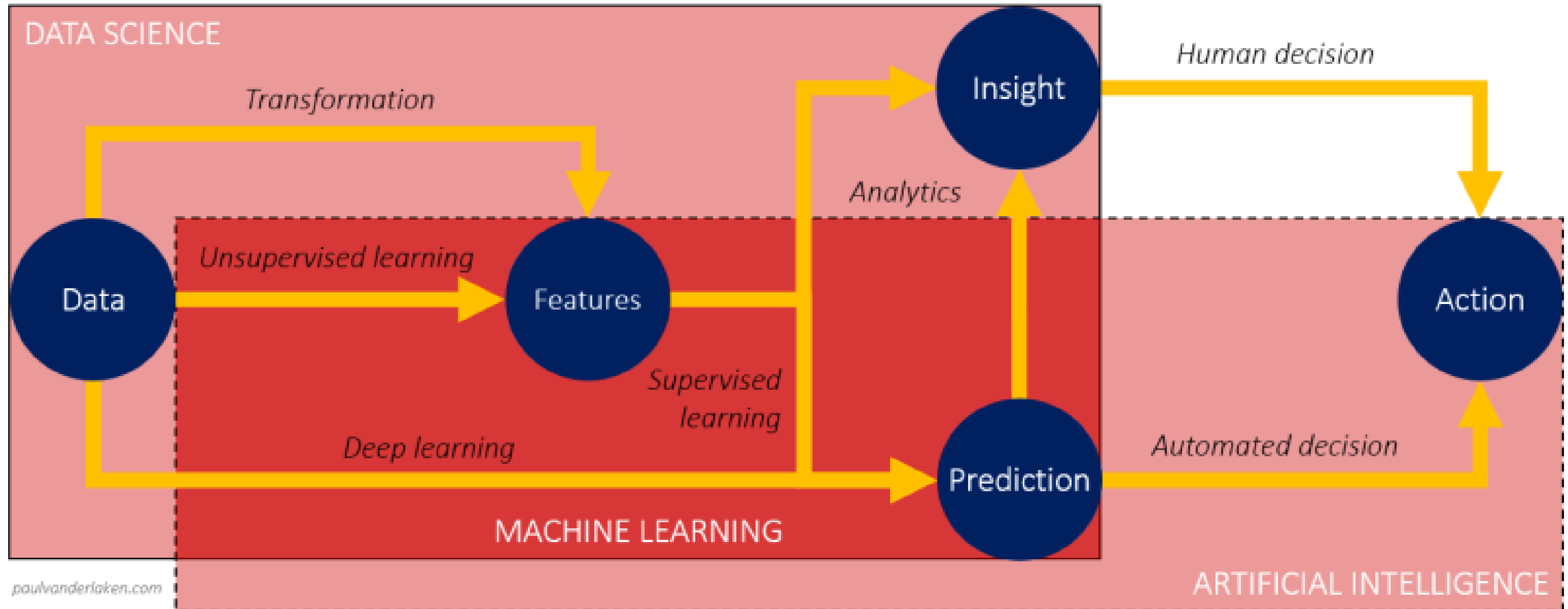
Customers who bought *Origin: A Novel* also bought



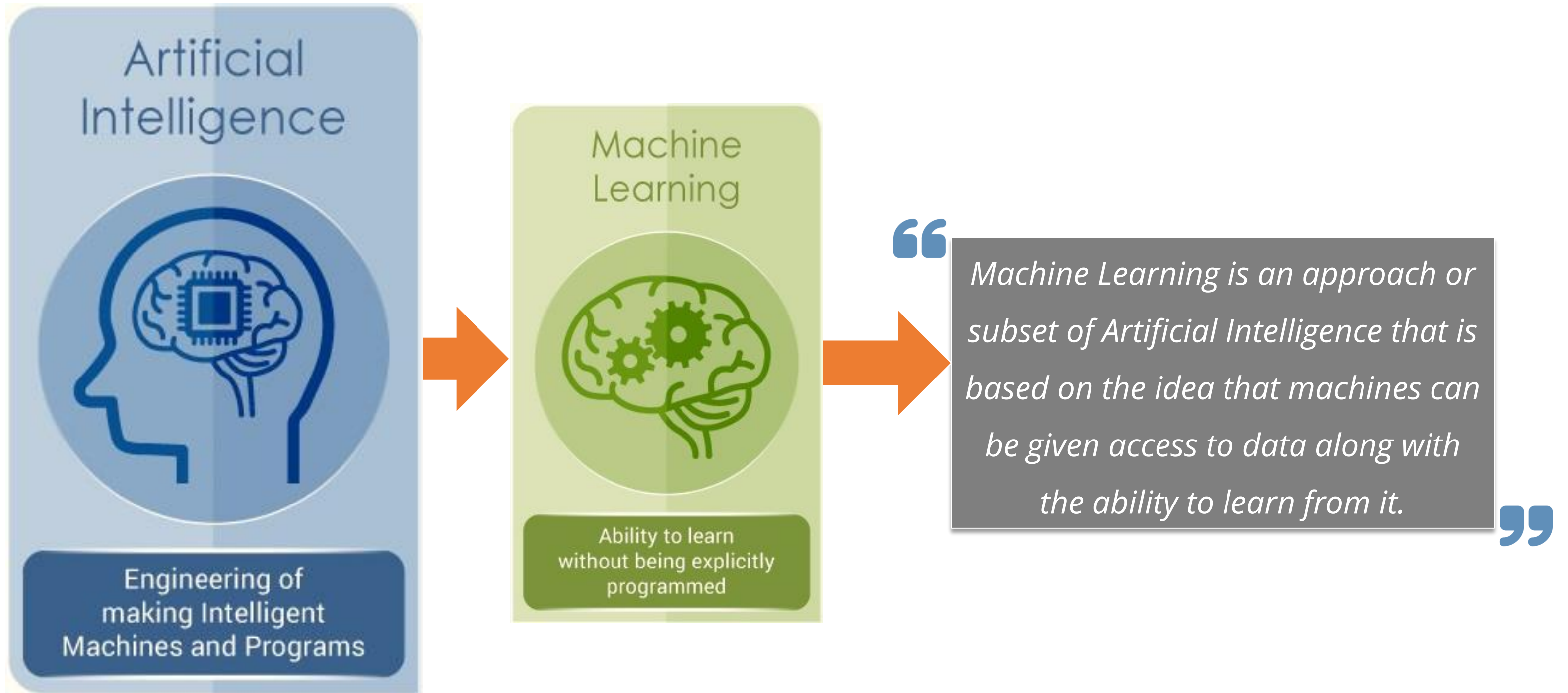
Topic 2: Relationship between AI, ML, and Data Science

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



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*

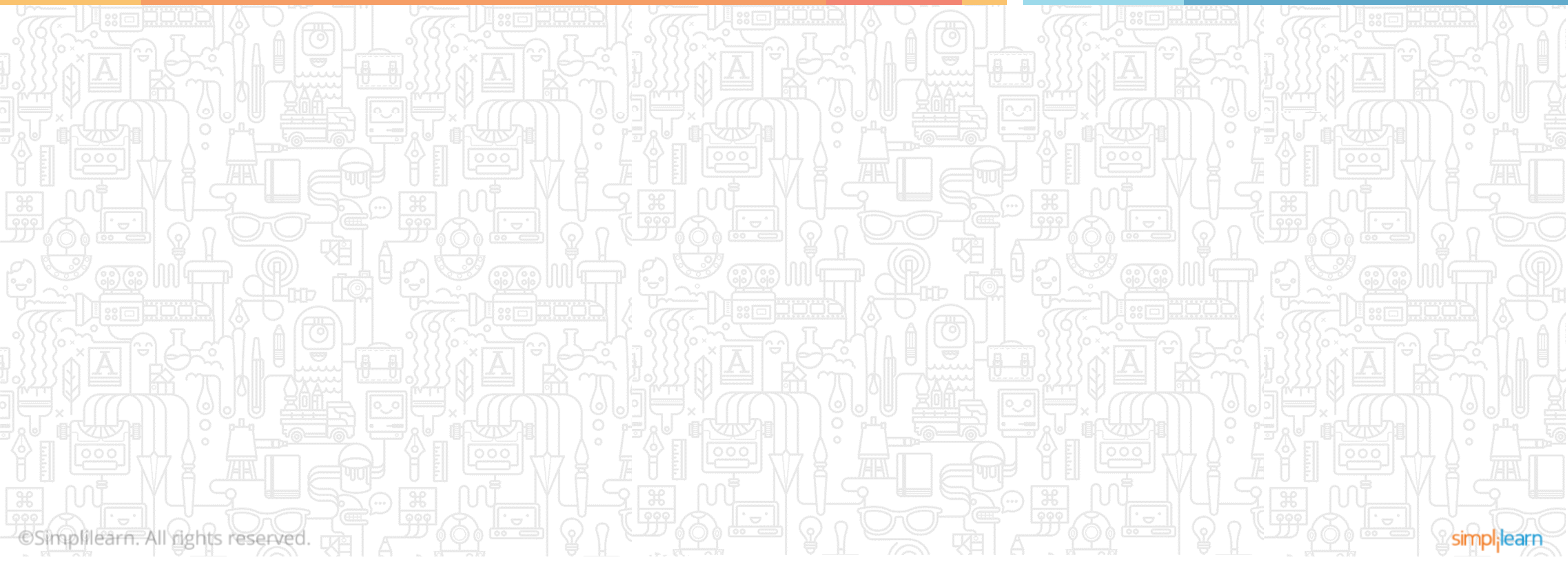
It *automates analytical model building*

04



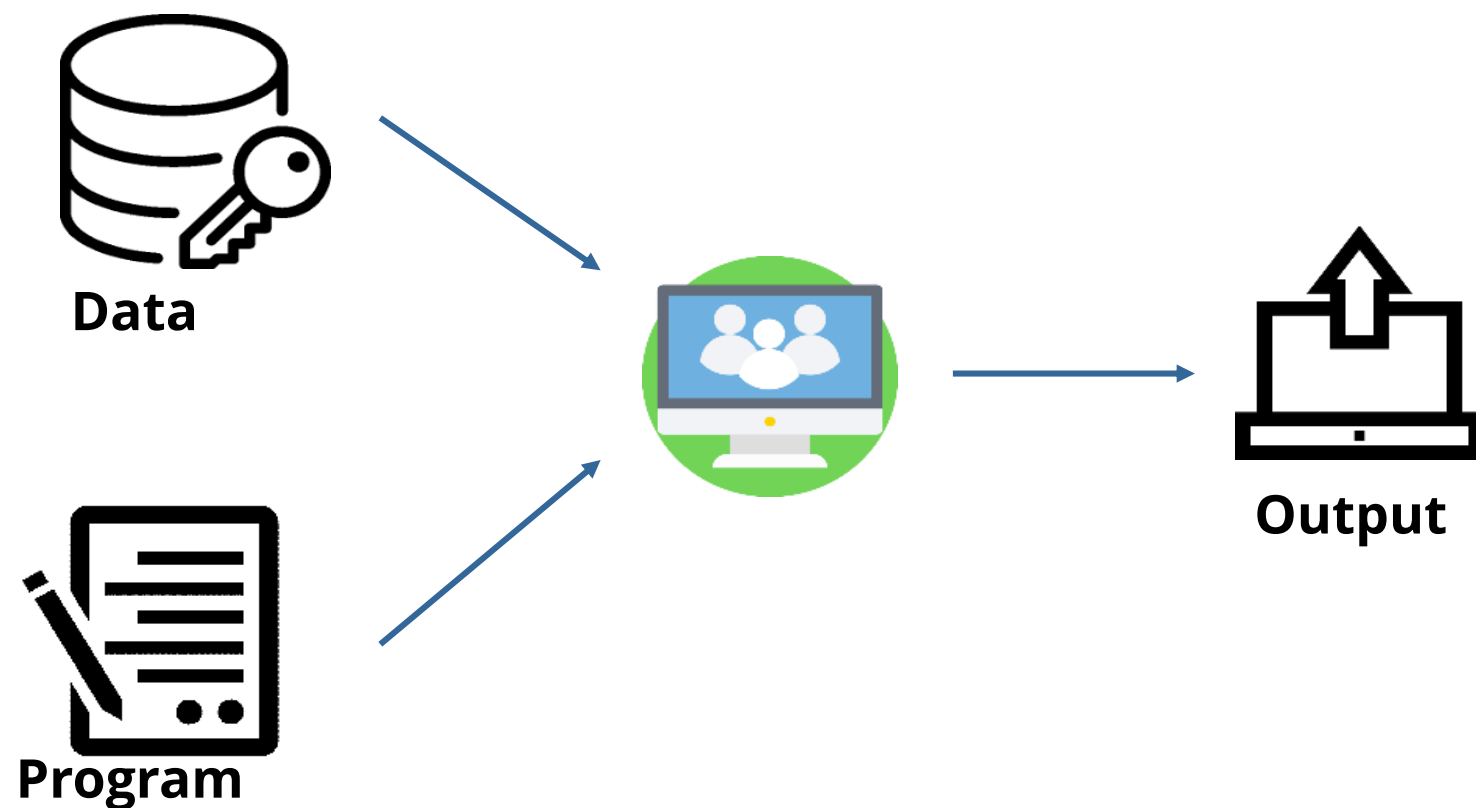
Introduction to Artificial Intelligence and Machine Learning

Topic 3: Machine Learning Approach

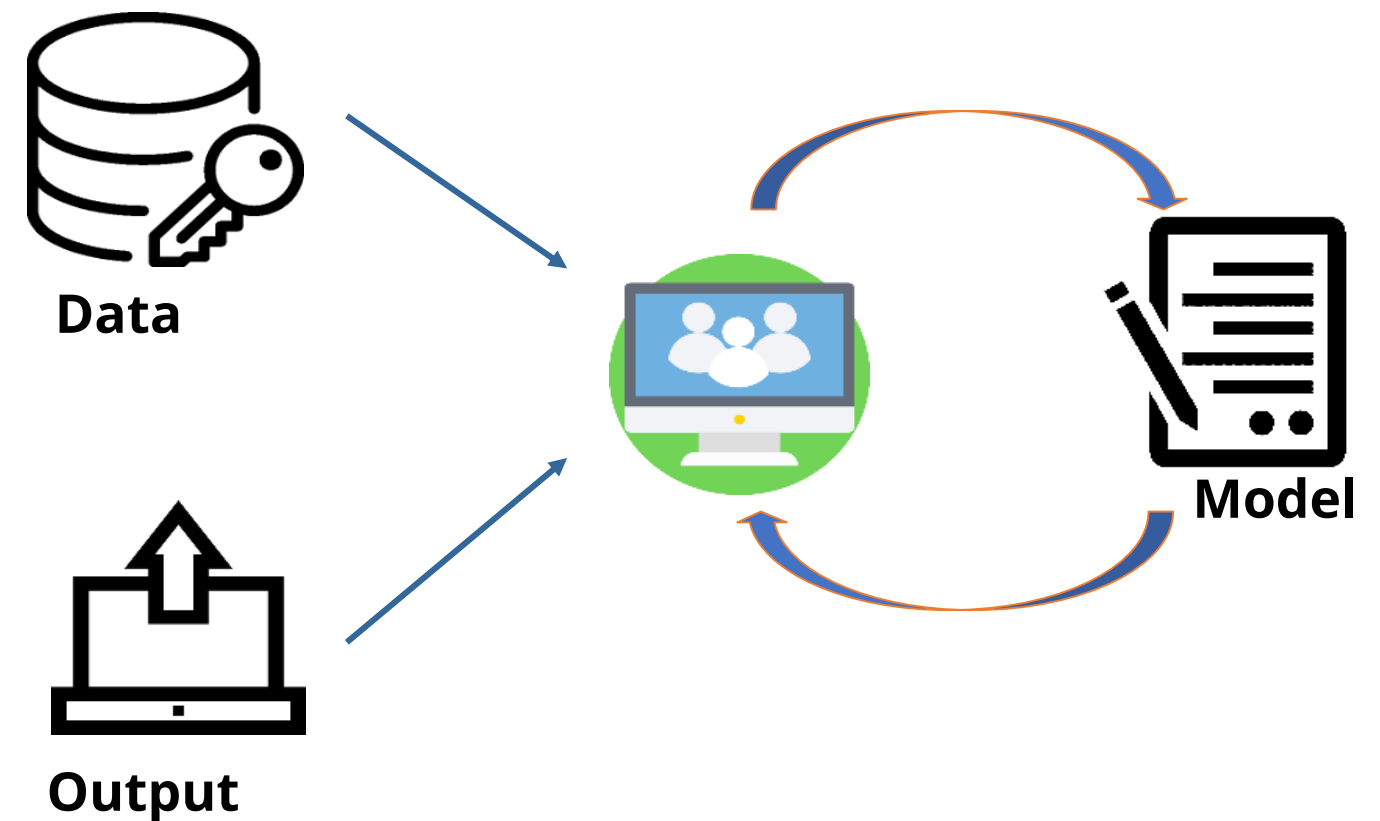


Traditional Approach vs. Machine Learning Approach

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

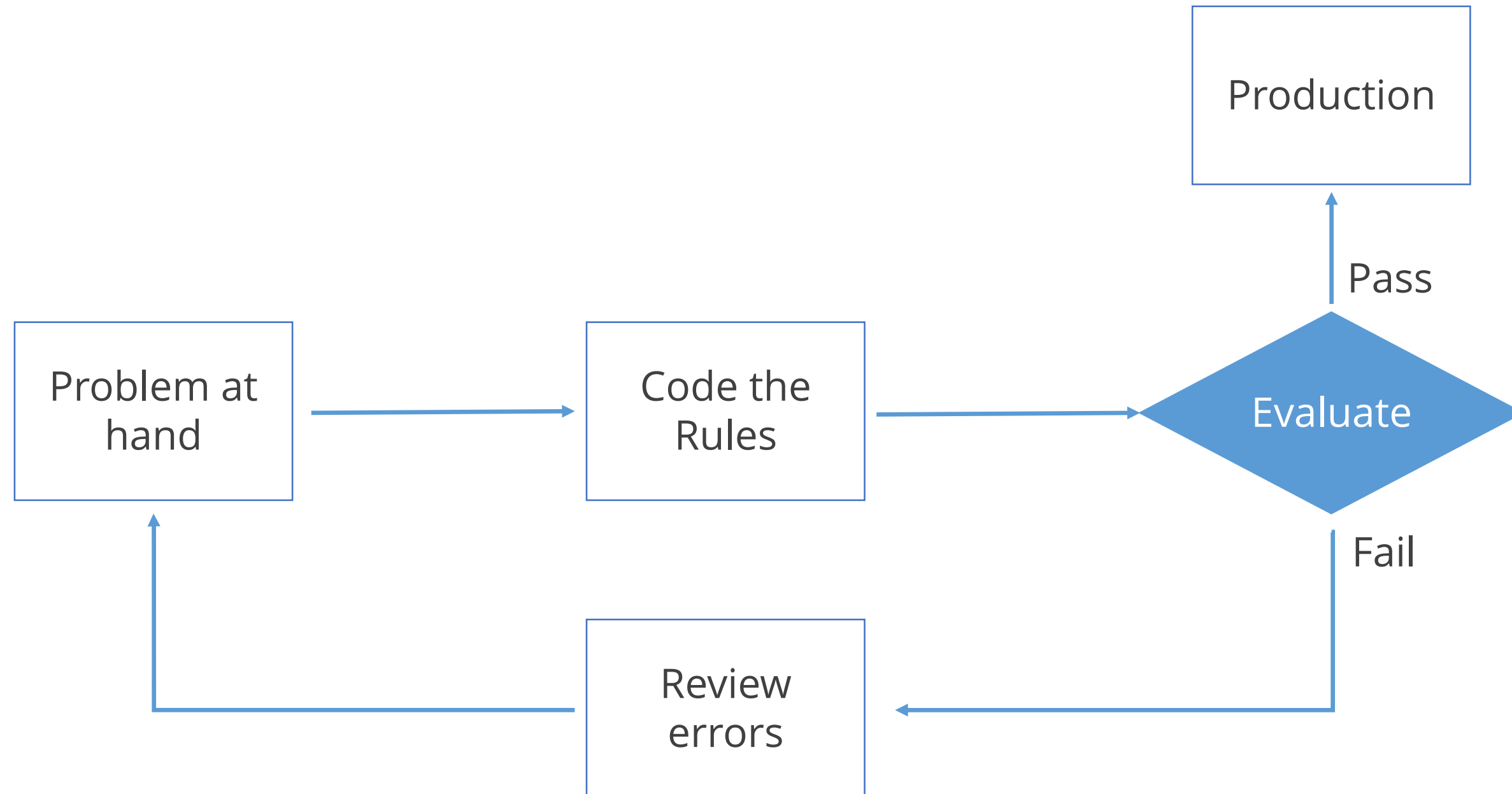


Machine Learning: Data and output is run on the computer to create a program



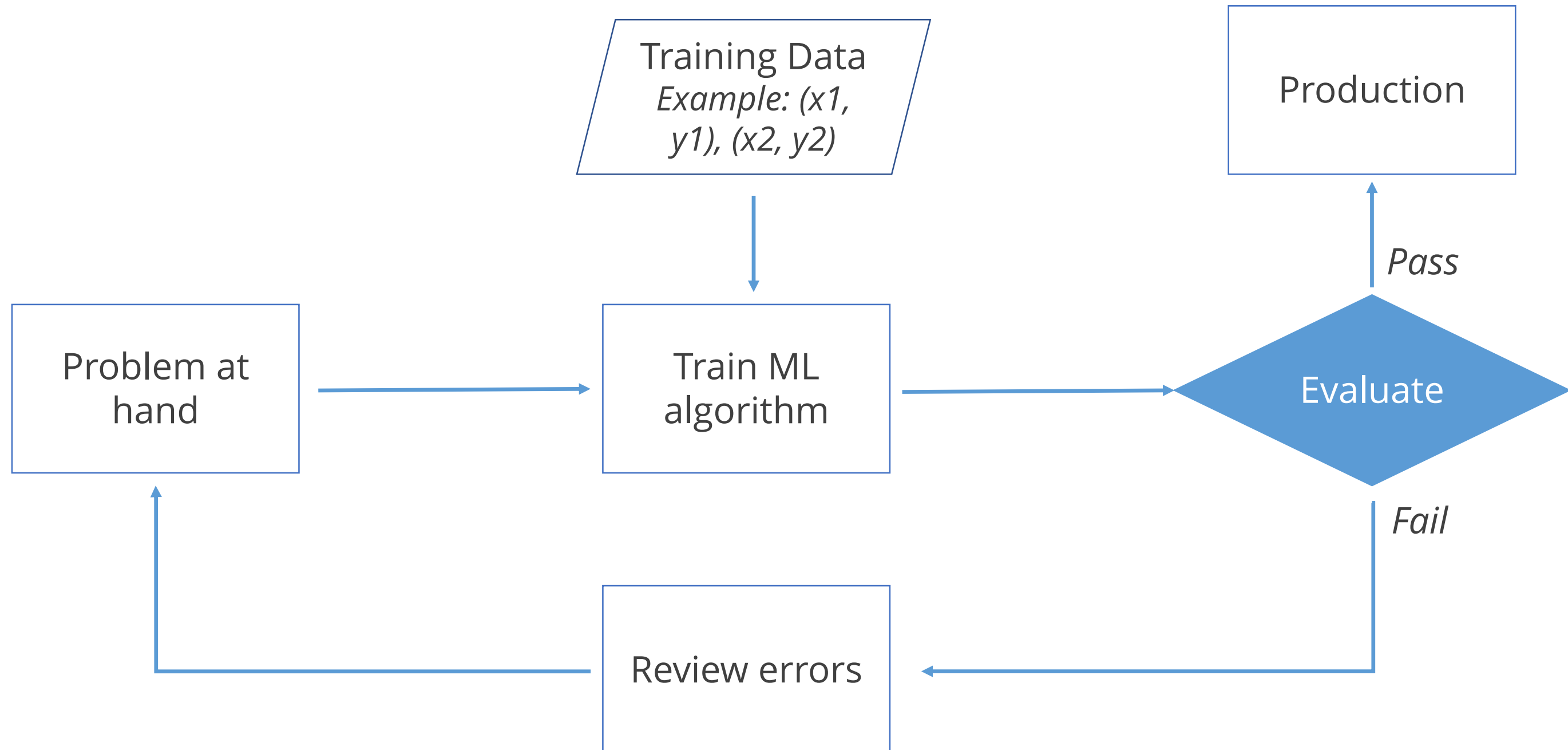
Traditional Approach

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

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.

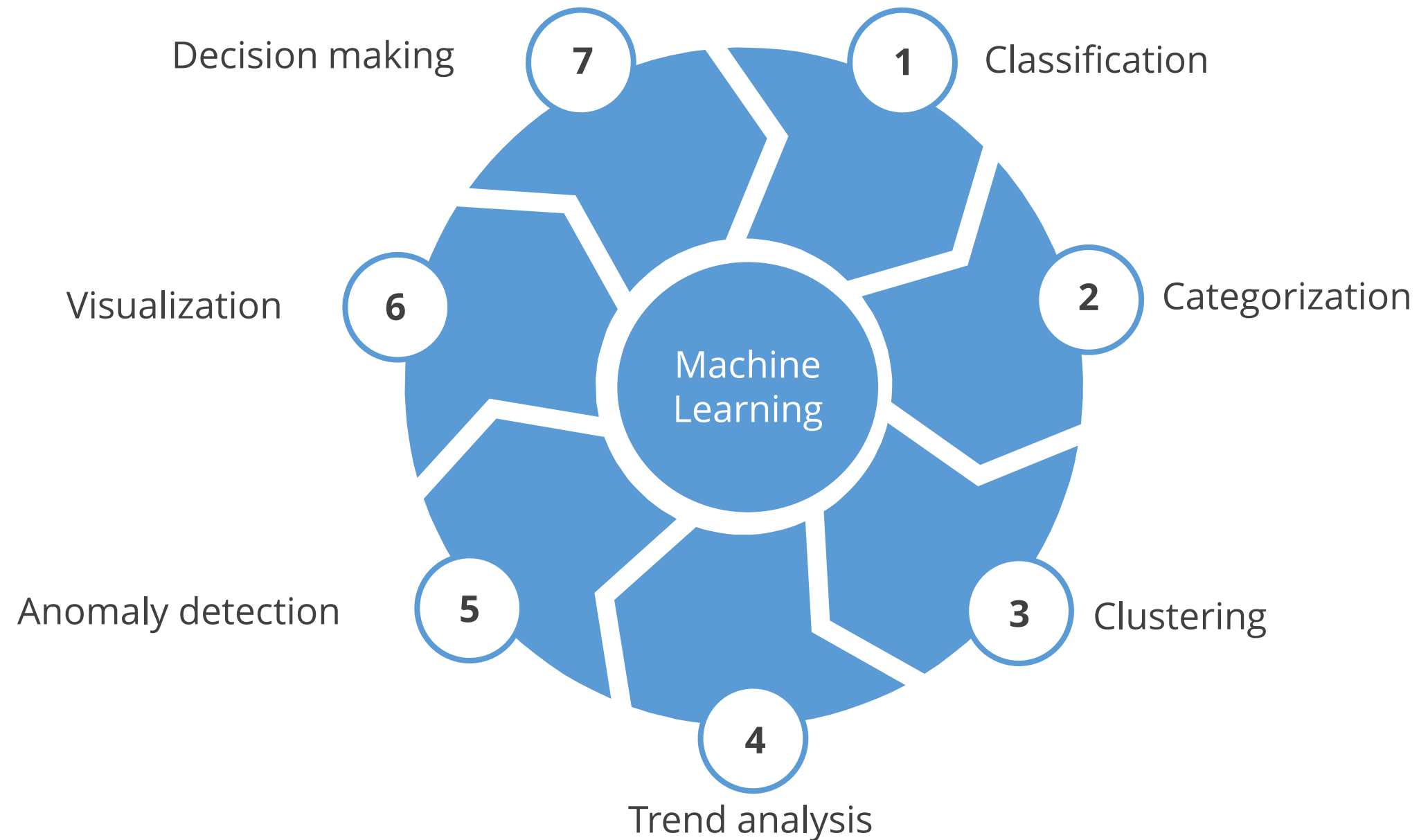
Statistical machine learning uses the same math and techniques as data science.

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.

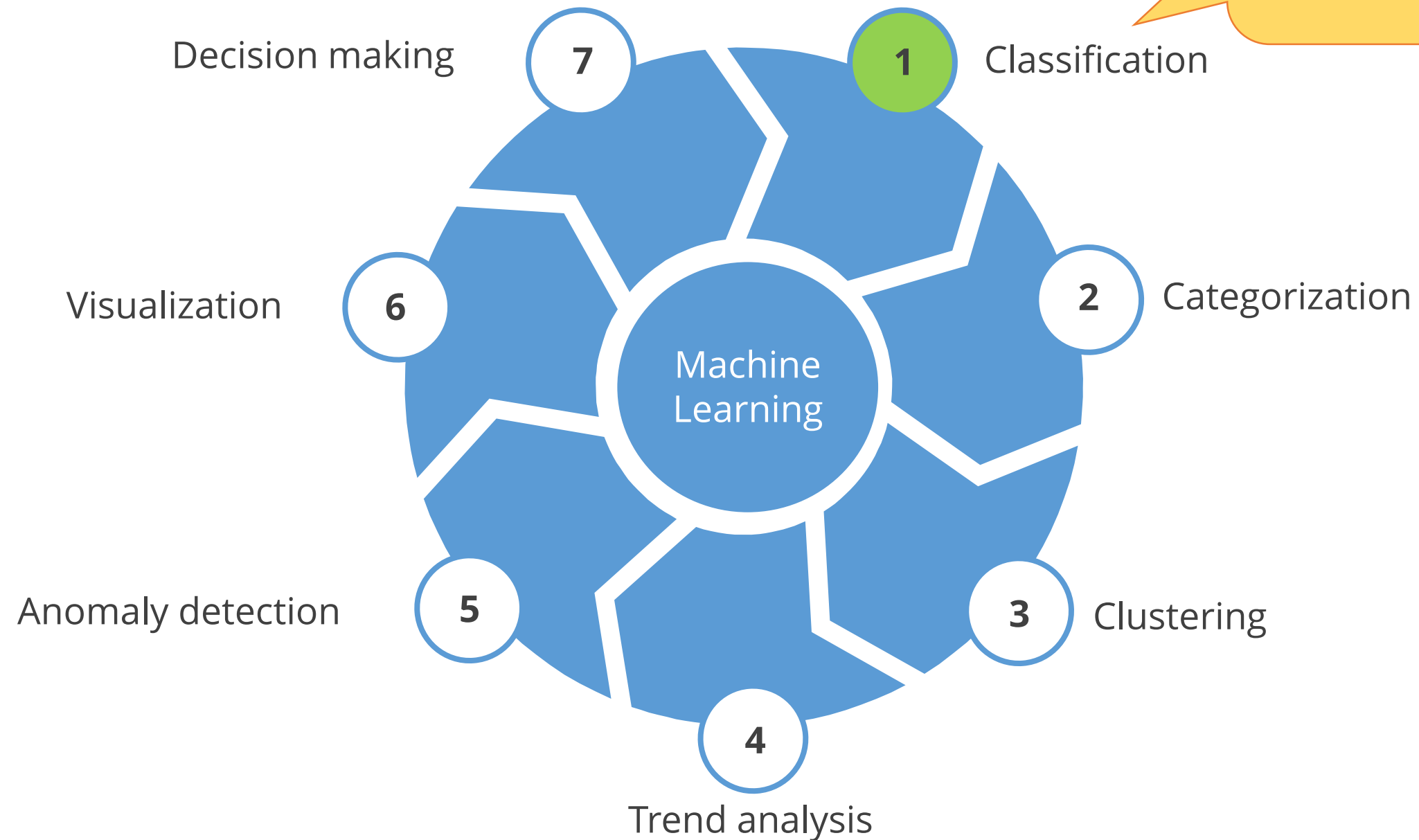
Machine Learning Techniques

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

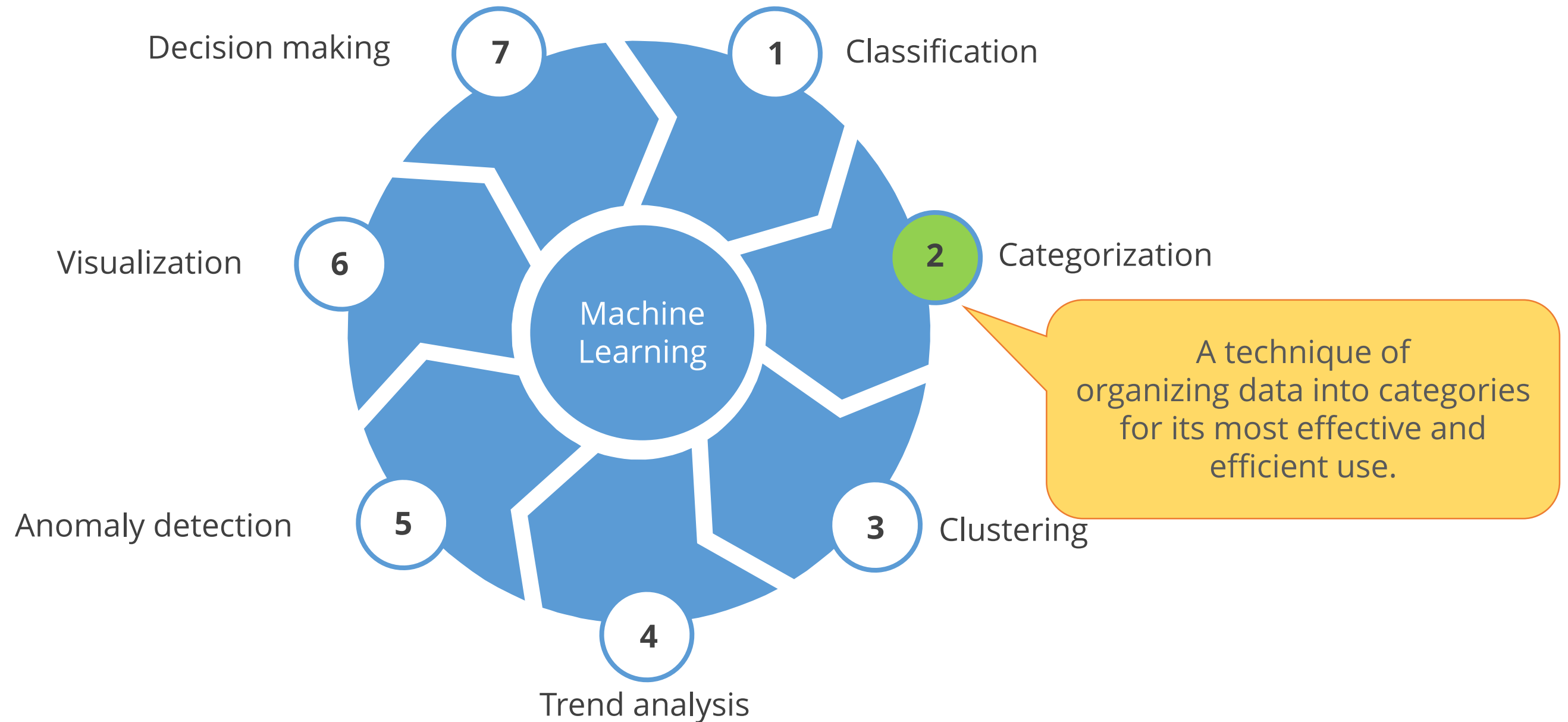


Machine Learning Techniques

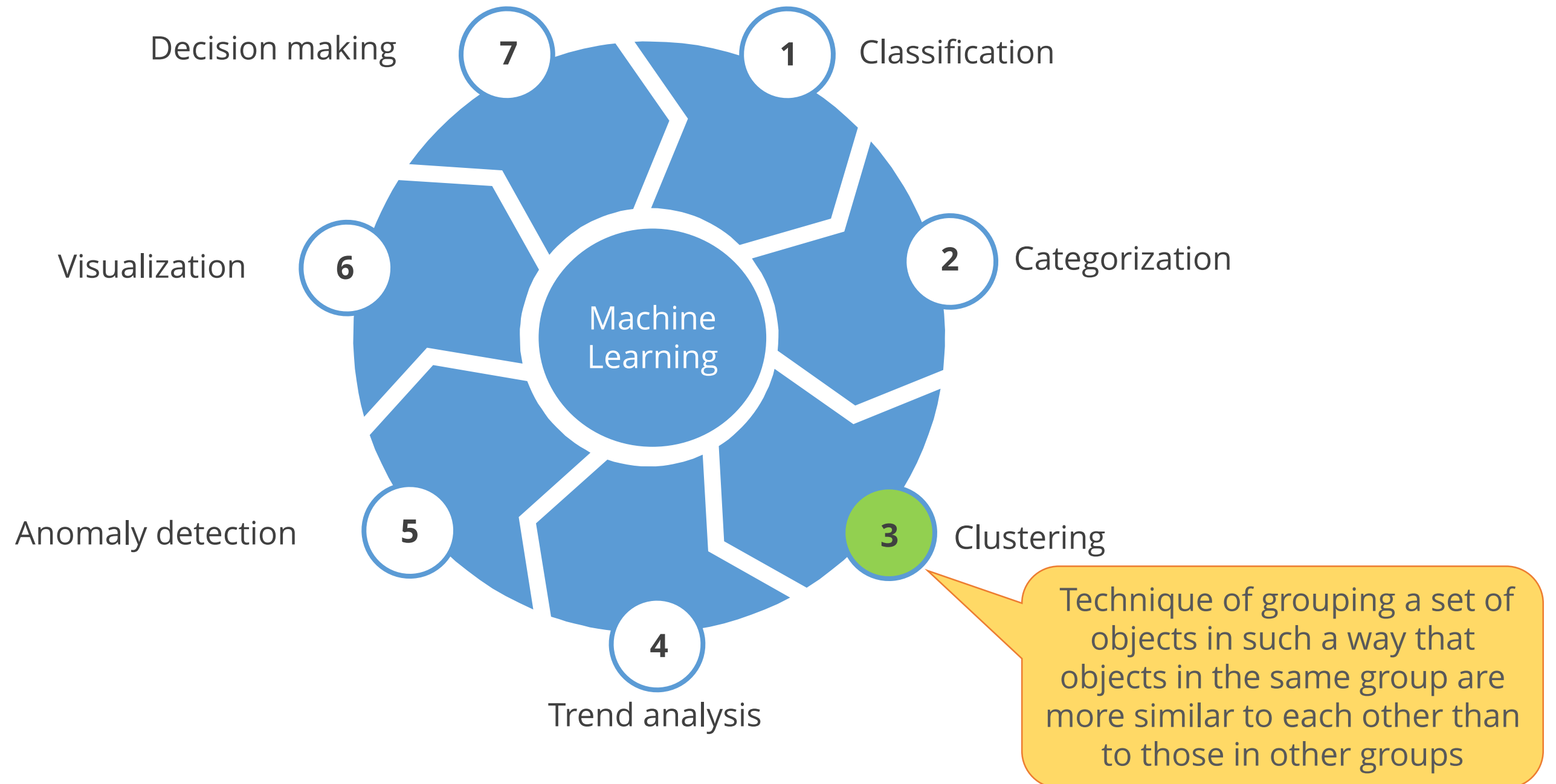
classification is a technique in which the computer program learns from the data input given to it and then uses this **learning** to **classify** new observation



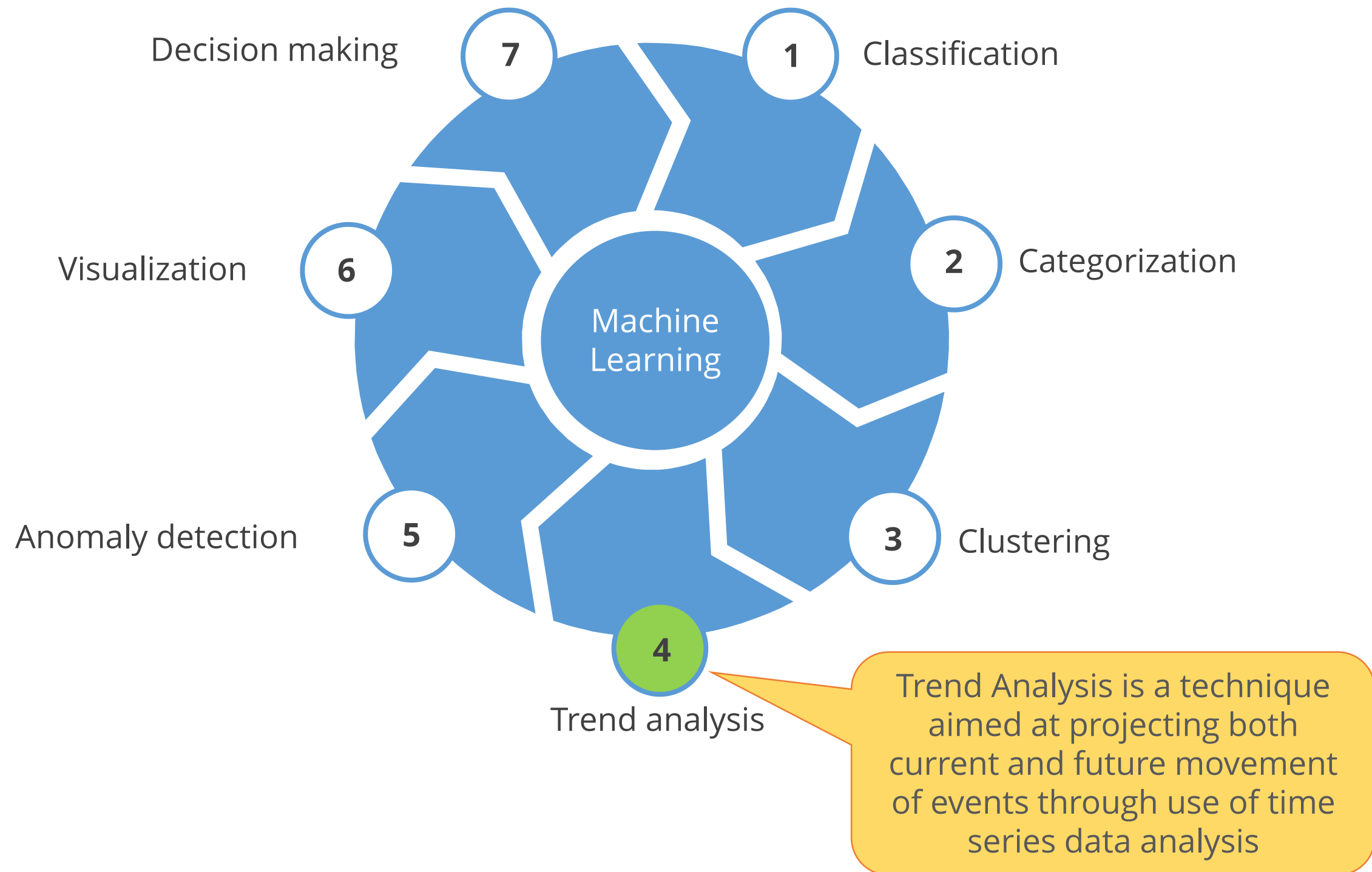
Machine Learning Techniques



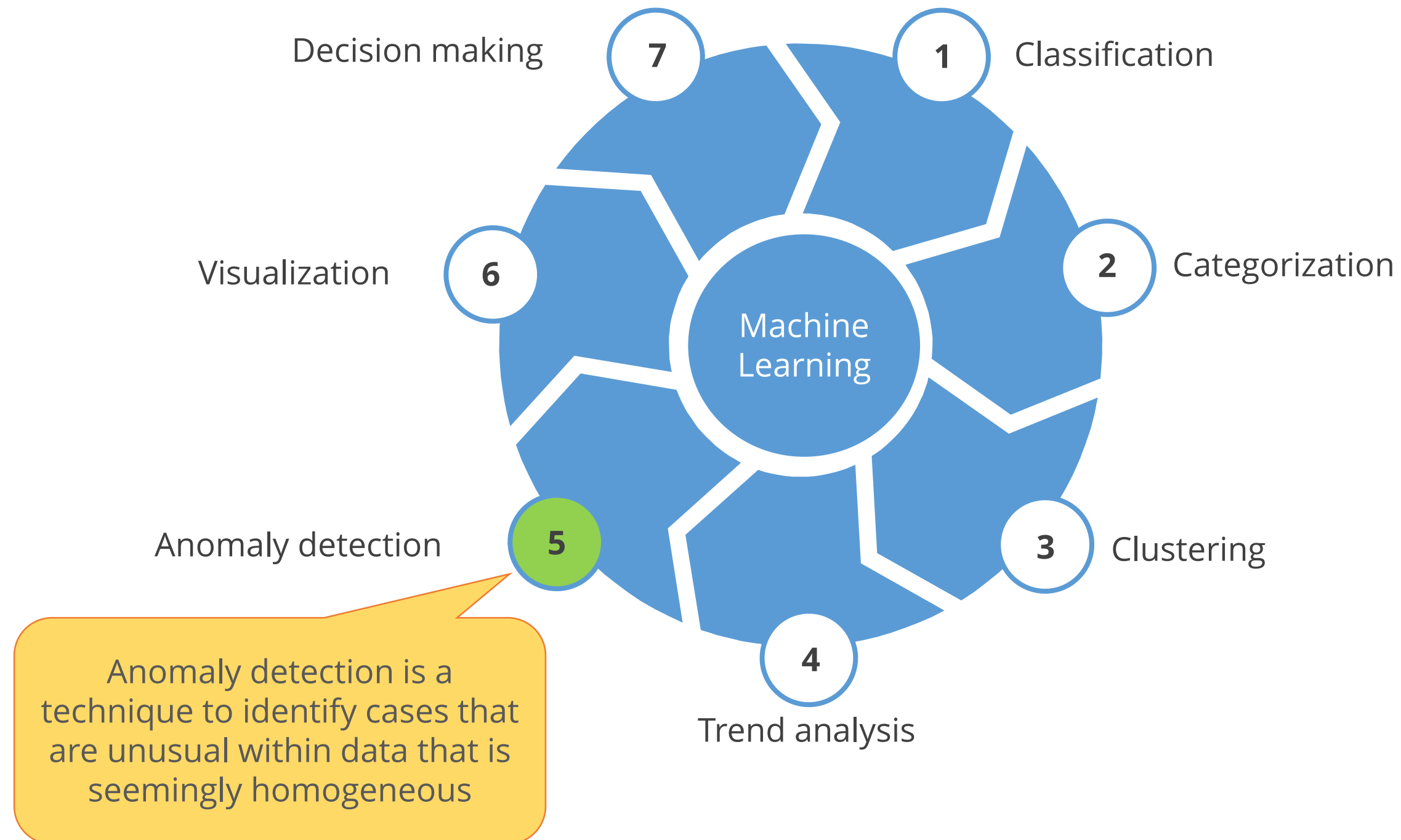
Machine Learning Techniques



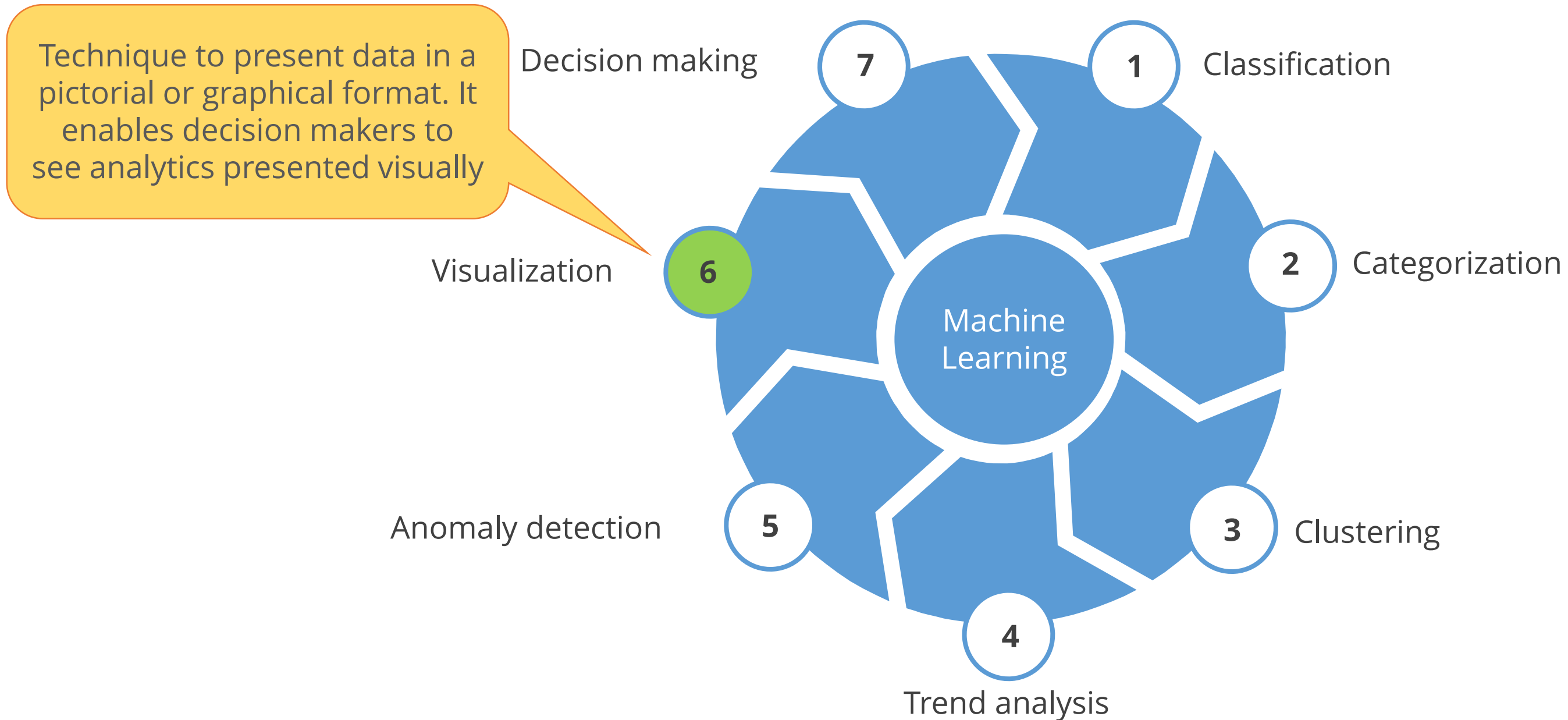
Machine Learning Techniques



Machine Learning Techniques

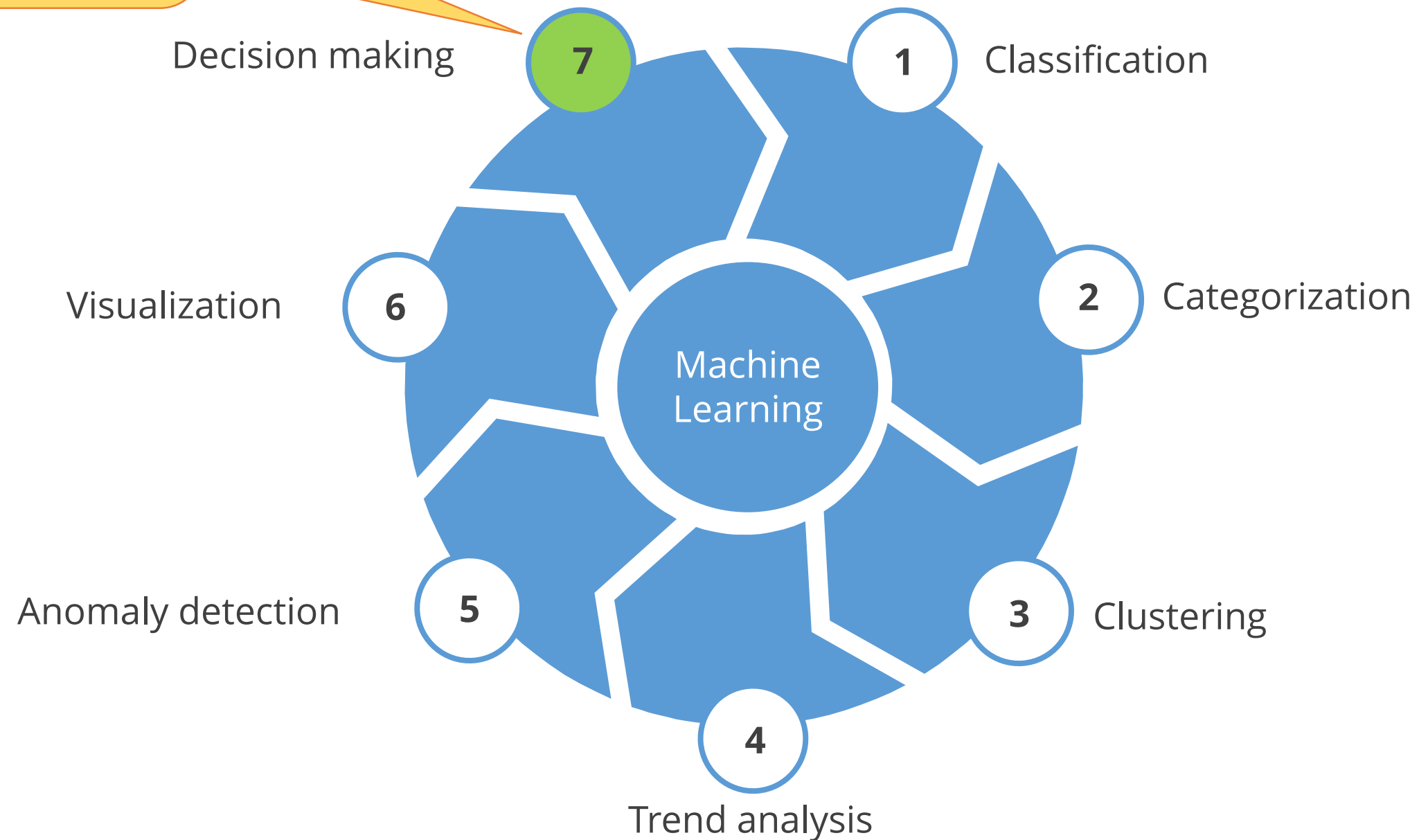


Machine Learning Techniques



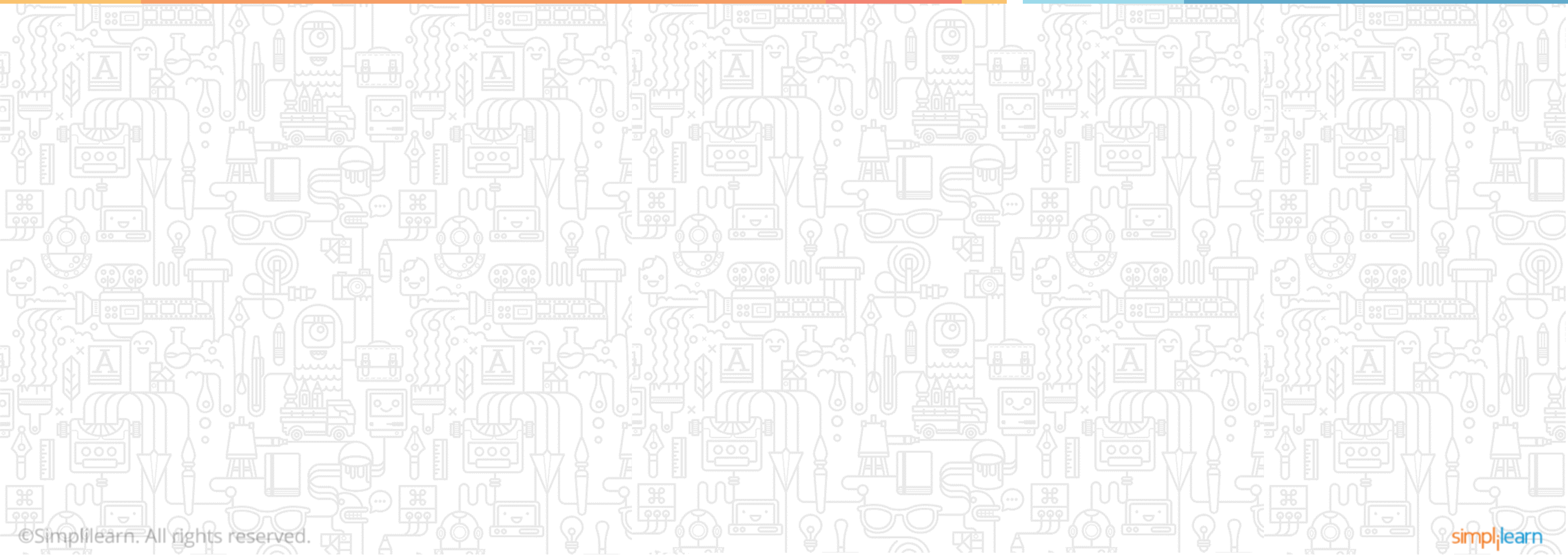
A technique/skill which provides you with the ability to influence managerial decisions with data as evidence for those possibilities

Machine Learning Techniques



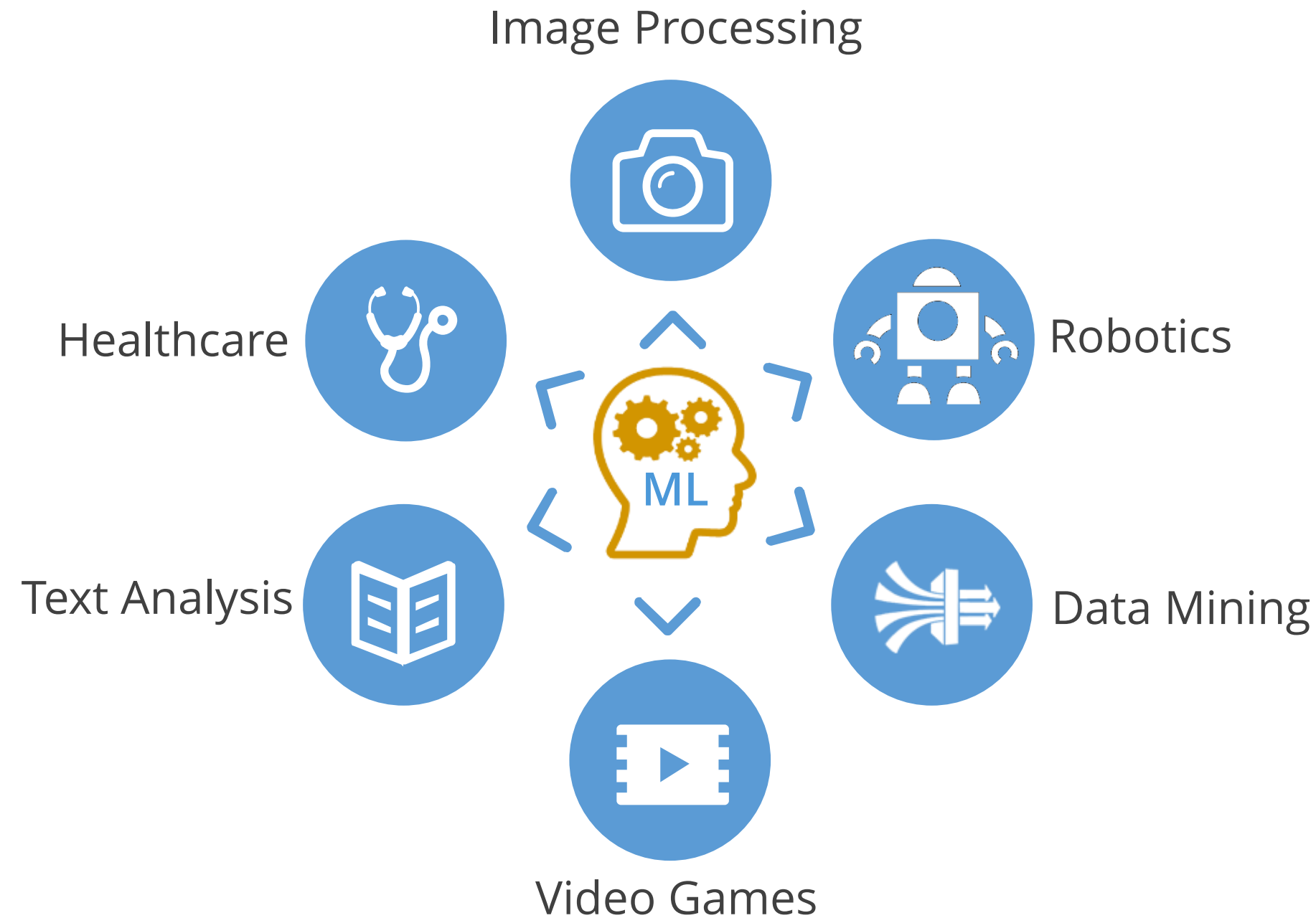
Introduction to Artificial Intelligence and Machine Learning

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

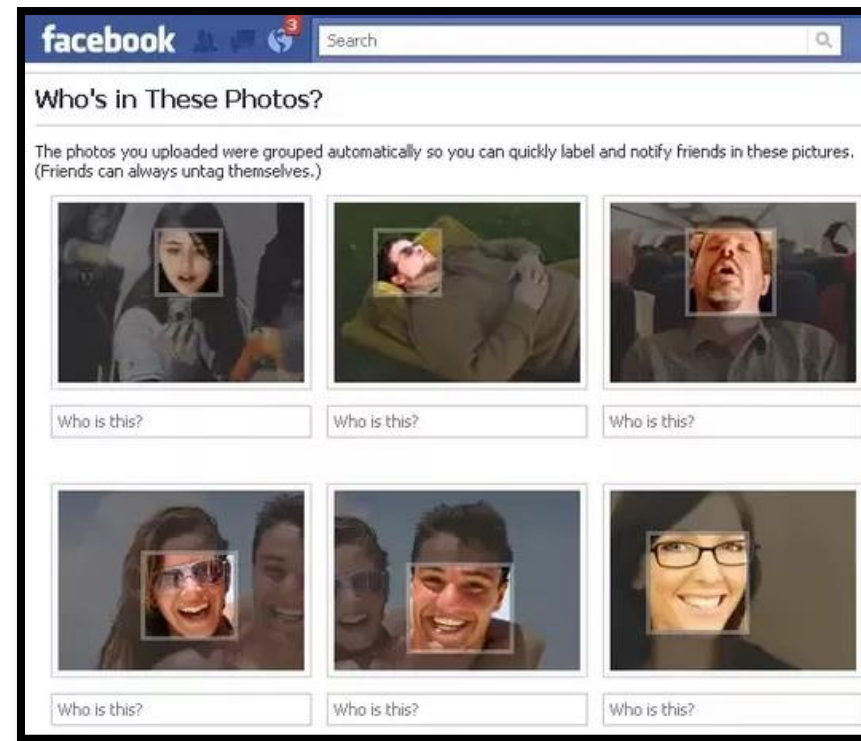
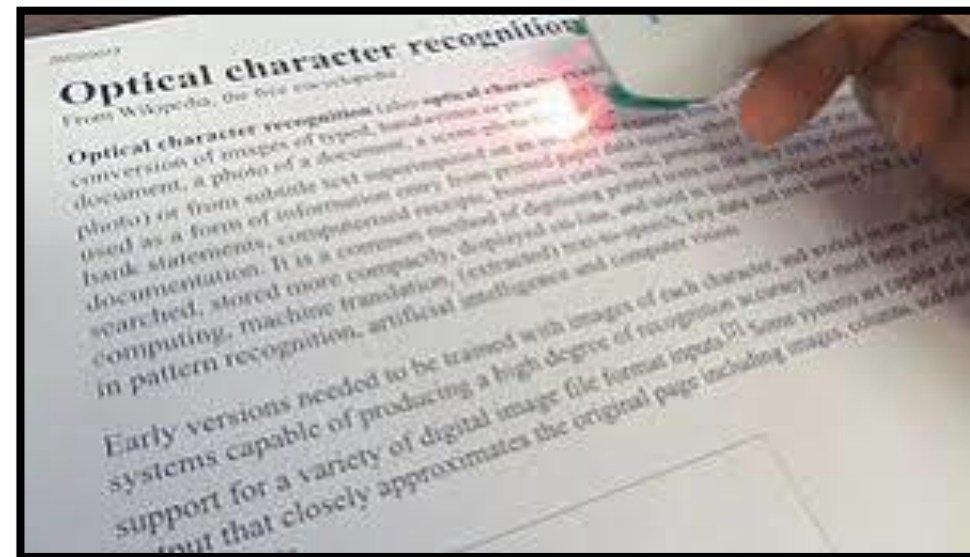
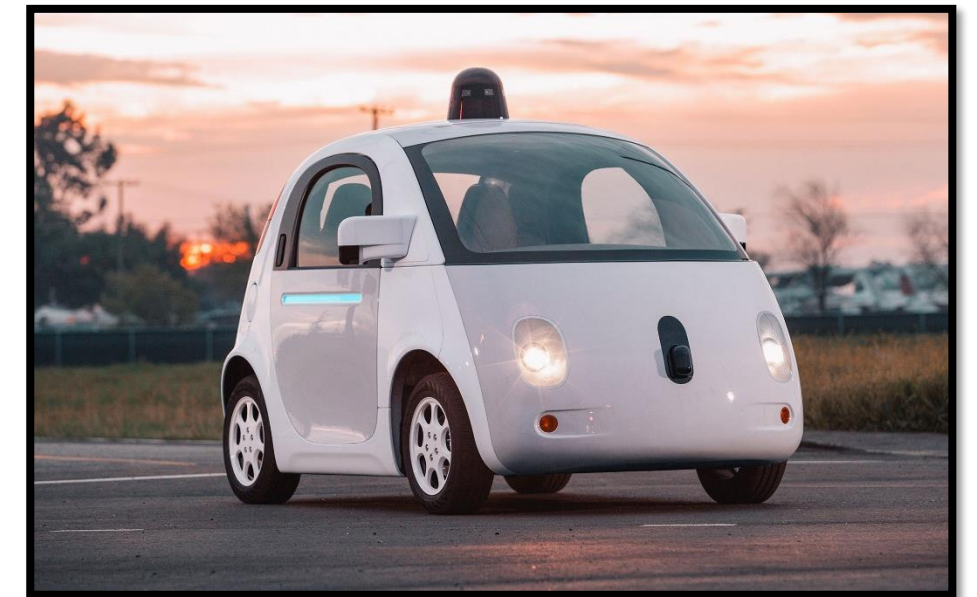


Image tagging and recognition



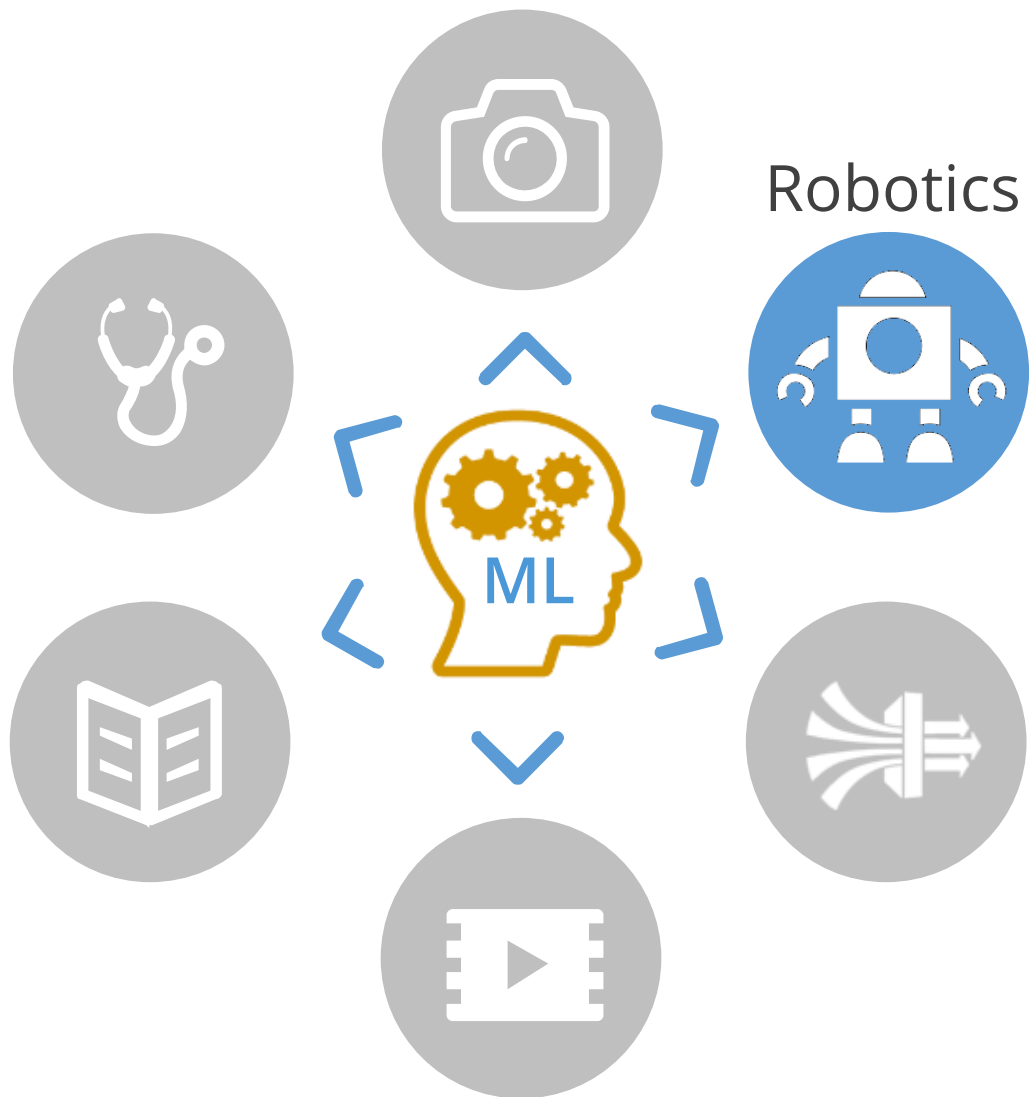
Optical Character Recognition (OCR)



Self-driving cars

Sources: Quora, documentarytube,
Wikipedia

Applications of Machine Learning



Human simulation



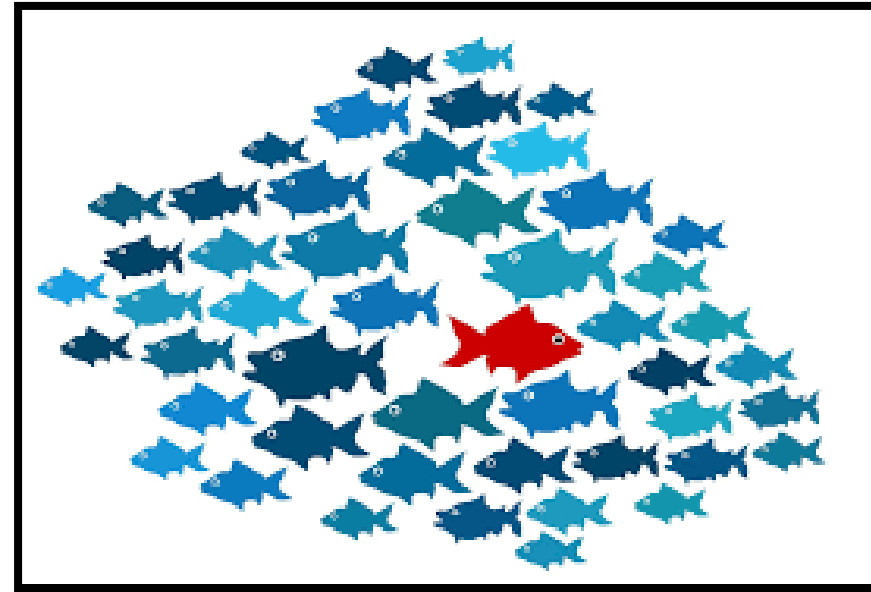
Humanoid Robot



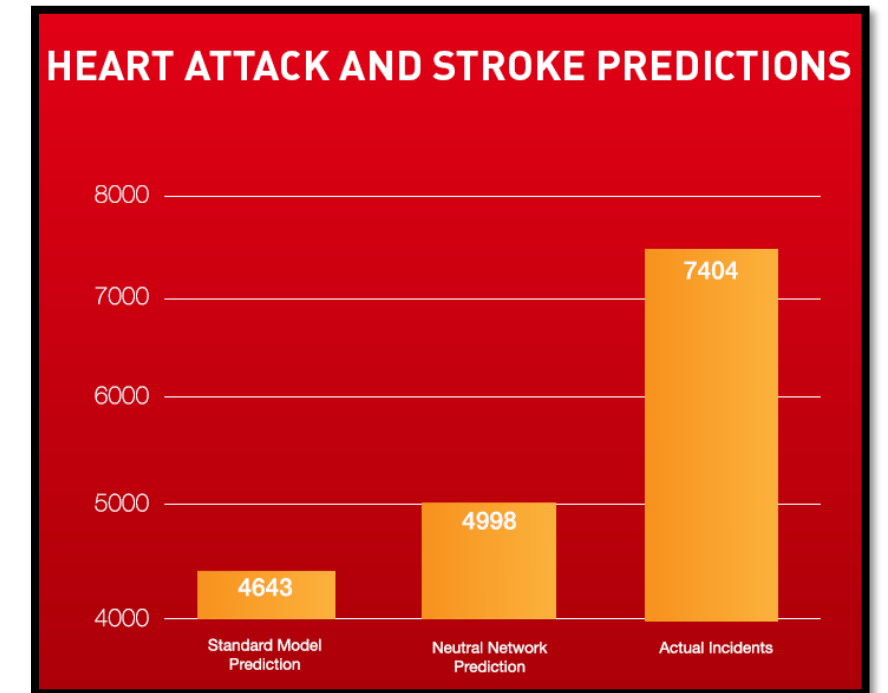
Industrial robotics

Sources: uiowa.edu, [LinkedIn](https://www.linkedin.com), [Hilton](https://www.hilton.com)

Applications of Machine Learning



Anomaly detection



Grouping and Predictions



Association rules

Sources: dbta, Futurism

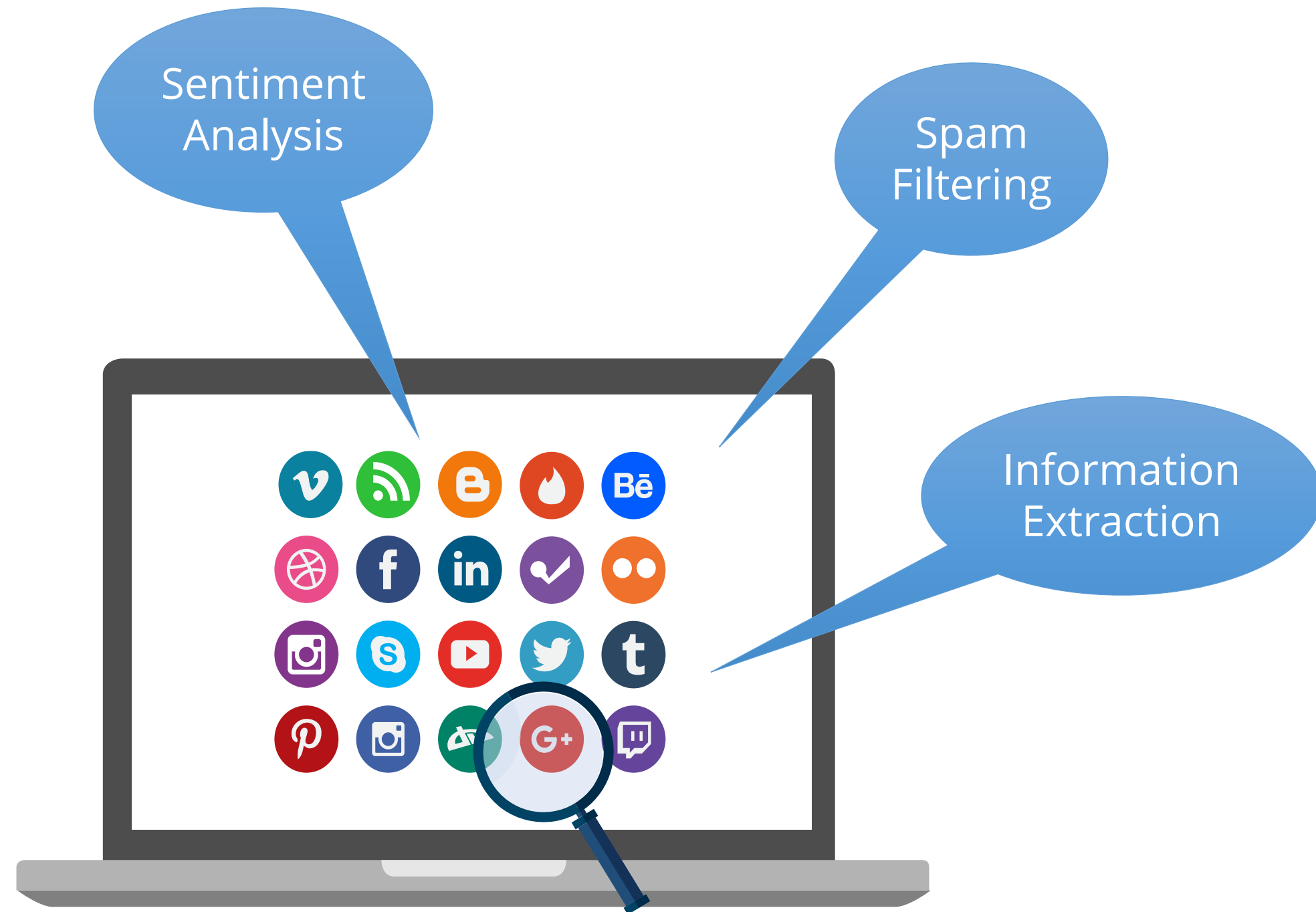
Applications of Machine Learning



Some games implement reinforcement learning

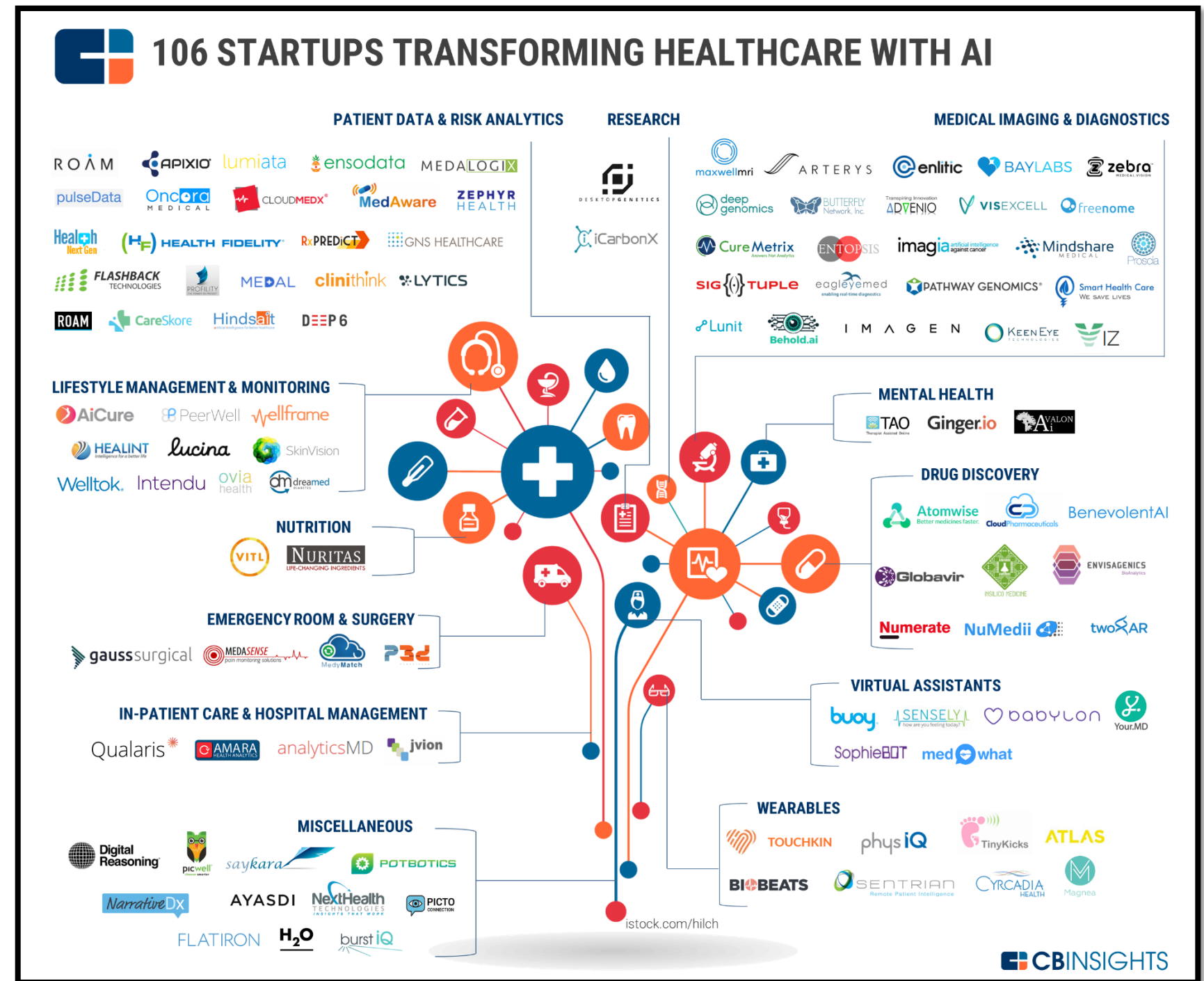
Sources: Quora

Applications of Machine Learning



Applications of Machine Learning

Healthcare



Key Takeaways

Now, you are able to explain:

- ✓ The explosion of data has given rise to a new economy known as the data economy.
- ✓ AI refers to the intelligence in machines that simulates human intelligence.
- ✓ The capability of AI systems to learn by extracting patterns from data is known as machine learning.
- ✓ Statistical machine learning uses the same math and techniques as data science.
- ✓ 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

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



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



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.



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.



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