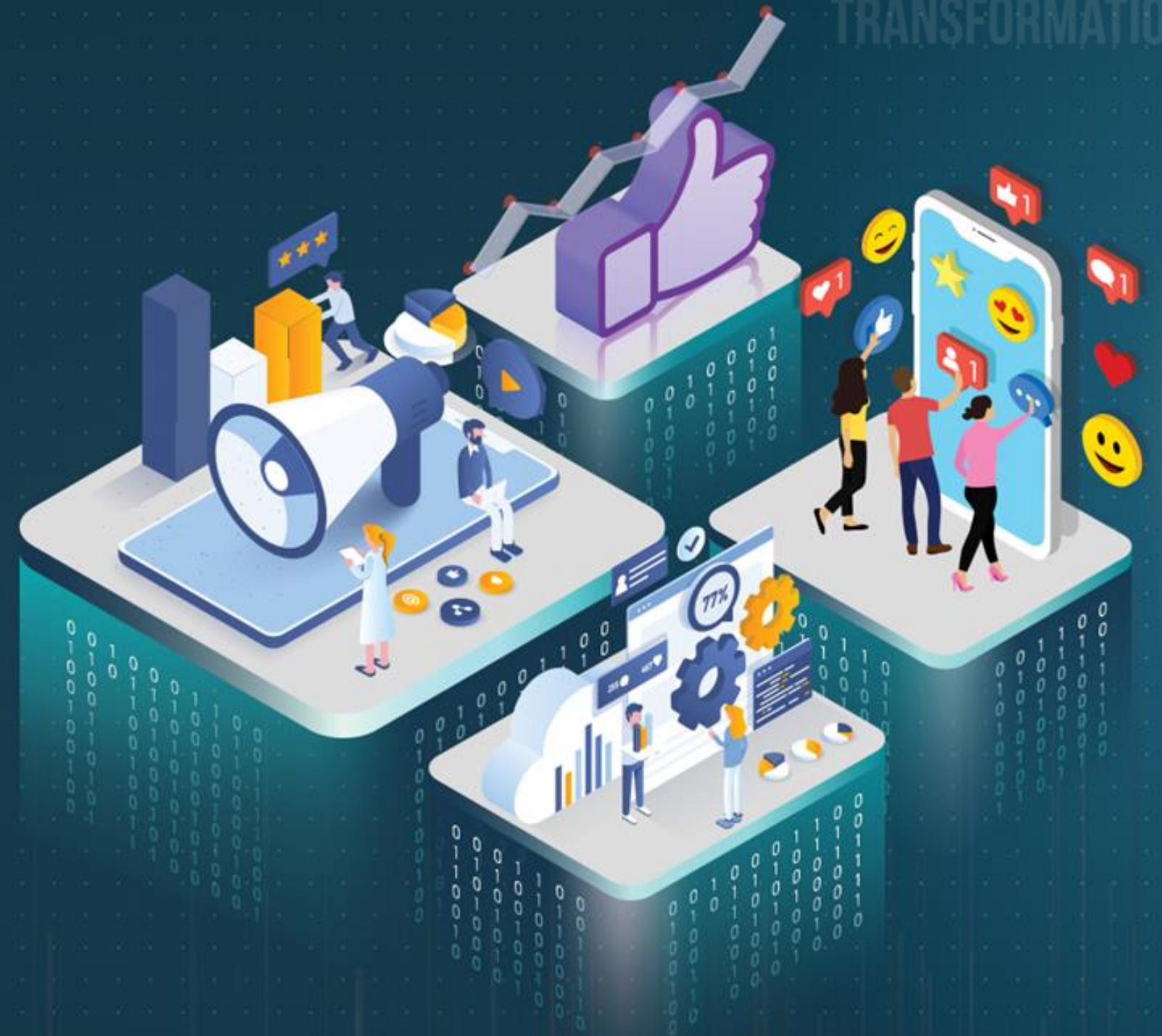


## Digital Transformation for Leaders





# Artificial Intelligence and Machine Learning



# Learning Objectives

By the end of this lesson, you will be able to:

- 🕒 Define artificial intelligence and machine learning
- 🕒 Explain the impact of machine learning on various industries
- 🕒 Discuss how to leverage machine learning for analyzing data and getting insights.





## Introduction

# Introduction

As big data expands, its analysis becomes a tedious and time-consuming activity.



There is a real time flow of all types of structured and unstructured data from social media, communication channels, transportation services, sensors, and devices.

# Introduction



- Using data science, one can teach machines to learn from data and derive useful insights, also known as **Artificial Intelligence (AI)**.
- Training machines can help in reducing human effort and can decrease the time required for analysis.

# Artificial Intelligence: Definition

Artificial intelligence refers to intelligence displayed by machines that simulates human intelligence.



It is a broad term for smart machines that can perform human tasks that require cognitive judgment-based decision making.



# Artificial Intelligence: Examples

Voice assistants that are trained to understand human speech and intent, based on their human interactions:



Apple  
Siri



Amazon  
Alexa



Microsoft  
Cortana



Google  
Assistant



Gmail

Gmail filters a new email into inbox or junk folder based on past information about what you consider spam.



# Artificial Intelligence: Examples

Predictions made by weather apps at a given time are based on some prior knowledge and analysis of weather patterns over a period of time.



Google's AlphaGo AI, Amazon Echo product, home controlled chatbox device, and self-driving cars are excellent examples of artificial intelligence.

## Artificial Intelligence: Use Cases

## Artificial Intelligence: Use Cases

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- Amazon pulls in data from its user database to recommend products to users.
- It uses AI algorithms to predict what items users may like based on the purchase history of similar classes of users.
- Their large customer base generates a huge amount of data, which helps enhance the recommendations.



# Artificial Intelligence: Use Cases

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- IBM Watson understands natural language and can respond to questions asked of it.
- It minds patient data and other data sources to form a hypothesis, which it then presents with a scoring schema.
- Companies use AI to make faster and better diagnosis, with the objective of improving patient outcomes and reducing costs.

## Types of AI

# Types of AI

## Reactive machines



- The most basic type of AI systems are purely reactive and have neither the ability to form memories nor to use past examples to inform current decisions.
- Example: IBM's chess-playing supercomputer can identify pieces on a chess board to make predictions, but it has no memory and cannot use past experiences to inform future ones.



# Types of AI

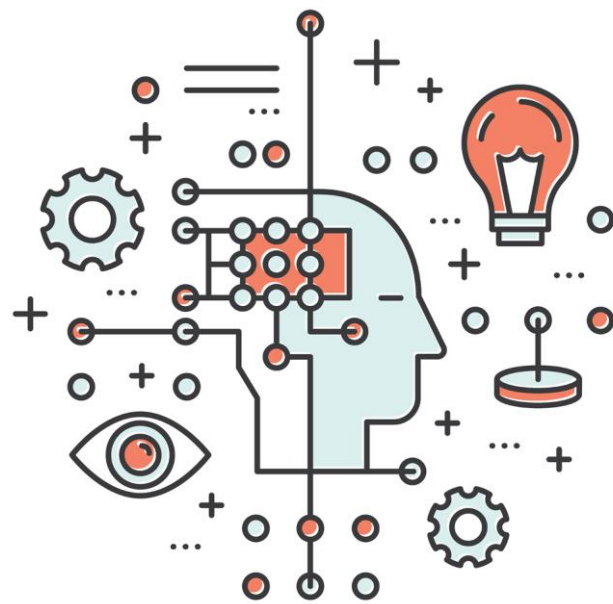
## Limited Memory



- These AI systems can use past experiences to inform future decisions.
- Some of the decision-making functions in autonomous vehicles have been designed this way.
- Observations are used to inform actions happening in the near future such as a car has changed lanes. These observations are not stored permanently.

# Types of AI

## Theory of Mind

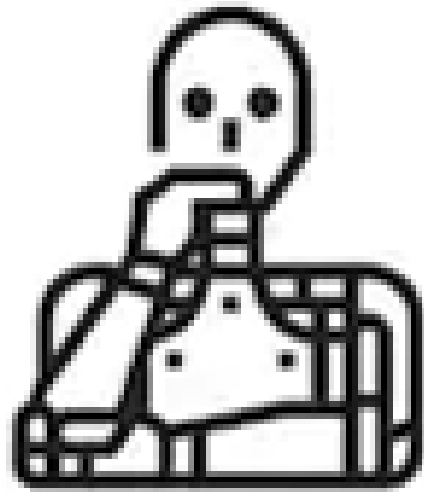


- This psychological term refers to the understanding that others have their own beliefs, desires, and intentions that impact the decisions they make.
- This is an important distinguishing factor between the machines now and the machines intended to be built in the future.

# Types of AI

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## Self-Awareness



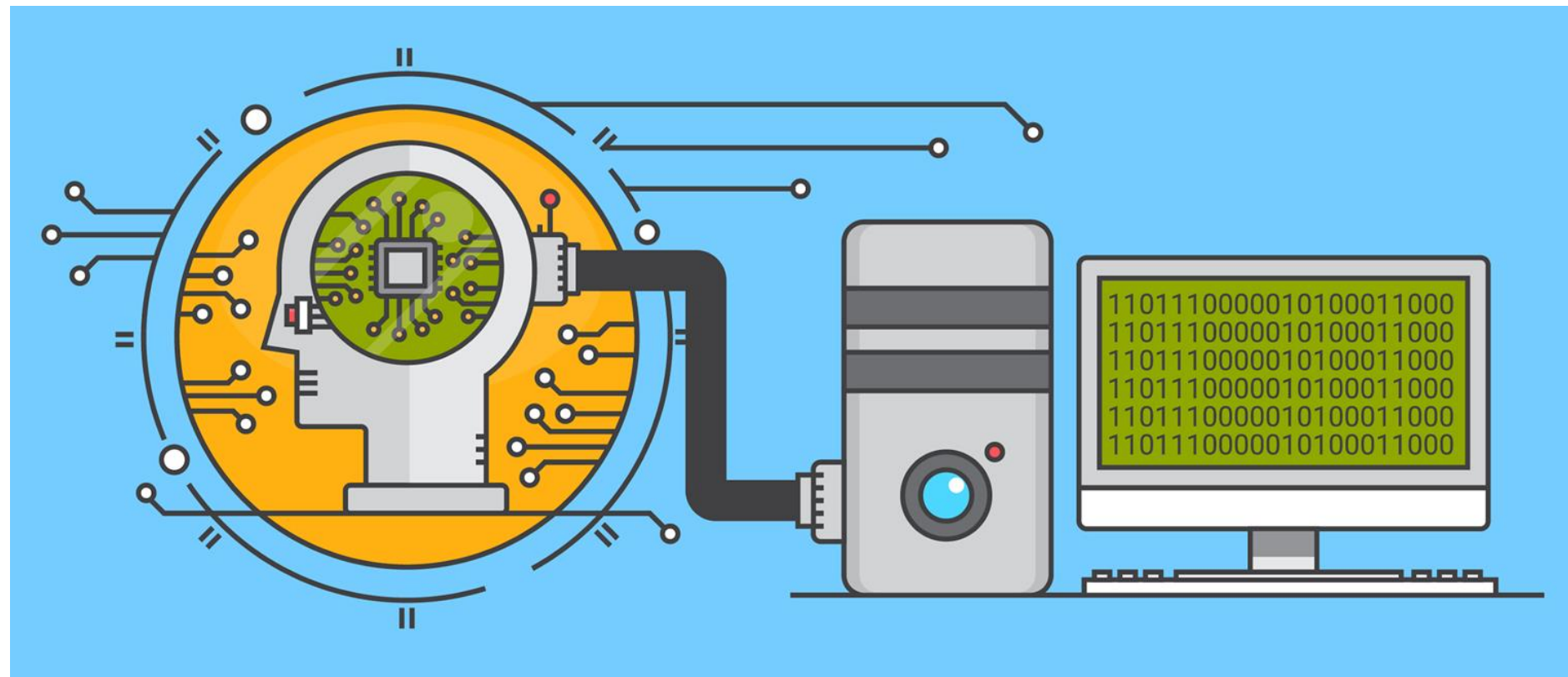
- These AI systems have a sense of self and have consciousness.
- Machines with self-awareness understand their current state and can use the information to infer what others are feeling.



# Machine Learning

# Machine Learning: Definition

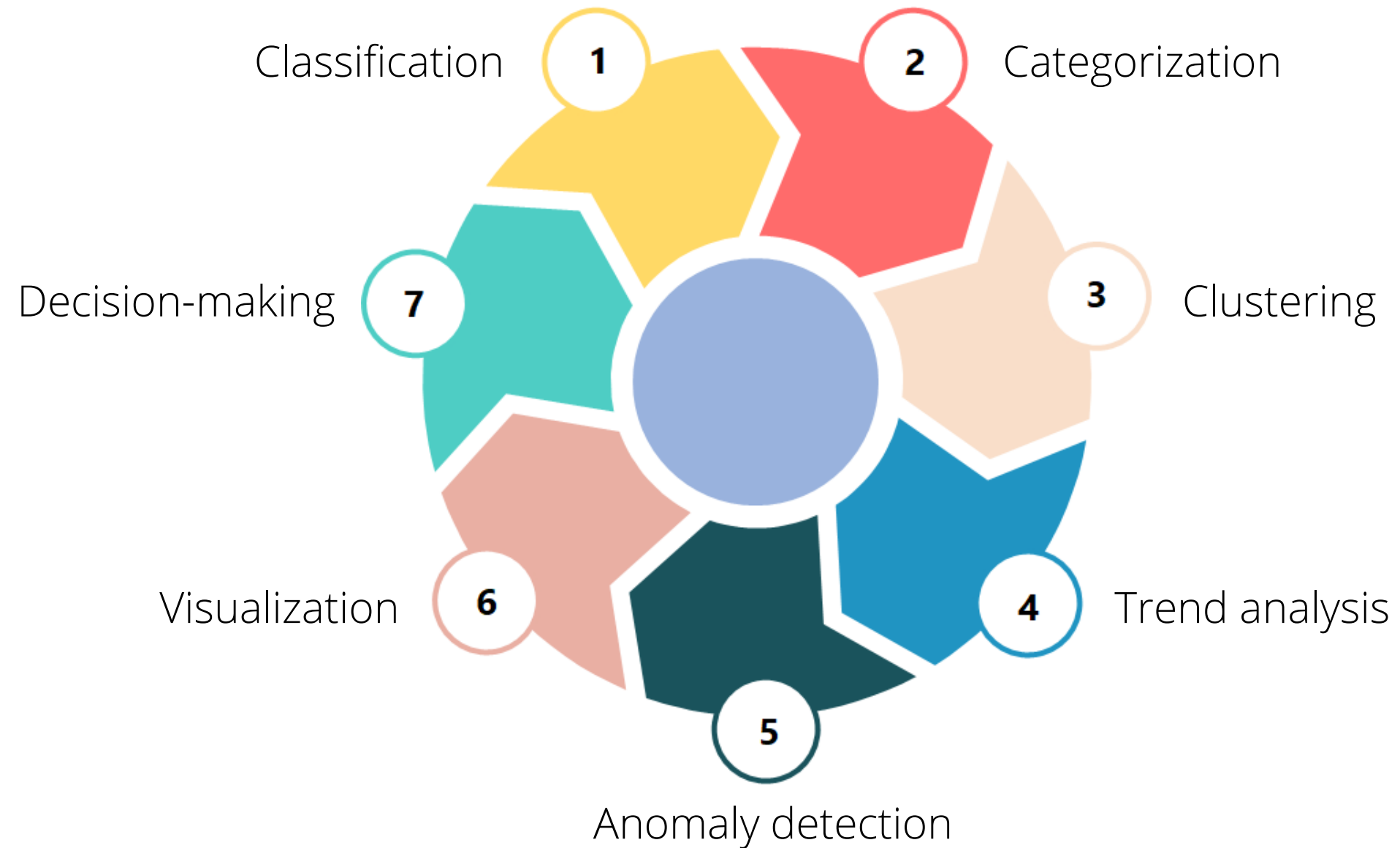
Machine learning is an application of artificial intelligence that provides systems the ability to automatically learn and improve from experience without being explicitly programmed.



It focuses on the development of computer programs that can access data and use it to learn for themselves.

# Machine Learning: Overview

Machine learning uses a number of theories and techniques from data science, some of them include:





## Impact of AI and ML on Industries

# Travel

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- Expedia and other sites provide recommendations based on customer search and booking history.
- They can even recommend alternative travel dates, destinations, and local sightseeing options based on your search queries.
- Expedia uses machine learning techniques and algorithms to make these recommendations.

## Insurance

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- Allstate partnered with EIS to develop a virtual assistant called **ABIE**, the Allstate business insurance expert.
- ABIE assist Allstate agents who are seeking information on Allstate's commercial insurance products.
- It provides agents with step-by-step guidance for quoting and issuing ABI products using a natural language.



# Healthcare

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- Apixio aims at improving accessibility of clinical knowledge, from digitizing medical records to improving healthcare decision making.
- It deals with a huge amount of unstructured data, gaps in patient documentation, and inaccuracies in disease prevalence and treatment.
- It introduced machine learning techniques to aggregate data across the population and derive insights.

# Banking

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- Bank of America corporation recently made a bold push into AI technology with the debut of an intelligent virtual assistant named **Erica**.
- Erica is a chatbot that leverages predictive analytics and cognitive messaging to provide financial guidance to the company's over forty-five million customers.

# Machine Learning Methods

# Machine Learning Methods

**Supervised learning** is a type of machine learning used to learn models from labeled training data and allows to predict output for future or unseen data.



Example: Voice assistants like Apple's Siri, Amazon's Alexa, Microsoft's Cortana, and Google Assistant are trained to understand human speech and intent based on human interactions.



# Machine Learning Methods

**Unsupervised learning** is a subset of machine learning used to extract inferences from data sets that consist of input data without labeled responses.

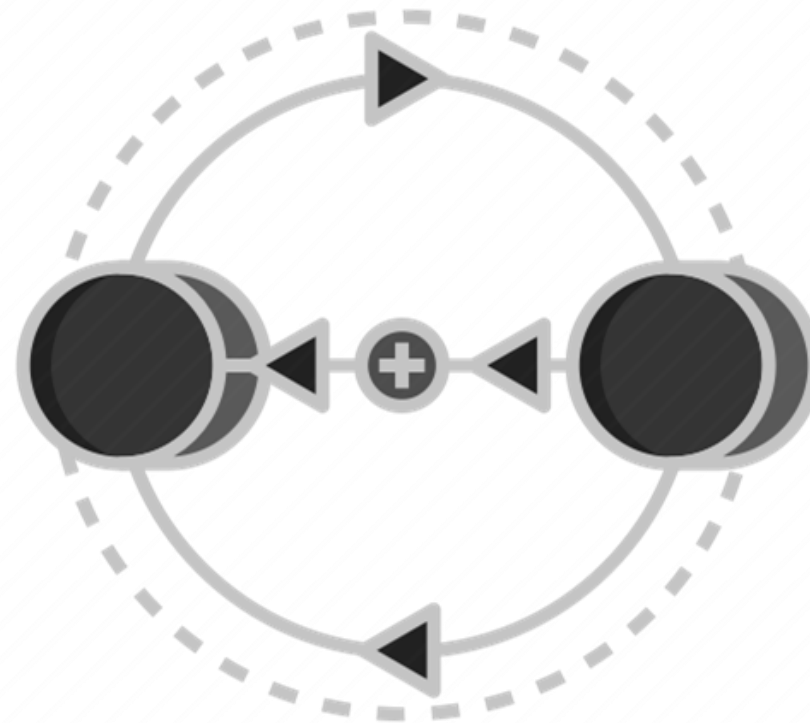


Example: An online news portal segments articles into categories like business, technology, sports, etc.

This is based on **Clustering** which is one of the most popular techniques of unsupervised learning.

# Machine Learning Methods

**Reinforcement learning** is a type of machine learning that allows the learning system to observe and learn the ideal behavior based on trying to maximize some notion of cumulative reward.

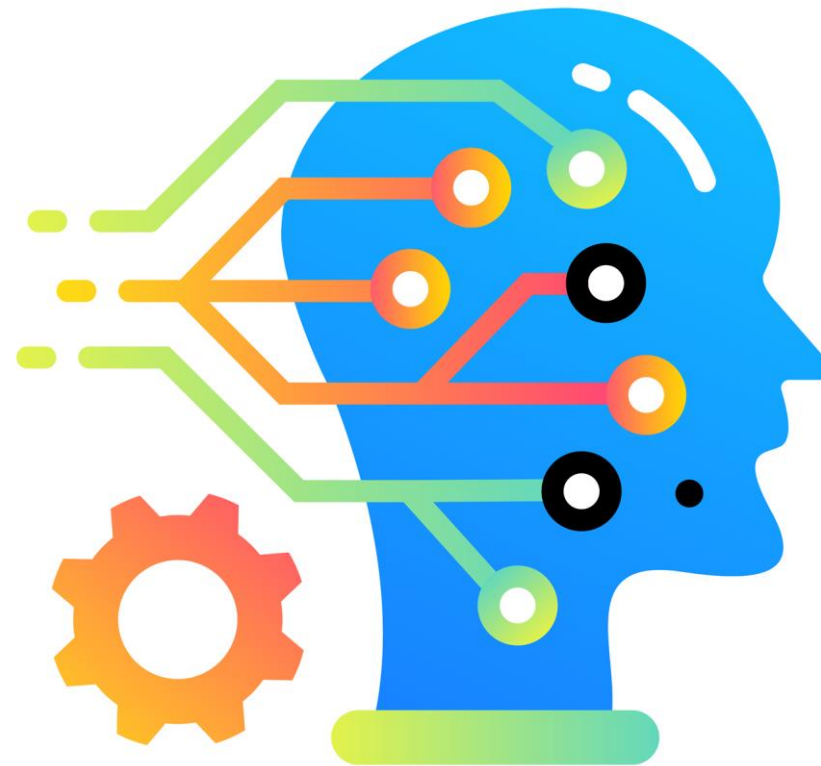


Example: Manufacturing units use robots to identify a device from one box and put it in a container. The robot learns this by means of a reward-based learning system which incentivizes it for the right action.

## Leveraging Machine Learning

# Leveraging Machine Learning

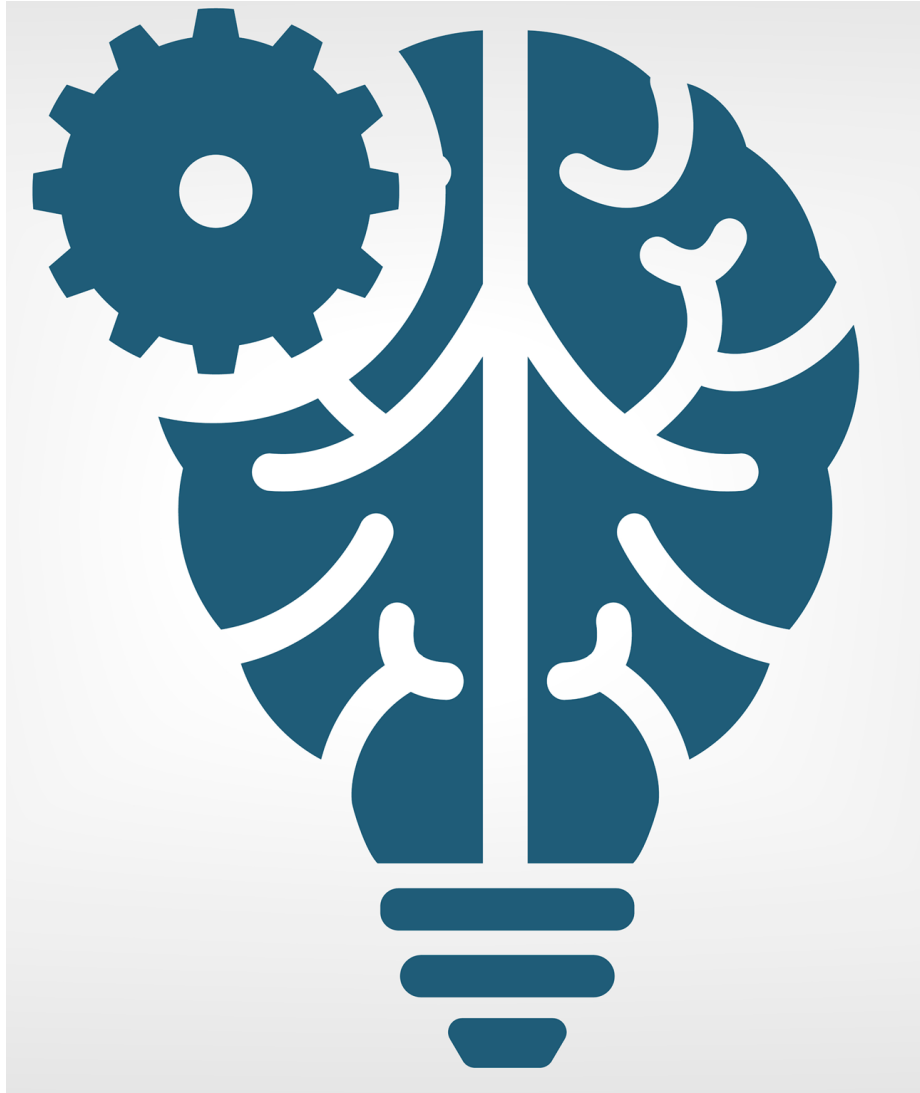
In machine learning, humans do not have to feed the algorithm, unlike traditional programming, as the computer learns by itself, which saves effort and brings more accuracy and transparency.



Combining machine learning with existing enterprise data enables a new generation of applications that can analyze and gain insights from large volumes of multi-structured machine data.



# Leveraging Machine Learning



Using the insights from the analyzed data, we can:

- Empower the C-suite that acts as a reassurance to the decision-makers
- Improve reliability and help identify failures
- Improve the flow of operations by reducing bottlenecks and problems
- Monitor and visualize data to help monitor end-to-end infrastructure and provide real-time alerts

## Key Takeaways

- Artificial intelligence refers to intelligence displayed by machines that simulates human intelligence.
- Reactive machine, Limited memory, Theory of mind, and Self-awareness are four types of AI.
- Machine learning is a subset of artificial intelligence, where machines can learn and improve from experience without being explicitly programmed.
- Machine learning can be combined with existing enterprise data to analyze and gain insights from large volumes of multi structured machine data.

