



# Artificial Intelligence & Machine Learning

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# What is AI?

In simplest language, artificial intelligence is a field, which combines computer science and robust datasets, to enable problem-solving.

It also encompasses sub-fields of machine learning and deep learning, which are frequently mentioned in conjunction with artificial intelligence.

## ARTIFICIAL INTELLIGENCE

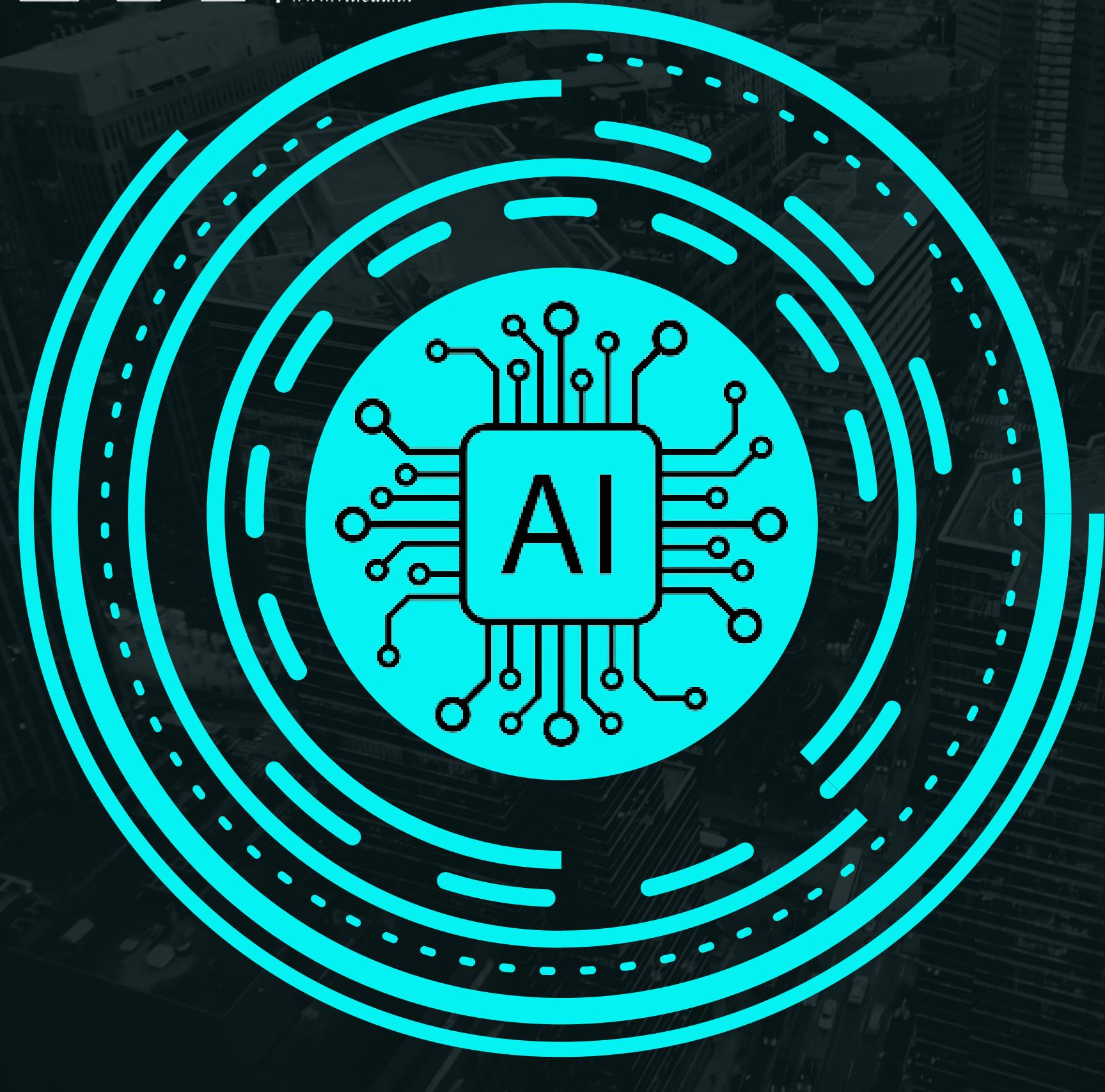
A program that can sense, reason, act, and adapt

## MACHINE LEARNING

Algorithms whose performance improve as they are exposed to more data over time

## DEEP LEARNING

Subset of machine learning in which multilayered neural networks learn from vast amounts of data

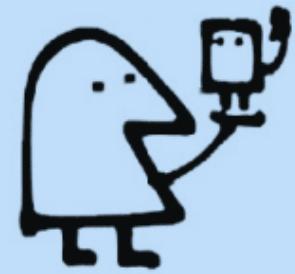


# Examples

Over the years, artificial intelligence has gone through many cycles of hype, but even to skeptics, the release of OpenAI's ChatGPT seems to mark a turning point. The last time generative AI loomed this large, the breakthroughs were in computer vision, but now the leap forward is in natural language processing

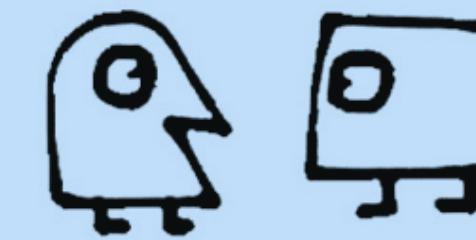


## 3 stages of AI



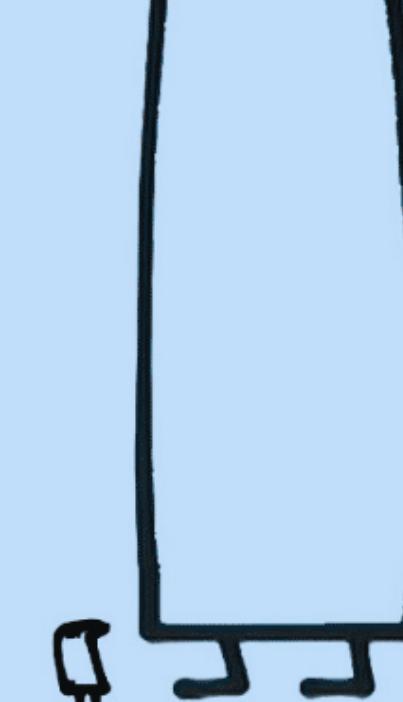
### Narrow AI

Dedicated to assist with or take over specific tasks



### General AI

Takes knowledge from one domain, transfers to other domain

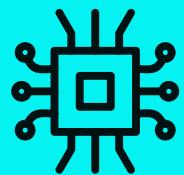


### Super AI

Machines that are an order of magnitude smarter than humans

Credit: Chris Noessel

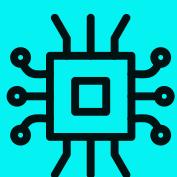
# Narrow AI or Weak AI



Weak AI also called Narrow AI or Artificial Narrow Intelligence (ANI)—is AI trained and focused to perform specific tasks. Weak AI drives most of the AI that surrounds us today. 'Narrow' might be a more accurate descriptor for this type of AI as it is anything but weak; it enables some very robust applications, such as Apple's Siri, Amazon's Alexa, IBM Watson, and autonomous vehicles.



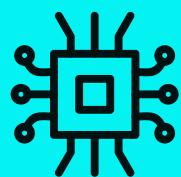
# General AI



Artificial general intelligence (AGI), or general AI, is a theoretical form of AI where a machine would have an intelligence equaled to humans; it would have a self-aware consciousness that has the ability to solve problems, learn, and plan for the future.



# Super AI

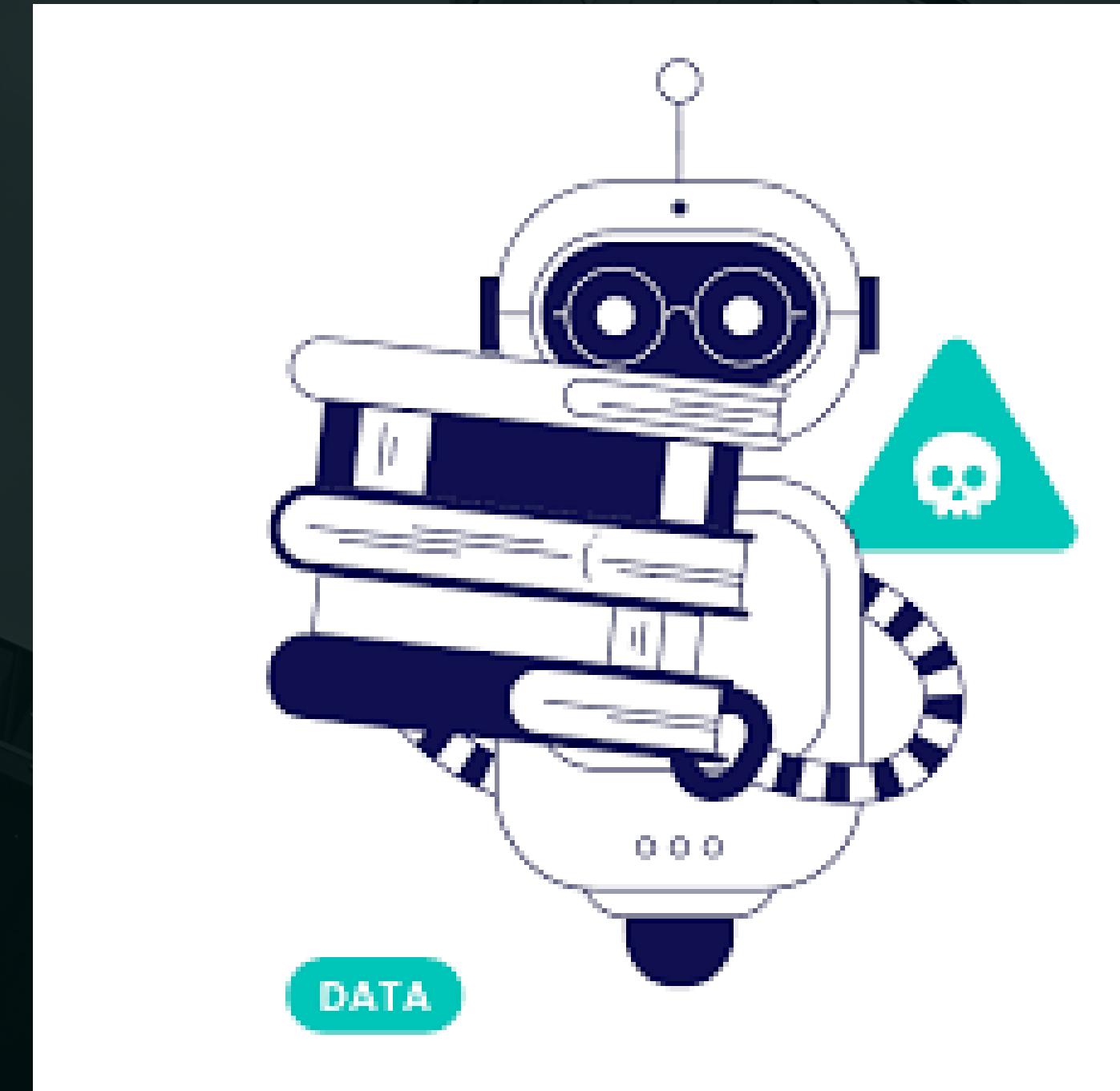


Artificial Super Intelligence (ASI)—also known as superintelligence—would surpass the intelligence and ability of the human brain. While strong AI is still entirely theoretical with no practical examples in use today, that doesn't mean AI researchers aren't also exploring its development. In the meantime, the best examples of ASI might be from science fiction, such as HAL, the superhuman, rogue computer assistant in 2001: A Space Odyssey.



# What is ML?

Machine learning is a branch of artificial intelligence (AI) and computer science which focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy



# How machine learning works

**A Decision Process:**  
Machine learning algorithms are used to make a prediction or classification. Based on some input data, which can be labeled or unlabeled, your algorithm will produce an estimate about a pattern in the data.

**An Error Function:**  
An error function evaluates the prediction of the model. If there are known examples, an error function can make a comparison to assess the accuracy of the model.

**A Model Optimization Process:**  
If the model can fit better to the data points in the training set, then weights are adjusted to reduce the discrepancy between the known example and the model estimate. The algorithm will repeat this “evaluate and optimize” process, updating weights autonomously until a threshold of accuracy has been met.

# Machine Learning Methods

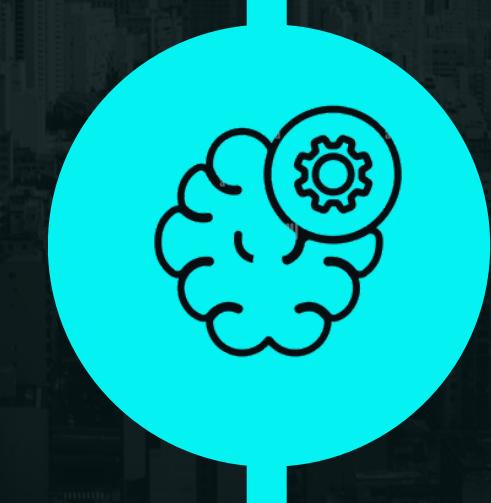
## Supervised ML

It's defined by its use of labeled datasets to train algorithms to classify data or predict outcomes accurately. As input data is fed into the model, the model adjusts its weights until it has been fitted appropriately.  
Ex: classifying spam in a separate folder from your inbox.



## Semi-supervised ML

It uses a smaller labeled data set to guide classification and feature extraction from a larger, unlabeled data set. Semi-supervised learning can solve the problem of not having enough labeled data for a supervised learning algorithm.



## Unsupervised ML

It uses machine learning algorithms to analyze and cluster unlabeled datasets. These algorithms discover hidden patterns or data groupings without the need for human intervention.  
EX: customer segmentation, and image and pattern recognition.

# Reinforcement Machine Learning

Reinforcement machine learning is a machine learning model that is similar to supervised learning, but the algorithm isn't trained using sample data. This model learns as it goes by using trial and error. A sequence of successful outcomes will be reinforced to develop the best recommendation or policy for a given problem.

Reinforcement learning uses algorithms that learn from outcomes and decide which action to take next. After each action, the algorithm receives feedback that helps it determine whether the choice it made was correct, neutral or incorrect. It is a good technique to use for automated systems that have to make a lot of small decisions without human guidance.



# ML Algorithms

- **Neural networks:** Neural networks simulate the way the human brain works, with a huge number of linked processing nodes. Neural networks are good at recognizing patterns and play an important role in applications including natural language translation, image recognition, speech recognition, and image creation.
- **Linear regression:** This algorithm is used to predict numerical values, based on a linear relationship between different values. For example, the technique could be used to predict house prices based on historical data for the area.
- **Logistic regression:** This supervised learning algorithm makes predictions for categorical response variables, such as “yes/no” answers to questions. It can be used for applications such as classifying spam and quality control on a production line.
- **Clustering:** Using unsupervised learning, clustering algorithms can identify patterns in data so that it can be grouped. Computers can help data scientists by identifying differences between data items that humans have overlooked.



# Thanks You



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