

About AI

While a number of definitions of artificial intelligence (AI) have surfaced over the last few decades, John McCarthy offers the following definition in this 2004 paper (PDF, 106 KB) (link resides outside IBM), " It is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable."

Terminologies related to AI

Algorithms: A set of rules or instructions given to an AI, neural network, or other machines to help it learn on its own; classification, clustering, recommendation, and regression are four of the most popular types.

Artificial intelligence: A machine's ability to make decisions and perform tasks that simulate human intelligence and behavior.

Artificial neural network (ANN): A learning model created to act like a human brain that solves tasks that are too difficult for traditional computer systems to solve.

Autonomic computing: A system's capacity for adaptive self-management of its own resources for high-level computing functions without user input.

Chatbots: A chat robot (chatbot for short) that is designed to simulate a conversation with human users by communicating through text chats, voice commands, or both. They are a commonly used interface for computer programs that include AI capabilities.

Classification: Classification algorithms let machines assign a category to a data point based on training data.

Cluster analysis: A type of unsupervised learning used for exploratory data analysis to find hidden patterns or grouping in data; clusters are modeled with a measure of similarity defined by metrics such as Euclidean or probabilistic distance.

Clustering: Clustering algorithms let machines group data points or items into groups with similar characteristics.

Cognitive computing: A computerized model that mimics the way the human brain thinks. It involves self-learning through the use of data mining, natural language processing, and pattern recognition.

Convolutional neural network (CNN): A type of neural networks that identifies and makes sense of images.

Data mining: The examination of data sets to discover and mine patterns from that data that can be of further use.

Data science: An interdisciplinary field that combines scientific methods, systems, and processes from statistics, information science, and computer science to provide insight into phenomenon via either structured or unstructured data.

Decision tree: A tree and branch-based model used to map decisions and their possible consequences, similar to a flow chart.

Deep learning: The ability for machines to autonomously mimic human thought patterns through artificial neural networks composed of cascading layers of information.

Fluent: A type of condition that can change over time.

Game AI: A form of AI specific to gaming that uses an algorithm to replace randomness. It is a computational behavior used in non-player characters to generate human-like intelligence and reaction-based actions taken by the player.

Genetic algorithm: An evolutionary algorithm based on principles of genetics and natural selection that is used to find optimal or near-optimal solutions to difficult problems that would otherwise take decades to solve.

Heuristic search techniques: Support that narrows down the search for optimal solutions for a problem by eliminating options that are incorrect.

Knowledge engineering: Focuses on building knowledge-based systems, including all of the scientific, technical, and social aspects of it.

Logic programming: A type of programming paradigm in which computation is carried out based on the knowledge repository of facts and rules; LISP and Prolog are two logic programming languages used for AI programming.

Machine intelligence: An umbrella term that encompasses machine learning, deep learning, and classical learning algorithms.

Machine learning: A facet of AI that focuses on algorithms, allowing machines to learn without being programmed and change when exposed to new data.

Machine perception: The ability for a system to receive and interpret data from the outside world similarly to how humans use our senses. This is typically done with attached hardware, though software is also usable.

Natural language processing: The ability for a program to recognize human communication as it is meant to be understood.

Recurrent neural network (RNN): A type of neural network that makes sense of sequential information and recognizes patterns, and creates outputs based on those calculations.

Supervised and Unsupervised Learning:

Supervised learning: A type of machine learning in which output datasets train the machine to generate the desired algorithms, like a teacher supervising a student; more common than unsupervised learning.

Swarm behavior: From the perspective of the mathematical modeler, it is an emergent behavior arising from simple rules that are followed by individuals and does not involve any central coordination.

Unsupervised learning: A type of machine learning algorithm used to draw inferences from datasets consisting of input data without labeled responses. The most common unsupervised learning method is cluster analysis.

Frameworks of AI: Tensorflow, keras, Pytorch, Theano, Microsoft Cognitive Toolkit, caffe, Amazon ML, Accord dot net, Apache Mahout.