



Machine Learning

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Abstract.The field of machine learning is introduced at a conceptual level. Ideas such as supervised and unsupervised as well as regression and classification are explained. The tradeoff between bias, variance, and model complexity is discussed as a central guiding idea of learning. In this paper, a brief review and future prospect of machine learning. **Keywords:** Algorithm Machine Learning, Supervised learning, unsupervised learning, Reinforcement learning semi-supervised learning

1. Introduction

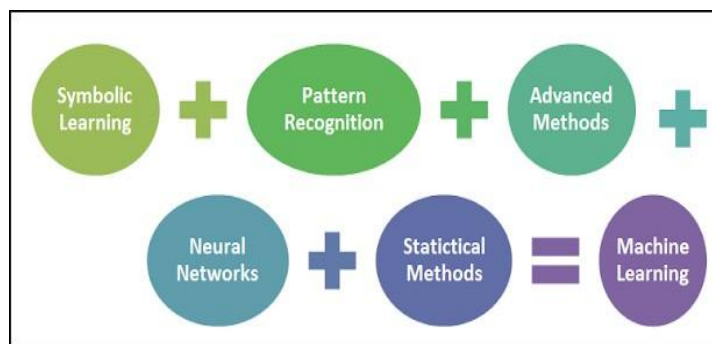


FIGURE1. Machinelearning

Machinelearning (ML) is a branch of artificial intelligence (AI) that enables computers to “self-learn” from training data and improve over time, without being explicitly programmed. Machine learning algorithms are able to detect patterns in data and learn from them, in order to make their own prediction. The term machine learning was first coined in the 1950s when Artificial Intelligence pioneer Arthur Samuel built the first self-learning system for playing checkers. He noticed that the more the system played, the better it performed.

Today, whether you realize it or not, machine learning is everywhere – automated translation, image recognition, voice search technology, self-driving cars, and beyond. Machine Learning” in 1959 while at IBM. He defined machine learning as “the field of study that gives computers the ability to learn without being explicitly programmed.

2. History of Machine Learning

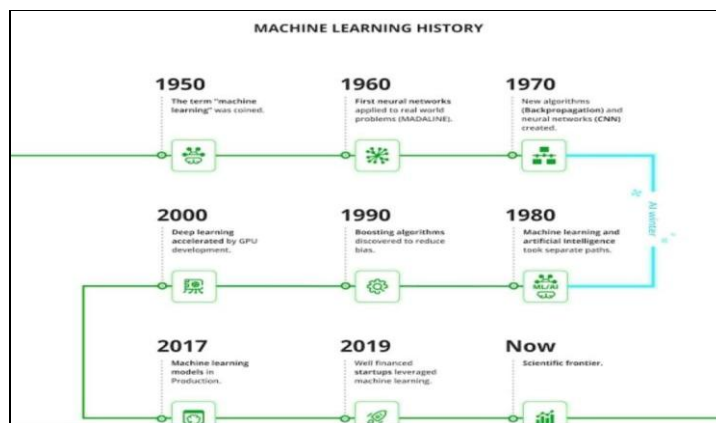


FIGURE 2. Machine Learning History

Machine learning (ML) is an important tool for the goal of leveraging technologies around artificial intelligence. Because of its learning and decision-making abilities, machine learning is often referred to as AI, though, in reality, it is a subdivision of AI. Until the late 1970s, it was a part of AI’s evolution. Then, it branched off to evolve on its own. Machine learning has become a very important response tool for cloud computing and eCommerce, and is being used in a variety of cutting-edge technologies. Arthur Samuel of IBM developed a computer program for playing checkers in the

1950s. Since the program had a very small amount of computer memory available, Samuel initiated what is called alpha-beta pruning? His design included a scoring function using the positions of the pieces on the board. The scoring function attempted to measure the chances of each side winning. The program chooses its next move using a minimax strategy, which eventually evolved into the minimax algorithm. Samuel also designed a number of mechanisms allowing his program to become better. In what Samuel called rote learning, his program recorded/remembered all positions it had already seen and combined this with the values of the reward function. Arthur Samuel first came up with the phrase “machine learning” in 1952.

3. What Is Machine Learning?

Machine learning is a modern innovation that has enhanced many industrial and professional processes as well as our daily lives. It's a subset of artificial intelligence (AI), which focuses on using statistical techniques to build intelligent computer systems to learn from available databases.

4. Purpose of machine learning

Machine learning is important because it gives enterprises a view of trends in customer behavior and business operational patterns, as well as supports the development of new products. Many of today's leading companies, such as Facebook, Google and Uber, make machine learning a central part of their operations.

5. Learning System in Machine Learning

According to Arthur Samuel “Machine Learning enables a Machine to automatically learn from Data, Improve performance from an Experience and predict things without explicitly programmed.” In Simple Words, When we fed the Training Data to Machine Learning Algorithm, this algorithm will produce a mathematical model and with the help of the mathematical model, the machine will make a prediction and take a decision without being explicitly programmed. Also, during training data, the more machine will work with it the more it will get experience and the more efficient result is produced.

6. Structure of machine learning

Machine learning is a technique of data evaluation that automates analytical version building. It is a department of artificial intelligence based on the concept that structures can study from facts, pick out styles and make choices with minimum human intervention.

7. Types of Machine Learning

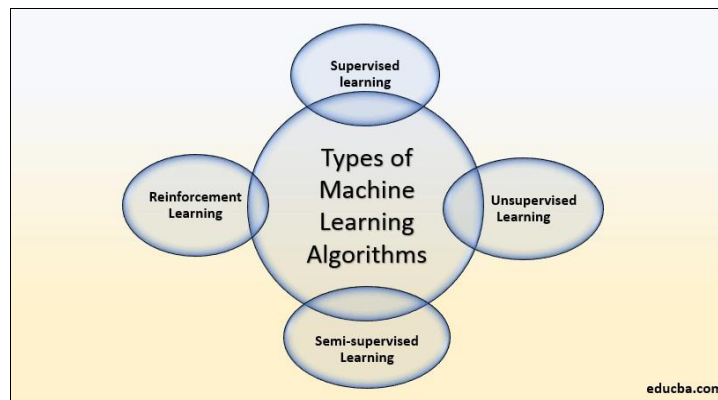


FIGURE 3. Types of Machine Learning

Supervised learning: Supervised learning is the machine learning task of learning a function that maps an input to an output based on example input-output pairs. The given data is labeled. Both classification and regression problems are supervised learning problems.

Unsupervised learning: Unsupervised learning is a type of machine learning algorithm used to draw inferences from datasets consisting of input data without labeled responses. In unsupervised learning algorithms, classification or categorization is not included in the observations.

Reinforcement learning: Reinforcement learning is the problem of getting an agent to act in the world so as to maximize its rewards. A learner is not told what actions to take as in most forms of machine learning but instead must discover which actions yield the most reward by trying them. For example — consider teaching a dog a new trick: we cannot tell it what to do, but we can reward/punish it if it does the right/wrong thing. When watching the video, notice how the program is initially clumsy and unskilled but steadily improves with training until it becomes a champion.

Semi-supervised learning: Where an incomplete training signal is given: a training set with some (often many) of the target outputs missing. There is a special case of this principle known as Transduction where the entire set of problem instances is known at learning time, except that part of the targets are missing. Semi-supervised learning is an approach to machine learning that combines small labeled data with a large amount of unlabeled data during training. Semi-supervised learning falls between unsupervised learning and supervised learning.

8. Conclusion

We have a simple overview of some techniques and algorithms in machine learning; furthermore, there are more and more techniques applied to machine learning as a solution. In the future, machine learning will play an important role in our daily life.

References

- [1]. Jordan, Michael I., and Tom M. Mitchell. "Machine learning: Trends, perspectives, and prospects." *Science* 349, no. 6245 (2015): 255-260.
- [2]. Mahesh, Batta. "Machine learning algorithms-a review." *International Journal of Science and Research (IJSR) [Internet]* 9 (2020): 381-386.
- [3]. Bi, Qifang, Katherine E. Goodman, Joshua Kaminsky, and Justin Lessler. "What is machine learning? A primer for the epidemiologist." *American journal of epidemiology* 188, no. 12 (2019): 2222-2239.
- [4]. Shavlik, Jude W., Thomas Dietterich, and Thomas Glen Dietterich, eds. *Readings in machine learning*. Morgan Kaufmann, 1990.
- [5]. Sra, Suvrit, Sebastian Nowozin, and Stephen J. Wright, eds. *Optimization for machine learning*. Mit Press, 2012.
- [6]. Ayodele, Taiwo Oladipupo. "Types of machine learning algorithms." *New advances in machine learning* 3 (2010): 19-48.
- [7]. Athey, Susan. "The impact of machine learning on economics." In *The economics of artificial intelligence: An agenda*, pp. 507-547. University of Chicago Press, 2018. Carleo, Giuseppe, Ignacio Cirac, Kyle Cranmer, Laurent Daudet, Maria Schuld, Naftali Tishby, Leslie Vogt-Maranto, and Lenka Zdeborová. "Machine learning and the physical sciences." *Reviews of Modern Physics* 91, no. 4 (2019): 045002.
- [8]. Zhou, Zhi-Hua. "Learnware: on the future of machine learning." *Frontiers Comput. Sci.* 10, no. 4 (2016): 589-590.
- [9]. Brunton, Steven L., Bernd R. Noack, and Petros Koumoutsakos. "Machine learning for fluid mechanics." *Annual review of fluid mechanics* 52 (2020): 477-508.
- [10]. Tarca, Adi L., Vincent J. Carey, Xue-wen Chen, Roberto Romero, and Sorin Drăghici. "Machine learning and its applications to biology." *PLoS computational biology* 3, no. 6 (2007): e116.