



Machine Learning and Modern Education

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Abstract. Machine learning is an important branch of artificial intelligence, which simulates human's real learning activities by machine so that the machine can acquire corresponding skills, knowledge and processing means to achieve artificial intelligence. The process of machine learning is the process of obtaining certain knowledge by a specific activity for a machine with a certain purpose, which is manifested as knowledge from unknown to known, and from the concrete to the abstract. The learning process of human brain is the process of acquiring knowledge, skills and attitudes through interaction with teachers, students and teaching information in the teaching context. It also shows the unknown and the known, and focuses on migration and application. Based on the consistency between machine learning and modern education, and based on the analysis of the theoretical basis and relationship between the two, machine learning is applied to modern education, which paves the way for the common development of the two.

Keywords: Machine learning · Human brain learning
Learning ability · Educational technology

1 Introduction

Machine learning is a multi-field interdisciplinary subject which involves probability theory, fuzzy theory, brain science, cognitive science, algorithm complexity theory and so on. It is based on the understanding of human learning mechanism based on physiology and cognitive science, and reorganizes the existing knowledge structure and constructs a computational model of human learning process. The common algorithms for machine learning include Bayesian algorithm, convolution neural network, ADABOOST algorithm, support vector machine algorithm and so on. In the era of big data, machine learning has made great changes in image recognition, speech processing, Natural Language Processing and other fields, showing great potential and development advantages.

We will explore the implications of machine learning education and its impact on the future development of educational undertakings under the background of large data in this paper.

2 The Development of Machine Learning

2.1 The Development Process of Machine Learning

AlphaGo and nine players Li Shishi man-machine war, let us enjoy the potential of artificial intelligence technology. Data is a carrier, intelligence is the target, and machine learning is an important way to help us to realize artificial intelligence from data carriers in the era of large data. Therefore, machine learning is the core of data science and the essence of modern artificial intelligence.

The development of machine learning can be roughly divided into three stages. The first stage is the neuron learning neural network learning machine, which began in the middle of 1950s. At that time, the research of neural network promoted the research of pattern recognition and automatic control. At this stage, artificial intelligence research in the “reasoning”, from logic theorist A. Newell and H. Simon is derived and then the general problem solving program, made exciting achievements at that time. With the development of research, people gradually realize that only the ability of logical reasoning is far from artificial intelligence. E.A. Feigenbaum and others believe that in order to make a machine intelligent, it is necessary to try to make the knowledge-based machine.

In the 1960s, machine learning entered the second stage which is learning from the parameters to the concept of symbols.

2.2 Machine Learning Model and Human Brain Learning Model

Learning and memory are inseparable. If learning does not have memory, learning will lose meaning. For the learning process of the human brain, memory is the product of the learning process, and the memory is inevitable in the learning activities. So the learning process of the human brain always contains the memory process.

Learning is a skill that human beings are different from many other organisms. “Machine learning” aims to achieve human’s learning activities by learning certain processes or results through the intervention and training of people in the periphery. Robert gamier, a famous American educational psychologist, believes that the process of learning can be reflected by the following patterns of information processing:

In this pattern, execution control and expectation are two very important parts. They can stimulate or change the processing of information flow. Executive control is the effect of existing experience on the current learning process, and it is expected that it is the influence of motivation system on learning, and it plays a directive role. They achieve the supervision of information flow processing. In a sense, the learning process of human brain is the process of information absorption, processing, feature extraction, preservation, use and acting on the next information processing (Fig. 1).

The process of machine learning is that machines form their own “knowledge base” through a large number of training samples, thus having the ability to

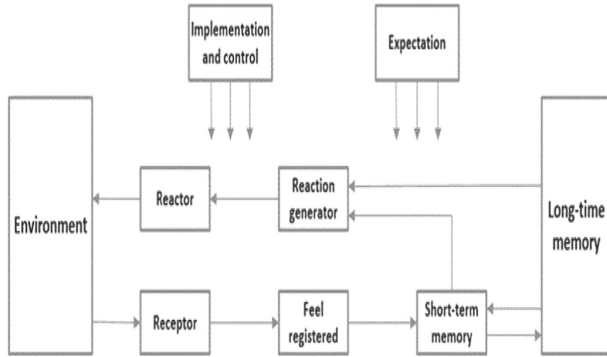


Fig. 1. The information processing model of Gagne's learning and memory

deal with an event. Machine learning processes information in the process of sample processing, preprocessing and extracting features of a large number of samples, and then building a certain model based on features. It is found that although human brain learning and machine learning are quite different in terms of self-organizing learning ability, timeliness and information processing capacity, the two processes of internal information processing are very similar. Therefore, it is of great practical value to think and explore the internal migration and application of the two.

3 The Exploration and Development Significance of Machine Learning in Education

3.1 A Wave of Deep Learning in the Wave of Education

Deep learning is a method based on the representation of data in machine learning. Observations (for example, an image) can be expressed in many ways, such as the vector of each pixel's intensity value, or more abstract to a series of edges and specific shape areas. It is easier to learn tasks from an instance by using certain specific representations. The advantage of deep learning is to use unsupervised or semi-supervised feature learning and layered features to extract efficient algorithms to replace handmade features.

Deep learning is a new field in machine learning research. Its motivation is to establish and simulate human brain's analysis and learning neural network. It simulates the mechanism of human brain to interpret data, such as image, voice and text. In recent years, there has been a wave of deep learning based on machine learning in the field of education in the world. In 2010, the William and Flora Hewlett foundation launched a strategic plan for deep learning in the United State of America. The program is committed to 2025, and 80% of American students are committed to deep learning. In addition, the document issued by National Association of State Boards of Education in 2015 also used

deep learning as the national policy of twenty-first Century education in the US. Besides, as one of the important branches of machine learning, deep learning has penetrated and is about to set off the wave of education.

3.2 The Significance of the Development of Machine Learning in Education and Teaching

First of all, in the era of big data, the real-time acquisition of students' learning data will become very easy. Combining machine learning analysis, studying and identifying student's learning mode will become an easy way to achieve. At the same time, combined with the analysis of students' learning data and the real-time change of learning mode, we can also make adjustments to the corresponding teaching contents and methods, so as to better achieve the two-way development of teaching and learning. For example, students through the stages of testing, the data collected can reflect the corresponding content in each small stage and grasp the situation; the big data collected by students doing different types of test in the course of time, accuracy, migration ability and other information, learning model can help teachers construct students, better understand the learning characteristics, in order to make the next step fit the development of teaching plan for it; and at a higher level, by comparing a large number of students in different knowledge points of mouse clicks, time information, completeness, it reflects the whole process of teaching system of what are the purpose of teaching and the actual situation of the students to accept the entry and other issues, this is also the general education teaching mode which can not be achieved.

Secondly, with the help of machine learning, the platform of data acquisition and the reliability of the evaluation system will be realized in the future education. Through platform education, teaching information collection, the corresponding system will be more standardized and practical, the same student feedback teaching information will be preserved as its identity information, and used for its feedback from many stages of learning. The record of student information year by year and the two-way function of the teaching are also the major progress of the reform of the whole education and teaching system.

4 The Application of Machine Learning in Future Education

4.1 The Application of Machine Learning in Distance Education

In the development of nearly ten years, machine learning has been very gratifying achievements in many fields, for example, show the advantages and great potential for development in many fields Chinese characters recognition, image recognition, voice recognition, and Natural Language Processing translation, and in people's lives has created a huge production value. The combination of machine learning and network distance education is becoming more and more closely.

With the popularization of computers and the development of the big data era, the rapid development of online education has been launched. And it has occupied a significant position in the field of education. Therefore, the more practical and intelligent network education system is also one of the important needs of the development of network education in the future. And any intelligent network teaching system must have machine learning technology to participate in it. For example, detection and summarization of students' topic styles and habits may involve neural network system, machine learning technology based on inductive and statistical learning, deep learning and many other aspects. After analyzing the statistics of learning, the induction of learning mode and the style of learning and understanding, if we combine the mechanism of reinforcement learning, the system will automatically feedback to the next learning task and make ladder goals.

4.2 Machine Learning Helps People to Better Understand and Promote Brain Learning

The ultimate goal of Robert gamier learning theory is to promote and improve people's learning, he proposed the learning hierarchy theory and learning accumulation of these theories, the construction is the basic form of psychological research learning and learning chain: Lenovo, which has a strong similarity between the neural network in machine learning. The process of learning "Gagne who raised the scientific information processing model" is mainly composed of three aspects: (1) to ensure that using mathematical method to describe the study of variables involved in the models; (2) the process of human brain simulation process of processing the information to the computer; (3) the language of science is dedicated to understanding people how to use language learning. Study on machine learning statistics and probability theory can be used to analyze and discuss related variables in the model of Gagne in learning, there are also conducive to improve the diversity and reliability analysis of the sample data in the background, the learning model is established to analyze the actual situation more fit, the mathematical model and is suitable for different learning styles and characteristics the students. At the same time, it also helps us to make up for the deficiency of human learning. Compared with the process of machine learning, the process of human mind and brain learning is longer and more complex. Besides, people's learning is influenced by many factors, such as environmental factors, intelligence level, interest and hobbies, learning background and so on. Machine learning has many advantages such as high efficiency, good effect and easy preservation of learning results. The task of putting some of the tasks completed by the human brain is done to the machine can save people from doing complicated and complicated work in person.

In short, machine learning in many aspects of the existing theory and research results if they can properly migrate to either Gagne's learning model, analysis of the actual teaching process, or to make up for each of human learning is not enough to replace the human aspects of the work, will be something groundbreaking and will have great practical value.

4.3 Realizing the Realization of Real-Time Update and Completion of Knowledge Base

At present, the automatic acquisition of knowledge and the real-time intelligent updating are the bottleneck of the development of the intelligent education and teaching system. In the background of large data, machine learning has the potential to solve these problems. For example, machines will hopefully achieve real-time knowledge, classification, organization and arrangement for knowledge acquisition, and how to solve the problem of migration between new knowledge and old knowledge, and how to ensure consistency and complete constraint of knowledge integration. People constantly improve their learning ability through continuous training of machines, so that they can improve the knowledge base in various problems, which is very meaningful for the preservation and development of knowledge.

5 Summary

The trend of times in machine learning is applied to modern education and teaching, the learning process of the human brain to help people understand and improve human knowledge base system, has great prospects for development to improve the network distance education teaching mode and the feedback mechanism. The collision between machine learning and traditional learning will also be a new attempt to combine and promote the development of AI and traditional education in the new era.

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