A Study and Application on Machine Learning of Artificial Intellligence

Abstract—This thesis elaborated the concept, significanceand main strategy of machine learning as well as the basic structure of machine learning system. By combining several basic ideas of main strategies, great effort are laid on introducing several machine learning methods, such as Rote learning, Explanation-based learning, Learning from instruction, Learning by deduction, Learning by analogy and Inductive learning, etc. Meanwhile, comparison and analysis are made upon their respective advantages and limitations. At the end of the article, it proposes the research objective of machine learning and points out its development trend. Machine learning is a fundamental way that enable the computer to have the intelligence ; Its application which had been used mainly the method of induction and the synthesis , rather than the deduction has already reached many fields of Artificial Intelligence.

Keywords- machineKeywords- machine learning; AI ;
system structure;
learning strategy; algorithm

I. INTRODUCTION

Along with the development of Internet technology and multimedia technical, Artificial Intelligence (AI) research has emerged a number of new issues. AI has attracted increasing attention in many disciplines, which is an edge of disciplines that is used to simulate human thought. Scientists who in many different professional backgrounds get some new thoughts and new methods in the fields of AI . As a branch of computer science, these systems are showing a human intelligence and behavior characteristics. AI expert system for sub -as a branch of AI has entered a stage of *A. The Concept of Machine Learning* Machine learning (ML) is studying how the computer to practical application in various departments on the national economy as well as many aspects of social life to play a role and continue moving in the direction of in-depth development.

II. THE CONCEPT AND SIGNIFICANCE OF MACHINE LEARNING

A. The Concept of Machine Learning

Machine learning (ML) is studying how the computer To simulate or to realize the study behavior of human being. The aim is to obtain the new knowledge or the skill, organize the knowledge structure ,which can make progressive improvement of it's own performance. It is the core of AI; It is a fundamental way that enable the computer to have the intelligence ; The application of it is reach in many areas of AI and is mainly uses the method of induction and the synthesis but not the deduction . The ML research establishes the computation model or the understanding model, according to the study mechanism of humanity through the physiology, the cognitive science ,develops each kind of study theory and the study method, studies the general algorithm and carries on the theoretically analysis, and establishes study system that has the specific application facing the duty.

B. The Significance of Machine Learning Research

Whether machine ability can surpass the human's or not, the main argument that many people who are holding denial opinion is: The machine is man-made, its performance and the movement are completely stipulated by the designer, therefore its ability cannot surpass designer in any case. This opinion is right for the machines which do not have study ability , but is worth considering for the learning capability machine. Because the ability of this kind of machine can be increased constantly in the application, after period of time, even the designer would not know the level of it's ability. The ML has the extremely important status in the AI research. The intelligent system which does not have the learning capability is difficulty to be called a true one, but the former intelligent system generally lacks of the study ability. Its application has been throughout the various branches of AI , such as expert systems, automated reasoning, natural language understanding, pattern recognition, computer vision, intelligent robots and other fields. Specific applications such as search engines, medical diagnosis, detection of credit card fraud, stock market analysis, DNA sequencing sequences, voice and handwriting recognition, strategy games and the use of robots.
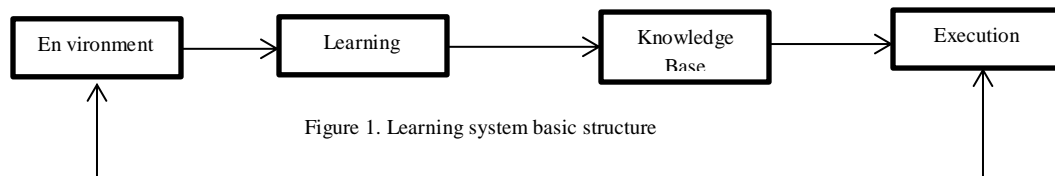

Figure 1. Learning system basic structure

III. THE BASIC STRUCTURE OF THE MACHINE LEARNIN SYSTEM

Fig. 1 is the basic structure of ML. The environment provides certain informations to the learning part of system, and the learning part revisions knowledge library by using these information. To enhance the performance of system implementation part. In the environment of concrete application, the knowledge library and the execution part have decided the concrete work content，the learning part which needed to solve the problem to be determined completely by the above three parts. We are going to narrate the impact of these three parts to design the learning system separately as follows:

The most important factor which affects to learning system design is the information which is provided to the system by the environment, specifically, or the information quality. Knowledge stored in guiding the implementation of part of the general principles of action. However, the environment and to the learning system is provided by a variety of information. If the information quality is higher and the difference of the general principle of equality is smaller, then the learning part is quite easy to deal with. If learning system to provide guidance and disorderly implementation of specific action specific information, the learning system deletes of the unnecessary details after gaining sufficient data, sums up the promotion, to form the general principles of guiding the action, and puts it into the knowledge base. Then the task of learning some of is heavier, the design is more difficult.

Because the information obtained from the learning system is often incomplete, reasoning is not entirely reliable which is carried out by reasoning. The rules summed up by reason is correct possibly, or not. This must be tested through the implementation of the effect. The correct rules make the system efficiency improve, it should be retained;

The incorrect rules should be modified or be deleted from the database. The knowledge base is the second factor which affects to the learning system design. The knowledge expressed in various forms, for instance, characteristic vector, step logic

sentence, production pattern rule, semantic network and frame and so on. These expressions have their characters respectively, when you choose any one of these expressions, you must take into four aspects account: (1) Ability to express strong (2) Easy reasoning (3) It is easy to modify Knowledge Base (4) Knowledge Representation is easy to expand.

A question finally needs to explain which regarding the knowledge library is studies the system not to be able not to completely have in any knowledge situation the baseless knowledge acquisition, each learning system all requests to have certain knowledge to understand the environment provides

the information, the analysis comparison, makes the supposition, examines and revises these suppositions. Therefore, to be exactly , the learning system is to the existing knowledge expansion and the improvement.

The execution part is core of the entire learning system, because operative part of the action is aimed at improving learning action. With the implementation of some related three issues are: complexity, feedback and transparency.

IV. SEVERAL COMMONLY LEARNING METHOD BASED ON LEARNING STRATEGY

The learning strategy is a reasoning strategy which is used in the process of learning system. The learning system is always composed by the learning and the environment two parts. Learning Strategies is on the basis of the classification criteria for converting an electronic message students to achieve the necessary degree of difficulty reasoning and how to classify and follow simple to complex, from small to multi-order divided into the following five basic types:

A. Rote Learning

The rote learning is the most simple machine learning method. The rote learning is the memory. That is, the new knowledge is stored, the supply and demand wants when retrieves transfers, but does not need to calculate and the inference.

When the rote learning system operative to solve problems, the system remembers this question and the solutions. We can regard the learning system execution part as some function abstractly, before calculating and outputting the function value (y1, y2,…, yp), this function obtains the independent variable input value (x1, x2,…, xn). The rote

learning makes a simple memory storage in the memory ((x1, x2,…, xn),(y1, y2,…,yp)). When it needs f(x1, x2,…, xn), but the execution part on (y1, y2,…, yp) retrieves from the memory rather than recalculation. This kind of simple learning pattern is as follows:

(x1,x2,…x n) f (y1,y2,… yp) store ((x1,x2,…x n), (y1,y2,…yp))

B. Explanation-Based Learning

The goal concept, a concept example, the domain theory which provides according to the teacher and operational guidelines. First, a structure explanation showed satisfies the goal concept for the assorted this example. Then, explained the promotion satisfies for target concept may operate the criterion the sufficient condition. EBL has been widely applied in the knowledge base refinement and the improvement of the system performance.

C. Learning from Instruction

The student (teachers or other information sources such as textbooks and so on) gains the information from the environment, transforms the knowledge into the expression form which the interior may use, and combines the new knowledge with the original knowledge organically. Therefore, the student is

required to have certain degree inference ability. However, the environment still have to do a lot of work. The teacher proposes and organizes knowledge by some form, to increase the knowledge which the student has continuously. This learning method is similar with human society's school teaching way. The learning dutyis to establish a system that enables it to accept the guidance and the suggestion, stores and applies the learning knowledge effectively. At present, many expert systems use this method to realize the knowledge gain when they established the knowledge base.

D. Learning by Deduction

The deductive reasoning is used by the student. The reasoning embarks from the axiom, infers the conclusion after the logical transformation. This kind of reasoning is a process that is from" fidelity " transform to specialize (specialization) , the student can obtain the useful knowledge in the reasoning process. This learning method contains macro operation learning, the knowledge edition and the Chunking technology. The inverse process of deductive reasoning is inductive reasoning.

E. Learning by Analogy

Analogy is one kind of useful and effective inference method, it can succinctly describe similarity clearly between the objects; At the same time, it also (either teacher) shifts certain test similar nature duty from the orator to the listener (or student).

Through the analogy, using the similarity between two different domains (source territory, goal territory) of the knowledge, (including similar characteristic and other nature) infers the goal territory from the source territory knowledge the corresponding knowledge, we can learn from it. The analogy learning needs more reasoning than the three kinds of learning ways above. It requests (source territory) to retrieve the available knowledge generally from the knowledge source, then transforms it into the new form, apply it to the new condition (goal territory). The analogy learning is playing the vital role in the human science and technology history, many scientific discoveries are obtained by the analogy.

F. Inductive Learning

The inductive learning is the most widely as a symbol learning methods. It expressed conceives the supposition from the example the process. The teacher or the environment provides some examples or the counterexample in some concept, lets the student obtain the general description in this concept through the inductive reasoning. This kind of learning reasoning work load is more heavier than the demonstration learning and the deduct learning , because the environment does not provide the general concept description (for example axiom).To some extent, the number of induction learning reasoning is heavier than the analogy learning , because there is

no one similar concept can be used as " source concept ". The inductive learning is the most basic method, its development is a mature learning method as well, it has been used to research and apply widely in the artificial intelligence domain.

V. MACHINE LEARNING RESEARCH AIM

There are three aims in the Machine learning: General learning algorithm theoretical analysis and development; Develops the humanity to learning the process thecomputation model; The structure special-purpose learning system face the duty research.

A. General Learning Algorithm

This direction research is the theoretical analysis duty and the development uses in the non-usable learning duty the algorithm. There is no limit to the algorithm type. The algorithm not necessarily is similar the method which uses in the humanity. Some person thought studies the knowledge structure which produces to be supposed to be similar humanity's knowledge structure at least, even if the learning process is different. At present, some scientists are researching the possible learning algorithm the theory space.

B. Cognitive Model

This direction is a studying human's learning computation theory and an experimental model. Not only had this kind of research vital significance of humanity education, but also of developing the machine learning system.

C. The Goal of the Project

This direction is aimed at solving the special actual problem, and developing to accomplish these tasks the project system. Not only do these questions often concern on the learning but also on other questions, for example, input signal by reasonable explanation or development question special-purpose data conversion.

VI. CONCLUSION

AI science is the only way that raises the machine intelligence level . Only improve the machine learning function continuously, can we make the machine close to or surpasses the humanity's intelligent level. To the ML discussion and the ML research progress, will certainly make the artificial intelligence and the entire science and technology further development.