

How do we move towards true artificial intelligence

Wei Liu
Artificial Intelligence School
Beijing University of Posts and
Telecommunications
Beijing, China
twhlw@163.com

Shaobo Hu
Artificial Intelligence School
Beijing University of Posts and
Telecommunications
Beijing, China
hushaobonl@163.com

Guangda Zhuang
Artificial Intelligence School
Beijing University of Posts and
Telecommunications
Beijing, China
zgd@bupt.edu.cn

Ruilin He
Artificial Intelligence School
Beijing University of Posts and
Telecommunications
Beijing, China
1550912373@qq.com

Xin Liu
Artificial Intelligence School
Beijing University of Posts and
Telecommunications
Beijing, China
2901425625@qq.com

Yuhu Wang
Artificial Intelligence School
Beijing University of Posts and
Telecommunications
Beijing, China
694000037@qq.com

Abstract—At present, the development of artificial intelligence technology has entered a new bottleneck period, and the algorithm dividend based on statistics has been exhausted. In the future, we should pay more attention to improving the efficient, intelligent collaboration among humans, machines, and the environment. This review first discusses the bottleneck problems encountered in the current artificial intelligence technology, then analyzes the essence of human intelligence and the differences, advantages, and disadvantages of the current machine intelligence and human intelligence. Based on this, it puts forward that the enhancement point of artificial intelligence technology is to enhance the efficient cooperation of the human-computer environment and states our solution, namely the deep situation awareness method based on human-computer integration technology. In the end, we put forward some thoughts about intelligence.

Keywords—Artificial Intelligence, Human-computer Collaborative, Situation Awareness

I. THE CORE PROBLEMS OF ARTIFICIAL INTELLIGENCE TECHNOLOGY

In recent years, artificial intelligence technology has gradually penetrated the public's daily life, and the rapid development of technology is impressive. In daily life, we can see the figure of artificial intelligence everywhere: efficient information distribution (such as Google, Tiktok), face recognition in buildings, and even our commonly used translation tools. The world's top scientists continue to try more optimization algorithms, and various algorithm indicators are constantly updated. At the same time, the application ability of artificial intelligence in specific fields is gradually approaching extreme Limits. At this time, we should stop to think calmly, where is the future of artificial intelligence?

There are two fatal shortcomings in the current artificial intelligence and the future intelligent science research: (1) mathematics is equal to logic; Russell and other logicians put mathematics under logic. ~For example, biology = bio ~ (life) + ~ logic (discipline). Logic is the material for

exploring, expounding, and establishing the principle of effective reasoning. Mathematics is not equal to logic. Mathematics studies spatial form and quantitative relation structure, logic studies the formal structure of thinking. Both of them are highly abstract structures [1]. On the one hand, the research objects of mathematics and logic mirror are different. The research object of mathematics is the spatial form and quantitative relationship of objective things, while the research object of logic is the form and law of thinking; on the other hand, the tasks and objectives of mathematics and logic are different, and the main goal and task of mathematics are to reveal the characteristics of spatial form and quantitative relationship of objective things and explore its regularity; however, the main goal and task of logic are to solve the problem of validity or authenticity of the reasoning form. (2) The symbol is confused with the reference of the object [2]. The former means that each image corresponds to one or more symbols, while the latter refers to the intention represented by each symbol.

II. THE ESSENCE OF INTELLIGENCE

Human learning is a component of early indoctrination and, more importantly, interactive learning triggered by a later environment. Human learning is mixed learning of fact and value and also dynamic learning of weight adjustment. People's memory is also self-adaptive [3]. It changes with the human-computer environment system, and from time to time, it will find features that have not been noticed before. Man's intelligence is to know that he is not intelligent, but machines are not. Human beings can jump out of concepts, understand and use concepts. Machines themselves do not have the ability and methods to fit reasonable concepts.

Natural intelligence has two meanings: one is the factual formal meaning, that is, the logic of rational action and decision-making, how to make a rational choice and maximize the utility in the case of scarce resources; the other is the substantive meaning of value, which neither takes rational decision-making nor scarcity condition as the premise, but only refers to how human beings seek from their social and natural environment. This process is not necessarily related to utility maximization, but to a greater

extent belongs to the category of sensibility. The power of reason is limited because, in the real world, people's behavior is not only affected by rationality but also has an "irrational" side. Ethics is still a complex system that is difficult to follow. Simple ethical rules are often the most difficult to implement. For example, we should help people with difficulties. This is a challenging ethical rule to operate.

III. THE ONLY WAY FOR AI DEVELOPMENT: EFFICIENT COOPERATION BETWEEN MAN MACHINE AND ENVIRONMENT

Everything, every person, every word, every psychological letter feedback is different from physiological feedback and physical feedback. The logic of feeling is different from that of perception. For cognition, the concept is a schema, while for sense, the concept is a symbol. In the field of intelligence, there are no so-called elements, only variable elements. Elements can be a big thing, such as the solar system and the galaxy. We call it the intelligent aggregate.

The empirical probability of humans is different from the substantial probability of machines. It is a kind of value probability, which can penetrate the barrier of non-family similarity and influence the SA of the current field with the success or failure results of other fields, such as sympathy, empathy, trust, etc.

So, how can artificial intelligence break the bottleneck and enter the next development period? Here we propose the method of human-computer integration. Human computer-integration intelligence is a new form of intelligence, which can help human-computer coordinate the contradictions and paradoxes in various intelligent problems by introducing human intentionality. The uncertainty and unexplainability of machine learning and even artificial intelligence is mainly due to the discovery that the induction, deduction, analogy, and other reasoning mechanisms of the invention may indeed lead to some incompleteness, instability, and contradiction, and with the continuous expansion of the scale of computing, these uncertainties and unexplainability become greater. However, human counterfactual and anti-value reasoning can prevent or warn these formal natural defects from the perspective of virtual hypotheses. In the process of human-computer integration, human beings include people and machines, equipment, and mechanisms [4]. In addition, it also relates to natural and social environment, real and virtual environment.

Generally speaking, in a system, the responsibilities of humans and machines lie in accuracy and precision, respectively. Accuracy involves direction and precision correlation process. The cognitive characteristics of humans and machines are different. People tend to perceive the overall level of information, while machines tend to calculate the details of information objectively and accurately. Artificial (machine) intelligence is good at objective fact (truth) calculation, and human intelligence is better than subjective value (truth) calculation. When the calculation is greater than the calculation time, the artificial intelligence can be emphasized; when the calculation is greater than the calculation, the human intelligence should be biased; when the calculation is equal to the calculation time,

it is better to use the human-computer intelligence. At present, a problem lies in the interpretability of the system. We believe that the key to interpretability lies in the trust generated by appropriate transparency. The key to trustworthiness lies in the approval after understanding. Understanding is the ability to organically integrate all kinds of (facts, values, responsibilities, etc.) possible related things. The interpretability of the system not only includes the existing rules. The interpretation of the rules includes the new connotation and extension of the construction rules.

There are two core breakthrough points in the efficient cooperation of the man-machine environment: one is the directivity of "an fact." In chess, there are some rules, such as rules, rules, and so on. Although the problems here are very different, they are both positive and negative, and the angle between them is not large, so it is called "Pan factual" directionality. This directivity, which is widely used in mathematics and physics, is easy to calculate. The other is the directionality of "Pan value", commonly used in the analysis and judgment of subjective intentionality, but it is inconvenient to measure. We know that the vector here has infinitely many directions, and adding two vectors with different directions usually leads to a vector with different directions. Therefore, we call "universal value" vector. This kind of "universal" directed mathematical model has too many directions for us to use. However, it is precisely because of the additivity of the vector of "Pan value" and the duality of the directivity of "Pan object", which enlightens us to study a cognitive quantity with both directivity and additivity. The directed distance of one-dimensional space, the directed area of two-dimensional space, the directed volume of three-dimensional space, and even the general n-dimensional space are examples of this geometric quantity. In general, we call a measure with the direction a directed metric. In situation awareness, the state is generally the directivity of "Pan fact", potential is the directivity of "Pan value", sense is the directivity of "Pan fact," and knowledge is the directivity of "Pan value" [5]. The man-machine relationship is a bit like quantum entanglement, which is often not a question of "being or not" but of "being and not being". There is no relationship between "have" and "have" can be calculated, "have" can be calculated, and "have and nothing" can be calculated. Therefore, there must be human and machine staff in the future military man-machine integration command and control system. One is responsible for the calculation of "have", and the other is used to deal with "nothing" to form the command and control "calculation" system. It can not only grasp things intuitively but also understand laws indirectly.

IV. SUMMARY

Hume believes that "all science is related to human nature, and the study of human nature should be the basis of all science." Any science has more or less something to do with human nature. No matter how far apart disciplines seem from human nature, they will eventually return to human nature somehow. Intelligence is only a tool to solve problems. Suppose it is not combined with the customs and habits in daily life, benevolence, righteousness, wisdom,

faith, and courage in ethics, and the statistical probability of boundary rules in law. In that case, it is easy to become a disaster and cannot be controlled. Natural intelligence is not omnipotent. It involves the truth and falsehood of fact and the right and wrong of value, which is closely related to the degree of responsibility. Therefore, strictly speaking, intelligence is a series of combined applications in many fields.

REFERENCES

- [1] Jean-Michel Hoc, From human - machine interaction to human-machine cooperation, *Ergonomics*, Vol.43, No.7, pp: 833-843, 2000.
 - [2] Y.Sankai, *Cybernetics: Fusion of Human, Machine and Information Systems*. In: Sankai Y., Suzuki K., Hasegawa Y. (eds) *Cybernetics*, Springer, 2014.
 - [3] S. Ning, M. Yan, Discussion on research and development of artificial intelligence, 2010 IEEE International Conference on Advanced Management Science(ICAMS 2010), pp: 110-112, 2010.
 - [4] X. S. Yang, S. Deb, Y. Zhao, S. Fong, X. He, *Swarm intelligence: past, present and future*, *Soft Comput* 22, pp: 5923C5933, 2018.
 - [5] H. Ghalavand, S. Panahi, S. Sedghi, Opportunities and challenges of social media for health knowledge management: A narrative review, *Journal of education and health promotion*, Vol.9, No.1, pp: 144, 2020.
- Foundation Project: Special project for Teachers of Ideological and Political Theory in Colleges and universities of the Ministry of Education
Project Name: Research project on content, carrier and mechanism of Artificial intelligence ethical literacy education for college students (20JDSZK061)