

A STUDY ON THE LEGAL PROTECTION MODEL OF ALGORITHMS

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ABSTRACT

What mode is used to properly protect algorithms? The author believes that the algorithm itself is a strategy for solving problems. In order to respect the objective attributes of the algorithm, and in the current situation where the algorithm has not yet developed to the advanced intelligence stage, it is temporarily appropriate for the law to protect the "white box" algorithm and the "gray box" algorithm through patent mode. As for the "black box" algorithm, "perception" algorithm, and "singularity" algorithm, due to their unpredictability, uncontrollability, and inexplicability, it is advisable to use non-exclusive incentive mechanisms to reward designers or inventors, rather than specifically defining their legal protection models.

Keywords: Algorithm; Computer Program; Legal Protection Mode

Algorithm is a strategic mechanism for solving problems through a series of clear instructions from computers, which is a code transformation of human problem-solving ideas.ⁱ To clearly define the protection mode of algorithms from a legal perspective, it is also necessary to clarify the connections and differences between algorithms and computer programs. Algorithms are specific ideas for solving problems, describing specific problem-solving steps that must be terminated within a limited number of steps, and reflecting the processing results of input data within a specified time limit through output terms. And the program is the code implementation of the algorithm, which is an executable file obtained after compiling the source code. That is to say, computer programs are essentially algorithms, and algorithms are not necessarily computer programs. Therefore, Articles 2 and 7 of China's Computer Software Protection Regulations stipulate that the protection of computer software cannot currently extend to the ideas, principles, and algorithms used in software development. According to current legal regulations, algorithms are not computer software works and therefore do not have copyright attributes.

What mode should be used to properly protect algorithms? The author believes that algorithms themselves are a strategy for solving problems. In order to respect the objective attributes of algorithms, in the current situation where algorithms have not yet developed to the advanced intelligence stage, the law should temporarily protect the "white box" algorithm and the "gray box" algorithm through patent mode, because these two algorithms condense a large amount of human intellectual labor, and meet the characteristics of patent novelty, innovation, and practicality without negative impact.ⁱⁱ Currently, granting patents to these two algorithms can clarify the scope of rights of algorithm designers or users, stimulate their innovation enthusiasm, and also facilitate effective supervision of the overall orderly operation of algorithms. As for the "black box" algorithm, "perception" algorithm, and "singularity" algorithm, due to their unpredictability, uncontrollability, and inexplicability, it is advisable to use non-exclusive incentive mechanisms to reward designers or inventors, rather than specifically defining their legal protection models.

Non-exclusive incentive mechanism refers to a mechanism in which the government, in order to stimulate the innovation enthusiasm of the whole society and unleash the innovation vitality of the whole society, grants material or non material rewards to those who make outstanding contributions in a certain field, with subsidies, bonuses, and tax incentives as consideration,

after acquiring ownership of the invention content of researchers and designers. Under this mechanism, designers or inventors who receive corresponding government rewards no longer apply for patents on the content of the invention, and no longer impose restrictions on users' use of their own invention. That is to say, once designers and inventors complete a major invention in a certain field or make significant breakthroughs in a certain field, they can transfer ownership of the result to the state. The state then applies material rewards to the designer or inventor based on the social value created by the invention or the financial expenses saved by the government for the invention, or at the reasonable request of the designer or inventor, Give them non material rewards. Adopting this incentive method is conducive to timely and smoothly promoting the latest invention achievements of designers or inventors to the entire society, thereby fully eliminating various obstacles in the progressive innovation process of society.

The application of non-exclusive incentive mechanisms in the field of high-order algorithms has the following advantages: firstly, it can improve the speed of China's high-order algorithm research and development technology in a short period of time, shorten the development and iteration cycle of high-order algorithms, and improve the quality of high-order algorithm research and development. The evolution of higher-order algorithms needs to be based on existing technologies, and excessive technological barriers will inevitably slow down the development speed of higher-order algorithms, prolonging the cycle of progressive innovation in society as a whole. Over time, the vitality of national innovation will be greatly suppressed and unable to fully flow. Once the designer or inventor of a higher-order algorithm has completed research and development and transferred ownership to the country, the invention does not need to be strictly limited by the patent or trade secret protection period, and can enter the public eye in the shortest possible time.ⁱⁱⁱ At the same time, the public can continue to expand and innovate higher-order algorithms in the shortest possible time. This cycle will inevitably shorten the research and development cycle of higher-order algorithms and greatly improve their development speed. In addition, with the participation of the whole nation in innovation, advanced algorithm technology will continue to move towards higher, more precise, and cutting-edge levels due to its ability to gather wisdom from multiple parties, continuously achieving new breakthroughs in quality.

Designers or inventors, after receiving corresponding material or non- material rewards, no longer retain ownership of the invention content, regardless of whether higher-order algorithms

can be patented or treated as trade secrets. The various challenges mentioned above will be effectively overcome under this non-exclusive incentive mechanism. Although designers or inventors do not receive exclusive incentive mechanisms such as patents or trade secrets, they can still achieve the same incentive effect under non-exclusive incentive mechanisms. The development of higher-order algorithms requires the participation of everyone. With the rapid improvement of iteration speed, designers or inventors can continue to receive non-exclusive material or non-material incentives without being troubled by the time-consuming and laborious patent application of higher-order algorithms, and without being criticized for hindering social progressive innovation by treating higher-order algorithms as trade secrets.^{iv} In this way, a good interaction between individual contributions and national rewards can be effectively achieved, which benefits both individuals and the country.

In fact, in addition to using this pure non-exclusive incentive mechanism, a hybrid incentive mechanism combining exclusive and non-exclusive attributes can also achieve the effect of motivating high-order algorithm developers and stimulating innovation in the whole society. Under the mixed incentive mechanism of exclusive and non-exclusive attributes, the government, universities, and enterprises need to collaborate to form a complete innovation cooperation system. Among them, the government is specifically responsible for providing research and development funding support for university innovation. After obtaining research and development funds, universities can either apply for patent protection on their own to obtain exclusive incentives or transfer innovative achievements to enterprises when developing innovative results. When universities transfer innovative achievements to enterprises and enterprises conduct in-depth research again before mass production, they can enjoy tax incentives granted by the government - obtaining non-exclusive incentives. This mixed innovation incentive mechanism, also known as the "industry university research" integration mechanism in China, is the synergy and integration of scientific research, education, and production in terms of functional and resource advantages, as well as the connection and coupling of technological innovation upstream, midstream, and downstream. Under this mechanism, a clear division of labor is conducive to close cooperation between the government, universities, and enterprises, achieving the goals of joint research, communism, and sharing.

However, with the rapid development of technology, this mechanism cannot fully meet the needs of enterprises for instant innovation due to the long conversion cycle of achievements. As a result, some companies have already started their own research and production model. The author believes that in order to adapt to the characteristics of the era with short technology update cycles, it is necessary to make appropriate adjustments to the mixed incentive mechanism. That is, when enterprises make outstanding contributions to the update iteration of higher-order algorithms through completely self-research and production, the government can provide certain tax incentives to enterprises through registration and filing to stimulate their innovation enthusiasm. This requires the government to play a good role as a service provider in the future, and timely provide non-exclusive material incentives to enterprises with strong algorithm innovation capabilities and significant innovation contributions within the administrative jurisdiction.

Based on the above analysis, the author believes that considering the non-transparent nature of higher-order algorithms and the current development of algorithm technology in China, whether pure non-exclusive incentive mechanisms such as taxes and bonuses are used, or hybrid incentive mechanisms are used, designers or inventors of "black box" algorithms, "perception" algorithms, and "singularity" algorithms can receive corresponding material incentives, Indirect realization of incentive effects equivalent to obtaining exclusive rights such as patents. In summary, based on the phased characteristics of algorithm evolution and the actual situation of patent applications, China's future legislation should be standardized according to the algorithm category, that is, to protect the "white box" algorithm and the "gray box" algorithm through patent models, and to provide exclusive rights incentives for designers and inventors; The legal protection models for "black box" algorithms, "perception" algorithms, and "singular" algorithms are no longer defined, and are directly owned by the state. However, the state needs to provide non-exclusive material incentives to relevant personnel and enterprises based on the social value created by higher-order algorithms or the financial expenses saved thereby.

ENDNOTES

ⁱ Zhen Zhihang, Legal Protection of Individuals from Automated Decision Making from the Perspective of Balance Theory, Political and Legal Treatise Series, Issue 4, 2022.

ⁱⁱ Zhang Huibin & Xie Jieyang, Patent Protection of Algorithms: How Possible? How to achieve it?, Electronic Intellectual Property, Issue 11, 2021.

ⁱⁱⁱ Zou Kailiang & Liu Zubin, On the Protection Route of Patent Law for Artificial Intelligence Underlying Algorithms, Journal of Ningxia University (Humanities and Social Sciences Edition), Issue 3, 2023.

^{iv} Guan Ru & Huang Yuye, Research on Patent Suitability of Artificial Intelligence Algorithms: A Discussion Based on Algorithm Features, Technology & Law, Issue 2, 2023.

