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A Study on the Improvement of the Intelligent Robots Act

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Abstract

The intelligent robot industry is a complex which encompasses all fields of science and technology, and its marketability and industrial impact are remarkable. Major countries in the world have been strengthening their policies to foster the intelligent robot industry, but discussions on liability issues and legal actions that are accompanied by the related big or small accidents are still insufficient. In this study, therefore, the patent law by artificial intelligence robots and the legislation for relevant legal actions at the criminal law level are presented. Patent law legislation by artificial intelligence robots should comply with the followings. First, the electronic human being other than humans ought to be given legal personality, which is the subject of patent infringement. Even if artificial intelligence has legal personality, legal responsibility will be varied depending on the judgment of whether the accident has occurred due to the malfunction of the artificial intelligence itself or due to the human intervention with malicious intention. Second, artificial intelligence as a subject of actors and responsibility should be distinguished strictly; in other words, the injunction is the responsibility of the intelligent robot itself, but the financial repayment is the responsibility of the owner. In the criminal law legislation, regulations for legal punishment of intelligent robot manufacturing companies and manufacturers should be prepared promptly in case of legal violation, by amending the scope of application of Article 47 (Penal Provisions) of the Intelligent Robots Development and Distribution Promotion Act. In this way, joint penal provisions, which can clearly distinguish the responsibilities of the related parties, should be established to contribute to the development of the fourth industrial revolution

▸Keyword: The intelligent robot industry, artificial intelligence, the electronic human being, Improvement of Patent Law, Improvement Plan for Criminal Law

Ⅰ. Introduction

The fourth industrial revolution combined with artificial intelligence has been regarded to show a new direction in the manufacturing industry. Since then, numerous issues have been raised in our society, which followed by a variety of relevant discussions. In this process, a new paradigm of intelligent information society was proposed [1]. The intelligent robot industry is a complex which encompasses all fields of science and technology, and its marketability and industrial impact are remarkable. Major countries in the world have been strengthening their policies to foster the intelligent robot industry, but discussions on liability issues and legal actions that are accompanied by the related big or small accidents are still insufficient. In this study, therefore, the patent law by artificial intelligence robots and the legislation for relevant legal actions at the criminal law level are presented.

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Ⅱ. Overview of Intelligent Robots

1. The Definition of Intelligent Robots

The concept of robots is gradually expanding from the traditional robot as mere alternatives for laborious work to the human-friendly intelligent robots. According to the Intelligent Robots Development and Distribution Promotion Act (hereafter referred to as the Intelligent Robots Act), an intelligent robot is defined as a mechanical system that autonomously operates by recognizing the external environment and judging the situation [2]. Traditional ordinary manufacturing robots differ from intelligent robots in that they are automatic machines that perform tasks in programmed orders [3]. Depending on the task, intelligent robots can be categorized into personal service robots, professional service robots, and industrial manufacturing robots; moreover, they can be divided into humanoid robots and non-humanoid robots according to their appearance. The appearance of humanoid robots is similar to that of humans such as KAIST Hubo, Honda Asimo, and Softbank Pepper. Non-humanoid robots do not have humans' appearance but have the characteristics of intelligent robots that can interact with humans, including, for instance, cleaning robots, entertainment robots, learning robots, and autonomous vehicles.

2. Global Trends on the Legal Status of Intelligent Robots

On March 28, 2008, South Korea instituted the Intelligent Robots Act to establish and promote measures for the continuous development of the intelligent robot industry by encouraging the development and distribution of intelligent robots and by establishing the basis of them. In particular, Item 1 of Article 2 of the Act stipulates that an intelligent robot is "a mechanical device that perceives the external environment for itself, discerns circumstances, and moves voluntarily." Though there have not yet been substantial issues regarding it in South Korea, it would be very important to define the non-legal concept of the robot if these issues would come into legal trouble. In other words, the legal system in South Korea focuses solely on the development management and dissemination of related technologies in the age of artificial intelligence, while the E.U. Parliament adopted a resolution in 2017 that would grant the artificial intelligence robot a legal status of "electronic personhood" presenting the first guidelines for the development of artificial intelligence robots [4]. This has been understood as providing grounds for granting citizenship to artificial intelligence robots; in fact, it implies that robots are required to be given the specific statutory status, e.g., electronic personality, to compensate damages caused by them, to accept their decision making, and so forth. In Japan, the Ministry of Internal Affairs and Communications launched the 'Artificial Intelligence Network Society Promotion Meeting' in 2017 to establish artificial intelligence development guidelines for international discussion, and announced the operation plan for the "Public Authentication System" to evaluate the safety and security of robots. The United States, with the White House in the lead, has recently published three research reports on artificial intelligence, and IT companies such as Google have created separate research teams to study artificial intelligence, ethics, and pertinent legal issues.

Ⅲ. Safety Management Plan

1. Legalization of Management and Supervision Systems

As the intelligent robots have mobility and activity, the risk factors are significantly higher than those of other robots. To prevent such a risk, therefore, the legislation of management and supervision system for them is required; in other words, this can be a way for promoting the intelligent robot industry.

2. Differentiation of Safety Level According to Contact with Humans

Depending on the degree of contact with humans, intelligent robots can be categorized robots that do not perform physical work on humans (low contact degree), robots that perform physical work on certain humans (moderate contact degree), and robots that perform physical work on unspecified humans (high contact degree). The greater the level of contact is, the more stringent control and supervision of the safety standards is required. Since robots with low contact degrees have the smallest risk to humans, it is sufficient to secure the levels of safety standards and systems that are appropriate for home appliances; for moderate contact

degree, they should be equipped with a level management system such as the motion output limit of robot, danger avoidance function, limitation of working condition, and mandatory safety training of users; registration system, periodical inspection system, and user's license system are necessary for high contact degree robots, which are analogous to the management and supervision systems of automobiles.

3. Securement System for the Safety of Information and Communication

In the case of a remotely controllable robot, it is mandatory to establish for the legislation of the "user authentication system" for preventing unauthorized access by a third party other than the owner. To prevent leakage of personal information through viruses or hacking, furthermore, "information security standard" ought to be legislated.

4. Review of Relevant Acts for Intelligent Robot Safety Management

Since intelligent robots have mobility and can cause damage to the property of people or others when driving on the road, etc., it is necessary to review the Road Traffic Act due to the necessity of the prevention and regulation methods for these accidents. Robots that can travel on the road should be governed by the rules of traffic safety to the level of people. Also, since the Act on the Promotion of Information and Communications Network Utilization and Information Protection, etc. stipulates measures for leakage of personal information and infringement accidents on the information and communication network (telecommunication system for transmitting and receiving information using telecommunication facilities), it is necessary to specify that the telecommunication facilities include intelligent robots.

Ⅳ. Legal Improvement Plan

Until now, subject for all legal actions is limited to either man or corporate, hence, it was impossible to ask for legal responsibility if the subject is not a man or corporate regardless of whatever illegal practices. In terms of patent law, it is controlled through injunction or compensation system but as robot intelligence is considered as a new tool, there is no legal boundary for any legal infringement caused. Therefore, Ministry of Law asked for long term research project to Korean Institute of Criminology on ‘base of criminal law dealing with intelligent robot period’ in year 2016. This research discuses more about legal improvements as I am more interested in patent law and criminal law instead of civil law.

1. Improvement of Patent Law

1.1 The Possibility of Patent Infringement

1.1.1 Direct Infringement

In order to determine the direct infringement of a patent right, it is first necessary to judge whether the artificial intelligence computer can be recognized as the subject of patent infringement. In the United States, the direct infringement of patent rights is regarded to have occurred because this corresponds to the cases of providing for selling or selling of the manufacture, use or sale of a patented product in the United States without permission, or importing the product into the United States.

1.1.2 Indirect Infringement

In the United States, the indirect infringement of patent rights would be the cases of contributory infringement more than induced infringement. It is necessary to evaluate whether artificial intelligence has a perception of infringement when judging indirect infringement by artificial intelligence. Since indirect infringement is based on direct infringement in the United States, indirect infringement is not acknowledged under the current laws unless the subject is recognized. In South Korea, unlike the United States, there is no provision that specifies the prerequisite of direct infringement and it does not require subjective recognition like induced infringement. Of course, it is presupposed in the current law that the subject of the patent infringement is human. However, if looking only at Article 127 of the Patent Act, "the production, transfer, rental or imports of goods that are used only for the manufacture of the products, or offering for assigning or leasing of them" seems possible to see when we regard artificial intelligence of robots to be similar to that of humans. In the case of the invention, the same shall apply to the Act of "the production, transfer,

rental or imports of goods that are used only for the operation of the methods, or offering for assigning or leasing of them."

1.2 Legislation

In recognition that ethical responsibility should be imposed on the actions of robots, overseas countries are preparing ethical guidelines, and there are also discussions surrounding the moral and legal responsibility of artificial intelligence in South Korea [6]. It would be desirable if the behavior of the artificial intelligence robot occurred within the level of legal acceptance, but acts of the robot and the regulation of the activities within the framework of the law will be difficult in reality as in the case of humans. Therefore, revision of the current patent law is required to regulate the act of artificial intelligence. When modifying legal requirements, it is necessary to consider the following:

1.2.1 Subject Requirements

As for present law, intelligent robot is not subject to any legal actions. This is because legal subject in present law is defined as either man or corporate. Although there are many insist on legal feature of machine but there is no any cases of other countries granting legal identity to the robot. The more important problem here is that if position similar to human being is granted to a subject which does not have any consciousness, this will cause confusion between 'human being and object.'Legel action for co-existence of human being and artificial intelligence may deteriorate position of human being rather than enhancing position of robot. Therefore, if any patent infringement happens by artificial intelligence, there will be a problem of who will be responsible for such infringement.

As of present law, even if there seems to be any action infringing patent, if there is no clear foundation or subject for responsibility, it is difficult to get help. Who can we consider for responsibility? This could be owner, developer, and data provider. As mentioned before, EU promoted resolution to grant legal position to AI as electronic human being and offered guildeline on utilization of AI robot first in the world.

It is essential to be able to include non-human substances as the subject of the act to regulate patent infringement by artificial intelligence robots. So far, in order to become a legal entity under the civil law in South Korea, it must be a person or a corporate body. However, in order to judge the possibility of the patent infringement of the robot, it is indispensable to break the provision in the present patent law that the subject of the act should be human. For this, recognizing the non-human substances as legal subjects is required.

1.2.1.1 Examples of Autonomous Vehicles

Regarding the legal identity of artificial intelligence, in the United States, the National Highway Traffic Safety Administration (NHTSA), under the United States Department of Transportation (DOT), has recognized the artificial intelligence-based autonomous navigation computing system of Google Autonomous Driving Vehicle as the driver [7]. This is the case to show recognition of the driver's character of non-human beings as human beings. If an act is made in the area of artificial intelligence alone without human intervention like the autonomous vehicle case, increasingly it is argued that it is desirable to acknowledge the right of humans to have been extended to corporations again to the electronic human such as artificial intelligence robots. [8]

1.2.1.2 In Case of Patent Infringement

If an artificial intelligence robot is given legal personality as an electronic human, the act of infringing a patent by an artificial intelligence robot can also be treated compared to that of a human. In other words, we can solve the problem that the patent infringement by artificial intelligence robots cannot be recognized due to the fact that the subject of the patent infringement is assumed to be human under the current patent law.

1.2.1.3 Classification of Requirements by Infringement Actor

When a human being inserts a malicious program into an artificial intelligence robot, it would be reasonable to assume that the person who inserted the program into the artificial intelligence robots committed the illegal act. If the artificial intelligence itself infringes by the wrong judgment, it is difficult to attribute illegal activities to those who own artificial intelligence robots or who develop software embedded in artificial intelligence robots. Therefore, in such a case, it is desirable to make the robot take responsibility for it as an electronic human being.

1.3 Subjective Requirements

Internal patent laws do not need subjective requirements for patent infringement. Therefore, it does not matter whether the behavior of artificial intelligence robots contains the intention to do so as a subjective factor.

1.4 The Subject of Responsibility for Infringement

The question of whether an artificial intelligence robot can infringe a patent and the question of who should be responsible for it is a separate matter. Provisional disposition or damage compensation system should be used in order to prevent patent infringement and protect patent holders. However, it should be deeply discussed whether we can hold artificial intelligence robots responsible for it or how we can distribute responsibility if they should hold joint liability with humans.

2. Improvement Plan for Criminal Law

2.1 The Necessity for Introducing New Legislation

Currently, accidents caused by artificial intelligence robots are emerging. Because artificial intelligence robots are considered just computer programs, there is no legal difficulty for the manufacturer to take responsibility for these accidents caused by the malfunction of the robot [9]. This means that they can still be solved through product liability, insurance, etc. However, if the violation of the legal interest due to the malfunction of the intelligent robots gradually increases in the future, it is clearly essential to discuss responsibilities in terms of criminal law beyond product liability.

The violation of Article 47 (Penal Provisions) subject to the provisions of Article 48 (Joint Penal Provision) of the current Intelligent Robot Act is limited to violation of the asset management method, violation of the use of the name of the intelligent robot investment company, violation of submission of the business report, etc., making it unable to cope with malpractice caused by malfunction of artificial intelligence robots. Therefore, by broadening the scope of Article 47, it is necessary to prepare regulations that can punish manufacturing companies and manufacturers who developed the robots in case of legal infringement due to the malfunction of intelligent robots. Of course, it is also true that there are many challenges to be solved in the future, such as the problem of adding a disclaimer in the legislative form of Article 48 of the Intelligent Robot Act or theoretical problems to apply to the manufacturing companies and the manufacturers of the intelligent robots [10]. Among the current judgments on Joint Penal Provision, there are also precedents with good implications indicating the following: The punishment of the business entity under the business rules is not dependent on the punishment of violating employees, and the establishment or punishment of employees is not a prerequisite for punishing the employer because they are punished independently for their own employees due to oversight of the supervisor. Based on this logic, if the manufacturer caused serious defects at the time of producing the artificial intelligence robot, it is possible that manufacturers will be liable due to the directors' negligence. In the United Kingdom, there is the Corporate Mishandling and Murder Act which is responsible for serious accidents caused by corporations [11]. It is possible to think about the possibility of introducing such acts by assuming that the malfunction of artificial intelligence can cause a serious danger to human life. In particular, the Act does not require a specific operator to be liable for deaths caused by a corporation, but it is attributed to the management/operating system of the corporation; so it is possible to impose fines without any upper limit on the corporation. The introduction of such acts will also make it easier for us to ask criminal responsibility for the manufacturers of artificial intelligence robots [12].

2.2 Recognizing the Liability of the Manufacturer of Artificial Intelligence Robots

Could it be possible to attribute criminal responsibility to the creators and owners of artificial intelligence robots regarding an accident caused by an artificial intelligence robot, even within the current legal system which does not have provisions on penalties for criminal liability caused by artificial intelligence robots? If the creator or the user develops the algorithm or intentionally causes the artificial intelligence robots to infringe the legitimate interests of others, criminal liability cannot be attributed to an artificial intelligence robot but the actor because the artificial intelligence robot can be regarded only as tools. However, a number of actual cases arise when artificial intelligence robots unintentionally infringe on the benefit of others. In this case, it is possible at first to discuss whether an artificial intelligence robot maker is negligent or not. In order for a manufacturer's negligence to be recognized, the p manufacturer must violate the state's

obligation to avoid the result, even though the result is predictable, and the manufacturer must have a causal relationship with the outcome and objective attribution. In this case, the problem of the negligence of the artificial intelligence robot maker and the range of the rule of permissible risk must be discussed in detail.

2.2.1 Predictability of the Robot Manufacturer

Artificial intelligence robots collect information from their surroundings themselves and perform their tasks by independently evaluating and responding to them. Therefore, the manufacturer cannot precisely predict what the artificial intelligence robot will recognize through the collected information, how to interpret the collected information, and how to deal with the information [13]. Based on this point, if an unforeseeable behavior of an artificial intelligence robot causes the infringement of other's benefit, the manufacturer can claim no legal responsibility for negligence. In most cases where the malfunction of an artificial intelligence robot is regarded predictable, the manufacturers must hold criminal liability for the outcome. In this case, if for any reason unforeseeable negligence is denied, no one shall be held responsible.

2.2.2 The Obligation of Objective Attention of the Manufacturers

The essential element of negligence is that it is due to the violation of the duty of care corresponding to neglecting the normal obedience. The violation of the duty of care is an obligation to anticipate the likelihood of an accident and take necessary measures to avoid the occurrence of the anticipated outcome. The obligation of objective attention in relation to artificial intelligence robots is not stipulated in the current law, so it is necessary to set the grounds and scope according to the social norms, such as general morals/rationality/customs, and the specific situations objectively/individually.

2.2.3 Acknowledge the Responsibility of the Owner of Artificial Intelligence Robots

Article 18 of the Criminal Law provides guarantor status to those who are obliged to prevent the occurrence of accidents, and a precedent that follows the legal form on the basis of the occurrence of a guarantor status states that there is also a legal duty to act if other principles of good faith, social rules or rational intention obligation are expected; thus, it is possible to obtain the guarantor status for the owner of the artificial intelligence robot. If an artificial intelligence robot used in a place that poses a danger, such as a construction site or a fire-fighting site, causes a malfunction, the owner of the artificial intelligence robot can be imposed a guarantee obligation to acknowledge the false omission, based on the above rationale. If it is clear that the owner of the robot has been able to prevent its malfunction, it would be able to recognize the guarantor status of the owner.

3. Other Legal Remedies

3.1 Product Liability Act

The Product Liability Act stipulates that a manufacturer must compensate a person who has suffered a loss of life/body or property due to a defect in the product. Since intelligent robots are also products, they are subject to this Act. However, if a manufacturer of an intelligent robot that has not yet reached a normal track is made responsible for damages close to strict liability, it would be probable that the development of relevant industry will be stranded before its foundation (the Circular Product Liability Act is stipulated as an almost strict liability). Therefore, when the intelligent robot manufacturer has faithfully completed all the measures such as quality certification and periodic inspection prescribed by law, it is necessary to exempt the consumer from the liability for damages of less than a certain amount (exemption system). However, the official compensatory system should also be applied to consumer damage less than the exemption amount because the relief of the injured party is required as well (public compensation for damage less than the exemption amount). As an example of a public reward system, there is a reward system provided by a mutual aid association established by intelligent robot corporations and the government. In addition, in order to lessen the burden on the compensation of the intelligent robot manufacturers, "compulsory insurance of product liability insurance" and "a plan to support a substantial part of the insurance by the State and the Mutual Aid Association" need to be devised. It is also conceivable to exclude the application of the Product Liability Act for intelligent service robots for research and development purposes. However, this does not necessarily mean that the liability is completely lost, and, in the case of illegal acts under the general civil law, the manufacturer shall be liable for such damages.

3.2 Medical Appliances Act

The Medical Appliances Act requires manufacturers or sellers to make various permits or registrations, and it is strictly regulated by punishment, etc. when violated. However, it may be an issue of whether it should be regarded as a medical appliance or not, when an intelligent robot has a simple function that conveys a question to a person and, when a person answers, it provides common medical knowledge about what disease can be suspected and what should be prevented in such a case (healthcare information robot). It can also be the same case, when intelligent robots have the ability to measure diabetes levels, prescribe according to the results, and recommend visiting the hospital in serious cases, or when intelligent robots have the ability to inform the degree of obesity by measuring body fat, etc., or the ability to notify the food to be avoided through questions about eating habits (liver function inspection robot, diabetic measurement robot). However, if we look into the Medical Appliances Act and the enforcement regulations of the Act or the notification of the Food and Drug Administration, such healthcare information robots, diabetes or liver function measuring robots are considered to be corresponding to the first to second class medical devices (medical devices with the lowest risk of risk); accordingly, lower level regulations and measures, for instance, exemption from approval of the clinical trial plan, etc., are required for these kinds of intelligent robots, and thus it is essential to specify the standard and norms because these items are not stipulated in the Act.

3.3 Medical Law

For the first and second class medical devices that have passed the Food and Drug Administration regulations, it needs to be stipulated that individuals can use without permission or prescription by a doctor to promote the development of intelligent robot industry. Even in such a case, there would be little harmful consequences by the regulations in the Medical Law.

V. Conclusion

Patent law legislation by artificial intelligence robots should comply with the followings. the electronic human being other than humans ought to be given legal personality, which is the subject of patent infringement. Even if artificial intelligence has legal personality, legal responsibility will be varied depending on the judgment of whether the accident has occurred due to the malfunction of the artificial intelligence itself or due to the human intervention with malicious intention.

In the criminal law legislation, regulations for legal punishment of intelligent robot manufacturing companies and manufacturers should be prepared promptly in case of legal violation, by amending the scope of application of Article 47 (Penal Provisions) of the Intelligent Robots Development and Distribution Promotion Act. In this way, joint penal provisions, which can clearly distinguish the responsibilities of the related parties, should be established to contribute to the development of the fourth industrial revolution. In addition, the traditional model of legal attribution theory is not able to adequately distribute responsibility when the interaction between a human and a machine is a problem, thus making it necessary to reconsider the notion that the subject of crime is only a natural person or corporation. In the field of philosophy of law, the question of the real meaning of a human being and the question of whether to maintain a human/non-human dichotomy has been already discussed to find the possibility to recognize artificial intelligence robots as the subject of rights. Allegedly, it would be premature to discuss at present the possibility of acknowledging the criminal responsibility of artificial intelligence robots. However, the wave of the fourth industrial revolution is in progress at a faster pace, hence requiring fundamental changes and amendments to the theory of criminal law.

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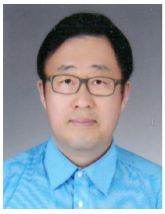

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