A study on legal service of AI

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Abstract

Last March, the world Go competition between AlphaGo, AI Go program developed by Google Deep Mind and professional Go player Lee Sedol has shown us that the 4th industrial revolution using AI has come close. Especially, there ar many system combined with AI hae been developing including program for researching legal information, system for expecting jurisdiction, and processing big data, there is saying that even AI legal person is ready for its appearance. As legal field is mostly based on text-based document, such characteristic makes it easier to adopt artificial intelligence technology. When a legal person receives a case, the first thing to do is searching for legal information and judical precedent, which is the one of the strength of AI. It is very difficult for a human being to utilize a flow of legal knowledge and figures by analyzing them but for AI, this is nothing but a simple job. The ability of AI searching for regulation, precedent, and literature related to legal issue is way over our expectation. AI is evaluated to be able to review 1 billion pages of legal document per second and many people agree that lot of legal job will be replaced by AI.

Along with development of AI service, legal service is becoming more advanced and if it devotes to ethical solving of legal issues, which is the final goal, not only the legal field but also it will help to gain nation's trust. If nations start to trust the legal service, it would never be completely replaced by AI. What is more, if it keeps offering advanced, ethical, and quick legal service, value of law devoting to the society will increase and finally, will make contribution to the nation. In this time where we have to compete with AI, we should try hard to increase value of traditional legal service provided by human.

In the future, priority of good legal person will be his/her ability to use AI. The only field left to human will be understanding and recovering emotion of human caused by legal problem, which cannot be done by AI's controlling function. Then, what would be the attitude of legal people in this period? It would be to learn the new technology and applying in the field rather than going against it, this will be the way to survive in this new AI period.

▸Keyword: the 4th industrial revolution, strong AI, weak AI, Influence of AI on legal field, Necessity of improvement of improvement of AI legal service

I. Introduction

Last March, the world Go competition between AlphaGo, AI Go program developed by Google Deep Mind and professional Go player Lee Sedol has shown us that the 4th industrial revolution using AI has come close. Especially, there ar many system combined with AI hae been developing including program for researching legal

information, system for expecting jurisdiction, and processing big data, there is saying that even AI legal person is ready for its appearance. As legal field is mostly based on text-based document, such characteristic makes it easier to adopt artificial intelligence technology. When a legal person receives a case, the first thing to do is searching for legal information and judical precedent, which is the one of the strength of AI. It is very difficult for a human being to utilize a flow of legal knowledge and figures by analyzing them but for AI, this is nothing but a simple job. The ability of AI searching for regulation, precedent, and literature related to legal issue is way over our expectation. AI is evaluated to be able to review 1 billion pages of legal document per second and many people agree that lot of legal job will be replaced by AI. In "Toorro's Lawyers," Richard Susskind expected that legal field will experience more rapid changes in future 20 years than what they had in the last two centuries[1].

Ⅱ. Concept of AI, technology development, and expansion of legal field

1. Concept

The concept of artificial intelligence has become known to the world in Dartmouth Conference in year 1956 where mathematicians and scientists get together. In general, AI is described as "intelligent machine, especially a scientific technology for making intelligent computer program." however, as research on such field is implemented in different fields, its specific definition varies depending on the researcher[2].

There are many definitions on AI but the most general definition is technology imitating thinking ability of human being (recognition, inference, learning etc). Conceptually, AI can be divided into two; strong AI and weak AI. Strong AI means AI containing ego enabling liberal thinking like human being. As this can do many jobs like human, it is also referred as Artificial General Intelligence, AGI. This strong AI can be again, divided into two types; human AI, acting and thinking like human being and non-human AI, which recognize and think in a different way from human being. Weak AI means artificial intelligence without ego. This has a limited intelligence scope for researching artificial

intelligence targeting at "solving a certain problem like human being." this is also referred to as narrow AI or applied AI[3]. Usually, this is developed to be specialized in a certain field to make up for limit of human being, increasing production. The typical examples of such AI include AlphaGo for Go program and Watson for medical field. So far, all those AI developed belong to weak AI and no strong AI with ego has yet been turned up.

There has been much improvement in weak AI field. Especially, there has been a great increased effort in AI researching in Japan and America with a great advance in Very-Large-Scale Integration (VLSI) and programing field. Many researchers believe that VLSI technology will provide a necessary hardware foundation for creating true intelligence machine.

The present intelligence computer has inner structure for parallel processing. The parallel processing means utilizing many direct circuit composed of one small silicone chip containing CPU, memory, and input/output to simultaneously process many independent arithmetics such as memory, logic, and control[4].

2. Development of artificial intelligence technology

Artificial intelligence was born in 1950s and went through its golden period in 1960s as a hot issue. As it came to 1970s, it was faced with many technical limit and went through down period due to halt in financial support. Afterwards, in 1990s, commercial database system was developed and again, there was an active investment in AI research. Although this is the case, its development was stagnant from late 1980s to early 1990s, then it has now become a hot issue. Techniques affected development of AI include "machine learning" and "deep learning" technologies. First of all, machine learning technology is a way of enhancing ability of a certain job through experience. Rather than focusing on certain incidents, this method offers pattern learning from many different experiences to make decision, hence, also known as "pattern recognition." Deep learning technology basis on "theory of artificial neural network. This enables the machine to learn and solve non-linear problems. Artificial neural network theory is statistical learning algorithm obtained from biological neural network (animal's central nerve, especially brain). Once deep learning is applied, although human being does not set standards for decision making, computer itself can

recognize, infer, and make decision. In the future, AI will be developed from weak AI to strong AI to not assist human but to replace the role of human[5].

3. Status on expansion of AI in legal field[6]

3.1 Adoption of AI lawyer informing precedent and regulation

Law firm DR & AJU has recently signed an agreement on adopting AI legal system with Intellicon Meta Lab, which has original technology for AI. Intellicon Meta Lab is a Korean based company developing 'Iris,' 'U-LEX,' and 'Rbo,' AI for legal service. It also has won global legal AI competition for consecutive two years, 2016 and 2017. Through this agreement, law firm DR & AJU will adopt legal service AI U-LEX. It provides visual network between precedent, regulation, and related law in regards to the issue. For instance, if the lawyer types 'a hidden camera shooting of women in subway' then this interprets it as 'sexual violence.' Then, it searches for related regulation and judical precedent based on its importance. Even international law frims are very active in adopting AI lawyer. A good example is IBM's Ross. Recently, a large law firm BakerHostetler located in New York has adopted Ross for specializing in bankruptcy and saved more than 20% of time required for searching regulation. Followed by this, around 10 law firms hired Ross. In Japan, one of the start up companies hired AI and released a contract legal consulting product at 980 Yen per month.

3.2 Active application of AI in Supreme Court and Ministry of Justice

Not only law firm but public organizations are also hurrying to hire AI. The Office Court Administration has adopted AI judical research in charge of individual revival and bankruptcy cases to establish 'intelligent individual revival and bankruptcy system.' Until year 2020, it is aiming to adopt big data and AI system based E-lawclert to nationwide justice for bankruptcy and revival. Ministry of Justice is planning to provide 'Bubbi' service, the second communication based life legal knowledge service based on AI through website and Kakao Talk. Bubbi is a 24-hour legal service based on AI for communication on daily life issues such as leasing housing and commercial building, salary, firing, succession of property, etc. In May 2017, Ministry of Justice has announced Bubbi 1st Generation, which provides information on regulation and precedent related to real estate leasing and labor field. It

has launched Bubbi 2nd Generation with additional function on succession of property so that public's access to legal service can be increased.

III. Influence of AI on legal field

1. Opinion on AI replacing legal practice

1.1 Negative opinion

Although human is very analytic and at the same time, comprehensive and rational, but one side of them is emotional. That is why there is a saying that far more to come for AI to take part in decision making where social context has to be considered and in foundation of art where creativity is required. As this is the case, in case of legal field where language processing and logical reasoning based on sign is required, it would be impossible for AI to replace professional legal person within a short or expected period time, rather, in most of the case, AI will be applied as simple work assistance [6].

1.2 Positive opinion

In accordance to 'UN Future Report 2045,' it points out lawyer as one of the jobs with high possibility of being replaced by AI after 30 years [7]. What is more, "The Future of Employment: How susceptible are jobs to computerisation" by Oxford Martin School, it estimated high possibility of jobs to be disappeared in 20 years by AI include trial researcher 41%, judge 40%, and law firm office staff 94% [8]. Such research result is drawing attention from the fact that it has numerically shown possibility of jobs to be disappeared by AI and determined the ranking. Many AI professionals are expecting that AI will be involved in not only game field such as chess, quiz show, or Go game, but also it will be commercialized to expand the market to medical, financial, distribution, and legal fields. One of the field that require human's most completed and advanced arithmetic processing is Go game and legal information field where the job is much easier than Go game, there is an analysis that AI will advance at the fastest rate [9].

2. Legal fields to be replaced by AI

2.1 Job of lawyer

One typical feature of legal document is that it is letter

(texture) based and one of the strength of AI is letter analysis. There is an estimation that 23% of job done in law firm can be automatized. For small law firm or individual law office may require to improve service quality and to save cost by having assistance from Legal-Tech. Under the present technique standard, AI is participating in the following legal service; case where roughly programmed frame is required such as bankruptcy or patent case and company inspection and contract paper where the first job is to analyze document as foundation data.

According to certain research centers, they are expecting that first, job replacement by AI will take place in traditional legal work where consultation is done based on precedent research and application, then this will influence job of lawyer[10]. This means that as technology for researching on related counseling field using AI develops, this may result in decreased needs for the number of legal professionals.

The job of filing lawsuit can be summarized as meeting client personally to organize his/her claim and collect and arrange all the evidence. Then, making them into a document to submit to the Court, afterwards, persuading judge at the Court. This can be said that the major job is to collect data and making a document. What is more, while doing this job, personal contact, understanding and consideration of the client is required. This is why it is difficult to automatize this job. However, if 'self lawsuit' increases with the assistance of AI, the job of filing lawsuit could decrease.

Those jobs of lawyer where their main job is to advise or research can mostly be replaced by AI. Even for non-professional persons, they can easily collect legal information using AI and make the first decision. This will then decrease the needs for hiring lawyer. In some big companies, there are lawyers working there to collect, organize, and report information on precedent and literature related to a specific field including the patent. However, application of AI will have a great influence on the related field and job.

2.2 Job of investigator
AI could play the role of simple analyzing and assistance function in terms of investigator's job but it cannot replace the role of investigator. The main job of investigator is not only searching and analyzing data but it is lot more active job. Their main role is to collect evidence through active investigation and identify the reality, then, make the result based on this to determine whether to prosecute or not, rather than simply determining prosecution based on the given evidence. As there is no certain standard to the 'reasonable decision making' by legal person, such decision is made based on persuasive evidence. Therefore, although AI become advanced and developed, it cannot replace legal person to make the reasonable decision.

In one hand, AI is expected to increase investigation efficacy. When investigating a big company, several Tera Bites of evidence data has to be collected and they have to analyze all the information within a short time to find the core evidence. Furthermore, to utilize this evidence data, they have to extract, categorize, and analyze each data, whereas investigators use evidence analysis system based on big data. Through this system, investigators examine financial accounts to find out borrowed-name bank account which is out of investigation boundary. Based on this, they can find the actual criminal out from the many suspects. To have advanced AI based legal service, 'natural language processing technology' is required where user's questions and inquiries are exactly understood. Followed by this, big data is analyzed along with function of deducting and estimating legal result. However, different from IBM Watson, AI developed in Korea lacks in function of estimating the result as well as processing natural Korean language. Therefore, further research and technical development on processing natural language is required.

2.3 The role of judge
2.3.1 Writing the ruling
2.3.1.1 For civil case
In case of civil case, electronic lawsuit is being generalized and increasing with implementation of "law related to electronic document in civil lawsuit." This implies that use of AI is coming close in terms of civil case. In terms of AI learning, rich data is compulsory and through electronic lawsuit, this big data can be accumulated naturally.

In large, civil case sentence is divided into formal

mentioning, request, and reasoning. Not only request but also reasoning part is in very theoretical structure implying fact, evidence, and legal decision on insist and counter-argument. If such theoretical structure is inserted into artificial intelligence, sentence can be written by AI as it is in writing newspaper article and report of analysts. At first, one will have to input result value (for instance, amount won in a suit and main evidence) to complete sentence and judge will revise for the final version. In the future, we can also imagine scene of court run by AI, determining amount and main evidence.

However, one issue is that what kind of demonstration will be applied during this process. The point is that are we going to insist on syllogism or going to program AI in accordance to other demonstration method. Another issue is in terms of normative decision, deciding sentence which cannot be solved solely by logic be a problem. This is because in ruling, always value judgement is involved rather than simple logic-based decision making [11].

2.3.1.2 Criminal judgement

If AI can determine evidence and proof or if AI can see the fact if condition is input by the Court, it wouldn't be a big problem applying law. If all the factual relationship is organized, we can have a lot of help from AI with big database in terms of deciding guilt or innocence and even examining an offence. At first, in trial job, AI will be take a part as an assistance of judge, however, if AI can perfectly recognize language, writing, or image delivered by human, the scope of their role will grow bigger.

Recently, law on 「Law on promoting electronic criminal judgement」 and 「Law on use of electronic data in simplified process」 are implemented. Therefore, we now have a foundation for collecting big data in criminal justice. In the future, if electronic documentation is implemented in official justice process other than simplified ones, the amount of big data be enormous. Based on this, there is already strong insist that it shall be applied to examination of a case to try its rationalization [12].

2.3.2 Processing trial

In a period where the role of AI increases, it is expected that there be a big change in processing trial. For now, the big frame of trial is to persuade the Court,

make it public, and oral proceedings. In contrast, once AI is commercialized, the main frame will be the process of AI understanding the case and checking potential error or people involved explaining the case, then the role of the Court be controlling all these in total.

2.3.3 Simple process

It is expected that in a short time, AI will be applied and many job will be replaced by it, especially in terms of judging small sized cases, demanding procedure, reconciliation, simplified process, and prompt decision making.

2.4 Small conclusion

In relation to the job of legal person, those ones with many precedents will be replaced by AI and those new cases without precedents, something more creative and require understanding of human emotion will be done by the person. For instance, those areas such as small sized cases, demanding procedure, reconciliation, simplified process, and prompt decision making with many precedents can be done mechanically by AI first. However, for family case, in consideration to sympathizing with the person, it cannot be replaced by AI easily and hence, will be difficult it to replace lawyer in a short time.

3. Possibility of having 'private law justice' by human rather than AI legal service

Not yet, what is ethical or not among human is not completely solved yet. Similar to this, there is nothing definite about legal inference done and method of decision making by person. That is, there is no uniform algorithm here. AI moves based on algorithm. Legal inference or agreement on decision making of human have to come first to have uniform private law justice. What is more, once reasonable private law justice is ready, AI can be taught on this. It might take tens and hundreds of years to solve such problem and thus, it seems difficult for AI to replace judge and investigator totally. Still, it can be a good assistance soon for simple case and decision making.

4. Problem of recovering reliability of the Court and investigator through legal service

4.1 The Court

One of the reasons for our nation to think of judical

service as unreliable is because there are many cases. If there is a service which puts together all the information submitted and extract the core argument, then arrange them in time and theoretical order, speed of trial will be much faster. Also, efficiency of trial will increase if there is a service which compares contradictory insist from the two different parties to extract the core point, then find the applicable law by searching related regulation or precedent. In this way, the Court can spend more time researching and reviewing evidence and law submitted by justice department. This will definitely devote to the increase in speed and quality of the trial.

4.2 Investigator

The most important point in recovering reliability on judical service is speed and accuracy. As investigators also have many cases at hand, it is very difficult for them to make decision quickly and accurately. If legal service advances with AI, it will be a help to solving such problem. When financial organizations need to track down bank account, investigators collect all the financial information from different organizations into the same format and this job requires around 3~4 days. However, if evidence analysis system is used, this job can be done in 1 minute. Likewise, if AI provides basic data for making quick and reasonable decision for legal persons, it will greatly help with increasing investigation efficacy.

5. Necessity of improvement of AI legal service in Korea

Including Legal-Tech, AI legal service in Korea is at its very beginning stage. In this global period, it is very important to know accurately about legal market of other countries. Based on development standard in Korea, it is very definite that important data will be exposed. In the end, this relates to legal market dominance. As this is the case, development of Legal-Tech, online legal service, and furthermore, AI legal service is urgently required.

For the ways to compete in this global legal market in the 4th Industrial Revolution includes first, Legal-Tech service is required and technical standard to protect domestic legal market is required. To do this, acquirement of very basic data rather than technology or algorithm is very important. What is more, repulsion of legal people on overall legal service should disappear to have more stabilized AI legal service. Second, AI legal service should be considered from industrial perspective

and surely, government support is required. Third, it should be easy to collect data. From commercial side, if necessary, it should be easy for legal side to collect data so that it can make significant analysis. Especially for small law firm, such AI legal service development could be a problem. This is because they should be able to offer high quality legal service to survive in the market. It is turned out that time charge for lawyers with assistance of Legal-Tech has increased.

IV. Conclusion

Along with development of AI service, legal service is becoming more advanced and if it devotes to ethical solving of legal issues, which is the final goal, not only the legal field but also it will help to gain nation's trust. If nations start to trust the legal service, it would never be completely replaced by AI. What is more, if it keeps offering advanced, ethical, and quick legal service, value of law devoting to the society will increase and finally, will make contribution to the nation. In this time where we have to compete with AI, we should try hard to increase value of traditional legal service provided by human.

In the future, priority of good legal person will be his/her ability to use AI. The only field left to human will be understanding and recovering emotion of human caused by legal problem, which cannot be done by AI's controlling function. Then, what would be the attitude of legal people in this period? It would be to learn the new technology and applying in the field rather than going against it, this will be the way to survive in this new AI period.

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