THE EMERGENCE OF ARTIFICIAL INTELLIGENCE IN INDONESIAN HEALTHCARE SERVICES: POTENTIAL USES AND POSSIBLE LEGAL RISKS

Falah Al Ghozali[1], Normalita Destyarini[2], Oktavia Eko Anggraini[3]
Universitas Duta Bangsa[1], Universitas Duta Bangsa[2], Universitas Duta Bangsa[3]
Email: falah_alghozali@udb.ac.id[1], normalita_destyarini@udb.ac.id[2], oktaviaanggrek234@gmail.com[3]

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ABSTRACT
Artificial Intelligence (AI) is rapidly affecting the healthcare system that is more sophisticated. The emergence of AI in Indonesia still gives potential problem on legal risks. Indonesia with its Health Act has actually covered of the technology development, including AI. In fact, in practical aspect, the legal risks coming out from AI malpractice is unclear to tackle. In different circumstances, AI technology has some potential uses which is beneficial for health service development, for instance, data management, drug creation, treatment design, nursing, etc. In this paper, the authors would like to analyze the legal risk possibilities resulting from AI technology in the field of medicine, then it would be synthesized into legal aspects and its legal basis, whether or not the existing AI-related laws should be strengthened in order to tackle the problem occurring from AI malpractice.

KEYWORDS Artificial Intelligence, Indonesian Healthcare Service, Legal Risks

INTRODUCTION

The Indonesian government officially launched the roadmap called "Making Indonesia 4.0" in April 2018. Industry 4.0 is a term that refers to the fourth industrial revolution in manufacturing and industry. It includes major innovations in the digital technology, biology and hardware automations, and also implies that cyber-physical systems can make their own basic decisions, hence becoming increasingly self-ruling. Industry 4.0 is supported by five key technological advances, namely Internet of Things (IoT), human-machine interface, robot and sensor technology, 3D printing, and Artificial Intelligence (AI) (Indonesia Investments, 2018). Industry 4.0 emphasizes the interconnection of machines and systems to achieve optimal performance and productivity gains. Furthermore, as the times goes by, the Industry 4.0 is upgraded into Industrial Revolution 5.0. This era is said to take it a step further by fine-tuning the

human-machine connection. Industrial Revolution 5.0 is more collaboration between the two: automated technology's ultra-fast accuracy combines with a human's intelligence and creativity. The driving force behind Industrial Revolution 5.0 is customer demand for customization and personalization, necessitating a greater human involvement in the production process. As it evolves, we may expect to see a slew of breakthroughs across various industries (Humayun, 2021, p. 605).

Artificial Intelligence (AI), where computers perform tasks that are usually assumed to require human intelligence, is currently being discussed in nearly every domain of science, and every aspect of work nature (Providakes, 2017, p. 7). In line with the government plan in adopting AI, medical sector in Indonesia is using AI that will assist the medical personnel and the patients. There are, basically, plenty of challenges faced by the Indonesian healthcare sector today. One of them is the high number of visual impairments caused by cataracts; this issue is worsened by the incomparable number of ophthalmologists available for every citizen in the country. But in the hands of an innovator, such challenges can lead to the birth of bright ideas. An example of such innovation is what the founders of CekMata have done. CekMata is a web-based platform that utilizes AI and Machine Learning (ML) to assist early detection of potential cataracts on users' eyes.

The process is quite simple; users only have to visit the site and upload a close-up photo of their eyes. From existing pigments, the system will detect any difference between a healthy eye and an infected one. Once it has found the anomaly, the system will direct users to the nearest ophthalmologist or hospital. In detail, CekMata CEO and Co-Founder, Caesar Lagaliggo Givani, explains the role that AI and ML play in the detection process (Yahoo News, 2018). Thus, Indonesia is great in responding the challenges offered by AI.

The development of AI in Indonesia is surprisingly fast since Indonesia is leading the ASEAN region in adopting AI, with 24.6% of organizations in the sprawling archipelago adopting the technology, a new survey has found. Indonesia was followed by Thailand (17.1%), Singapore (9.9%) and Malaysia (8.1%), according to the IDC Asia-Pacific Enterprise Cognitive/AI survey (Computer Weekly, 2018). AI is basically the most disruptive technology of the modern era. Its impact is likely to dwarf even the development of the internet as it enters every corner of our lives. The AI goal is to filter the noise, find meaning, and act upon it, ultimately with greater precision and better outcomes than humans can achieve on their own. However, the emerging intelligence of machines is a powerful tool to solve problems and to create new ones (Manheim and Kaplan, 2019, p. 108).

The AI in healthcare indeed inherits opportunities as well as challenges which would be the two things that should be considered deeply. Even though several uses in healthcare may be presented by the existence of AI, there are, however, legal risks on developing AI that could happen at any time. These risks associated with artificial intelligence are not the gravest problem facing us today, but the consequences can be disastrous as Stephen Hawking, Elon Musk and Bill Gates have warned; Artificial Intelligence may be humanity's greatest invention but also imposes great risk (Manheim and Kaplan, 2019, p. 113). Therefore, the plan of Indonesian government to implement the AI as a player in its industrial sector should be built upon a very deep consideration. The following sub-topics are the things that are becoming our major focus to discuss.

RESEARCH METHOD

To make this paper academically correct, the researchers use normative legal research methods in structuring and researching the paper. Normative legal research method is a scientific research procedure aiming to find truth based on legal scientific logic in term of its normative (Rusli, 2006, p. 40). Data analysis used is descriptive-qualitative method. It merely describes the phenomenon or situation under study and its characteristics (Vibhute and Aynalem, 2009, p. 16). It reports descriptively how the emergence of AI in Indonesia is. Furthermore, the study shows the AI potential uses in healthcare services and its possible legal risks.

RESULT AND DISCUSSION

1. Opportunities and Challenges for Indonesia

1.1. AI Opportunities for Indonesia

Before analyzing the possible uses of AI in healthcare and its legal risks, it is necessary to state several assumptions at the outset. An AI system must possess certain capabilities. It must possess a sufficiently large data base from which it can draw information of past events; it must be able to recognize a situation and connect it with relevant past events by reasoning and drawing a conclusion; and it must be able to learn from present occurrences (Spagnoletti, 1987, p. 105). This will be great for Indonesia realizing the opportunities embodied in AI as Indonesia must be ready to take it as advantages.

Below are a few examples showing how AI can be applied for the good, thus it absolutely might be taken as considerations for Indonesia to use AI:

a. Agricultural productivity can be increased through digitization and analysis of images from automated drones and satellites.
b. Improving the collection, processing and dissemination of health data and information can enhance patient diagnosis and treatment, especially for people living in rural and remote areas. Better data on climate and environmental conditions can also help governments better predict the occurrence of malaria, control the spread of the disease, and deploy medical resources more efficiently.
c. AI can be used to assess the learning capability of students and help them develop confidence to master subjects.
d. AI can help people with a disability or special needs in numerous ways. AI is getting better at doing text-to-voice translation as well as voice-to-text translation, and could thus help visually impaired people, or people with hearing impairments, to use information and communication technologies (ICTs).
e. AI is already helping to create smart sustainable cities.
f. Climate change data analysis and climate modeling infused with AI predicts climate-related challenges and disasters.

g. Pattern recognition can track marine life migration, concentrations of life undersea and fishing activities to enhance sustainable marine ecosystems and combat illegal fishing.

1.2. AI Challenges for Indonesia

The AI may be having roles for the good, however AI is as a weapon and we have to deal with it as we deal with other weapons, said Cindy Smith, director of the United Nations Interregional Crime and Justice Research Institute (UNICRI), during a panel discussion at an artificial intelligence summit in Geneva in 2017. Moreover, Paul Bunje, chief scientist at XPRIZE Foundation, added that AI is still not very well developed and that we are in "a very good position" to think about a roadmap for the future and build "a new world" (Geyter, 2017).

For Indonesia, AI has some challenges which need to be seriously discussed if Indonesia really wants to be an advanced country by adopting advanced technology as like AI. The challenges of AI could be:

a. Datasets and algorithms can reflect or reinforce gender, racial or ideological biases. When the datasets (fed by humans) that AI rely on are incomplete or biased, they may lead to biased AI conclusions.
b. Humans are increasingly using deep-learning technologies to decide who gets a loan or a job. But the workings of deep-learning algorithms are opaque, and do not provide humans with insight as to why AI is arriving at certain associations or conclusions, when failures may occur, and when and how AI may be reproducing bias.
c. AI can deepen inequalities by automating routine tasks and displacing jobs.
d. Software, including the software that runs cell phones, security cameras, and electrical grids, can have security flaws. These can lead to thefts of money and identity, or internet and electricity failures.
e. New threats to international peace and security can also emerge from advances in AI technologies. For example, machine learning can be used to generate fake video and audio to influence votes, policy-making and governance.

2. AI Potential Uses in Indonesian Healthcare

Many industries in Indonesia have been disrupted by the influx of new technologies in the Information Age. Healthcare is no different. Particularly in the case of automation, machine learning, and artificial intelligence (AI), doctors, hospitals, insurance companies, and industries with ties to healthcare have all been impacted. Essentially, there are several potential uses of AI in medicine (Novatio, 2019). There are at least 7 (seven) common ways AI is changing healthcare now and will in the future.

(1) Managing Medical Records and Other Data

Since the first step in health care is compiling and analyzing information (like medical records and other past history), data management is the most widely used application of artificial intelligence

and digital automation. Robots collect, store, re-format, and trace data to provide faster, more consistent access.

(2) Doing Repetitive Jobs

Analyzing tests, X-Rays, CT scans, data entry, and other mundane tasks can all be done faster and more accurately by robots. Cardiology and radiology are two disciplines where the amount of data to analyze can be overwhelming and time consuming. Cardiologists and radiologists in the future should only look at the most complicated cases where human supervision is useful.

(3) Treatment Design

Artificial intelligence systems have been created to analyze data such as notes and reports from a patient's file, external research, and clinical expertise which will help select the correct, individually customized treatment path.

(4) Digital Consultation

Apps like Babylon in the UK use AI to give medical consultation based on personal medical history and common medical knowledge. Users report their symptoms into the app, which uses speech recognition to compare against a database of illnesses. Babylon then offers a recommended action, taking into account the user's medical history.

(5) Virtual Nurses

This is actually a digital nurse to help people monitor patient's condition and follow up with treatments, between doctor visits. The program uses machine learning to support patients, specializing in chronic illnesses. In 2016, Boston Children's Hospital developed an app for Amazon Alexa that gives basic health information and advice for parents of ill children. The app answers asked questions about medications and whether symptoms require a doctor visit.

(6) Medication Management

The National Institutes of Health have created the AiCure app to monitor the use of medication by a patient. A smartphone's webcam is partnered with AI to autonomously confirm that patients are taking their prescriptions and helps them manage their condition. Most common users could be people with serious medical conditions, patients who tend to go against doctor advice, and participants in clinical trials.

(7) Drug Creation

Developing pharmaceuticals through clinical trials can take more than a decade and cost billions of dollars. Making this process faster and cheaper could change the world. Amidst the recent Ebola virus scare, a program powered by AI was used to scan existing medicines that could be redesigned to fight the disease. The program found two medications that may reduce Ebola infectivity in one day, when analysis of this type generally takes months or years, a difference that could mean saving thousands of lives.

These are just a sample of the solutions AI is offering the healthcare industry. As innovation pushes the capabilities of automation and digital

workforces, from providers, then more solutions to save time, lower costs, and increase accuracy will be possible. On the other hand, there is sufficient potential that governments, tech companies, and healthcare providers are willing to invest and test out AI-powered tools and solutions. Here are 5 (five) of the AI advances in healthcare that appear to have the most potential (Forbes, 2018), namely; (1) AI-assisted robotic surgery; (2) virtual nursing assistants; (3) aid clinical judgment or diagnosis; (4) workflow and administrative tasks; and (5) image analysis. These AI potential uses are amazingly great to be adopted by Indonesia as the country is seeking the most proper way in medicine to deal with the advanced technologies era.

3. AI Possible Legal Risks for Indonesia

The futures of AI in healthcare and the law in most country, including Indonesia, indeed depend on numerous factors, such as technological advancements, the willingness of medical personnel to become more technologically savvy and to test out new products and approaches, the expectations of clients, courts, and other actors in healthcare, and the extent of regulation, as well as its accuracy of the specific AI applications in use (Goodman, 2019, p. 156). To date, artificial intelligence has experienced limited but significant success in various disciplines, including bioengineering, chemistry, medicine, geology, and military science (Spagnoletti, 1987, p. 103 – 104). AI risks can be characterized and classified according to the severity of the harm they may induce, as well as to the probability and frequency of the harm induced (European Parliamentary Research Service, 2022, p. 3).

It is great knowing if society enhances the artificially intelligent tools available for addressing challenges of such enormous medical and legal consequence, we will gain new opportunities to close the considerable gap between medical personnel, legal aspirations and reality that currently bedevils aspirations for justice (Cuéllar, 2017, p. 36). Artificial intelligence is surely a massive opportunity, but triggers some risks which cannot be sorted through over-regulations that might damage the market in Indonesia and the regions (Coraggio, 2017). The full range of rewards, and risks, that arise from the use of advanced technologies has not been fully explored. However, there are at least 4 (four) legal issues innately associated with AI and machine learning that could probably happen in Indonesian healthcare system when the country completely adopts AI-based technologies, namely (Traverse Legal, 2017);

a. Who is at fault?

If an accident happened in healthcare service involves AI, trying to find the liable party is like playing a science-fiction version of Clue. A smart aid clinical judgment or diagnosis fails to give true diagnose to the patient, who is the guilty party? The programmer in the office/hospital with the source code? The owner on the road with the car? The manufacturer in the lab with the testing protocols?

b. When artificial outweighs intelligence

AI often has to identify objects such as surgery tools, or people. However, because AI relies on cameras and coding, things like contrast, color, and image density affect AI's "thinking" much more dramatically than humans. A person would not be likely to miss a white semi-trailer "against a brightly lit sky." A human would not mistake a pattern of dots or lines for a starfish. AI also can reflect biases of the developer; as seen in many software programs' tendencies to develop racial biases.

c. Humanizing robots

As technology develops, AI gets closer to actual consciousness. Will the AI-assisted robotic surgery substitute the existence of surgeon? We can take the example of the risks of AI in other fields, like in the United States, they already granted rights and legal responsibilities to non-human entities, namely corporations; it is not unfathomable robots and machines utilizing AI will be granted the same. Facebook has already created AI sophisticated enough to develop their own, non-human language. Were the civil rights of these machines violated when Facebook decided to shut them down? If AI commits a crime, can the software itself be held liable? Switzerland faced that very problem when a robot bought illicit substances online. Accordingly, in medical sector, it is feared we will depend on robots to solve the health problems.

d. Privacy no longer exists

AI already tracks and predicts individuals' shopping preferences, political preferences, and locations. The data accumulated and shared between these technologies has already created many controversies within the legal field. However, AI is starting to tackle more controversial subjects, such as predicting sexuality and propensity to commit a crime. Will these predictions be able to be used in trial? Or will the AI serve as experts, to be cross-examined to determine the validity of their opinions?

4. AI-Related Laws in Indonesia

Up to nowadays, Indonesia does not have a particular law concerning AI. However, AI-related system is implicitly regulated in Indonesian Electronic Information And Transactions Law 2016, Article 1 paragraph (8) which states *"Electronic Agent is an automated electronic means that is used to initiate an action to certain Electronic Information, which is operated by Persons."* Other than that, several Articles of Laws might be the legal basis of the possible risks emerged by existence of AI. These Articles stated in 1945 Constitution of the Republic of Indonesia, Indonesian Health Law 2009, Indonesian Consumer Protection Law 1999, and Indonesian Electronic Information and Transactions 2016.

(1) The 1945 Constitution of the Republic of Indonesia

Article 28A

"Each person has the right to live and the right to defend his life and existence".

Article 28G (1)

"Each person is entitled to protection of self, his family, honor, dignity, the property he owns, and has the right to feel secure and to be protected against threats from fear to do or not to do something that is part of basic rights".

(2) Law of the Republic of Indonesia Number 36 Year 2009 on Health (Indonesian Health Law 2009)
Article 5 paragraph (2)
"Every people shall have right to obtain safe, quality, and affordable health service".

(3) Law of The Republic of Indonesia Number 8 Year 1999 on Consumer Protection (Indonesian Consumer Protection Law 1999)
Article 4 paragraph (1)
"The rights of the consumers are to obtain comfort, security and safety in using or consuming the goods and/or service".

(4) Law of The Republic of Indonesia Number 19 Year 2016 on Electronic Information and Transactions (Indonesian EIT Law 2016)
Article 26 paragraph (1)
"Unless otherwise specified by legislation, use any information through electronic media involving personal data of a person shall be done with the approval of the person concerned".

The regulations mandate the Indonesian people to defend their life and existence from the sophisticated technologies like AI. The 1945 Constitution guarantees all individual to have proper lives and should not worry about the emergence of technology. Moreover, those laws on AI regulates about the protection of personal data and privacy of citizens. By having these legal bases, healthcare services need to create legal compliance to prevent any crimes happen in future or to find best legal remedies for risks which might occur in implementing AI technologies in medicine.

As of in situation where the AI do some wrongdoings, Article 21 paragraph (1) & (2) of Indonesian Electronic Information and Transactions Law might be applied to refer to whom the fault could be charged. The Article states: *"(1) Senders or Recipients may conduct Electronic Transactions in person, or by his/her proxy, or by Electronic Agents. (2) Parties responsible for any legal effect in the conduct of Electronic Transactions as intended by paragraph (1) shall be regulated as follows: a. if conducted in person, any legal effect in the conduct of Electronic Transactions shall become the responsibility of parties to a transaction; b. if conducted by proxy, any legal effect in the conduct of Electronic Transactions shall become the responsibility of the grantors of the proxy; or c. if conducted by Electronic Agents, any legal effect in the conduct of Electronic Transactions shall become the responsibility of Electronic Agent providers."* It is, therefore, the parties liable for the AI malpractice has ben set by the law.

5. Indonesia should Learn from Other Countries as a Solution

When it comes to AI and machine learning in the healthcare services, there are currently more legal questions than answers. At this point, Indonesia

should be really ready to figure out the answers to the questions in order to prove the fact that Indonesia is leading the ASEAN region in adopting AI. Learning from countries which have experienced a lot about AI is necessary for Indonesia. Thus, the country might take lessons from European countries as the Legal Affairs Committee of the European Parliament approved a report calling the EU Commission for the introduction of a set of rules on robotics. Such rules include (Coraggio, 2017):

a. Who is liable and how damages should be recovered?

The Committee is for the introduction of strict liability rules for damages caused by requiring only proof that damage has occurred and the establishment of a causal link between the harmful behavior of the robot and the damage suffered by the injured party. This would not sort the issue around the allocation of responsibilities for "autonomous" robots like Google DeepMind that did not receive instructions from the producer. This is the reason why the Committee is proposing the introduction of a compulsory insurance scheme for robots producers or owners (e.g. in the case of producers of self-driving cars). The issue is whether such obligation would represent an additional cost that either would be borne by customers or would even prevent the development of technologies. Hence, if we discuss the AI in Indonesian healthcare services, then the regulation should really point out about who is liable for any damage occurred because of adopting AI in medicine.

b. Robots treated as humans?

What sounds quite unusual and honestly a bit "scary" is that the Committee also calls for the introduction of a "legal status" for robots as electronic persons "with specific rights and obligations, including that of making good any damage they may cause, and applying electronic personality to cases where robots make smart autonomous decisions or otherwise interact with third parties independently." The report does not fully clarify how such legal status should work in practice, but it seems like we are already attempting to distinguish the liability of the artificial intelligence itself separate from the one of its producer/owners. This shall be assessed on a case-by-case basis in relation to autonomous robots, but civil law rules definitely need to evolve in order to accept such principles.

c. Are ethical rules needed?

The Committee stressed the need of guiding ethical framework for the design, production and use of robots. This would operate in conjunction with a code of conduct for robotics engineers, of a code for research ethics committees when reviewing robotics protocols and of model licenses for designers and users. My prediction is that most of the companies investing in the area shall sooner rather than later establish an internal ethical committee. But the issue is whether statutory laws on ethics are necessary since they might limit the growth of the sector. Therefore, Indonesian government and the Ministry of Health of the Republic of Indonesia must think deeply on the need of the ethical rules.

d. Privacy as a "currency" cannot affect individuals

It is the first time that I see privacy associated to a "currency." However, it is true that we provide our personal data to purchase services. And the matter is even more complicated in case of complex robots whose reasoning cannot be mapped. Such circumstance might trigger data protection issues. But it is important that the Committee called for guarantees necessary to ensure privacy and security also through the development of standards. In Indonesia healthcare services, as privacy is something that must be kept confidentially, consequently the medical personnel shall keep it secret unless there is consent agreement between the patients and medical personnel to make it public. Thus, AI tools that assist in medicine is also expected to keep the patient's privacy secret.

CONCLUSION

For the Republic of Indonesia, AI indeed embodies opportunities as well as challenges which would be the two things that should be considered deeply. On the other hand, AI presents several uses in healthcare services, such as using managing medical records and other data, doing repetitive jobs, treatment design, digital consultation, virtual nurses, medication management, as well as drug creation. In addition, AI tools offers AI-assisted robotic surgery; virtual nursing assistants; aid clinical judgment or diagnosis; workflow and administrative tasks; and image analysis. There are, however, great legal risks on developing AI that could happen at any time. Indonesia shall focus on strengthening the laws related to AI. At the end, to deal with the new trend of current situation of the AI-based technologies existence, Indonesia might take a look and learn from other countries that have experience in adopting advanced technologies.

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