COLLABORATIVE INTELLIGENCE AND INTELLECTUAL PROPERTY: HUMANS AND HUMANOIDS IN THE LIGHT OF THE HEALTH CARE SYSTEM

Lipsa Dash
Sambhabi Patnaik
Saranya Dash
Silpalika Biswal

COLLABORATIVE INTELLIGENCE AND INTELLECTUAL PROPERTY: HUMANS AND HUMANOIDS IN THE LIGHT OF THE HEALTH CARE SYSTEM

Lipsa Dash

Sambhabi Patnaik

Saranya Dash

Silpalika Biswal

Campus 16, KIIT School of Law, KIIT University, India

Abstract

Our intelligence is what makes us humans unique, and Artificial Intelligence is an extension of that quality that makes it humanoid. By 2029, an estimation of 95% of human interactions will be supported by Artificial Intelligence technologies. Humans have dynamic existence in the world, an existence which excesses in knowledge, analysis, expression, ideas, and many more issues. With the rapid development of computer science and data technological dependence, it has been observed that Robots and Artificial Intelligence are making their way to fit into the human world as Humanoid Versions. Furthermore, they are even trying to support the present Health Care structure across the world and want to be present among the doctors, nurses, hospitals, and many other people, to solve and assist in the medical errands. Currently, the relationship between patients and health professionals is based on human interactions which form the natural foundation of health care. The field of healthcare is data-intensive, which leads it to perform complex tasks and compare and analyze huge volumes of data and try to classify them. This paper provides an immense dimension to Collaborative Intelligence, meaning the involvement of both human and artificial mankind in the health sector. So, when new inventions and discoveries are coming up, we know that Intellectual Property comes into the scene, as it protects and provides a vast number of monopolistic rights to the true owner or inventor. This paper makes a comprehensive analysis of human intelligence vs. artificial intelligence in the context of legality and acceptance from the lens of society. It also highlights mapping Artificial Intelligence in the health care sector regarding an outlook of intellectual property. In addition, this paper reflects an idea about technology transfer and a know-how move towards AI-based medical machines and technologies from the Indian health care perspective. This paper concludes by mentioning the necessary improvements on AI or human assisting machines as well.

About the authors: Lipsa Dash, Assistant Professor. Campus 16, KIIT School of Law, KIIT DU, Bhubaneswar, Odisha, India. ORCID: 0000-0002-0885-3433. E-mail: lipsa.das@kls.ac.in

Sambhabi Patnaik, Assistant Professor.Campus 16, KIIT School of Law, KIIT DU, Bhubaneswar, Odisha, India. ORCID: 0000-0003-3839-7739. E-mail: sambhabi.patnaik@kls.ac.in

Saranya Dash, Law Student. Campus 16, KIIT School of Law, KIIT DU, Bhubaneswar, Odisha, India. ORCID: 0000-0001-7804-6314. E-mail: 1784015@kls.ac.in

Silpalika Biswal, Law Student. Campus 16, KIIT School of Law, KIIT DU, Bhubaneswar, Odisha, India. ORCID: 0000-0002-4302-0509. E-mail: 1783114@kls.ac.in

INTELIGENCIA COLABORATIVA Y PROPIEDAD INTELECTUAL: HUMANOS Y HUMANOIDES EN EL CONTEXTO DEL SISTEMA SANITARIO

Lipsa Dash

Sambhabi Patnaik

Saranya Dash

Silpalika Biswal

Campus 16, KIIT School of Law, KIIT University, India

Resumen

Los humanos somos seres inteligentes, y esta característica es la que nos hace únicos. La Inteligencia Artificial (IA) es una extensión de esa cualidad, lo cual la hace humanoide. Para 2029, se estima que el 95% de las interacciones humanas estarán respaldadas por tecnologías de IA. Los humanos tienen una existencia dinámica en el mundo, una existencia que destaca en conocimiento, análisis, expresión, ideas y muchas cosas más. Con el rápido desarrollo de la informática y la dependencia de la tecnología de datos, se ha observado que los humanoides, como los robots y la IA, se están abriendo paso en el mundo humano. Además, se utilizan para apoyar la estructura sanitaria actual en todo el mundo y ayudan a los médicos, enfermeras, hospitales y otros trabajadores sanitarios en sus diversas tareas. Actualmente, la relación entre los pacientes y los profesionales de la salud se basa en interacciones humanas, que constituyen la base natural de la atención médica. Sin embargo, hay un lugar para la IA en este campo de uso intensivo de datos, donde es necesario realizar tareas complejas, comparar y analizar enormes volúmenes de datos e intentar clasificarlos. Así, cuando surgen nuevos inventos y descubrimientos, la propiedad intelectual entra en escena, ya que protege y proporciona un gran número de derechos monopolísticos al verdadero propietario o inventor. Este artículo ofrece un análisis exhaustivo de la inteligencia humana frente a la IA en el contexto de la legalidad y aceptación por la sociedad. También destaca la importancia de mapear la IA en el sector de la salud en relación con la propiedad intelectual. Además, este estudio refleja una idea de transferencia de tecnología y conocimientos técnicos hacia máquinas y tecnologías médicas basadas en la IA desde la perspectiva de la asistencia médica en la India. Este artículo se concluye con una descripción de las mejoras necesarias en la IA y en las máquinas de asistencia humana.

Los autores: Lipsa Dash, Profesor asistente. Campus 16, KIIT School of Law, KIIT DU, Bhubaneswar, Odisha, India. ORCID: 0000-0002-0885-3433. Correo electrónico: lipsa.das@kls.ac.in

Sambhabi Patnaik, Profesor asistente. Campus 16, KIIT School of Law, KIIT DU, Bhubaneswar, Odisha, India. ORCID: 0000-0003-3839-7739. Correo electrónico: sambhabi.patnaik@kls.ac.in

Saranya Dash, Estudiante de derecho. Campus 16, KIIT School of Law, KIIT DU, Bhubaneswar, Odisha, India. ORCID: 0000-0001-7804-6314. Correo electrónico: 1784015@kls.ac.in

Silpalika Biswal, Estudiante de derecho. Campus 16, KIIT School of Law, KIIT DU, Bhubaneswar, Odisha, India. ORCID: 0000-0002-4302-0509. Correo electrónico: 1783114@kls.ac.in

INTELIGÊNCIA COLABORATIVA E PROPRIEDADE INTELECTUAL: HUMANOS E HUMANOIDES NO CONTEXTO DO SISTEMA SANITÁRIO

Lipsa Dash

Sambhabi Patnaik

Saranya Dash

Silpalika Biswal

Campus 16, KIIT School of Law, KIIT University, India

Resumo

Os humanos são seres inteligentes, e essa característica é o que nos torna únicos. A Inteligência Artificial (IA) é uma extensão dessa qualidade, o que a torna humanoide. Até 2029, estima-se que 95% das interações humanas serão apoiadas por tecnologias de IA. Os seres humanos têm uma existência dinâmica no mundo, uma existência que se destaca por meio do conhecimento, análise, expressão, ideias e muito mais. Com o rápido desenvolvimento da ciência da computação e a dependência da tecnologia de dados, tem-se observado que humanoides, como robôs e IA, estão entrando no mundo humano. Além disso, eles são utilizados para apoiar a atual estrutura de saúde em todo o mundo e auxiliar médicos, enfermeiros, hospitais e outros profissionais de saúde em suas diversas tarefas. Atualmente, a relação entre pacientes e profissionais de saúde é baseada em interações humanas, que constituem a base natural do atendimento médico. No entanto, há um lugar para a IA neste campo que utiliza dados de forma intensa, no qual é necessário realizar tarefas complexas, comparar e analisar grandes volumes de dados e tentar classificá-los. Dessa forma, quando novas invenções e descobertas surgem, a propriedade intelectual entra em cena, já que ela protege e fornece muitos direitos de monopólio ao verdadeiro proprietário ou inventor. Este artigo oferece uma análise abrangente da inteligência humana versus IA no contexto de legalidade e aceitação pela sociedade. Destaca também a importância do mapeamento da IA no setor de saúde com relação à propriedade intelectual. Além disso, este estudo reflete uma ideia de transferência de tecnologia e *know-how* para máquinas médicas baseadas em IA e tecnologias na perspectiva da saúde na Índia. Este artigo é concluído com uma descrição das melhorias necessárias na IA e nas máquinas de assistência humana.

Os autores: Lipsa Dash, Professor assistente. Campus 16, KIIT School of Law, KIIT DU, Bhubaneswar, Odisha, India. ORCID: 0000-0002-0885-3433. Correio eletrônico: lipsa.das@kls.ac.in

Sambhabi Patnaik, Professor assistente. Campus 16, KIIT School of Law, KIIT DU, Bhubaneswar, Odisha, India. ORCID: 0000-0003-3839-7739. Correio eletrônico: sambhabi.patnaik@kls.ac.in

Saranya Dash, Estudante de Direito. Campus 16, KIIT School of Law, KIIT DU, Bhubaneswar, Odisha, India. ORCID: 0000-0001-7804-6314. Correio eletrônico: 1784015@kls.ac.in

Silpalika Biswal, Estudante de Direito. Campus 16, KIIT School of Law, KIIT DU, Bhubaneswar, Odisha, India. ORCID: 0000-0002-4302-0509. Correio eletrônico: 1783114@kls.ac.in

1. Human intelligence vs. artificial intelligence: legality and acceptance in society

1.1. Human origin of intelligence

It's very difficult to comprehend how the human species have managed to evolve their intelligence to not only elaborate complex ideas but to shape them into reality and go beyond natural basic human functioning. It is difficult to understand how we became so intelligent. There has been much research and theories concerning the assessment of human intelligence and its evolution, which is very challenging. Some studies try to establish the interface of psychology, anthropology, biology, archaeology, and cognitive science, while behavioral, artefactual, anatomical/neurological measures are being employed to analyze and infer the different intellectual capacities of humans[1].

It is difficult to study and find out the intellectual division between humans and other species. There have been studies aimed to understand and learn more about non-human intelligence, and it is surprising to find out that the abilities which were previously attributed only to humans are not unique to them. For example, there was a presumption that only human beings are capable of making tools, but then a study carried out by Jane Goodall (1963) established that the chimpanzees are also able to make and use tools, as well as to produce even complex tools[2].

1.2. Origin of Artificial Intelligence (herein referred as AI)

It is next to impossible to have a universally accepted definition of intelligence. However, intelligence may be defined as "the ability to reason, plan, solve problems, think abstractly, comprehend ideas and language, and learn.[3]"Until computers and wireless communication technology were made a reality, it seemed like science fiction. Similarly, artificial intelligence was considered a myth in the late 1800s. The seed for the idea behind artificial intelligence, was thought by Mr. Alan Turing during the1950s, whereby he questioned that as humans stored information and processed it to make a decision, could a similar feat be achieved by machines?

---

[1]   Gabora, L., & Russon, A. (2011). The evolution of human intelligence. In R. Sternberg & S. Kaufman (Eds.), The Cambridge handbook of intelligence (pp. 328-350). doi:10.1017/CBO9780511977244.018, available at https://arxiv.org/ftp/arxiv/papers/1308/1308.5034.pdf
[2]   https://pubmed.ncbi.nlm.nih.gov/18763477/
[3]   https://www.sciencedaily.com/terms/hominid_intelligence.htm

Earlier, computers were only limited to processing commands and not to storing information. In the next 20 years, there was a revolution in machine learning algorithms and computers became more equipped to store information and solve problems. One major milestone for artificial intelligence was achieved in 1997 when a computer (IBM's Deep Blue) could defeat a grandmaster in the game of chess, which requires the massive ability of decision making. Speech recognition software, developed by the Dragon system during the same time, makes our life and home smart and easy, which also paved the way for AI being induced in our day- to- day life.

What about the limitation of the computing power of AI to process data with an increase in data every day? Moore's Law[4] comes to the rescue and according to its principle, the memory and speed of computers double every year which will help us even in the age of Big data[5]. The European Commission's Communication on Artificial Intelligence (European Commission, 2018a) defines artificial intelligence as follows:

"Artificial Intelligence (AI) refers to systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals. AI-based systems can be purely software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and face recognition systems) or AI can be embedded in hardware devices (e.g. advanced robots, autonomous cars, drones or Internet of things applications)."[6]

Nowadays AI has become a reality and is being used, commercialized and industrialized massively in every possible aspect of human life. Everyone, from policy makers to CEOs of giant organizations echoes the same concern about recognizing and regulating AI. Currently, AI, whether implemented either in the form of a software package or embedded with a hardware component (robot) has wide-ranging applications across varied fields and industries. It is difficult for policy makers around the world to keep up the pace of advancement in AI systems, making the traditional regulatory approach ineffective and existing regulations stay relevant. In the absence of a uniform regulatory mechanism, soft law frameworks such as

---

[4]   Carla Tardi, Moore's Law, 24 February 2021, Moore's Law Definition, History, & Impact (investopedia.com)
[5]   https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/
[6]   https://www.europarl.europa.eu/RegData/etudes/STUD/2020/634452/EPRS_STU(2020)634452_EN.pdf

the *Asilomar AI Principles*[7] and *Singapore's Model AI Governance Framework*[8] have been helpful for organizations to implement AI responsibly.

1.3. Legal personality for AI

There has been a popular demand to accord legal personality to AI, which will help in the regulation of AI, especially, the liability concerns. Most of the legal systems across the world recognize legal persons in the categories of natural persons and juridical persons. Natural persons are human beings while juridical persons are given a legal personality, such as corporations, religious entities, etc., for convenience and governance of legal regulations. Can AI be considered a legal person?

There have been a lot of studies and debates about recognizing AI as a juridical person. Some countries contemplate including AI as a legal entity, without having legislative provisions and little planning to introduce AI within their current and prospective legislation, while others might introduce AI, equal to a person, and not regulated by separate legal principles. But there will be challenges in whatever method one chooses to regulate AI by giving it a legal personality[9]. For instance, Saudi Arabia granting citizenship to robot Sofia[10] is contrary to its legal principles of citizenship.

Policies and strategies concerning AI have been initiated by major countries - Canada, Japan, China, Russia, etc. The European Commission's Communication on Artificial Intelligence (European Commission, 2018a), released its first international strategy on AI in 2018, which looks very promising[11]. India, joining the wagon, came up with *AI for All*[12], which includes setting up of Centres of Research Excellence for AI, 'Centres for Studies on Technological Sustainability'. There have been increasing international initiatives for AI striving to establish a uniform framework for AI, which paves the way ahead and establishes the fact that we all are embracing AI and its legal status.

---

[7]   https://futureoflife.org/ai-principles/
[8]   https://www.pdpc.gov.sg/-/media/files/pdpc/pdf-files/resource-for-organisation/ai/sgmodelaigovframework2.pdf
[9]   https://www.ersj.eu/journal/1245/download
[10]   https://www.dw.com/en/saudi-arabia-grants-citizenship-to-robot-sophia/a-41150856
[11]   https://www.oecd.org/going-digital/ai-intelligent-machines-smart-policies/conference-agenda/ai-intelligent-machines-smart-policies-huet.pdf
[12]   https://ai-for-all.in/#/home

2. Mapping AI in the IP world: Reverberation and repercussions

2.1. Significance of human intelligence in the IP world (Recognition under Copyright Act and Patents Act)

Creative works are the essence of copyright. In the colloquial sense, an artificial intelligence (AI) is a machine capable of completing tasks through the use of processes typically associated with human cognition (Russell & Norvig, 2010). Sometimes, AI players defeat humans in complicated games. Although many might consider artistic expression a singularly human attribute, AI has proven capable of producing works that, at the very least, mimic the characteristics of human-created works. AI-generated works could have an enormous potential commercial value. AI's are now capable of creative writing which has also reached publication.

The above fact proves that AI is capable of autonomously generating their works which endangers the question of ownership of the copyrighted work. Who gets the right of ownership, with whom does the idea of originality subsists, and how it can lead to competing claims is a major question involved. There is a constant struggle as to: firstly, the AI's creator might own the copyright in the AI's code and lay claim to ownership in any works derived from that AI. Secondly, a separate AI user may claim ownership in the copyright on the basis that they have selected the data and parameters around which to apply AI's algorithmic processes. Finally, the investor or owner of the AI may constitute a third entity with a claim to ownership in the AI's works.[13]

Intellectual Property is all about innovation and creativity. The laws about these concepts were created to incentivize humans who create and define new characteristics. The application of Intellectual Property to upcoming technologies is on par with the world's needs. Artificial Intelligence is one of such innovations, where human involvement can be least and still would be accurate enough in identifying, tracking, understanding, diagnosing, etc. Based on this, questions also arise as to how AI innovation and creation strikes a balance with valuing or incentivizing humans for their contribution. AI is taking up the world forum and it is directly hitting the existing IP systems and also showing how the IP framework functions.

---

[13] https://www.cba.org/CBAMediaLibrary/cba_na/PDFs/Sections/IP-Copyright-of-AI-created-works-AODA.pdf

For the first time in India, the copyright office has recognized an artificial intelligence tool – RAGHAV Artificial Intelligence Painting App – as the co-author of a copyright-protected artistic work. Ankit Sahni, an IP lawyer who owns the AI-based app, is the other author and is registered as the copyright owner. Recently, he commissioned the painting which was surrounded with bunch of questions i.e., 'Suryast' and even believes that India might be the first country to have acknowledged AI co-authorship in a copyrighted work.

2.2. AI in the health sector inventions all over the world: challenges and prospects

The field of healthcare is data-intensive, which leads it to perform complex tasks and compare and analyze a huge volume of data and try to classify it. Digital medicine is one of the growing fields, where technology is researched and developed to make the patient-doctor interface more accessible and user-friendly. Some new technologies are being developed, where voice recognition devices are now paired up with medical databases for helping and prescribing medicines for health-related issues. The AI inbuilt can measure the intensity of the voice or coughs and suggest the use of different cough drops. It can detect early cancers, kidney diseases, and sleep cycles. However, each assistant varies in results depending on the skills downloaded and access to different databases in exclusivity.

Thinking of advancements like this, are our activities monitored constantly and how far is it safe to conclude that AI in medical fields is for our good? This non-human interaction also poses a lot of threat to the data. The growth of tele-medicine has taken shape in the healthcare system. Each app of tele-medicine is again integrated into other applications. The ease of access enables useful features like text and video chat, screen sharing, and file transfer for the patients online. Electronic health records are thereby stored and analyzed and allow access to existing information, giving the doctor a complete idea of the patient's past health record. The forthcoming questioning is how far are we comfortable with such ailments.

The potential of AI is unimaginable as machine learning can transform the delivery of healthcare systems in countries. From streamlining workflow processes to improving the accuracy of diagnosis and personalizing treatment, as well as helping staff work more efficiently and effectively. During the pandemic, they also helped in facial recognition, thermal screening, CT Scan analysis, etc. However, the high cost creates a setback, like the risk of data bias, as it is a machine; and, above all,

the high risk of losing private sensitive information. The innovations have set their goals to productivity, efficiency, and best possible performance; however, they are always susceptible to unprecedented disruptions.

2.3. Public interest and the Ministry of Health along with the Ministry of Science and Technology and Industry contemplate the implementation of intellectual property on AI-based assistance and human-based assistance

Numerous AI-powered health applications designed for personal use have been shown to improve patient outcomes, building predictions based on large volumes of granular, real-time, and individualized behavioral and medical data. The government has encouraged AI-based assistance and recognized AI's as a part of intellectual property; however, due to lack of legislation and jurisprudence, the ambiguity can always be challenged in the court of law.

The government has quoted: "Rendering protection to creations by AI will go a long way in recognizing and protecting the interests of those who develop such AI applications, and will ensure that they are appropriately incentivized." It also extended its arms during the recognition of the first AI as a copyright holder in India, quoting: "While the existing legislation has its own set of limitations, the act of granting recognition to an AI program as co-author of an artistic work marks the beginning of an era of change that governments across the world will be working on." Policymakers encourage interdisciplinary collaboration between developers and health care providers. This could result in AI tools that are easier to implement and use within an existing workflow. The major concern still lies in ensuring data representation, transparency, and equity. Interdisciplinary education and policy changes can be path-breaking.

2.4. Patenting and market demand for such technologies: pros and cons

Patient outcomes, predictions, understanding the patients' behavioral patterns, etc., are all a part of AI-powered health applications. Telehealth technologies in a few instances have been of critical importance during the COVID-19 pandemic. Countries have benefited from AI software focused on natural language processing, which enabled identifying and addressing patients based on urgency and type of illness.

The AI's do not limit themselves to patient communication but remarkably help patients to maintain glucose levels and detect cases of any artery congestion. These sensors are smartphones that enable providing approximate results and, if embedded, allow tracking the location of the patient, thereby alerting clinicians of any further substance use that needs immediate attention and intervention. The need of the hour is patenting these market demand innovative AI technologies.

3. Technology transfer and know- how of AI-powered medical machines in India

"Technology transfer is the movement of one organization to another of innovation, information, materials, knowledge or trade secrets".[14] The technology transfer is a process that is directed by different strategies, procedures, expenses of every organization engaged with the cycle. According to PWC, Artificial Intelligence will contribute to the world economy an additional 15.7 Trillion by 2030 and the most effective impact will in the part of the healthcare system. This is why we need to facilitate the technology transfer of AI in the field of the healthcare sector. Technology transfer in the case of pharmaceutical companies or industries makes efforts for improving and maintaining the health department of the recipient countries by providing AI-powered medical technology.

Intellectual property plays a vital role in protecting new technologies and innovation through different types of IPR such as patents, trademarks, trade secrets, etc. A stronger IPR regime helps to create more opportunities in developing countries, as it encourages to create more innovation and giving profit on investment in research and development. Developing countries do not have much-patented technology upon which they can rely for research and development. LDC also argued that it will be difficult for providing access to pharma drugs and other health care items if there is a stronger patent protection.

The developed countries' view is that a stronger IPR will promote R&D within developing countries.[15] A sufficient IPR security can bring about a huge effect on innovation diffusion and relies upon the country's assets for domestic advancement and improvement. Relying on IFPMA companies, as they have more experience,

---

[14]   TWI, what is Technology Transfer, (July 19, 5:20 PM), https://www.twi-global.com/technical-knowledge/faqs/what-is-technology-transfer
[15]   Peter Magic, International Technology Transfer & Intellectual Property Right. Nov 30, 2003

the solution for effective pharmaceutical technology depends upon the activities conducted at the country's level or national level, with the help of many types of associations and good dedication from the industry.[16]

To make AI-based technology is difficult without understanding the production process; hence, the transfer of the know-how technology is an important strategy. Technology transfer is done in various ways, such as Foreign Direct Investment (FDI) which plays a vital role in TT. However, some market mechanisms like licensing agreements, joint ventures, and royalties are important channels for transferring R&D for pharmaceutical innovation; licensing is another essential part of TT as it helps developing countries to obtain profit and enhance welfare. It is a process whereby the owner or the inventor of the technology gives the right to use the technology for a certain period to the recipient. There are three different methods for TT, such as joint venture, collaboration, and spin-off. A joint venture is a business venture that embraces joint participation of two or more parties. Collaboration is an act of working with somebody to create something. And spin-off is the formation of an autonomous company through the distribution of the parent company.[17]

WHO provides many guidelines in the pharmaceutical industries or sectors on the transfer of technology, especially today, due to the global pandemic caused by the COVID-19. However, these guidelines need more up-grading for the betterment of society. Technology transfer is one of the legal methods for maintaining the procedure of the transfer along with its documents. This also involves the development areas and the testing process of the transfer. For transferring the pharmaceutical products from one place to another, the procedure can be followed before or after finding the regulatory marketing authorizations only. Pharmaceutical product transfers can be made during developments and also manufacturing.[18]

The requirements necessary for the fulfillment of a technology transfer project are as follows:

1. An elaborate risk management.
2. An inclusive and broader gap synthesis that also contains due diligence.

---

[16] Ugo Pagallo, Colette Cuijpers, Massimo Durante, New Technologies and Law. Jul 6,
[17] Denis Kuzniatsou, Technology Transfer Methods, DENIS KUZNIATSOU'S PERSONAL BLOG (July 20, 2021, 1:22 PM), http://innodigest.com/technology-transfer-methods/
[18] WORLD HEALTH ORGANIZTION, WHO Guidelines on the Transfer of Technology in Pharmaceutical Manufacturing, April 2021, https://cdn.who.int/media/docs/default-source/medicines/norms-and-standards/current-projects/qas20_869_transfer_of_technology.pdf?sfvrsn=552e10bd_13

3. The paperwork of the project including the relevant segments of the plan.
4. Enough trained personnel with appropriate skills, intelligence, and experience.
5. A perfect setup of the process and product awareness.
6. The capability between the SU and RU must be measured, and this should not be limited to the types of equipment used.
7. The difference has to be recognized between the SU and RU by viewing the maintenance strategies, their risk, etc.

The technology transfer process is divided into three very important aspects:

1. Production part:
   As per the technical experts, the information must be passed so that the transfer process can be made properly. An agreement must be made by the parties. All the important activities must be recognized.

2. Quality control part:
   It is also known as the analytical method. Here, the pharmaceutical products have to be tested. This method has been prepared by considering both parties: the sender and the receiver. This part makes sure those responsibilities and operations are described properly. A system must be made available for the risk management plan.

3. Documentation part:
   The documentation of the Master plan of the technology must contain the title, the scope of the transfer, its objectives, address, and all the rest of responsibilities that are required.

AI in the health care sector is benefiting by enforcing cognitive technology to record a large amount of medical data and to perform any power diagnosis, for example, "nuance". It is a production service provider which offers an AI-powered solution to doctors to help improve reporting quality and minimize documentation time. It provides insights so that customer retention can be improved. This product uses AI and machine learning to predict the intention of the particular user so that the company can make better decisions and carry out better actions that enhance the customer's experience and, overall, benefit the company.

Another frequent example that is being used by most of the population is the AI-based wearable health trackers such as Fitbits, Apple Watch, Garmin, and

others. These wearable trackers monitor the heart rate and blood pressure level to prevent a heart attack. Apple Watch uses the tagline to promote its watches, so that "precaution is always better than cure". Apple Watch keeps the record of the health of any person who is wearing the watch by collecting data such as heartbeat speed, sleep cycle, breathing rate, blood pressure level, etc., which can predict the risk of a heart attack.

AI-based surgical robots can decrease the case-to-case variation and also help to improve the efficiency of the surgeons. A surgical robot name "da Vinci" allows the surgeons to perform various complex procedures with greater flexibility, reliability, and also control of the conventional approaches. It also provides rich magnified, 3D high-definition views of the surgical area for properly performing the surgery. It is an instrument that helps in carrying out surgeries.

4. Improvements in Artificial Intelligence or human assisting machines in the health care structure

Due to the rapid growth of economic costs and worsening consequences of machine-based technologies, various health care systems across the globe are suffering and struggling a lot. Over the survey of 1.3 billion people, and considered as the second largest inhabited country in the world, India witnesses and meets new challenges in the health sector every time. Generally, health is regarded as a crucial basis for defining a person's state of well-being. This sector not only covers medical aspects but also various other categories like biomedical factors, quality, cost, etc.

In India, it is presumed that four criteria make an ideal health care system, namely: 1) universal and adequate access, 2) fair distribution of costs and quality, 3) competent health service providers, and 4) special attention and initiatives for vulnerable groups of public. The policy makers, politicians, clinical entrepreneurs, and computer data scientists and analysts put forth their stance that Artificial Intelligence, particularly Machine Learning (herein referred as ML) will pave the way ahead. They strongly believe that the health care system will be controlled and taken over by "Robotic Medical Staff or Humanoid Medical Staff".

Nevertheless, the health care sector is a blend of human judgment and scientific data. The future of health care systems and the future growth of AI are deeply interlinked. Various enumerable AI inventions relating to the medical sector have shown their capacity for envisaging patient health trajectories, recommending

treatments, guiding surgical care, and supporting efforts to advance the health services of the medical community.

As we are already aware of recent, rapid and upward developments in AI by computers, scientists paved the way towards the health industry. The AI mechanism in the health sector establishes the usage of computer-controlled humanoids where, with the help of human health researchers, human doctors, and human scientists, by using human intelligence, inject complex algorithms and big data inputs that are designed to perform certain difficult tasks automatically and can also review, interpret and suggest solutions to complex health problems. This helps to reduce the workloads of clinicians, path-labs, and various primary check-ups stations.

The usage of AI, ML, and Internet of Medical Things (herein referred to as IoMT) for public health awareness and application have already been the helping hand by various technology applications and apps like Fit-bit which encourage and exert control towards healthy mental and physical behaviour and a proactive lifestyle.

AI or ML have already come up to the market and are being used to detect acute diseases like cancer in their early stages.[19] For instance, improving the health conditions and care systems requires a proper stimuli and alignment of big health input data from all over the world with accurate and appropriate decisions, predictive analysis of the disease that can support clinical decision-making and actions as well as prioritise other primary administrative errands. When human-human interfaces embedded effectively in the clinical practice then three primary issues need to be looked upon which are: the technical possibilities and limitations; ethnicity, regulatory and legal framework; and finally, the governance or management framework.

Various factors were encouraged and determined for the substantial growth and development of AI- Health amalgamation. One of the main and highlighted factors is the belief that the algorithms can take more objective, robust and evidence-based decisions (in medical terms, the evidences for clinical trials, diagnosis, prognosis, etc.), speedily and precisely than human health care providers. This ultimately leads to the ability to make evidence- based legal decisions in cases like medical negligence which can't be underestimated because AI tools can be better in analysing

---

[19] American Cancer Society, a high proportion of mammograms yield false results, leading to 1 in 2 healthy women being told they have cancer; Wired (2016), http://www.wired.co.uk/article/cancer-risk-ai-mammograms

the risk factors, predicting the diseases, adverse effects and other infections and monitoring the health related activities and interactions being carried out.

Generally, the future benefits of human assisting machines are taking over tasks that are way more standardized, as they cannot imitate the emotional virtues of which human health care providers are capable. The ultimate goal of AI-health collaboration, or rather, human assisting machines, is to create a standardized machine learning formula for the healthcare system where a robotic system is constantly learning from the data inputs that it receives from the computer scientist upon the performance of its interventions.[20]

There are high chances of system destruction or data breaches or theft that include the confidential information or personal information of the patient. This means that the quality and quantity of data required for a particular human assisting machine may likely be considered as a dispute matter in the light of the collecting and sharing of the patient's details and data during the training process. In case the data are mishandled then this will create huge damage and compensations to all the sectors that are coming under the umbrella of human assisting machines in the health care system.

Currently, in various other countries apart from India, more diagnostic and therapeutic inventions are based on AI-health collaboration and not on human interventions, which encourages the sharing of more and more new algorithms inputs in the field of health that are unknown to the medical community and have a utility. But this can also portray a negative impact on the public as many people don't have the level of understanding of the E-health benefits, facilities, and measures being provided to them at the doorstep. This means it will be the toughest task to convince a patient to undergo a treatment with the help of AI-based medical machines as it increases the chance of risks and side effects if so happened anything to them.

The use of Machine Learning in health care decision-making seems very straight-forward for providing various services and fitting into numerous categories of medical practices but involves many other human dynamic interactions with the public as well and will create chaos and disputes between the health providers and communal people. Let's have a look at a scenario where a human assisting machine

---

[20]   Codrin Arsene, The Global 'Blockchain in Healthcare' Report: The 2021 Ultimate Guide for Every Executive, January 10, 2020; https://healthcareweekly.com/blockchain-in-healthcare-guide/

is deciding to send the patient to an Intensive Care Unit (ICU). This is a limited hospital resource and only people who are at risk of losing their lives or suffering from severe harm or injuries are sent there. Such decisions are made by humans considering different factors that include the likelihood of people surviving if they are sent to the ICU. This underlines the idea that human doctors, by applying human intelligence and professional guidelines, will decide upon the matter whereas the AI-based medical machines are oriented and operated according to their values embedded in its coded form.

Human Intelligence and AI- health- based technologies and tools are having neutral scope but may provide unfair results with the direct involvement of the public at large that emerges risks and diverse ethical concerns especially with regards to moral responsibility. In a machine learning health care system, it is observed that a single AI tool might involve many people for various tasks like organizing, collecting and brokering data, as well as performing on it by its coded formula and making this transparent enough.

Upon the moral responsibility and lack of clarification, an issue will be put forth in the face of society what is acceptable and preferable along with what is affordable to them. To handle these small and big challenges, if the health industry *per se* is using AI-based technologies, it must come up with both hard and soft mechanisms that include policies, standards, and regulations drafted based on existing moral obligations of society. Only then, both weighing scales will be balanced, which means protecting the individuals from the harm of cyber insecurity as well as providing the health service in a better way.

Cut short, our health care system should not be extremely rigid in adopting and introducing the AI-based technologies to the combo of health and fitness industry but should be heedful of its impact and aftermath effect to continue the same and be able to control it in a certain way. When we use the terms 'policies or standards' explicitly, it means regulating and monitoring various software into the medical devices.

In 2020, World Health Organisation (WHO) came up with many new medical devices projects and also came into effect across the globe which substantially increased its growth in AI-driven technologies. Along with that, it also increased the market demand and the country's economy even in this high frequency of pandemic

where the world is placed under the digital realm.[21] This might not reduce the risk associated with the algorithmic tools or AI-powered medical devices or even the online consulting databases.

Conclusion

No doubt, human assisting machines have a huge potential for obtaining profits from the health and wellness industry. If it works so in India, it can be a factor for bettering the country's economy as well. With the expansion of science and technology by the innovators from various categories of the field, this concept has been slowly being adopted in their inventions as there are many excessive menace features involved while experimenting with AI even with the help of human intelligence, due to privacy issues, data integration concerns, and data sharing for keeping the intellectual property rights in hand.

With this in mind, this topic has covered various concerns related to fetching human- humanoid interfaces in the health care system in a nation widely populated like India along with various limitations. It also provides several approaches to help the policymakers and legislators to draft certain sets of guidelines and develop evidence-based and regulatory frameworks to come up soon. Recently, drug discovery is one of the most advanced searches in the AI regime which cuts down the time and costs of new drugs in the market arena by way of repurposing process.[22]

The conclusion to be drawn is that few capable areas can try to develop such an innovative approach where AI-powered machines come into the picture for leveraging in clinical decision making, early detection of the diseases, and market play that involves costs and quality. It can also provide services and alerts as to whether or not to continue the medical care for critically ill patients like people entering in a state of coma or having a cardiac arrest, etc., by stipulating some measures or alternative options for treatment purposes.

In the tech-savvy world, starting from smartphones to the fitness bands, it is presumed that such technology can produce images or photos and videos of their

---

[21] Management Regulations on Application of Electronic Medical Report under the guidelines of Ministry of Health and Family Welfare, India; https://main.mohfw.gov.in/sites/default/files/17739294021483341357.pdf

[22] No Longer Science Fiction, AI and Robotics are transforming healthcare; https://www.pwc.com/gx/en/industries/healthcare/publications/ai-robotics-new-health/transforming-healthcare.html

disease which can be analyzed by AI algorithms and more easily put in front of our fingertips. Since then, the nation began to take steps towards building AI software and hardware into their devices to generate more than billions of terabytes of daily data for providing faster and smarter services. Human intelligence and AI collaboration will enter into a new revolution in the coming decades by giving powers to the new generation with digital tools and systems in the health care sector to keep the motto of being healthy, wealthy, and wise.

Bibliography

A. Atabekov, O. Yastrebov. «Legal Status of Artificial Intelligence Across Countries:.» *European Research Studies Journal, Volume XXI, Issue 4*, 2018: 773 - 782. https://www.ersj.eu/journal/1245/download

American Cancer Society. (2016). A high proportion of mammograms yield false results, leading to 1 in 2 healthy women being told they have cancer. http://www.wired.co.uk/article/cancer-risk-ai-mammogram

Anyoha, Rockwell. (2017). *Can Machines Think?* Blog, special edition on artificial intelligence the history of artificial intelligence https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/

Arsene, Codrin, The Global 'Blockchain in Healthcare' Report : The 2021 Ultimate Guide For Every Executive, January 10, 2020; https://healthcareweekly.com/blockchain-in-healthcare-guide

Bird, Eleanor Bird; Fox-Skelly, Jasmin; Jenner, Nicola; Larbey, Ruth; Weitkamp, Emma; Winfield, Alan. (2020). T*he ethics of artificial intelligence: Issues and initiatives.* EPRS | European Parliamentary Research Service Scientific Foresight Unit PE634.452. https://www.europarl.europa.eu/RegData/etudes/STUD/2020/634452/EPRS_STU(2020)634452_EN.pdf

Codrin Arsene, The Global 'Blockchain in Healthcare' Report: The 2021 Ultimate Guide For Every Executive, January 10, 2020; https://healthcareweekly.com/blockchain-in-healthcare-guide/

DW News. *Saudi Arabia grants citizenship to robot Sophia.* https://www.dw.com/en/saudi-arabia-grants-citizenship-to-robot-sophia/a-41150856

Future of life Institute. *Asilomar ai principles.* https://futureoflife.org/ai-principles/

Gabora, L., & Russon, A. (2011). *The evolution of human intelligence.* In R. Sternberg & S. Kaufman (Eds.), The Cambridge handbook of intelligence (pp. 328-350). doi:10.1017/CBO9780511977244.018, available at https://arxiv.org/ftp/arxiv/papers/1308/1308.5034.pdf

Huet *Cécile*; Directorate-General for Communication Networks, Content & Technology European Commission. *European Commission's Initiatives in Artificial Intelligence*.https://www.oecd.org/going-digital/ai-intelligent-machines-smart-policies/conference-agenda/ai-intelligent-machines-smart-policies-huet.pdf

Info-communications Media Development Authority (IMDA); Personal DataProtection Comission. (2020). *MODEL ARTIFICIAL INTELLIGENCE GOVERNANCE FRAMEWORK.* https://www.pdpc.gov.sg/-/media/files/pdpc/pdf-files/resource-for-organisation/ai/sgmodelaigovframework2.pdf

Kuzniatsou, Denis. *Technology Transfer Methods*. DENIS KUZNIATSOU'S PERSONAL BLOG (July20,2021). http://innodigest.com/technology-transfer-methods/

Lakatos L, Janka Z. (2008). *Evolution of human brain and intelligence*. Ideggyogy Sz. (pp.220-9). Hungarian. PMID: 18763477. available at. https://pubmed.ncbi.nlm.nih.gov/18763477/

Magic, Peter.(2003).*International Technology Transfer & Intellectual Property Right*. http://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=24D28C24A4201F02957CE402594BFF8D?doi=10.1.1.123.9989&rep=rep1&type=pdf

No Longer Science Fiction, AI and Robotics are transforming healthcare; https://www.pwc.com/gx/en/industries/healthcare/publications/ai-robotics-new-health/transforming-healthcare.html

Pagallo,Ugo; Cuijpers,Colette; Durante,Massimo; New Technologies and Law.

ScienceDaily. *The evolution of human intelligence*. https://www.sciencedaily.com/terms/hominid_intelligence.htm

State of the Arts: How Should Canadian Copyright Law Treat Works.» *THE CANADIAN BAR ASSOCIATION*, s.f. w.cba.org/CBAMediaLibrary/cba_na/PDFs/Sections/IP-Copyright-of-AI-created-works-AODA.pdf

TARDI, CARLA. *Moore's Law*. 24 de February de 2021. https://www.investopedia.com/terms/m/mooreslaw.asp.

World Health Organization. *Who Guidelines on the Transfer of Technology in Pharmaceutical Manufacturing*. April 2021, https://cdn.who.int/media/docs/default-source/medicines/norms-and-standards/current-projects/qas20_869_transfer_of_technology.pdf?sfvrsn=552e10bd_13