



Harnessing Artificial Intelligence and Robotics at the Crossroads of Health Care Administration in India: A Sustainable Development Initiative

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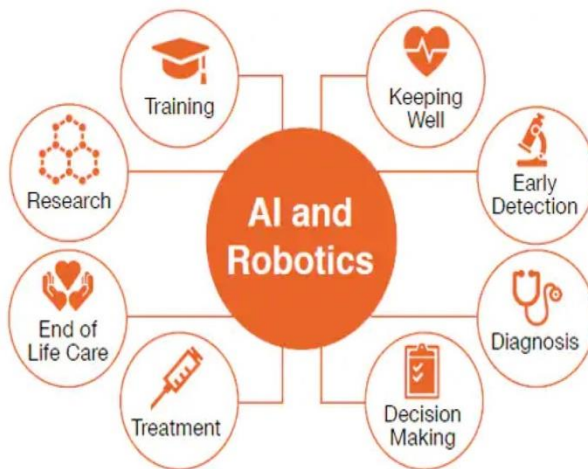
Abstract. The intersection of sustainable development and Artificial Intelligence (AI) through a human rights lens has been widely discovered throughout this paper. It looks at how AI technology may support human rights values while helping to achieve the Sustainable Development Goals (SDGs). The integration of AI in healthcare represents a transformative shift, offering improved medical treatment, diagnostics, and societal health outcomes. However, alongside these advancements come ethical, safety, and equity concerns that cannot be overlooked. Robotics, a expanding field within AI, has gained traction in the medical sector. Praised as a critical solution to healthcare challenges, robotics is seen as essential for achieving SDGs. Many of India's leading hospitals have adopted robotic surgery and clinical support services. Yet, questions persist about the widespread acceptance and accessibility of these technologies, particularly among rural populations. Addressing this issue requires consideration of state support and resources. This paper aims to review recent advancements in AI and assess their impact on patient rights and autonomy in healthcare decision-making. Additionally, it explores the need for legal safeguards to protect patient values and preferences, thereby upholding human dignity and principles.

Keywords: Sustainability, Health care, Human Rights, Artificial intelligence, Robotics.

1 Introduction

The United Nations established the Sustainable Development Goals (SDGs) to address global challenges and achieve sustainable development by 2030. Goal 3 focuses on ensuring good health and well-being. To achieve this, innovative technologies like artificial intelligence (AI) and robotics are crucial in improving healthcare accessibility, quality, and efficiency. AI-powered robotics are transforming healthcare by enhancing diagnosis, treatment, and patient care. However, integrating these technologies poses challenges, including bias, safety concerns, and legal accountability. Addressing these issues through ethical frameworks and stakeholder trust is essential to fully realize AI and robotics' potential in advancing healthcare aligned with SDG 3.

The COVID-19 pandemic has had a profound global impact, affecting various sectors such as healthcare, manufacturing, and services. Faced with the rapid spread of the virus and a lack of vaccines or effective treatments, urgent measures were necessary to control transmission. Lockdowns were implemented in many countries due to the virus's ability to spread from person to person, prompting strict adherence to social distancing measures. As a result, there was a surge in demand for essential products, including medications, advanced robotics, and AI-based applications. Robotic technologies have emerged as promising solutions during the pandemic, assisting in diagnosis, risk assessment, patient monitoring, and disinfection tasks. This has alleviated pressure on frontline workers and facilitated vaccine distribution. Moreover, these technologies have played a role in supporting mental health during this challenging time. Robotic systems have enabled contactless specimen collection and remote patient diagnosis, while AI has streamlined scheduling and testing processes, reducing the need for human intervention. These advancements have been instrumental in meeting the urgent healthcare needs arising from the pandemic.



¹**Fig. 1.** Artificial intelligence and robotics in the healthcare sector

More than US\$40 billion is anticipated to be generated by the healthcare AI market by 2027, from a worldwide market that surpassed US\$6 billion in 2021. As stated by the World Health Organization, AI has great promise for improving healthcare delivery and assisting nations in reaching universal health coverage. AI has applications in many domains, such as clinical care (helping diagnoses and customizing treatment plans); research and drug development (accelerating the discovery and optimization of new drugs); public health surveillance (allowing for real-time monitoring and quick re-

¹ Arooj, S.: A deep convolutional neural network for the early detection of heart disease. *Bio-medicines* 10(11), 2796 (2022).

sponses to health threats); and health systems management (enhancing hospital operations and resource management to a greater extent). This integration of AI promises to revolutionize healthcare by making it more accessible, efficient, and personalized.

AI systems are changing numerous important fields in research and medication development. In terms of data creation and analysis, AI can generate high-quality data for biomedical research and efficiently analyze big datasets, improving our knowledge of illnesses and human physiology and hastening the development of efficient therapies. AI tools in drug development speed up the identification of molecules and chemicals that cause disease and may be useful targets for new therapeutic candidates. AI also enhances the design of clinical trials by enhancing participant recruiting, trial administration, and monitoring. AI also helps determine the most suitable locations for clinical trials, optimizes resource allocation, and accelerates participant identification and recruitment. These advancements collectively streamline the research and development process, making it more efficient and effective.

AI is being used in public health in a number of important areas. AI systems are utilized for tracking disease transmission, identifying outbreaks, and developing vaccines and other therapies related to disease outbreak monitoring and management. AI may micro-target populations or people at high risk and address the root causes of unfavorable health outcomes or disease outbreaks in the context of health promotion and disease prevention. It is anticipated that AI will continue to spread over a range of roles and applications in the healthcare industry. According to a 2022 study, AI is the most promising technology in the healthcare sector, with 50% of participants intending to make investments in the field that year. Among the noteworthy advancements is the AI-powered drug discovery platform from Insilico Medicine, which has resulted in a treatment candidate for idiopathic pulmonary fibrosis that is now advancing to clinical trials.

2 Materials and Methods

This study employs a qualitative research approach to examine current socio-legal trends and gaps arising from the intersection of artificial intelligence and robotics with the healthcare sector in India. The primary objective is to investigate how these technological advancements contribute in achieving the third target under the sustainable development goals.

Hypothesis framed for the study is that, the adoption of AI-driven robotics in healthcare will advance its goals if comprehensive regulatory frameworks and ethical guidelines that prioritize inclusivity, protection of human rights, and the reduction of socioeconomic disparities are put in place which will encourage the responsible and equitable deployment of these technologies.

3 Intersection of AI and Human Rights

Autonomous vehicles and unmanned aircraft in transportation, autonomous weapons in the military, intelligent communication devices embedded in daily environments, industrial robots in factories, and autonomous electronic agents in e-commerce and finance are just a few examples of how AI mechanisms are influencing the human and social world. AI has emerged as a potent catalyst for social change, impacting politics, the economy, and personal relationships. It also presents significant hazards and opportunities from social and legal standpoints. There are high hopes and grave concerns regarding the effects of AI on people and society. On the one hand, AI has the potential to enhance human capabilities, increase security and efficiency, facilitate universal access to information and skills, promote scientific research, and improve environmental, health, and educational outcomes. However, AI also poses risks such as disruption of social interactions, control, manipulation, discrimination, and exposure to harm from technological errors or disregard for societal values and individual rights.

Human-machine interaction is evolving rapidly and is likely to change even more in the near future due to AI advancements. Initially, robots were used for mundane, repetitive tasks that could be precisely programmed, leaving humans to handle duties requiring judgment, creativity, and decision-making. AI is increasingly capable of taking on these more complex tasks, creating opportunities to enhance human skills and initiative through intelligent machines. However, this also risks using intelligent machines in ways that may hinder the effective use of human talents, restrict human liberties, and undermine the realization of human ideals. In relation to AI, numerous specific ethical and legal concerns have already surfaced in various areas, including contracts, insurance, data protection, safety, responsibility, and criminal activity. As an increasing number of intelligent systems leave the confined and controlled environments of laboratories and factories to coexist with humans in real and virtual spaces (such as Internet services, roads, skies, stock exchanges, and other online and offline markets), these issues become increasingly significant.

Addressing the normative difficulties arising from the current and future use of AI requires both ethical and legal approaches. The current and future effects of AI on individuals, society, and the environment are the main topics of AI ethics and AI law. One of the most important challenges is juggling the competing demands of ethics and the law. Recognizing that social values and human/fundamental rights are central to both ethics and law, despite being expressed differently in various contexts, provides a helpful normative framework. This framework can integrate ethics and law and address the normative concerns that arise in relation to artificial intelligence, ensuring that AI development and deployment align with essential human rights and social values.

3.1 The Implications of AI on Human Rights in the Healthcare Sector

AI technology adoption in the healthcare industry has the potential to both mitigate and intensify current human rights issues. The main topics of this paper are the possible threats to human rights that might result from the application of AI technology, as well as how these developments can exacerbate already-existing disparities in the sector. We

identified four primary areas of risk from our interactions with healthcare organizations, technology firms who offer AI services, and non-discrimination, the right to health and science, privacy and surveillance, and human autonomy. The fairness, accessibility, and moral integrity of healthcare services are among the major issues raised by AI's potential effects.

Inequalities already present in the healthcare industry might be exacerbated by AI systems, which could result in biased outcomes based on age, gender, color, disability, or other protected groups. Due to the fact that AI systems are frequently taught on previous data, biased, discriminating, or unrepresentative data can be passed down to them and perpetuated. AI models may exhibit disparities in accuracy and efficacy among distinct patient demographics due to the under-representation of specific gender, ethnic, or age groups in datasets utilized for training. For people of color individually or in communities, this may result in fewer accurate diagnoses or suggestions for less successful therapies. Additionally, AI systems may contribute to the "digital divide," a phenomenon in which disparate distribution of the advantages associated with AI, such as better health outcomes, arises from unequal access to AI technology owing to obstacles like language, geography, or device availability. In the end, this would jeopardize the Universal Declaration of Human Rights' guarantees of equality and against discrimination (UDHR Articles 1 and 2).

Although AI technologies in healthcare have the potential to significantly improve the efficacy and accessibility of medical services, they also pose a number of hazards that might worsen already-existing gaps in access to treatment and result in unanticipated negative health effects. For instance, under-represented groups may experience disproportionately poorer health outcomes as a result of the over-representation of some populations in different phases of the drug development process, such as clinical trials. Similarly, if high-income people or communities are the main users of AI diagnostic tools, this might widen the healthcare gap by creating disparities in access to high-quality medical treatment. Moreover, diagnostic errors driven by AI could undermine the right to health if patients and healthcare professionals mistakenly regard AI-generated outcomes as infallible, leading to misguided decisions about treatment options. The right to science is affected by the use of AI to prioritize research and development. Lower-income countries might not be able to take advantage of these scientific developments because of expensive costs or a lack of critical infrastructure, like refrigeration, if AI systems concentrate on innovations customized to the demands of high-income countries. This could further entrench global inequalities in healthcare and scientific progress, limiting access to life-saving treatments and technologies for those in less affluent regions.

The application of AI in healthcare presents serious privacy and surveillance issues since healthcare institutions may obtain, utilize, and distribute patient data in ways that violate people's right to private. Data is frequently purchased and used without the patients' knowledge or consent. Furthermore, the definition of health data has evolved in recent years, now include personal data from sources other than medical records, such as environmental, behavioral, and socioeconomic data as well as data from personal devices. Although combining data from many sources can improve data quality and boost AI systems' accuracy and performance, it also increases the danger of privacy

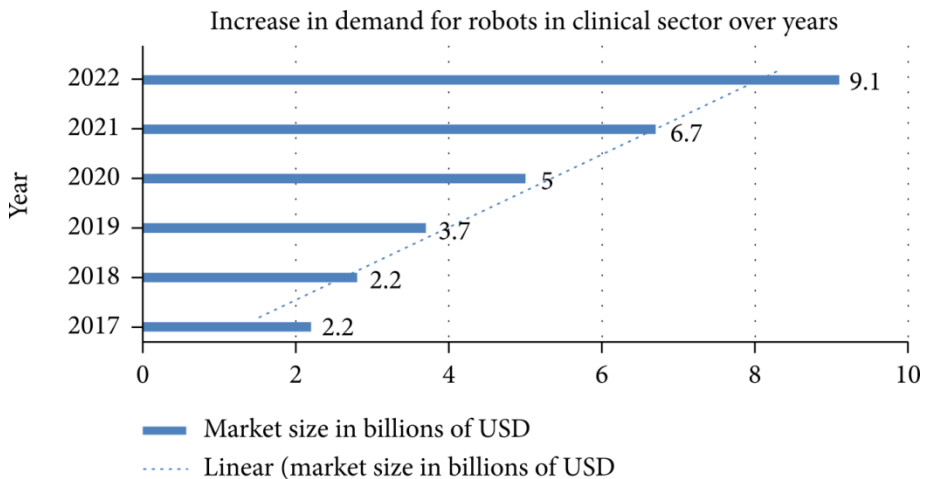
infringement. For example, without a person's informed consent, sensitive health information may be deduced or revealed, which might stigmatize or exclude vulnerable populations. Furthermore, the massive data gathering may lead to heightened monitoring by public or private organizations, including employers, insurance providers, and police enforcement. These outside parties may use private health information to locate, follow, or keep an eye on specific people. For instance, location information gathered by applications that enforce quarantines may be used for intelligence and law enforcement purposes. Likewise, governments may want access to user data on private health issues like pregnancy and abortion, which would present major privacy and ethical issues.

The increasing integration of AI systems into the healthcare landscape offers remarkable potential for improving patient outcomes, yet it simultaneously raises critical concerns regarding human autonomy. As healthcare professionals and patients become increasingly reliant on algorithms for diagnosis, treatment planning, and symptom monitoring, the risk of overdependence grows. A risky precedent is created when patients and the medical community start to view AI systems as perfect. This unshakeable confidence may be detrimental to mental autonomy, which might result in a reduced ability to think critically and make autonomous decisions. While people may completely rely on these tools to make health decisions, healthcare professionals may place an undue emphasis on algorithmic results, undermining their experience and intuition. The repercussions of such overreliance can manifest in various ways, including misdiagnosis, overdiagnosis, under-diagnosis, and overtreatment. For instance, an AI system might flag a condition that doesn't actually exist, prompting unnecessary interventions that carry their own risks. Conversely, it may fail to identify a critical issue, leading to untreated ailments that could have been effectively managed with human oversight. Furthermore, the potential for biases within AI algorithms can exacerbate these issues. If AI systems are trained on flawed or incomplete data, they may produce skewed results that disproportionately affect certain populations. This could perpetuate existing health disparities rather than alleviate them. Ultimately, while AI has the potential to augment healthcare delivery, it is essential to strike a balance that preserves human autonomy. Ongoing education, transparent decision-making processes, and collaborative care models that integrate AI as a supportive tool rather than a definitive authority are vital to ensuring that the healthcare system remains patient-centered and ethically sound.

4 Results and Discussion

Robotic technology is reshaping the healthcare landscape by enhancing operational efficiency and reducing risks, allowing staff to allocate more time to patient care. Beyond operating rooms, robots support medical professionals in clinical settings, contributing to improved patient outcomes. During the COVID-19 pandemic, hospitals and clinics increasingly turned to robots for various tasks to minimize pathogen exposure. The use of health robots offers several advantages, including autonomous preparation and cleaning of patient rooms in infectious disease wards, reducing the need for human interaction. AI-enabled medication identification software installed on healthcare robots expedites the medication administration process. With the widespread adoption of

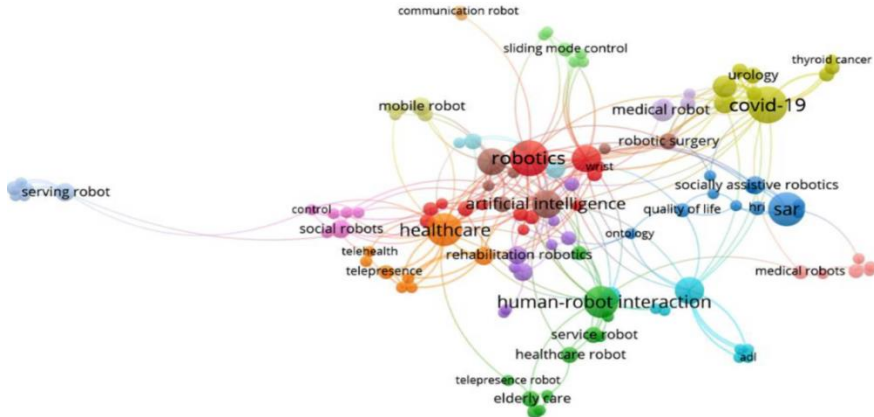
robotics in healthcare, its routine use is imminent, promising to revolutionize the industry. Robotic surgery, in particular, has lowered infection risks and shortened hospital stays, leading to quicker recovery and reduced need for transfusions. Additionally, robotics alleviates the burden on physicians and provides patients with a less daunting and anxiety-inducing experience. Overall, the utilization of robotics in healthcare streamlines tasks and improves patient outcomes.



²**Fig. 2.** Shows increase in demand for robots in clinical sector over the years specifically from 2017-2022

The analysis depicted in the image below involved conducting bibliometric analysis, focusing on publications linking COVID-19 and robots, particularly emphasizing their potential and performance. Numerical subsets yielding significant findings were selected for analysis. Key terms from publication titles and abstracts were collected and analyzed for co-occurrence, visually represented to illustrate interconnections among different aspects of healthcare robots. Topics with higher co-occurrence signify greater importance, categorizing robots used in healthcare, such as socially assistive or surgical robots, along with relevant research papers and their technological applications. Post-COVID-19, the market for medical robots is expected to surge, especially for disinfection, nursing, and teleoperation robots, with projected market growth of 3.8 times by 2027 from its 2017 valuation of less than a billion dollars. The pandemic has spurred the healthcare industry to make significant technological advancements to address unpredictable scenarios and enhance overall quality and efficiency.

² Raje, S.: Applications of Healthcare Robots in Combating the COVID-19 Pandemic. Appl. Bionics Biomech. 2021, 7099510 (2021).



³**Fig. 3.** Shows Applications of Robotics in Healthcare Sector & Management during COVID-19 Pandemic.

Robots play diverse roles in healthcare institutions, indirectly or directly impacting patient lives, including providing care to elderly and disabled patients by engaging them in conversations to alleviate boredom or discomfort. Medical robots offer several advantages, including increased efficiency and accuracy in robot-assisted procedures, higher surgical success rates, and reliable performance within allocated timeframes. Other benefits include enhanced patient monitoring, reduced infection risks, minimal time wastage, and more. However, the high cost of medical robots poses a significant drawback, limiting their accessibility to advanced hospitals, research institutes, and industrialized nations. Affordability remains a concern for patients, and on-going training for staff on robot operation incurs additional costs. Furthermore, the potential for job displacement due to automation presents ethical and economic challenges in healthcare settings.

4.1 Legislative Approach in Governing AI

The debate around AI ethics, as delineated in the previous section, has to be separated from legal discourse. Comparing it to legal discourses concerning the substance, application, and interpretation of existing laws, the difference is striking. These discourses revolve on credible sources that will be compelled to be followed by the relevant authorities. In addition to offering interpretations and defending or criticizing judgements and actions based on them, they aim to ascertain the content and implications of such sources. Legal analysis of existing laws is to provide guidance to the public and authorities about the application and observance of legal norms in the interest of upholding legal principles. In an effort to put them more in line with legal principles, doctrinal

³ Fatima, K., Nawaz, S., and Mehrban, S.: Biometric authentication in Health Care Sector: A survey. In: *2019 International Conference on Innovative Computing (ICIC)*, DOI: 10.1109/ICIC48496.2019.8966699 (2019).

discourses that concentrate on preexisting legal sources may propose novel interpretations, constructions, or modifications of those sources.

As long as the relationship to recognized modes of interpretation and legal sources is preserved, ethical considerations—which are grounded in the positive morality that permeates the society controlled by the legal system at issue—as well as significant advances or revisions of it, may have an impact on legal interpretation. A broader ethical appeal may be found in discussions of legislative innovation, which call on competent authorities to modify legal sources to better accomplish particular political objectives, some of which may be linked to values ingrained in the legal system. Regarding legal regulation of AI, it is crucial to remember that its application does not happen in a vacuum; regulations that were not created with AI in mind may be applied to it and, for the most part, provide adequate solutions. Due to the wide range of impacts AI has on people's personal and professional lives, it is governed by several industry-specific legal frameworks. These regulations include, but are not restricted to, rules pertaining to competition, consumer protection, and data protection.

Aside from labor law, which deals with the new AI-enabled forms of worker control, other legal fields that are affected by AI include administrative law, which deals with the potential and hazards of using AI to support administrative decision-making, civil liability law, which deals with harm caused by AI-driven systems and machines, contract law, which deals with the use of AI in the preparation, execution, and performance of contracts, and laws pertaining to political propaganda and elections. Even if, as was previously said, AI finds its way into a legally regulated area, appropriate legal remedies are not always available to address its pervasive and frequently disruptive social effects. Therefore, legal advice may arise from AI-related difficulties. These proposals frequently include an analysis of the shortcomings of the current legal system along with reform options. Law changes may be pushed for on the basis of moral concerns (possibly connecting morality to legal principles) or by making an appeal to social or political objectives that are backed by significant numbers of the populace and political figures.

4.2 Healthcare Automation in India with respect to Robotic Revolution

India is leading the world in robotics with its achievements in creating multifunctional and humanoid robots. In India, these state-of-the-art and most stylish robots are already being utilized in every industry to boost output and enhance customer satisfaction. India's robotics has effectively amazed the entire world. Technology has had a major impact on healthcare in two ways: it has increased accessibility to therapy and guaranteed consistently reliable outcomes. The application of robotics during knee replacement surgery may lead to more durable, more natural-feeling replacement knees, and faster recovery periods. Based on market research, the robotic-assisted medical industry in India is expected to grow at a compound annual growth rate (CAGR) of 19.8% and reach 2,600 crores by 2024. The Indian healthcare system has reaped enormous benefits over time from robotics-assisted surgeries. Senior researchers predict that by 2025, over 50% of operations performed in India would involve the use of robot help. India's

healthcare system has several challenges, such as insufficient resources and inefficiency. Apart from a scarcity of healthcare professionals, rural communities have several accessibility challenges. Most of these barriers may be removed with a shift in the healthcare system towards collaborative and preventative treatment. Robots and artificial intelligence could be the key to solving the problem. While the cost of using robotic technology in healthcare settings is still prohibitively high, advancements have been made in its flexibility to assist with surgery.⁴

Approximately 500 robotic surgeons are employed in both public and commercial healthcare facilities in India, according to sources. By undergoing surgery remotely, Indian patients would be able to avoid paying for their journey and accommodations on top of the usual hospitalization costs. Both helping surgeons and teaching future medical workers to become surgeons have shown that robots are indispensable. The process has become shorter and more efficient, which has accelerated the training of younger, more skilled surgeons.⁵ This change is being spearheaded by the Indian government. The goal of the Ayushman Bharat Digital Mission (ABDM) is to offer the infrastructure needed to maintain the country's integrated digital health system. By utilizing digital highways, it will shorten the distance between the several players in the healthcare ecosystem. In the upcoming years, the government must emphasize enhancing the infrastructure for healthcare and advocating for a quicker absorption and integration of technology at all levels. Robots are meant to be the source of genuine intelligence in operating rooms. It is projected that the use of semi-autonomous and autonomous robots for predictable, consistent, and efficient medical treatments would increase.⁶

Legal recognition to Robotics in Indian Health Industry. The concept of "digital health" integrates digital technology with healthcare to enhance efficiency and personalize treatment. Though not explicitly defined in India, the Digital Information Security in Healthcare Act of 2018 (DISHA) outlines "digital health data" as electronic records containing an individual's health-related information. This encompasses data on physical and mental health, services received, donations, and medical test results. The Telemedicine Practice Guidelines (TPG) issued by the Indian government aim to establish telemedicine as routine practice, aligning with WHO's definition of telemedicine as delivering healthcare services using information and communication technologies. Various tools and services in healthcare utilize information and communication technology (ICT) to prevent, treat, and monitor illnesses. Digital health encompasses genetic and digital technology applications for early illness identification and treatment, overseen by the Ministry of Health and Family Welfare (MoHFW). Key emerging technologies in India's digital healthcare system include robot-assisted surgery, self-monitoring healthcare devices, electronic health records (EHRs), targeted advertising, personal ge-

⁴ Ibid.

⁵ Ibid.

⁶ Ibid.

nomics, precision medicine, biomarker tools, e-pharmacies, Cloud computing, AI, tel-medicine, mobile health, machine learning, medical imaging, big data, the Internet of Medical Things (IoMT), and medical imaging.

In India, digital health technology is governed by various rules and regulations, including the IT Act, Information Technology (Intermediaries Guidelines) Rules of 2011, and Information Technology (Reasonable Security Practices and Procedures and Sensitive Personal Data and Information) Rules of 2011. These laws ensure secure online transactions and address cybercrime. While India lacks specific regulations for robotics in healthcare, existing laws like the Medical Devices Rules, 2017, and the Consumer Protection Act, 2019, indirectly impact their use. The Personal Data Protection Bill, 2019, aims to regulate data processing, including health-related information, which will affect robotics in healthcare data management. Ethical guidelines for AI in biomedical research and healthcare have been released by the Indian Council of Medical Research (ICMR), focusing on establishing an ethics framework for AI-based solutions. These guidelines address ethical considerations surrounding AI usage and emphasize safety and precision. The National Health Policy (2017), National Digital Health Blueprint (NDHB 2019), and Digital Information Security in Healthcare Act (2018) aim to streamline AI technologies in healthcare, providing a foundation for the National Health Authority and health information exchanges.

Role of Judiciary in Recognizing the Relevance of Robotics in the Health Care Sector of India: Case Study Analysis. The evolution of the healthcare sector in India has been greatly influenced by the Indian courts, particularly in terms of the incorporation of advanced technologies like as robotics. Through landmark decisions, the courts have highlighted the need of defending human rights, advancing sustainable development, and overcoming the challenges posed by the COVID-19 pandemic. The Indian court has been essential in construing and upholding the tenets of sustainable development, especially in relation to Sustainable Development Goal 3 (SDG 3), which centers on guaranteeing the health and well-being of everyone. Furthermore, the court has played a pivotal role in molding the legal terrain pertaining to healthcare, technical innovations such as robots, and the essential human entitlement to health and life.

In the case of *State of Punjab v. Mohinder Singh Chawla*,⁷ the Supreme Court established that the right to health is an integral part of the right to life under Article 21 of the Constitution. This judgment laid the foundation for future judicial interventions that emphasize the necessity of providing access to advanced healthcare technologies, including robotics, to ensure that citizens receive the highest standard of care. Robotics in healthcare, particularly in surgeries and diagnostics, aligns with this mandate by enhancing precision and reducing human error, thereby protecting the fundamental right

⁷ (1997) 2 SCC 83.

to life. Similarly, in *Dr. X v. Hospital Z*,⁸ the court dealt with issues of medical confidentiality and patient rights, reinforcing the ethical dimensions of healthcare. The use of robotics in healthcare must be aligned with these ethical considerations, ensuring that patient data and rights are protected while leveraging technological advancements to improve outcomes.

In an earlier decision, *Paschim Banga Khet Mazdoor Samity v. State of West Bengal*,⁹ the Supreme Court further expanded the scope of the right to health, holding that the state is obligated to ensure the availability of medical facilities, especially during emergencies. This ruling underscored the necessity of a robust healthcare system that can respond effectively to public health needs, a central tenet of SDG 3. The Court's directive for the state to improve its healthcare services highlights the judiciary's role in pushing for systemic reforms aligned with sustainable development goals. The judgment in *Vinod Kumar Soni v. Union of India*,¹⁰ which addressed the regulation of new technologies in healthcare, highlighted the balance between innovation and ethical concerns. The judiciary's acknowledgment of the need for a regulatory framework for emerging technologies, including robotics, is crucial for sustainable development in the healthcare sector. This ensures that while the benefits of robotics, such as efficiency and precision, are harnessed, they are implemented in a manner that is ethical and sustainable, safeguarding public health and safety.

In *Puttaswamy v. Union of India*,¹¹ the Supreme Court's recognition of the right to privacy as a fundamental right has significant implications for the use of robotics in healthcare. The deployment of robotic systems in healthcare must respect patient privacy, especially when dealing with sensitive health data. This judgment ensures that while robotics can enhance healthcare delivery, it must not infringe upon the privacy rights of individuals. *Common Cause v. Union of India*,¹² which dealt with the right to die with dignity, also has implications for the use of robotics in healthcare, particularly in end-of-life care. Robotics can play a role in palliative care, providing support to patients while ensuring that their autonomy and dignity are respected, in line with the court's directives.

The COVID-19 pandemic brought unprecedented challenges to the healthcare sector, prompting the judiciary to take decisive actions. In the *Delhi High Court on Telemedicine*,¹³ the court recognized the role of telemedicine and, by extension, tele-robotics, as essential tools in managing the pandemic. The judgment underscored the importance of integrating technology into healthcare to maintain continuity of care while minimizing physical contact, thereby reducing the spread of the virus. The Supreme

⁸ (1998) 8 SCC 296

⁹ (1996) 4 SCC 37

¹⁰ (2005) Cri LJ 3408 (MP)

¹¹ (2017) 10 SCC 1

¹² (2018) 5 SCC 1

¹³ *Dr. Kunal S. Rathi v. Union of India*, 2020 SCC OnLine Del 1045

Court on Oxygen Supply¹⁴ further highlighted the need for technological solutions to manage critical resources in healthcare. The integration of robotics in managing logistics, such as oxygen supply chains, can be seen as a response to the court's call for innovative solutions to healthcare crises. The judgment emphasized the responsibility of the state to ensure the availability of essential resources, a task that can be efficiently managed with the help of advanced robotics. The Madras High Court on COVID-19 Testing¹⁵ emphasized the need for widespread and accessible testing during the pandemic. Robotics, particularly in automated testing and diagnostics, can be a game-changer in making healthcare more accessible and efficient. The judiciary's focus on accessibility and the equitable distribution of healthcare resources aligns with the broader use of robotics to bridge gaps in the healthcare system.

The Indian judiciary has consistently underscored the importance of a balanced approach to development, one that integrates respect for human rights, the promotion of health and well-being, and the responsible adoption of technological advancements. Through its rulings, the judiciary has not only endorsed the integration of emerging technologies such as robotics in the healthcare sector but has also ensured that these innovations align with the broader objectives of sustainable development and human rights. This approach is particularly critical in the context of Sustainable Development Goal 3 (SDG 3), which seeks to ensure healthy lives and promote well-being for all at all ages. By advocating for inclusivity, equity, and sustainability in healthcare advancements, the judiciary has played a pivotal role in shaping a healthcare system that not only benefits from cutting-edge technologies but also remains committed to the broader goals of social justice and human rights. Through landmark judgments, the Indian judiciary has reinforced the right to health as an essential human right, promoted the ethical integration of technologies like robotics in healthcare, and emphasized the need to balance technological progress with the protection of human rights. These judicial interventions have been instrumental in establishing a legal and ethical framework that supports sustainable development, guarantees access to high-quality healthcare, and upholds the fundamental rights of individuals. In doing so, the judiciary has significantly contributed to advancing the goals of the United Nations' 2030 Agenda for Sustainable Development, ensuring that healthcare progress is both equitable and sustainable.

5 Conclusion

As AI expands its reach, its intersection with human rights becomes more evident. Without strong data protection regulations, society is vulnerable to exploitation by technology companies, posing risks to privacy and human rights. The unchecked intrusion of AI into people's lives threatens security, economic rights, and fundamental freedoms.

¹⁴ Re: Distribution of Essential Supplies and Services During Pandemic, (2021) 10 SCC 130

¹⁵ D. Muthukumaran v. The State of Tamil Nadu, W.P. No. 9742 of 2020

Addressing these issues requires comprehensive legal frameworks in our evolving digital societies, including transparent AI decision-making, accountability for tech companies, and empowering civil society to scrutinize the impact of new technologies. In healthcare, integrating AI prompts questions about balancing innovation with traditional practices. Rather than fearing or uncritically embracing AI, a balanced approach is needed to determine its appropriate use alongside traditional methods. Robust legislative frameworks are vital to ensure the benefits of AI in healthcare outweigh the risks. Additionally, supporting human professionals alongside AI advancements promotes safety and innovation in medical technology.

The difficulty is finding a balance between the growth of technology, the protection of human rights, and ensuring that the third sustainable development goal—access to quality medical care—is met. To successfully negotiate this complicated terrain, cooperation amongst a variety of stakeholders is required, including governments, commercial companies, academics, NGOs, and the general public. A basis for safeguarding security and privacy in the digital era is provided by established norms, such as those set forth by the Council of Europe Convention on Data Protection and the European Court of Human Rights. Authorities must ensure that the private sector adheres to human rights norms in AI development and implementation. Moreover, promoting AI literacy through public awareness campaigns is crucial for empowering individuals to engage with AI technology responsibly. Finally, national human rights frameworks must be equipped to address emerging forms of discrimination stemming from AI usage.

6 Recommendations

To effectively minimize negative impacts on human rights associated with AI, companies should explore a variety of strategies, including conducting thorough impact assessments, establishing clear guidelines for AI usage, and promoting transparency throughout the organization. By fostering a culture of collaboration and open communication, organizations can create a comprehensive approach to responsible AI that not only mitigates risks but also enhances trust and accountability.

1. Assess AI Applications within the Organization

Begin by evaluating how various functions within your organization are currently utilizing AI technologies. Engage with relevant teams to gather insights into their existing or planned AI applications. Once this information is collected, compile a comprehensive list of these applications and prioritize them based on their associated risks. This foundational understanding is crucial for effective management and oversight.

2. Exercise due care to respect basic human rights

To determine and lessen the possible and real effects of AI solutions on people, start a process of due diligence for human rights. Rather than concentrating on broad economic risks, this evaluation should particularly address concerns to human rights. Understand that the field of AI applications is dynamic and that continual assessments are necessary. Do focused evaluations of the influence of new AI technologies on human rights in order to spot any new dangers. To protect human rights, use the results to improve the technologies or put the appropriate mitigating measures in place.

3. Define Purpose and Usage Restrictions

Establish a clear purpose for the deployment of AI technologies within your organization. It is essential to set limitations within your implementation guidelines to prevent misuse. If your AI solutions are intended for external sharing, develop comprehensive acceptable use policies that outline the permissible and prohibited actions for users. This clarity helps ensure responsible usage of AI technologies.

4. Create a Governance Framework for Responsible AI Use

Develop a robust governance framework to address the ethical and human rights implications of AI. Organizations should ask critical questions about how they identify, assess, and manage these implications. Some companies enhance their existing ethics committees with specialized expertise or develop guiding principles specifically for AI usage. Others establish dedicated councils to provide advice and oversight on AI-related matters, ensuring responsible governance.

5. Prioritize Robust Data Protection

Understand that management of personal data is the root cause of many issues related to AI and human rights. Companies should take a proactive approach to data protection rather than just complying with current privacy requirements. Adopt thorough privacy and data protection policies that comply with the strictest international standards. This will guarantee that privacy measures are incorporated from the beginning instead of depending only on individual right claims.

6. Check for Prejudice and External impacts in AI Models

Regularly assess AI models to identify and address biases present in data inputs, which can lead to discrimination and unequal access to resources. Conduct thorough audits of the data utilized in your AI models to ensure fairness and equity. This ongoing evaluation helps mitigate negative human rights impacts and fosters more inclusive AI applications.

7. Ensure Transparency Regarding AI Model Functioning

Communicate openly about the functioning of AI models with all stakeholders. Developers should disclose critical information such as the sources of training data, optimization metrics, and key limitations of the models. Additionally, organizations should

strive to make these technologies understandable to end users and employees, enhancing their ability to make informed decisions based on the capabilities and constraints of AI.

8. Incorporate Feedback Mechanisms

Establish channels for users to report potential misuse or abuse of AI solutions. It is crucial to prioritize employee input when determining how to implement new technologies. Create effective mechanisms for gathering and integrating feedback from employees regarding the deployment and use of AI. This approach fosters accountability and promotes a culture of collaboration and continuous improvement.

9. Prepare for Impending Regulations

Ahead of time, become familiar with legislation like the EU AI Act and the EU Corporate Sustainability Due Diligence Directive (CSDD). To start, incorporate AI concerns into your company's larger human rights due diligence procedures. Alternatively, carry out focused evaluations on certain AI use cases to find possible dangers to human rights. Being ahead of the curve in terms of regulatory readiness guarantees adherence to changing legal standards while also showcasing a dedication to moral AI practices.

10. Foster Dialogue with Industry Peers

Engage in discussions with industry peers to collectively address the impacts of AI technologies, especially in sensitive sectors like healthcare. By collaborating with other organizations, you can enhance understanding of the human rights implications of AI, share knowledge, and develop best practices that prioritize ethical considerations in the use of AI technologies. This collective approach strengthens the commitment to responsible AI practices across the industry.

These recommendations, when implemented, will not only enhance the ethical deployment of AI technologies but also promote a culture of responsibility, transparency, and continuous improvement within organizations.

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