

# Artificial Intelligence as the Future of Creativity and Human Identity: Adapting and Redefining Human-Machine Relationships

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## Abstract

As we advance through 2024, the horizon is increasingly enriched with artificial intelligence (AI) innovations poised to redefine conventional boundaries. The effects of AI on work and workers are a major topic of discussion, with concerns about widespread displacement of human labour as AI-driven technologies are integrated into workplaces and labour processes. The World Economic Forum (WEF) projects that AI and autonomous machines could replace 85 million jobs by 2025, but also create 97 million new positions in an evolving division of labour between humans, machines, and algorithms. (1) This suggests that the future will involve job substitution rather than mere displacement. Here, we have focused on the positive impacts of AI across various fields and also explored how it has influenced different sectors of society. Our analysis reveals that AI is not destined to replace human workers, but rather calls for a redefinition of roles and skills, enabling AI to become an integral part of our development and progress.

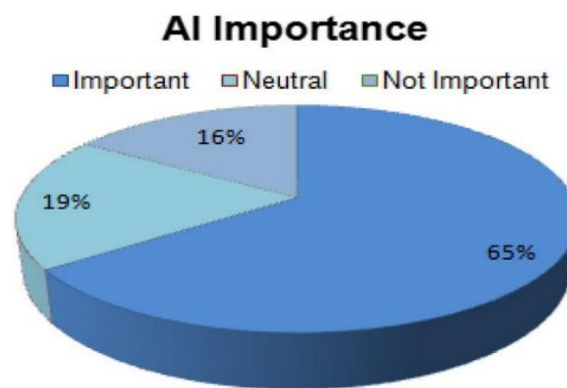
**Keywords:** Artificial Intelligence, AI Innovations, Social Impact, autonomous machines, job substitution, displacement, positive impacts.

## Introduction

At the heart of this reinvention lies the symbiotic relationship between AI and various fields like Maths, medicine, health services, schools, offices, agriculture, design, etc. Through the integration of advanced machine learning, deep learning, and computational techniques, computer scientists are pushing the boundaries of what's possible, revolutionizing the landscape of problem-solving and decision-making. AI has indeed become an integral part of our daily lives, seamlessly woven into the fabric of modern society. In today's fast-paced world, it's hard to imagine a society that isn't advancing at a rapid pace, and much of this progress is driven by AI. The absence of AI could potentially slow down innovation and development, making it difficult for such a society to keep up with the ever-evolving global landscape. AI's influence spans across various sectors, from healthcare and education to finance and entertainment, making it a crucial component of contemporary progress.

Is AI really needed in human society? It depends. If human opts for a faster and effective way to complete their work and to work constantly without taking a break, yes, it is. However, if humankind is satisfied with a natural way of living without excessive desires to conquer the order of nature, it is not. History tells us that human is always looking for something faster, easier, more effective, and convenient to finish the

task they work on; therefore, the pressure for further development motivates humankind to look for a new and better way of doing things. Humankind as the homo-sapiens discovered that tools could facilitate many hardships for daily livings and through tools they invented, human could complete the work better, faster, smarter and more effectively. The invention to create new things becomes the incentive of human progress. We enjoy a much easier and more leisurely life today all because of the contribution of technology. (18) The human society has been using the tools since the beginning of civilization, and human progress depends on it. The human kind living in the 21<sup>st</sup> century did not have to work as hard as their forefathers in previous times because they have new machines to work for them. It is all good and should be all right for these AI being used in almost all the fields and remembering the ethical concerns surrounding its use and developments.



**Figure 1- Importance of AI**

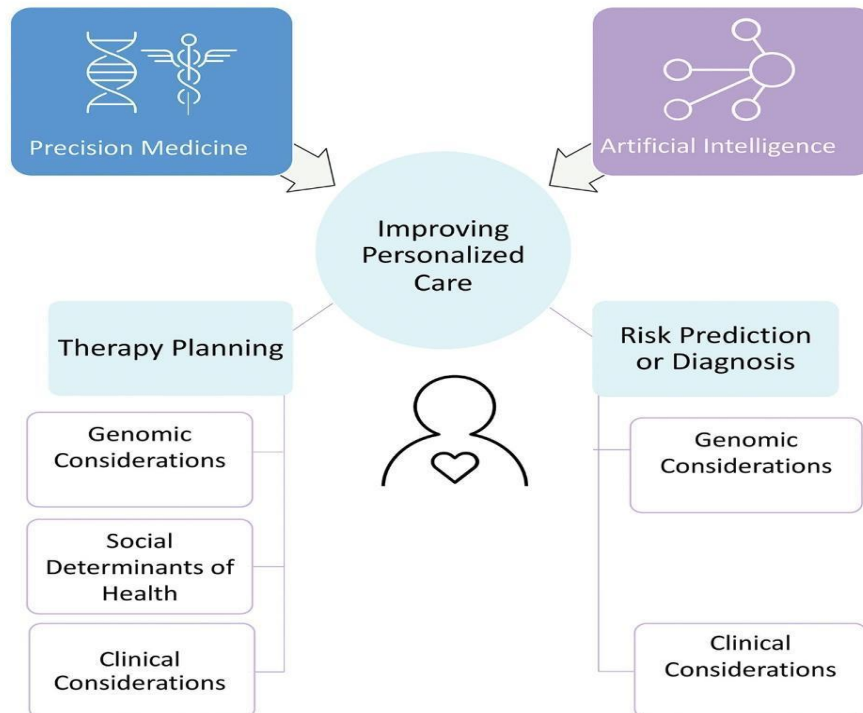
### Methodology

The study adopted field survey approach as primary data source for investigating the research problem. The nature of study is exploratory. A representative and qualitative data collection and research has been done, providing comprehensive metadata on the past and present scientific landscape of artificial intelligence and its effects, its incentives, its benchmarks, and its challenges and requirements. The quality of the database depends on the appropriateness of the search strategy applied. The search term must involve all important synonyms. For this study the terms: “Artificial Intelligence, AI Innovations, Social Impact, autonomous machines, job substitution, displacement, positive impacts”, were applied. To retrieve only the original research publications, only data from the publication type “Articles” was downloaded. No limitation of the evaluation period was made so that most articles till May 2024 were included in the analysis. Secondly survey is able to provide a complete picture of AI- its positive and negative role and also able to increase concerns about ethical issues.

### AI in Medicine:

In today’s world, artificial intelligence (AI) is playing a crucial role in revolutionizing various industries, including healthcare. A recent study revealed that AI can perform medical interviews and provide diagnoses based on a patient’s medical history, potentially transforming the healthcare industry. This development can help doctors make more accurate diagnoses and provide better treatment options to patients. AI can analyze vast amounts of data and identify patterns humans might miss. This ability of AI can help healthcare professionals detect diseases at an early stage, which can save lives. Moreover, AI can help create personalized patient treatment plans by considering their medical history, genetics, lifestyle,

and other factors. Alongside diagnostic capabilities, AI makes headway in unexpected areas such as human interaction. AI-powered assistants can provide emotional support to patients, which can help improve their mental health and well-being. Additionally, AI-powered technologies can help improve communication between healthcare professionals and patients, enhancing the overall quality of care.



**Figure 2- AI in Medicine**

According to the World Economic Forum (WEF), the future of AI in healthcare will dramatically change between now and 2030 in the following three ways:

**Connected care** -AI in healthcare will help detect patterns and connect systems. This will allow for a network of seamless sharing of data, to anywhere, from anywhere. This shared data and information will create life-saving connectivity across the globe.

**Better AI-powered predictive care** -Improved data will evaluate the probability and risk of an individual developing a disease in the future.

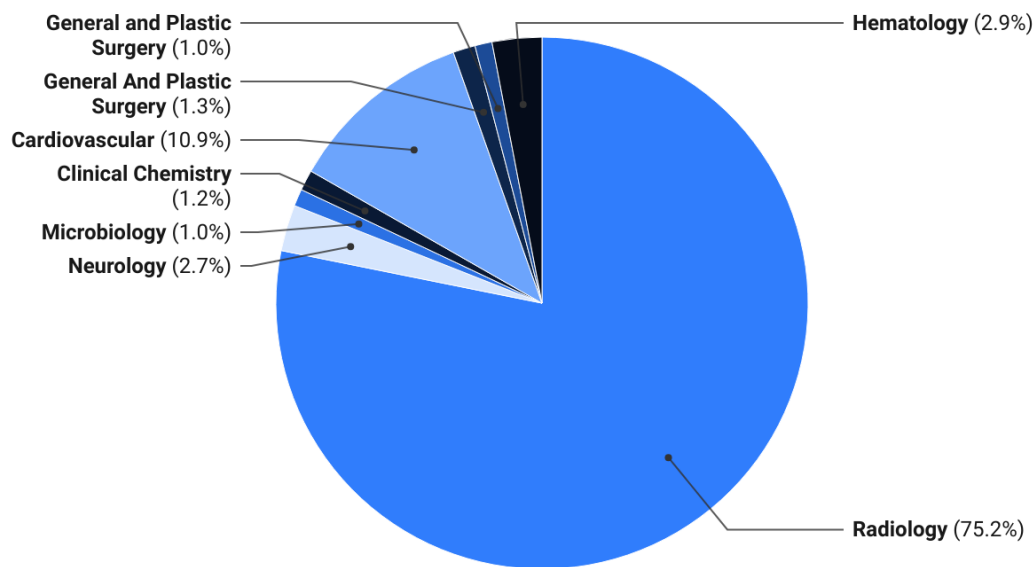
**Improved patient and staff experiences**-As AI evolves, it will continue to improve patient and provider experiences, including reducing wait times for patients and improved overall efficiency in hospitals and health systems. (10)

Articulate Medical Intelligence Explorer (AMIE) is a chatbot designed to communicate with patients and provide them with medical advice. In a recent study, AMIE was tested against human doctors to assess its empathy and conversation quality performance. The study found that AMIE outperformed physicians in 24 out of 26 criteria for conversation quality. This means that the chatbot could provide patients with a similar level of empathy and support as human doctors, and in some cases, even better.

This is a significant development in the healthcare field, as it suggests that AI-powered chatbots like AMIE can support patients in ways that human doctors may be unable to. For example, AI chatbots can provide patients with 24/7 medical advice, which is not always possible for human doctors who have limited availability. Additionally, AI chatbots can analyze vast amounts of patient data to provide personalized

medical advice, which can be difficult for human doctors to do promptly. Overall, the results of this study are promising and suggest that AI-powered chatbots like AMIE have the potential to revolutionize the healthcare industry by providing patients with more accessible and personalized medical advice. (4)

### AI - ENABLED DEVICES ACROSS MEDICAL DISCIPLINES



Source: Enterprise Apps Today

**Figure 3- AI enabled devices across medical disciplines**

#### AI for better accessibility:

AI has the potential to improve healthcare access in remote or underserved areas. AI-powered telemedicine enables patients receive medical advice from doctors and specialists without needing physical visits or travel at any time and from anywhere. (11) This can significantly benefit patients who might not otherwise have access to medical care due to distance or other barriers.

AI can also help streamline the healthcare process by automating routine tasks, simplifying administrative procedures, and reducing waiting times. For instance, AI-powered chatbots can help patients book appointments, manage prescriptions, and ask medical questions without human intervention. This can save time and resources for healthcare providers and improve the patient experience.

Moreover, AI can aid healthcare professionals in diagnosing and treating diseases accurately and efficiently. AI algorithms can analyze medical images, detect patterns, and provide insights that might be difficult for human experts to see. This can help doctors make more informed decisions and improve patient outcomes.

We believe that AI has an important role to play in the healthcare offerings of the future. In the form of machine learning, it is the primary capability behind the development of precision medicine, widely agreed to be a sorely needed advance in care. Although early efforts at providing diagnosis and treatment recommendations have proven challenging, we expect that AI will ultimately master that domain as well. Given the rapid advances in AI for imaging analysis, it seems likely that most radiology and pathology

images will be examined at some point by a machine. Speech and text recognition are already employed for tasks like patient communication and capture of clinical notes, and their usage will increase. (19)

### 10 AI Applications That Could Change Health Care

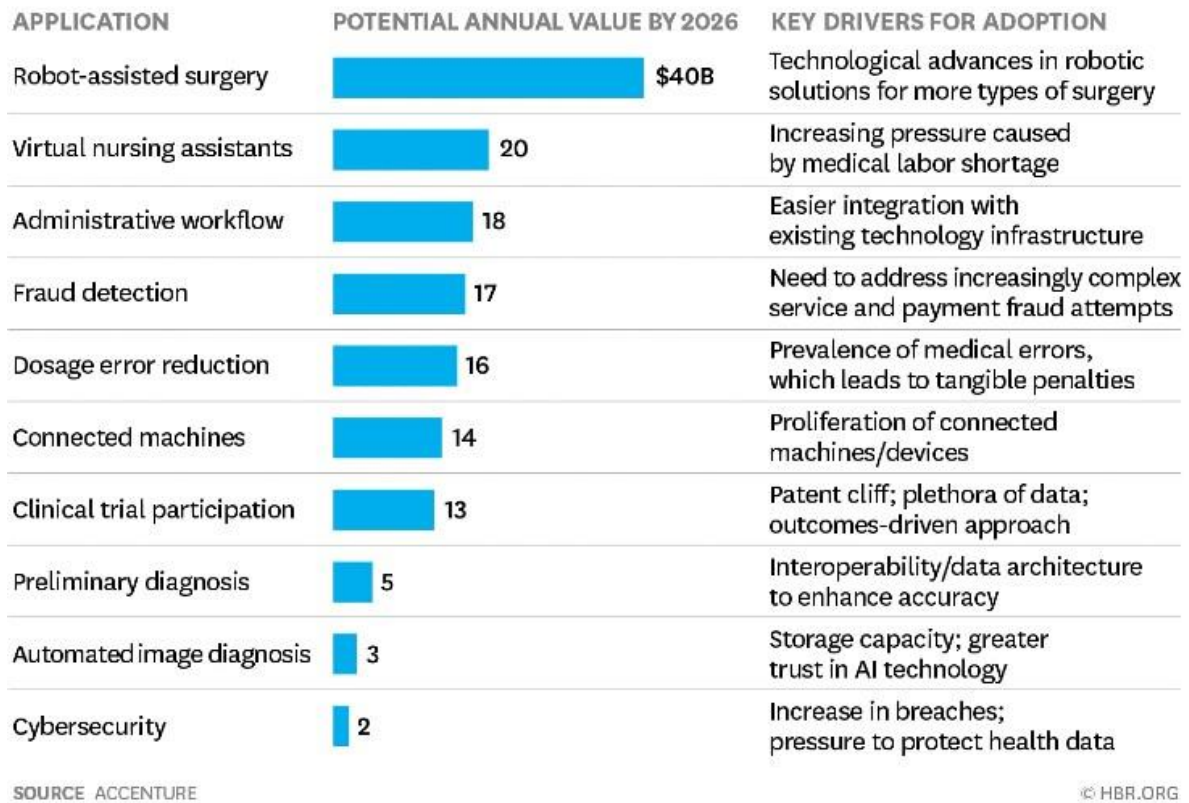


Figure 4- 10 AI applications that could change Health care

#### Diagnostics and drug discovery with AI:

AI has become an increasingly valuable tool in the healthcare industry. One of its most notable applications is diagnosing complex diseases like skin cancer. In recent years, AI-powered deep-learning models have been developed to assist dermatologists and doctors in identifying skin lesions. These models have been trained on tens of thousands of images, allowing them to improve diagnostic accuracy. AI algorithms can analyze vast amounts of genetic information, clinical trial results, and patient history. This allows them to detect patterns and relationships that may not be immediately apparent to humans. (9) Using this approach, researchers have discovered new medications and treatments for various conditions, including cancer and multiple myeloma.

Thanks to AI, researchers have identified new drug targets and designed more effective drugs targeting the underlying mechanisms of different diseases. This breakthrough may lead to better outcomes and quality of life for patients. AI-powered systems can assist healthcare professionals in creating personalized treatments and therapies for patients based on their genetic makeup and medical history. This customized approach to treatment can result in improved patient outcomes as they receive treatments tailored to their specific needs and characteristics.

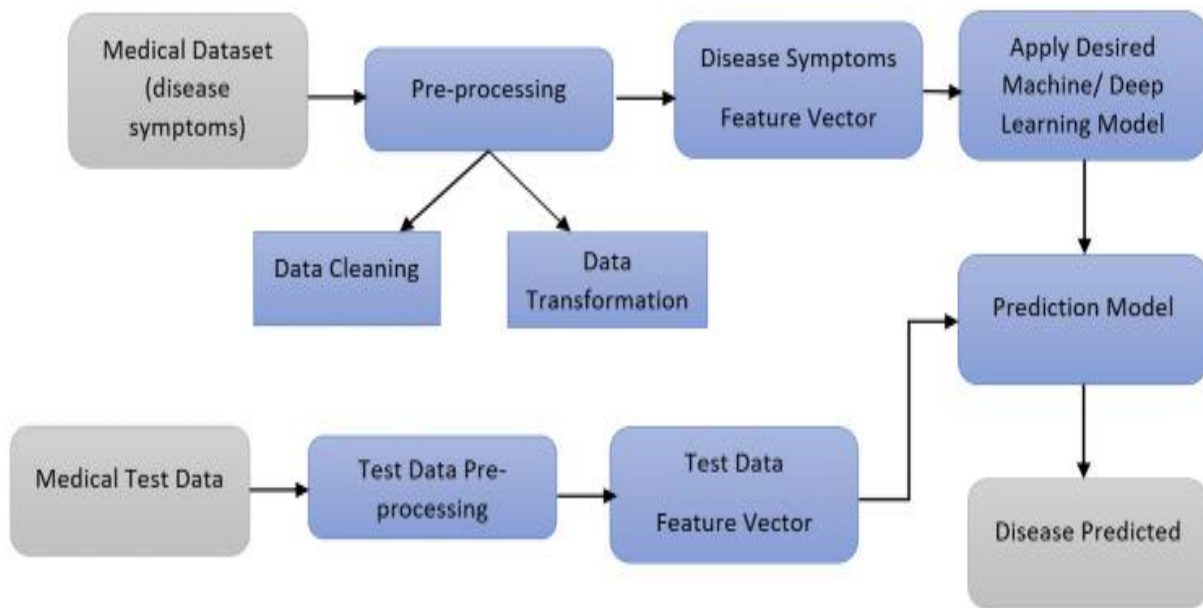


Figure 5- AI in Health Care

**AI in Mathematics:**

Traditional pedagogical approaches often prioritize rote memorization and procedural fluency, neglecting deeper conceptual understanding and critical thinking skills. However, AI-driven educational technologies, such as adaptive learning systems and interactive simulations, are revolutionizing math education by fostering conceptual clarity, personalized instruction, and active engagement. In addition to transforming education, the rise of AI in mathematics has far-reaching implications for scientific research, technological innovation, and societal advancement. From unlocking the mysteries of the universe through advanced mathematical modelling to optimizing complex systems and processes in engineering, finance, and healthcare, AI-powered mathematical algorithms are driving breakthroughs that were once thought impossible. AI and Mathematics together represents a pivotal moment in the evolution of mathematical thinking and practice. By embracing the synergies between mathematics and artificial intelligence, we can unlock new frontiers of knowledge, drive innovation across diverse domains, and shape a future where mathematical literacy is more accessible, inclusive, and impactful than ever before. (2)

**AI in marketing and marketing jobs:**

There are plenty of ways AI has already embedded itself in the marketer’s day-to-day life. (3) This specifically includes:

**Predictive AI:** AI can help marketers predict performance on things like email open rates and ad performance.

**AI image generation:** AI can generate images that marketers can use in campaigns.

**AI copywriting:** AI uses machine learning and natural language processing (NLP) to generate copy that fits a particular tone, style, and format.

**Chatbots:** AI-powered chatbots work using NLP technology to interpret knowledge and understand conversation structure to respond to customer queries, instead of relying on pre-programming.

**Data enrichment and cleanup:** AI can help marketers clean up their contact lists and enrich data to remove broken records and data mismatches.

**Social media:** AI and machine learning can be used in social media marketing to create high-performance campaigns, provide insights on buyer personas, suggest optimum publishing times, and track the performance of marketing campaigns.

**Automation:** AI can automate repetitive manual tasks, saving marketers time and money.

### **AI in Agriculture:**

The growth of the global population, which is projected to reach 10 billion by 2050, is placing significant pressure on the agricultural sector to increase crop production and maximize yields. To address looming food shortages, two potential approaches have emerged: expanding land use and adopting large-scale farming, or embracing innovative practices and leveraging technological advancements to enhance productivity on existing farmland. Pushed by many obstacles to achieving desired farming productivity — limited land holdings, labour shortages, climate change, environmental issues, and diminishing soil fertility, to name a few — the modern agricultural landscape is evolving, branching out in various innovative directions. Farming has certainly come a long way since hand plows or horse-drawn machinery. Each season brings new technologies designed to improve efficiency and capitalize on the harvest. (5) However, both individual farmers and global agribusinesses often miss out on the opportunities that artificial intelligence in agriculture can offer to their farming methods.

### **Benefits of AI in agriculture:**

Until recently, using the words AI and agriculture in the same sentence may have seemed like a strange combination. After all, agriculture has been the backbone of human civilization for millennia, providing sustenance as well as contributing to economic development, while even the most primitive AI only emerged several decades ago. Nevertheless, innovative ideas are being introduced in every industry, and agriculture is no exception. In recent years, the world has witnessed rapid advancements in agricultural technology, revolutionizing farming practices. These innovations are becoming increasingly essential as global challenges such as climate change, population growth together with resource scarcity threaten the sustainability of our food system. Introducing AI solves many challenges and helps to diminish many disadvantages of traditional farming. The AI in agriculture market is expected to grow from USD 1.7 billion in 2023 to USD 4.7 billion by 2028, according to Markets and Markets. Traditional farming involves various manual processes. Implementing AI models can have many advantages in this respect. By complementing already adopted technologies, an intelligent agriculture system can facilitate many tasks. AI can collect and process big data, while determining and initiating the best course of action.

### **Data-based decisions:**

The modern world is all about data. Organizations in the agricultural sector use data to obtain meticulous insights into every detail of the farming process, from understanding each acre of a field to monitoring the entire produce supply chain to gaining deep inputs on yields generation process. AI-powered predictive analytics is already paving the way into agribusinesses. Farmers can gather, then process more data in less time with AI. Additionally, AI can analyze market demand, forecast prices as well as determine optimal times for sowing and harvesting. Artificial intelligence in agriculture can help explore the soil health to collect insights, monitor weather conditions, and recommend the application of fertilizer and pesticides. Farm management software boosts production together with profitability, enabling farmers to make better decisions at every stage of the crop cultivation process.

### **Cost savings:**

Improving farm yields is a constant goal for farmers. Combined with AI, precision agriculture can help farmers grow more crops with fewer resources. AI in farming combines the best soil management practices, variable rate technology, and the most effective data management practices to maximize yields while minimizing spending. Application of AI in agriculture provides farmers with real-time crop insights, helping them to identify which areas need irrigation, fertilization, or pesticide treatment. Innovative farming practices such as vertical agriculture can also increase food production while minimizing resource usage. Resulting in reduced use of herbicides, better harvest quality, higher profits alongside significant cost savings.

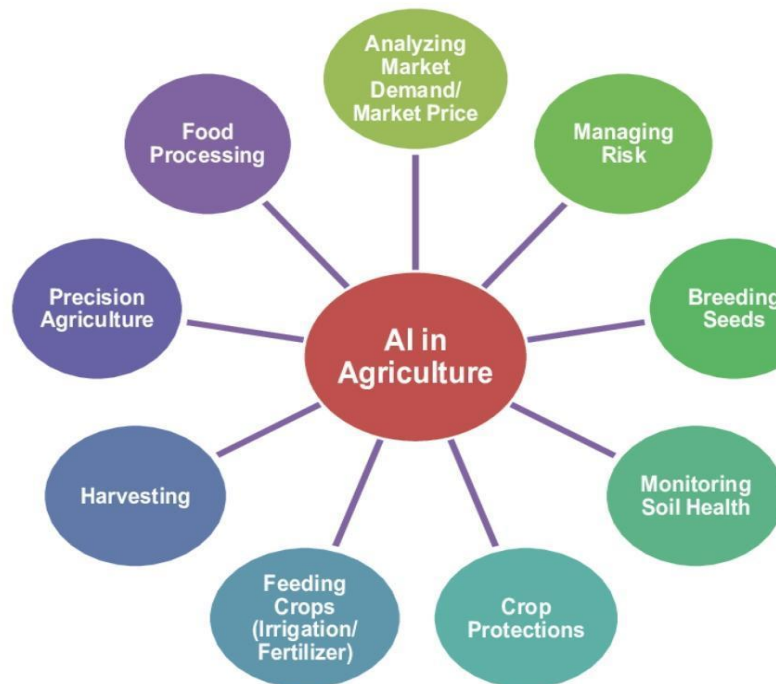
### **Automation impact:**

Agricultural work is hard, so labour shortages are nothing new. Thankfully, automation provides a solution without the need to hire more people. While mechanization transformed agricultural activities that demanded super-human sweat and draft animal labour into jobs that took just a few hours, a new wave of digital automation is once more revolutionizing the sector. Automated farm machinery like driverless tractors, smart irrigation, fertilization systems, IoT-powered agricultural drones, smart spraying, vertical farming software, and AI-based greenhouse robots for harvesting are just some examples. Compared with any human farm worker, AI-driven tools are far more efficient and accurate.

### **Detecting leaks or damage to irrigation systems:**

AI plays a crucial role in detecting leaks in irrigation systems. By analyzing data, algorithms can identify patterns and anomalies that indicate potential leaks. Machine learning (ML) models can be trained to recognize specific signatures of leaks, such as changes in water flow or pressure. Real-time monitoring and analysis enable early detection, preventing water waste together with potential crop damage. AI also incorporates weather data alongside crop water requirements to identify areas with excessive water usage. By automating leak detection and providing alerts, AI technology enhances water efficiency helping farmers conserve resources.





**Figure 6 - AI in Agriculture**

### **Crop and soil monitoring:**

The wrong combination of nutrients in soil can seriously affect the health and growth of crops. Identifying these nutrients and determining their effects on crop yield with AI allows farmers to easily make the necessary adjustments. While human observation is limited in its accuracy, computer vision models can monitor soil conditions to gather accurate data necessary for combatting crop diseases. This plant science data is then used to determine crop health, predict yields while flagging any particular issues. Plants start AI systems through sensors that detect their growth conditions, triggering automated adjustments to the environment. In practice, AI in agriculture and farming has been able to accurately track the stages of wheat growth and the ripeness of tomatoes with a degree of speed and accuracy no human can match.

### **Detecting disease and pests:**

As well as detecting soil quality and crop growth, computer vision can detect the presence of pests or diseases. This works by using AI in agriculture projects to scan images to find mould, rot, insects, or other threats to crop health. In conjunction with alert systems, this helps farmers to act quickly in order to exterminate pests or isolate crops to prevent the spread of disease. AI technology in agriculture has been used to detect apple black rot with an accuracy of over 90%. It can also identify insects like flies, bees, moths, etc., with the same degree of accuracy. However, researchers first needed to collect images of these insects to have the necessary size of the training data set to train the algorithm with. AI-powered drones provide the best advantages of each approach while avoiding their drawbacks. Drones use computer vision to determine the amount of pesticide to be sprayed on each area. While still in infancy, this technology is rapidly becoming more precise.



**Figure 7- Monitoring crop fields with AI**

### **Monitoring livestock health:**

It may seem easier to detect health problems in livestock than in crops, in fact, it's particularly challenging. Thankfully, AI for farming can help with this. For example, a company called Cattle Eye has developed a solution that uses drones, cameras together with computer vision to monitor cattle health remotely. It detects atypical cattle behaviour and identifies activities such as birthing. Cattle Eye uses AI and ML solutions to determine the impact of diet alongside environmental conditions on livestock and provide valuable insights. This knowledge can help farmers improve the well-being of cattle to increase milk production.

### **Yield mapping and predictive analytics:**

Yield mapping uses ML algorithms to analyze large datasets in real time. This helps farmers understand the patterns and characteristics of their crops, allowing for better planning. By combining techniques like 3D mapping, data from sensors and drones, farmers can predict soil yields for specific crops. Data is collected on multiple drone flights, enabling increasingly precise analysis with the use of algorithms. These methods permit the accurate prediction of future yields for specific crops, helping farmers know where and when to sow seeds as well as how to allocate resources for the best return on investment.

### **Automatic weeding and harvesting:**

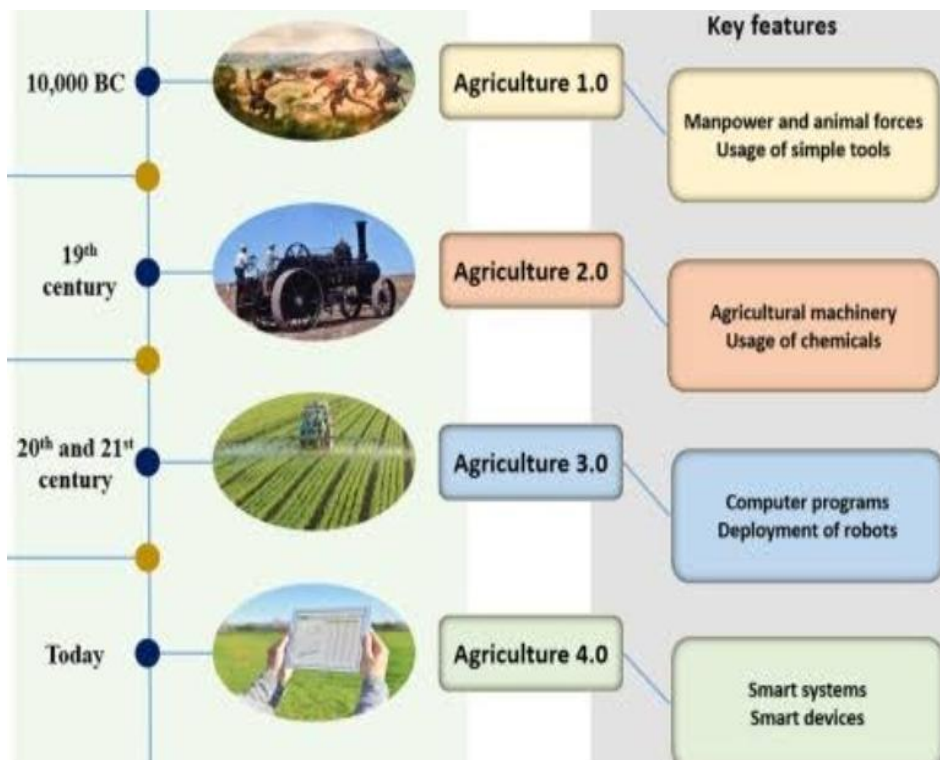
Similar to how computer vision can detect pests and diseases, it can also be used to detect weeds and invasive plant species. When combined with machine learning, computer vision analyses the size, shape, and colour of leaves to distinguish weeds from crops. Such solutions can be used to program robots that carry out robotic process automation (RPA) tasks, such as automatic weeding. In fact, such a robot has already been used effectively. As these technologies become more accessible, both weeding and harvesting crops could be carried out entirely by smart bots.

**Sorting harvested produce:**

AI is not only useful for identifying potential issues with crops while they’re growing. It also has a role to play after produce has been harvested. Most sorting processes are traditionally carried out manually however AI can sort produce more accurately. Computer vision can detect pests as well as disease in harvested crops. It can grade produce based on its shape, size, and colour. This enables farmers to quickly separate produce into categories — for example, to sell to different customers at different prices. In comparison, traditional manual sorting methods can be painstakingly labour-intensive.

**Surveillance:**

Security is an important part of farm management. Farms are common targets for burglars, as it’s hard for farmers to monitor their fields around the clock. Animals are another threat — whether it’s foxes breaking into the chicken coop or a farmer’s own livestock damaging crops or equipment. When combined with video surveillance systems, computer vision and ML can quickly identify security breaches. Some systems are even advanced enough to distinguish employees from unauthorized visitors.



**Figure 8- Growth of Agriculture using AI**

**AI in research and development:**

Scientists have long been challenged by the complex process of drug discovery and development, with investments that often go unrewarded. However, with the advancement of experimental technology and computer hardware, artificial intelligence (AI) has emerged as a leading tool in analyzing abundant and high-dimensional data.

AI is capable of discovering new drugs more efficiently and at a lower cost. Through the explosive growth of biomedical data, AI has led to a revolution in drug R&D, from target discovery to preclinical research, automated drug synthesis, and influences on the pharmaceutical market. AI greatly reduces the cycle time

and cost of drug R&D. While some limitations still remain in the AI-based drug R&D process, it is believed that AI is an indispensable technology in the drug R&D process. In the future, AI technologies will change the R&D paradigm of pharmaceutical sciences, providing personalized medicine to patients.

(6)

Scientists are working hard for further research to inject new energy into this field and keep the momentum going. The emergence of AI is gradually helping scientists unravel the mystery of large and complex biological systems, making it a game-changer in the drug R&D process. As technology continues to advance, the potential of AI in the pharmaceutical industry is limitless.

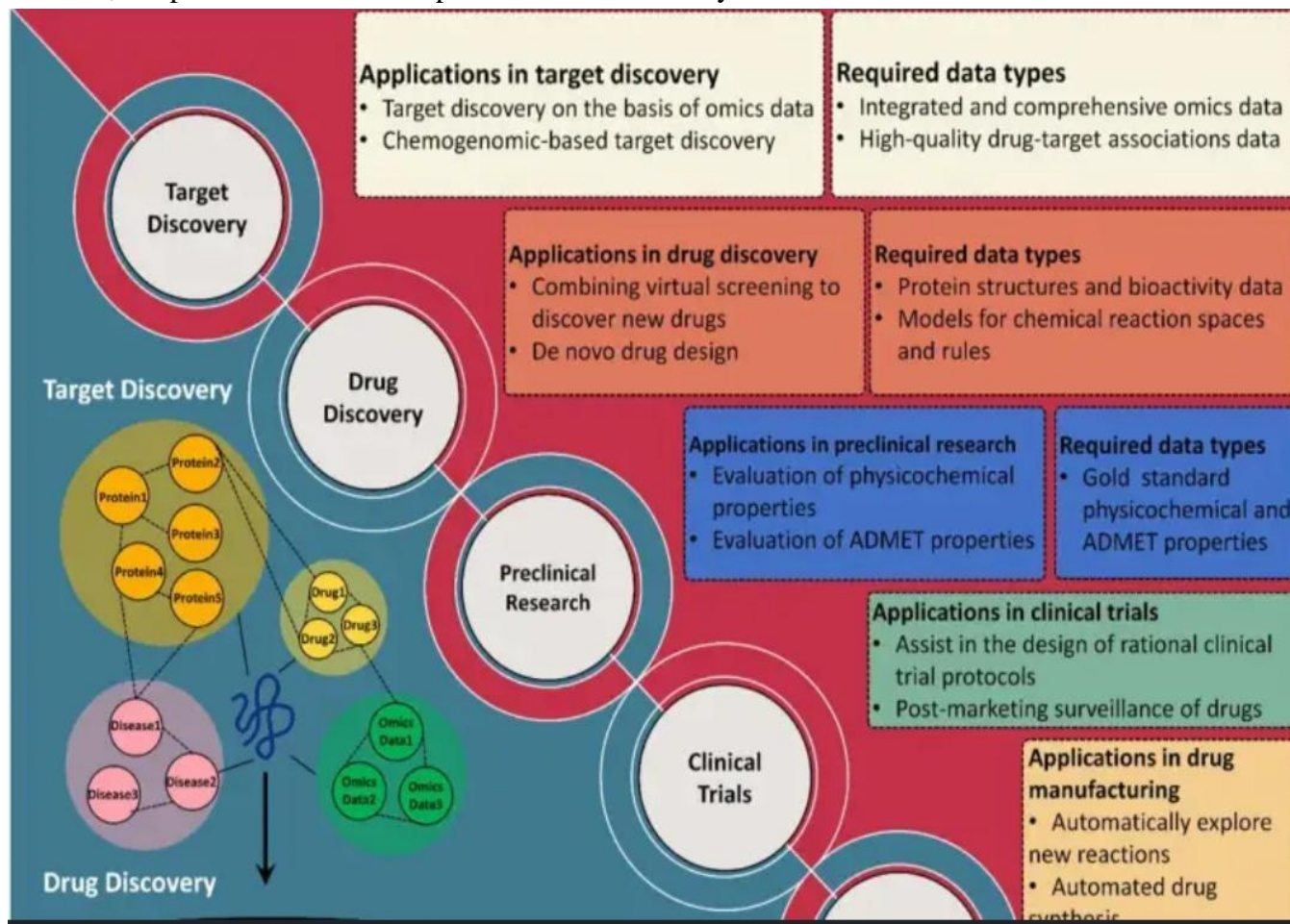


Figure 9- AI in research and development

### AI in engineering:

AI engineering is an emergent discipline focused on developing tools, systems, and processes to enable the application of artificial intelligence in real-world contexts. In contrast to the prevalent rush to develop capabilities and progress in individual tools, AI Engineering asks a different set of questions: How can AI help humans achieve mission outcomes? What are the limits of AI systems in practice today? How can we ensure that ethical standards are upheld as AI systems are deployed?

The rise in availability of computing power and massive datasets have led to the creation of new AI, models, and algorithms encompassing thousands of variables and capable of making rapid and impactful decisions. Too often, though, these capabilities work only in controlled environments and are difficult to replicate, verify, and validate in the real world. The need for an engineering discipline to guide the

development and deployment of AI capabilities is urgent. For example, while an autonomous vehicle functions well cruising down an empty race track on a sunny day, how can it be designed to function just as effectively during a hail storm? AI engineering aims to provide a framework and tools to proactively design AI systems to function in environments characterized by high degrees of complexity, ambiguity, and dynamism. The discipline of AI engineering aims to equip practitioners to develop systems across the enterprise-to-edge spectrum, to anticipate requirements in changing operational environments and conditions, and to ensure human needs are translated into understandable, ethical, and thus trustworthy AI. (7)

### **AI in designing**

AI magic is here to save the world, making us giddy with excitement and terrifying us at the same time. However, AI is still mostly unknown, and figuring out exactly how it will work in the design world is pretty much like trying to figure out how many angels can dance on the head of a pin. AI (artificial intelligence) has become an over-hyped buzzword across many industries and the design world is no exception. There are ongoing conversations between designers and developers around the future impact of AI, Machine Learning, Deep Learning, VR, AR, and MR (virtual, augmented, and mixed realities), and how our jobs may be changing.

So, what does design bring to the conversation? With AI, new relationships will need to be established between customer and product. These interactions will be just the beginning of the ongoing conversation between business and consumer about what artificial intelligence can, and should be able to do for products and services. Designers will bring the necessary empathetic context for innovation, which is how a business will succeed with AI. IBM CEO Ginni Rometty recently expressed that “If I considered the initials AI, I would have preferred augmented intelligence.” (8)

AI is going to be mostly about optimization and speed. Designers working with AI can create designs faster and more cheaply due to the increased speed and efficiency it offers. The power of AI will lie in the speed in which it can analyze vast amounts of data and suggest design adjustments. A designer can then cherry-pick and approve adjustments based on that data. The most effective designs to test can be created expediently, and multiple prototype versions can be tested with users. Instead of being a threat, augmented intelligence will present a series of exciting opportunities. Leveraging those design opportunities is not going to happen by magic, but by designers co-creating with AI as our creativity sits in the crosshairs of art, science, engineering, and design. Technology in the past made us stronger and faster. AI will make us smarter.

### **AI in the Textile Industry**

The emergence of Artificial Intelligence (AI) has significantly impacted various facets of our world, including the field of art. This influence is particularly notable in the realm of traditional art, an area rich in history and tradition. The integration of AI technologies with traditional artistic practices presents a unique opportunity for groundbreaking innovation. AI’s integration with the textile industry signifies a major transformation, moving from labour-intensive methods to automation and data-driven decision-making. AI has become an integral part of every aspect of textile manufacturing, from production to quality control, contributing significantly to improved efficiency, cost reduction, and enhanced product quality.

Artificial Intelligence (AI) profoundly influences the textile industry through advanced tools and technologies, significantly impacting quality control. AI-powered sample-making technology, revolutionizes fabric cutting and minimizes waste in textile production. This technology optimizes fabric layouts and dynamically adapts patterns to accommodate stretching during cutting processes, leading to more efficient production. AI also plays a crucial role in colour matching, a critical aspect of textile production. Companies utilize AI to fine-tune colour tolerances, drawing insights from historical data and human visual inspections. This approach bridges the gap between instrumental measurements and visual standards, enhancing colour consistency in textiles.

### **Rise of threat- Misconception about AI**

Most federal governments and policy makers have a misconception that with increasing adoption of AI, jobs would become redundant, thus adversely affecting the economic goal of job creation. On the contrary, it is being analyzed that with adoption of AI, the employment opportunities are going to increase, and new age skills would be in great demand. Many jobs like caregiving and rehabilitation require human emotions and utmost care which AI cannot currently replicate. AI is integrated in healthcare organizations to assist with care provision, not replace it. Moreover, as AI continues to evolve in healthcare, there would be more jobs created for new skill sets.

AI in healthcare would have advantages of increased efficiency and decreased costs of treatment, leading to higher volume of care delivered. This would result in higher profits and employment opportunities. Thus, it is a misconception that AI would replace healthcare workers; In reality, it can lead to an increase in demand for a qualified workforce and improve efficiency in services like diagnostics, patient engagement and precision medicine. AI is now addressing identified gaps in healthcare services. With its growing population, the world is seeing a shortage of healthcare workers, and this gap continues to widen. As per the World Health Organisation (WHO), the world will be short of about 13 million healthcare workers by 2035. Moreover, training physicians and health workers has been challenging as the demand for qualified trainers remains largely unmet in various countries. (12)

Additionally, a report published by WHO found there is an estimated shortage of about 17.4 million healthcare workers and an availability of only 4.45 skilled health professionals per 1000 people globally. This results in increased demand for healthcare professionals. AI could potentially replace certain administrative jobs such as those associated with medical record maintenance and patient engagement, and at the same time, also increase the demand for specialized professionals.

### **Ethical Issues**

In the emerging era of AI integration in healthcare, we are encountering an excess of ethical dilemmas. The integration of artificial intelligence (AI) into healthcare has the potential to revolutionize the industry by improving patient care, optimizing resource allocation, and advancing medical research. However, the widespread adoption of AI in healthcare also raises a host of ethical concerns that must be carefully considered. (16) The main ethical issues of AI in healthcare includes data bias, informed consent, patient autonomy, transparency, data privacy and security, and accountability.

### **Data Privacy and Security**

Data privacy and security are paramount concerns in the context of AI in healthcare. As healthcare systems increasingly rely on AI to process and analyze vast amounts of patient data, it becomes essential to

safeguard this sensitive information. Healthcare organizations are entrusted with a wealth of patient data, including medical records, diagnostic images, and treatment histories. These records contain highly personal and confidential information, and patients expect that their data will be kept secure and confidential. In the digital age, data breaches can have severe consequences, including identity theft and unauthorized access to medical information, which can lead to harm and distress for individuals. To address these concerns, healthcare organizations and AI developers must implement robust data privacy and security measures.

### **Bias and Fairness**

Bias and fairness are critical aspects of ethical considerations in the use of artificial intelligence (AI) in healthcare. When we talk about bias in AI, we refer to the presence of systematic and unfair discrimination in the outcomes or decisions made by AI algorithms. This bias can emerge from various sources, including biased training data, human prejudices, or flaws in the algorithmic design. In the context of healthcare, biased AI systems can have profound consequences, as they may lead to disparities in the diagnosis, treatment, and overall care of patients. Addressing bias in AI systems is essential to ensure fairness and equity in healthcare. To achieve this, healthcare organizations and AI developers must carefully curate and diversify their training datasets. These datasets should include information from a wide range of demographic groups, ensuring that the AI system is exposed to a representative sample of the patient population. Additionally, it's crucial to implement bias-detection mechanisms within AI systems to continuously monitor and mitigate any emerging biases. Transparency is another vital component in addressing bias and ensuring fairness.

### **Accountability and Transparency**

Accountability and transparency are fundamental principles when it comes to the ethical use of AI in healthcare. These principles are closely interlinked and play a pivotal role in building trust among healthcare professionals and patients alike. Accountability refers to the concept of holding individuals or organizations responsible for their actions and decisions, even when AI systems are involved. In the context of AI in healthcare, accountability means establishing clear lines of responsibility for the outcomes produced by AI algorithms. Transparency, on the other hand, involves making the operations and decision-making processes of AI systems understandable and explainable.

### **Informed Consent**

Informed consent is a fundamental principle in medical ethics that revolves around the concept of autonomy and respect for an individual's right to make informed decisions about their healthcare. It is a process through which healthcare providers ensure that patients understand the nature of a proposed medical procedure, treatment, or intervention, including its potential risks, benefits, alternatives, and any possible consequences. Informed consent serves as a safeguard to protect the patient's autonomy and dignity, enabling them to actively participate in their own healthcare decisions.

When obtaining informed consent, healthcare professionals have a responsibility to provide clear and comprehensible information to patients, allowing them to make choices that align with their values and preferences. This process involves open and honest communication between the healthcare provider and the patient.

In October 2023, the World Health Organization (WHO) released a publication entitled Regulatory considerations on artificial intelligence for health, which emphasizes the ‘importance of establishing AI systems’ safety and effectiveness, rapidly making appropriate systems available to those who need them and fostering dialogue among stakeholders. (17)

### **Summary and Conclusion**

In an era marked by rapid advancements in artificial intelligence (AI) and global staffing shortages, the medical field is undergoing significant treating physicians’ insights into the changing healthcare environment to better prepare for a future where adaptability and foresight are paramount.

The roles of professionals in society are shifting thanks to the development of truly useful and powerful generative artificial intelligence. Every industry will be impacted. Generative AI has the potential to revolutionize the way we treat disease, develop new medicines and personalize treatments to fit individual patients. It will also fundamentally change both the day-to-day working lives of doctors, nurses and other clinical health professionals and even the way they are seen by society. Artificial intelligence, machine learning and deep learning are some of the significant contributions of technology which have proved to be valuable for the healthcare sector. (13) The process of collecting and analyzing health data was once thought to be time-consuming and prone to errors, but the development of these technologies has made it easier while producing accurate results. Moreover, administrative tasks such as pre-authorizing insurance and maintaining records demanded extensive effort but integrating AI into the healthcare ecosystem has eased the workload of healthcare professionals by automating these tasks and saving money in return. Apart from that, machine learning has made early disease detection possible, which has further enabled patients to target quick treatment and cure, thereby decreasing the number of hospital readmissions. AI will not replace doctors, but a doctor who does not know how to use AI will be replaced by someone who is a physician or another clinician who uses the technology. (14)

Doctors possess emotional intelligence and the ability to provide psychological support to patients, which is essential for effective healthcare. AI, no matter how advanced, cannot replicate the human touch and compassion that doctors bring to patient care. They also consider a patient's social, cultural, economic, and environmental factors when diagnosing and understanding the root causes of diseases. AI systems, which primarily rely on data analysis, may overlook these broader contextual aspects, impacting the quality of care. AI will not replace the doctor but will be a valuable tool for the entire healthcare industry. Times are changing fast and the entire industry needs to quickly plan on how to adapt this revolutionary technology through restructuring, legislation, and making sure healthcare is more accessible. (15)

AI has the potential to bring about significant improvements in healthcare, from more accurate diagnoses to personalized treatment plans. However, it is imperative that the ethical implications of AI in healthcare are carefully considered and addressed. Balancing the benefits of AI with ethical concerns is required. Ultimately, ethical AI in healthcare should prioritize the well-being of patients and the integrity of medical practice while harnessing the power of technology to advance medical science and improve patient outcomes. (16)

We are likely to encounter many ethical, medical, occupational and technological changes with the use of AI. It is important that various sectors, as well as governmental and regulatory bodies, establish structures to monitor key issues, react in a responsible manner and establish governance mechanisms to limit negative implications. This is one of the more powerful and consequential technologies to impact human societies, so it will require continuous attention and thoughtful policy for many years.



Thus, AI is here to stay in our world and we must try to enforce the AI bioethics of beneficence, value upholding, lucidity and accountability. Since AI is without a soul as it is, its bioethics must be transcendental to bridge the shortcoming of AI's inability to empathize. AI is a reality of the world and it has a tremendous potential to positively impact all manners of life, from industry to employment to health care and even security.

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