

# The Role of Artificial Intelligence in the Medical Field

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## Abstract

The Artificial Intelligence in the medical field has revolutionized the industry. Recently, A. I. has interested medical practitioners in applying innovation to healthcare systems. A. I. has emerged as a transformative force, revolutionizing the industry by leveraging advanced algorithms and computing power to enhance various aspects of healthcare delivery. The background highlights that artificial intelligence as innovation promises to transform how medical staffs manage patients and treat and diagnose patients. This comprehensive literature review to identify the relevant sources of information on A. I implementation in healthcare, focusing on the advantages and disadvantages. The obtained results from the materials provided valuable insights into the various means A. I. is used in the medical industry and its effects on patient care and recovery. The findings indicated that; A. I. streamlines Tedious Tasks since it is accurate and gives speedy services enabling early detection of illnesses and leading to positive patient outcomes. A. I. provides Real-Time Data which is essential in addressing patients' conditions with clear objectives; the use of A. I. improves helps to reduce Burnout in medical practitioners. The use of A. I. helps provide Precision Medicine since it can obtain and analyze large amounts of information. The future directions encompass the implementation of the legal framework, enhancing transparency and accountability, and addressing challenges related to data standardization.

## Keywords

Artificial Intelligence, Medical Field, Role of A. I. in Healthcare, Advantages of A. I., Disadvantages of A. I. in Medical Field

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## 1. Introduction

The application of A. I. in various sectors of the economy has sparked significant improvements in recent years and has since revolutionized how people approach

complex situations in life. The medical industry has been included; hence the potential of A. I. to redefine healthcare systems by enhancing overall patient care, optimizing treatment plans and improving diagnostic accuracy has attracted many researchers, policymakers and medical practitioners.

About the above assertions, the use of technology is expected to keep growing. As predicted the A. I. market in medicine will increase from \$11 billion in 2021 to \$188 billion in 2030 [1]. Such shows that medical practitioners will need the skills to use A. I. Medical facilities have also started to demand that their medical practitioners embrace a lot supported by A. I. Significant concerns have also been that A. I. can potentially displace workers in many sectors. As such, it is essential to research the advantages and disadvantages of A. I. in the medical field.

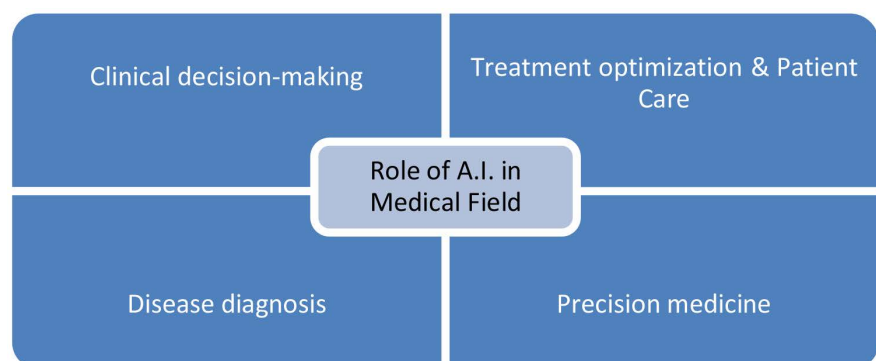
In this research, a comprehensive article review was utilized to compile its findings. Using a systematic search, the researcher identified all relevant sources of information concerning the implementation of A. I. in the healthcare sector with a significant focus on the advantages and disadvantages of artificial intelligence. The information gathered formed valuable perspectives on the diverse applications of artificial intelligence in medical facilities and their effects on patient care.

The aim of this study was to explore and critically analyze the role played by artificial intelligence in the medical field with a significant focus on the advantages and disadvantages of innovation. Through the critical analysis of the advantages and disadvantages, the research will provide a comprehensive understanding of this rapidly evolving landscape and stimulate essential discussions on integrating artificial intelligence to better patient care and, ultimately, positive patient outcomes. Below is a representation of the roles of A. I. in medical field based on the identified and discussed roles presented within this study (See **Figure 1**).

## 2. Literature Review

### The Role of A. I. in Medical Field

The use of Artificial Intelligence in the medical field has gained traction in the



**Figure 1.** The role of A. I. in medical field.

recent past, and many researchers have carried out extensive exploration and research yielding a plethora of materials that discuss the potential challenges and benefits of this innovation in the medical field. In this section, the findings of the notable materials gathered to form a comprehensive understanding of the role of A. I. in healthcare settings were examined.

Artificial intelligence reduced administrative workload. A study conducted discussed the roles played by A. I. in the medical industry and discovered that the use of A. I. reduced the administrative workload, helped to provide virtual patient care, can be used to discover new drugs and vaccines, helping in the detection of clinical conditions, identification of prescription errors and provision of extensive data storage facilities [2]. In [3] the authors stated that, the future of healthcare is being transformed by the ability of A. I. to augment decision support systems as administrative support. However, the authors of [4] identified that, despite the thrill of using A. I. innovations in healthcare, it was critical to not to replace the human element in providing solutions as the A. I. systems would adopt. This comprehensive research discussed many values of using A. I. in the medical industry.

The efficiency and reduction in the workload reduce burnout among healthcare professionals. According to Tilahun *et al.* [5], artificial intelligence aided in reducing burnout among healthcare professionals during the COVID-19 pandemic. During the pandemic digital health was embraced and technologies like telemedicine saw healthcare professionals tackle a few in person visits that used to be overwhelming. As per Xiao *et al.* [6], artificial intelligence introduced efficiency in healthcare setting in turn reducing burnout. A. I. can assist in alleviating workload thereby allowing healthcare professionals to enjoy reduced workload.

Artificial Intelligence revolutionized the healthcare system. Similarly, the research conducted by Alexandra [7] shows the transformative effects of A. I. in healthcare facilities. The study highlighted how artificial intelligence plays a pivotal role in patient care through advanced disease detection, personalized treatment practices and early intervention formations in patients. Beltrami *et al.* [8] stated that, A. I. development would enhance patient's care by reducing the medical costs and procedures in detection and diagnosis of skin cancer. The research clearly shows A. I.'s role in enhancing the clinical decision-making process and helps optimize medical resource allocations. According to Robert [9], nurses at Yale Haven Hospital indicated that through the adoption and use of Rothman index, the technology was stated to have provided the exemplary advisory that aided in successful patient outcome. A. I.'s incorporation and implementation improve delivery of healthcare services.

Task automation through the use of A. I.-powered tools within the healthcare setting. In the study of Ali *et al.* [10], A. I. systems have improved service delivery in the hospitals from the A. I. functionalities it undertakes that have been automated. Secinaro *et al.* [11] examined the role of A. I. in healthcare and stated that A. I. offer clinicians support through diagnostics, predicting, and coming up

with treatment plans. From the above articles, artificial intelligence makes work easier [12]. Through automation of tasks as A. I. algorithms provide alerts to healthcare providers based on the identified task. As a result, healthcare professionals enjoy streamlined tasks as tediousness is eliminated. However, A. I. is perceived to promote unemployment [12] [13].

Efficiency of services is upheld as the automated systems foster proactive care. According to Meskó and Topol [14], the use of A. I. support tackling multiple medical tasks. As per the study, through the data, A. I. promote patient autonomy based on their symptoms and recommend a treatment plan. Yin *et al.* [15] examined the applicability of A. I. in clinical practices and their study indicated that A. I. gained positive perceptions as the performance was deemed satisfactory regarding diagnosis and decision-making capacity. On the other hand, Hernandez-Boussard *et al.* [16], acknowledged that, in as much tasks are automated, the risk of inaccuracies and biasness might slip in through the data generated by A. I. Nangendran *et al.* [17] also identified that lack of transparency and bias from 81 studies which they conducted an empirical evaluation.

In the article developed by Dave and Patel [18], which aimed at providing an analysis of the impact of A. I. in the medical industry with a focus on the advantages and disadvantages of the innovation in the sector, the researchers discovered that A. I. is used to analyze large volumes of data enabling positive patient outcomes, they similarly discovered that A. I. could be used to support clinical decision making which help in forming proper conclusions on patient care. They discovered that the accuracy of diagnoses was improved with the help of machine learning; hence A. I. was found to be crucial in the healthcare sector. Dave and Patel [18] further articulate the importance of A. I. in eliminating the likelihood of patients facing being misdiagnosed and recommended improper treatment. This was supported by Lee and Yoon [19] who explored the opportunities and challenges imposed by A. I. on healthcare. In their study, they revealed that A. I. reduced medical errors through its capabilities to engage in decision making. Their study further indicated that the accuracy by A. I. was at 87.3% thereby aided in reducing the error rate while fostering improved and quality services [19].

Gathering real time data from the dataset, Yan *et al.* [20] stated that data documentation improved with Artificial intelligence. In real-time, personalized assessment and personalized treatment programs by (A.I) utilize, A. I. predictive analytics. As a result, delivers on demand, enabling more rational decisions and timely interventions. According to Lysaght *et al.* [21] and O'Connor *et al.* [22] A. I. provides healthcare professionals with patient information based on real-time that could be used for research. By harnessing the power of A. I., the medical industry can unlock new possibilities for early diagnosis, disease prevention and personalized medicine using the already provided real time data.

On the contrary, the use of A. I. was discovered to have many challenges and advantages from the findings of various research studies. A study by Kulkarni *et al.* [23] found that A. I. had potential biases in datasets causing major disparities

in patient treatments and care. The unclear nature of the decision-making process in A.I, which some researchers call the “black-box problem”, has been a question of scrutiny in recent years, raising many issues on accountability and interpretability, including trust. This raises many issues and makes the use of A. I. to face challenges in the implementation process. Durán *et al.* [24] decried ethical concerns that arise with the “black box” as it hinders transparency and accountability. It is critical that the decisions made in the hospital settings ought to be explainable to promote trust and accountability between the healthcare providers and their patients.

A. I. in healthcare is prone to barriers to adoption. According to Kelly *et al.* [25], A. I. does not consider the sociocultural aspect of a patient’s life, which leads to unfairness subjected to algorithmic bias. Leslie *et al.* [26] noted that A. I. tools foster inequality among individuals from disadvantaged communities. In their study, the researchers claim that due to the overreliance on the already pre-existing dataset. Artificial intelligence is highly likely to be inherently biased, thus fostering healthcare inequality. Ideally, biases will likely arise from demographic factors and underrepresentation of the marginalized. In addition, algorithms can perpetuate biases by reinforcing the existing disparities and biases in the long run.

The lack of empathy by A. I. touches on the human input. According to Kocaballi *et al.* [27], artificial intelligence systems lack empathy, which would remain so for the near future. Their study further emphasizes that doctors would find it difficult to engage patients where A. I. do a consultation. In the study by Hatherley [28], the researcher acknowledges the absence of empathy by the A. I. systems. Empathy is critical in service delivery in a healthcare setting. The lack of human input places a barrier towards patient-doctor interactions since A. I. is not capable of emotions as empathy is the key in healthcare service delivery [29]. Such calls for concerns as A. I. will be rejected by patients who rely on the trust relationship with their healthcare providers. On the same note, the cost of installing and implementing artificial intelligence is a great question that has left many stakeholders grappling. A study by Aung *et al.* [30] emphasized the significance of prudently assessing the benefits of investing in A. I. implementation while considering the potential effects on the available healthcare practitioners with their responsibilities and professional roles.

The researchers realized it is challenging for many healthcare facilities to find the required experience and resources to implement A. I. technology. They also explained the challenge of data privacy and security, which they viewed as great concerns in using patient data for A. I. implementation [31]. The discovery indicated that they might be biased since patients’ social history is important in prescribing the proper regimen for their conditions. Also, the author in [32] indicated that the issue of data privacy by artificial intelligence as social control. The misuse and mishandling of patient data can end in stigmatization or breach of trust. As a result, this would pose a security concern with the age of cyberbullying and identity theft.

### 3. Methodology

The methodology employed by this research included a comprehensive understanding of the transformative roles played by A. I. in healthcare through reviews. As a researcher, the researcher utilized clear systematic approaches to locate relevant sources and key findings related to the topic as provided above. All sources were accessed and analyzed to ensure that the right information was provided to be included in this study.

The selection criteria for all materials involved screened articles to ensure the quality of the information gathered was maintained. The keywords for the selection were artificial intelligence, patient care and medical applications. The articles that combined the three words were considered relevant, and their findings were analyzed for further qualification. After this initial search, the researcher meticulously assessed the retrieved articles centered on the exclusion and inclusion criteria. The inclusion criteria considered the year of production specifically focused on at most five years. This criterion aimed to find the most recent developments in the application of A. I. in healthcare facilities. The papers accessed had to focus on using A. I. technologies to enhance clinical decision-making processes, treatment optimization, disease diagnosis and patient care.

Later, the researcher scrutinized all findings and conclusions as the final articles were gathered based on the inclusion criteria as explained. The key themes were picked, and the trends related to the disadvantages and advantages of artificial intelligence were identified and elaborated to form the basis for this discussion. The study formed unbiased findings in the literature accessed through critical examinations of A. I.'s role in transforming patient outcomes in the medical field.

### 4. Results and Discussion

A. I. has emerged as a potential groundbreaking innovation in the medical industry promising positive results in patient outcomes. This study focused on the advantages and disadvantages of artificial intelligence in the field to shed light on the transformations and challenges associated with these discoveries. The research gathered the following advantages and disadvantages.

#### 4.1. Advantages

Technological advancement in the medical field through Artificial Intelligence has revolutionized the industry. Its integration into the healthcare system has brought about numerous benefits and improved the quality of healthcare as well as patient outcomes by harnessing machine learning algorithms and data analysis. A. I. systems have shown significant changes in the enhancement of the medical field through the role played.

##### 4.1.1. Streamlining Tedious Tasks

Artificial intelligence automates mundane and tedious tasks in the medical field.

These tasks may include insurance reviews, care recommendations, appointment scheduling, and translating clinical details. Streamlining these tasks saves time and resources, enabling medical professionals to spend more important issues, like improving a patient's health. According to Malik *et al.* [33], A. I. gives medical practitioners more time to evaluate and diagnose patients' conditions by automating vital processes. This was further supported by the studies [3] [5] [6] [9] whose authors indicated that artificial intelligence improved service delivery and reduced workload. Also, Meskó and Topol acknowledged A. I. tackling multiple tasks as a way to enhance efficiency [14]. Saving time translates to saving resources. Administrative tasks like filing, reviewing, and resolving accounts are some of the leading causes of high healthcare costs in the US. A. I. has proven to be more accurate in performing these tasks, thus, minimizing unnecessary costs associated with administrative errors. In like manner, medical professionals also waste much time reviewing patient information. However, A. I. uses deep learning and new natural language processing to help physicians review patient information quickly, thus saving time and resources. For example, Grady Hospital, a medical facility in Atlanta, saved about \$4 million over 24 months by using A.I.-enabled equipment to identify at-risk patients [19]. A. I.'s ability to streamline tasks can minimize medical costs. In general, A. I. powered systems can help in processing large volumes of data in medical field making the process to diagnose patients quicker which makes the healthcare provision efficient.

#### 4.1.2. Real-Time Data

Artificial intelligence can gather, process, and analyze large datasets for relevant information, thus providing medical professionals with real-time and accurate data to make clinical decisions. Effective medical care relies on the timely acquisition of correct information. A. I. provides medical practitioners with immediate and precise information, which leads to early diagnosis and treatment [33]. A study by Lee and Yoon has shown that Mayo Clinic used A. I. for cervical cancer screening [19]. The system utilizes an algorithm deploying over 60,000 cervical images from the National Cancer Institute. The study showed that the A. I. system identified precancerous signs at a quicker accuracy rate of 91.0%, leading to early diagnosis and treatment. Artificial intelligence enhances preventive steps and minimizes patients' waiting time by providing information quickly. Yan *et al.* [20] stated that documenting data in real time improved with Artificial intelligence. Also, the study by Lysaght *et al.* [21] and O'Connor *et al.* [22] indicated that A. I. provides patient information based on real-time. Real-time analytics enables medical practitioners to provide timely patient care. A. I. is also helpful in emergency rooms, where medical professionals must make fast and accurate decisions. For example, John Hopkins partnered with GE Healthcare to use A. I. technologies to improve their operation flow, which enabled patients to be assigned beds 30.0% faster than before [19]. A. I.'s ability to provide immediate data improves decision-making in the medical field.

#### 4.1.3. Reducing Burnout

Physician burnout is a major problem in the current medical system. According to Singh *et al.* [34], over 50.0% of US physicians report burnout symptoms. However, A. I. can eliminate this problem by automating tasks, streamlining procedures, and instantly sharing data, relieving medical practitioners from performing many tasks. Tilahun *et al.* [5] and Xiao *et al.* [6] indicated that A. I. reduced burnout among healthcare professionals. It can also help with time-intensive tasks like explaining diagnoses, thus minimizing physician exhaustion and stress. A. I. also provides accurate data, which enables medical professionals to make the best interventions without worrying that their decision may be inadequate due to limited research. In this regard the healthcare professionals can have humble time to address complex activities and help them to have enough time to engage their patients which leads to increased quality of care.

#### 4.1.4. Precision Medicine

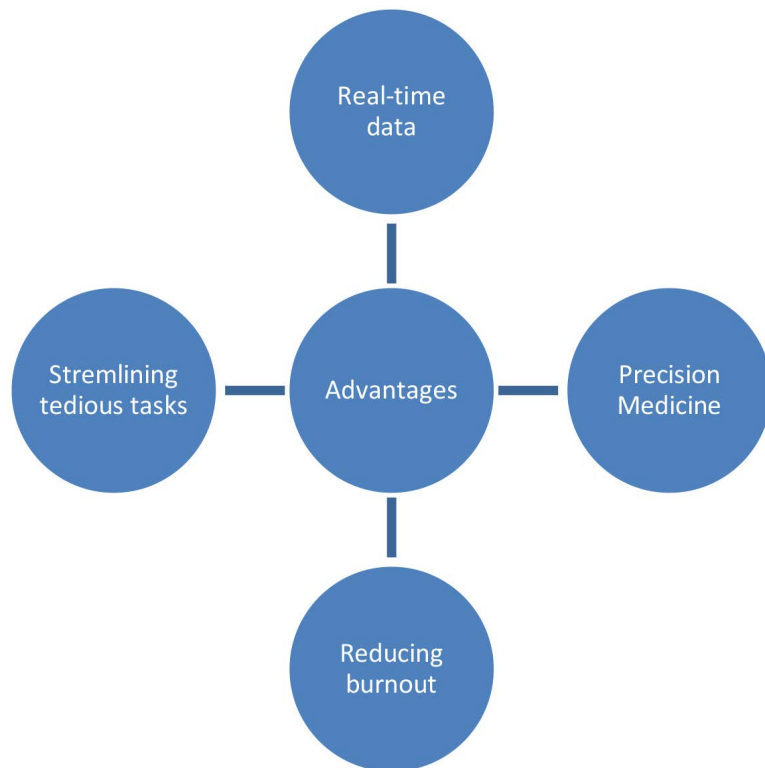
Artificial intelligence improves precise medicine in significant ways. Precise medicine considers environmental, genetic, and lifestyle differences when determining the best prevention and treatment interventions. Medical areas like radiology have adopted this technology due to its ability to obtain and analyze large amounts of information. As articulated by Su *et al.* [35], the technology uses algorithms to mine vast amounts of lifestyle, preference, clinical, genetic, and social data, thus improving precision medicine. A. I. can also predict the likelihood of patients having a disease in the future and the outcomes of current patients. Such awareness enables medical practitioners to provide personalized care. In the study of Rompianesi *et al.* [36], the use of artificial intelligence in healthcare setting would enable healthcare professionals to efficiently diagnose colorectal cancer liver metastasis (CRLM) thereby mitigating the challenges exhibited in the management of CLRM as treatment options and precision medicine. However, in order for A. I. to be efficient, Davenport and Kalakota [37] affirmed that, A. I. usage in healthcare in precision medicine required a training dataset at the onset of disease through supervised learning. A. I. therefore contributes to optimization of treatment outcomes, personalized therapies and makes treatment more effective.

According to the findings of this study, below is a representational diagram of the advantages of A. I. in medical field (See **Figure 2**).

## 4.2. Disadvantages

While Artificial Intelligence has revolutionized the medical field, it has shortcomings. The challenges impose threats to the medical profession that jeopardize the services rendered, impacting the healthcare professionals, patient-doctor relationships, and patient outcomes. These disadvantages pinpoint the need for careful consideration of the ongoing integrated Artificial Intelligence within healthcare systems.





**Figure 2.** Diagram representation of the advantages of A. I. in medical field.

#### 4.2.1. Socially Bias

From a liberal perspective, patients are not the same because their needs may be influenced by social, historical, political, and economic factors. Several social variables may influence care recommendations, plans, and treatment. In line with Kulkarni *et al.* [23], artificial intelligence may ignore social factors affecting patient care. For example, A. I. can recommend a patient to a specific care center depending on a particular diagnosis. However, it may overlook the patient's personalized preferences and socioeconomic restrictions. According to Kelly *et al.* [25], A. I. cannot integrate the sociocultural aspect of a patient's life, which leads to unfairness subjected to algorithmic bias. Leslie *et al.* [26] noted that A. I. tools foster inequality among individuals from disadvantaged communities through overreliance on the already pre-existing dataset. The lack of diversity and its integration within A. I. technologies can result in biased algorithms. As a result, calling for the need to improve A. I. technologies through research and its implementation. A study conducted in 2019 found that an A. I. algorithm employed to predict the healthcare needs of more than 100 million individuals was biased against Black participants because it depended on healthcare spending [38]. In other words, A. I. falls short of considering how social variables can affect patient care. This means that the use of A. I. may be inaccurate in specific individuals leading to disparities in patient care.

#### 4.2.2. Human Input

It is imperative to acknowledge that artificial intelligence has made significant

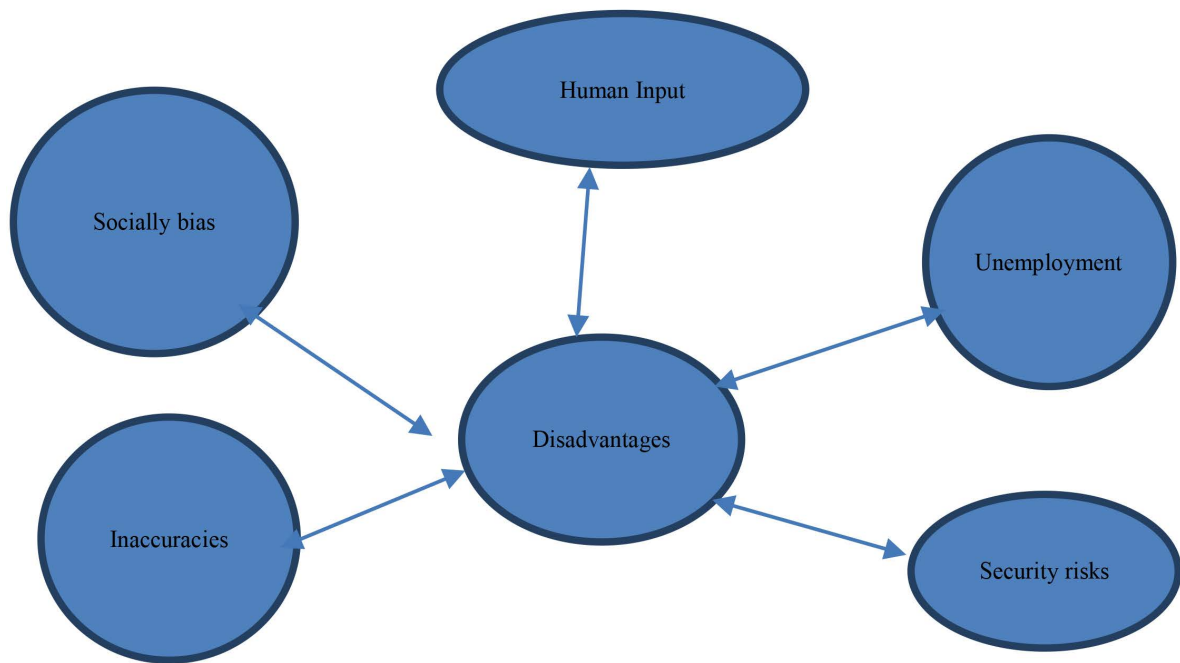
progress in the medical sector but still needs human input and surveillance. Artificial intelligence systems lack empathy [27] [28]. Since empathy is essential for providing healthcare services, A. I. is not emotionally capable of offering the same [29]. Such raises issues like trust as A. I. risk losing the confidence of patients who rely on the relationship with their healthcare professionals. From a liberal point of view, human beings empathize with patients and notice more essential behavioral observations than machines, making them useful in diagnosing and preventing medical complications. However, artificial intelligence lacks these capabilities because it operates logically, which affects patient experience and satisfaction.

#### **4.2.3. Inaccuracies**

While A. I. eradicates many human-based medical errors, it is also susceptible to inaccuracies, negatively affecting patient care. Artificial intelligence relies on diagnostic data from millions of catalogued cases [30]. As such, misdiagnosis is likely to happen in cases where there is limited information about specific diseases, demographics, or environmental variables. Hernandez-Boussard *et al.* [16] and Nagendran *et al.* [17] noted that artificial intelligence faces the challenge of accuracy and bias since the biases are hidden within the pre-set data during training. Such biases will eventually lead to inaccurate data being generated. For example, there may be inadequate data about reactions to medication or other treatments in a particular population. These data gaps can create problems when treating and diagnosing some patients. They can cause medical errors that can jeopardize patient safety. As the machines work on specific patterns, they may find it difficult to handle rare conditions because they are programmed to handle usual medical cases and this likely leads to misdiagnosis and sometimes giving misleading recommendations.

#### **4.2.4. Unemployment**

Artificial intelligence poses a significant threat to employees in many sectors, including medicine. The technology can improve efficiency and effectiveness in the medical field by doing tedious and menial jobs in this industry. However, it is essential to consider what happens to workers who traditionally perform these jobs. In healthcare setting, A. I. is perceived to promote unemployment [12] [13]. These two studies identified unemployment as a threat due to the A. I.'s ability to streamline tasks and take up roles that are currently being conducted by healthcare practitioners. A. I. might displace medical professionals as medical facilities make many administrative roles redundant. While most medical practitioners view A. I. as an essential tool for improving their work, a significant percentage of them fear that it may replace them and have a negative impact on their work. Scott *et al.* [39] conducted a survey to enquire about attitudes toward A. I. applications among 1271 dermatologists from 92 nations, and 6.0% saw that A. I. would replace them. Therefore, this technology has negative social ramifications.



**Figure 3.** Representation of the disadvantages of A. I. in the medical field.

#### 4.2.5. Security Risks

Artificial intelligence relies on data networks, making them vulnerable to security risks. It can increase the risk of a security breach, violating data privacy. Compelling evidence has shown that offensive A. I. is increasing rapidly [30]. Offensive A. I. entails using artificial intelligence for malicious acts like adversarial machine learning and A.I-generated malware. These attacks can affect the medical field as they can cause disruptions that can affect patient care negatively. They can manipulate data, increasing the probability of erroneous diagnoses. It has been alleged that data privacy by artificial intelligence was a form of social control prone to misuse [32]. A. I. exposes data to challenges like breach of privacy thereby raising ethical and legal concerns [31]. Cyber-attacks will evolve as technology advances. For example, as artificial intelligence utilizes data to make systems more accurate and smarter, cyber-attacks will begin to integrate A. I. to become smarter, making them more challenging to prevent and predict. Moreover, data collected by A. I. can also be abused if it falls on the wrong hand. Such can lead to additional costs to increase data security for medical facilities using A. I.

As discussed in this study; below is a representational diagram of the disadvantages of A. I. in medical field (See **Figure 3**).

## 5. Conclusions

The application of A. I. into the medical field is a ground-breaking advancement promising limited possibilities and transforming patient care and overall health-care practices. This analysis delved into the disadvantages and advantages of artificial intelligence in the medical field, providing information on the potential

effects this innovation has while recognizing its challenges that need to be scrutinized to ensure a proper implementation process.

The advantages of artificial intelligence, as discussed, are broad-based and include the following; A. I. streamlines tedious tasks in the medical field, enabling the professionals to redirect their focus to more complex issues facing patients through interactions leading to improved patient outcomes. Secondly, using A. I. enables clinicians to obtain timely information, facilitate timely information and form quick interventions to manage health conditions. The A. I., as shown, can tailor treatments to specific patients leading to improved patient outcomes.

With the above many advantages, the use of A. I., as discussed, contains many disadvantages, including social biases, which raise concerns about patient care; they also require human effort for them to function correctly; hence they cannot be entirely relied on in providing patient care. Similarly, A. I. has been found to elicit concerns about data privacy since it can allow access to unauthorized access to sensitive information, breaching data privacy and security. On the other hand, adopting A. I. leads to massive loss of jobs as they replace human beings in some activities. This requires mitigation and re-skilling or up-skilling to ensure no job losses.

Conversely, A. I. has advantages and disadvantages like any other technology. It can improve medicine by automating and streamlining tedious tasks, improving access to real-time and accurate data, minimizing burnout, improving precision medicine, and saving time and resources by minimizing administrative errors. However, the technology is socially biased, susceptible to cyber-attacks, still requires human input, can be accurate, and can cause unemployment. Despite these challenges, A. I. promises extraordinary benefits in the medical field as technical experts and medical professionals work to address its shortcomings.

## 6. Future Directions

Having a legal framework will be crucial in addressing the ethical and privacy concerns that arise with the increasing use of artificial intelligence in the medical field. It will provide guidelines and regulations for the collection, storage, and use of patient data, ensuring that it is protected and used responsibly. Additionally, the legal framework will also define the liability and accountability of A. I. systems and their developers, establishing a clear chain of responsibility in case of any errors or malfunctions. This will help build trust in the technology and ensure that A. I. is used in a way that benefits both healthcare professionals and patients.

Enhance transparency and accountability in the healthcare sector. By implementing measures such as requiring A. I. systems to provide explanations for their decisions and making the data used in their training accessible, transparency can be achieved. Moreover, accountability can be strengthened by establishing mechanisms for auditing and monitoring A. I. systems, ensuring that they are performing as intended and identifying any potential biases or errors. These ef-

forts will not only foster trust in A. I. technology but also pave the way for continuous improvement and refinement of these systems.

Addressing challenges related to data standardization and privacy protection. Data standardization is crucial for ensuring that A. I. systems can effectively process and analyze information from various sources in a consistent and reliable manner. By establishing standardized formats and protocols for data collection, storage, and sharing, healthcare professionals can enhance the interoperability of A. I. systems and enable seamless collaboration between different organizations and sectors. Additionally, robust privacy protection measures must be put in place to safeguard sensitive data and prevent unauthorized access or misuse. This includes implementing strong encryption techniques, strict access controls, and comprehensive data governance frameworks. By addressing these challenges, we can create a solid foundation for the responsible and ethical deployment.

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### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

### References

- [1] Stewart, C. (2023) Artificial intelligence (AI) in Healthcare Market Size Worldwide 2021-2030. Statista. <https://www.statista.com/statistics/1334826/ai-in-healthcare-market-size-worldwide/>
- [2] Al-Kuwaiti, A., Nazer, K., Al-Reedy, A., *et al.* (2023) A Review of the Role of Artificial Intelligence in Healthcare. *Journal of Personalized Medicine*, **13**, Article No. 951. <https://doi.org/10.3390/jpm13060951>
- [3] Noorbakhsh-Sabet, N., Zand, R., Zhang, Y. and Abedi, V. (2019) Artificial Intelligence Transforms the Future of Health Care. *The American Journal of Medicine*, **132**, 795-801. <https://doi.org/10.1016/j.amjmed.2019.01.017>
- [4] Bajwa, J., Munir, U., Nori, A. and Williams, B. (2021) Artificial Intelligence in Healthcare: Transforming the Practice of Medicine. *Future Healthcare Journal*, **8**, e188. <https://doi.org/10.7861/fhj.2021-0095>
- [5] Tilahun, B., Gashu, K.D., Mekonnen, Z.A., Endehabtu, B.F. and Angaw, D.A. (2021) Mapping the Role of Digital Health Technologies in Prevention and Control of COVID-19 Pandemic: Review of the Literature. *Yearbook of Medical Informatics*, **30**, 26-37. <https://doi.org/10.1055/s-0041-1726505>
- [6] Xiao, D., Meyers, P., Upperman, J.S. and Robinson, J.R. (2023) Revolutionizing

- Healthcare with ChatGPT: An Early Exploration of an A.I. Language Model's Impact on Medicine at Large and Its Role in Pediatric Surgery. *Journal of Pediatric Surgery*. <https://doi.org/10.1016/j.jpedsurg.2023.07.008>
- [7] Alexandra Harry. (2023) Transforming Patient Care: The Role of Artificial Intelligence in Healthcare; A mini Review. *BULLET: Jurnal Multidisiplin Ilmu*, **2**, 530-533. <https://journal.mediapublikasi.id/index.php/bullet/article/view/2760>
- [8] Beltrami, E.J., Brown, A.C., Salmon, P.J.M., Leffell, D.J., Ko, J.M. and Grant-Kels, J.M. (2022) Artificial Intelligence in the Detection of Skin Cancer. *Journal of the American Academy of Dermatology*, **87**, 1336-1342. <https://doi.org/10.1016/j.jaad.2022.08.028>
- [9] Robert, N. (2019) How Artificial Intelligence Is Changing Nursing. *Nursing Management*, **50**, 30-39. <https://doi.org/10.1097/01.NUMA.0000578988.56622.21>
- [10] Ali, O., Abdelbaki, W., Shrestha, A., Elbasi, E., Alryalat, M.A.A. and Dwivedi, Y.K. (2022) A Systematic Literature Review of Artificial Intelligence in the Healthcare Sector: Benefits, Challenges, Methodologies, and Functionalities. *Journal of Innovation & Knowledge*, **8**, Article ID: 100333. <https://doi.org/10.1016/j.jik.2023.100333>
- [11] Secinaro, S., Calandra, D., Secinaro, A., Muthurangu, V. and Biancone, P. (2021) The Role of Artificial Intelligence in Healthcare: A Structured Literature Review. *BMC Medical Informatics and Decision Making*, **21**, Article No. 125. <https://doi.org/10.1186/s12911-021-01488-9>
- [12] Bhbosale, S., Pujari, V. and Multani, Z. (2020) Advantages and Disadvantages of Artificial Intelligence. *Aayushi International Interdisciplinary Research Journal*, **77**, 227-230. [https://www.researchgate.net/profile/Vinayak-Pujari-2/publication/344584269\\_Advantages-And-Disadvantages-Of-Artificial-Intelligence/links/5f81b70192851c14bcbc1d96/Advantages-And-Disadvantages-Of-Artificial-Intelligence.pdf](https://www.researchgate.net/profile/Vinayak-Pujari-2/publication/344584269_Advantages-And-Disadvantages-Of-Artificial-Intelligence/links/5f81b70192851c14bcbc1d96/Advantages-And-Disadvantages-Of-Artificial-Intelligence.pdf)
- [13] Sitthipon, T., Kaewpuang, P., Jaipong, P., Sriboonruang, P., Siripipattanakul, S. and Auttawechasakoon, P. (2022) Artificial Intelligence (A.I.) Adoption in the Medical Education during the Digital Era: A Review Article. *Review of Advanced Multidisciplinary Science, Engineering & Innovation*, **1**, 227-230. <https://ssrn.com/abstract=4168693>
- [14] Meskó, B. and Topol, E.J. (2023) The Imperative for Regulatory Oversight of Large Language Models (or Generative A.I.) in Healthcare. *NPJ Digital Medicine*, **6**, Article No. 120. <https://doi.org/10.1038/s41746-023-00873-0>
- [15] Yin, J., Ngiam, K.Y. and Teo, H.H. (2021) Role of Artificial Intelligence Applications in Real-Life Clinical Practice: Systematic Review. *Journal of Medical Internet Research*, **23**, e25759.
- [16] Hernandez-Boussard, T., Bozkurt, S., Ioannidis, J.P. and Shah, N.H. (2020) MINIMAR (MINimum Information for Medical A.I. Reporting): Developing Reporting Standards for Artificial Intelligence in Health Care. *Journal of the American Medical Informatics Association*, **27**, 2011-2015. <https://doi.org/10.1093/jamia/ocaa088>
- [17] Nagendran, M., Chen, Y., Lovejoy, C.A., Gordon, A.C., Komorowski, M., Harvey, H., Topol, E.J., Ioannidis, J.P.A., Collins, G.S. and Maruthappu, M. (2020) Artificial Intelligence versus Clinicians: Systematic Review of Design, Reporting Standards, and Claims of Deep Learning Studies. *BMJ (Clinical Research ed)*, **368**, m689. <https://doi.org/10.1136/bmj.m689>
- [18] Dave, M. and Patel, N. (2023) Artificial Intelligence in Healthcare and Education.

- British Dental Journal*, **234**, 761-764. <https://doi.org/10.1038/s41415-023-5845-2>
- [19] Lee, D. and Yoon, S.N. (2020) Application of Artificial Intelligence-Based Technologies in the Healthcare Industry: Opportunities and Challenges. *International Journal of Environmental Research and Public Health*, **18**, Article No. 271. <https://doi.org/10.3390/ijerph18010271>
- [20] Yan, Y.S., Thilo, F.J., Felzmann, H., Dowding, D. and Lee, J.J. (2023) Artificial Intelligence in Nursing and Midwifery: A Systematic Review. *Journal of Clinical Nursing*, **32**, 2951-2968. <https://doi.org/10.1111/jocn.16478>
- [21] Lysaght, T., Lim, H.Y., Xafis, V. and Ngiam, K.Y. (2019) A.I.-Assisted Decision-Making in Healthcare: The Application of an Ethics Framework for Big Data in Health and Research. *Asian Bioethics Review*, **11**, 299-314. <https://doi.org/10.1007/s41649-019-00096-0>
- [22] O'Connor, S., Yan, Y., Thilo, F.J.S., Felzmann, H., Dowding, D. and Lee, J.J. (2023) Artificial Intelligence in Nursing and Midwifery: A Systematic Review. *Journal of Clinical Nursing*, **32**, 2951-2968. <https://doi.org/10.1111/jocn.16478>
- [23] Kulkarni, S., Seneviratne, N., Baig, M.S. and Khan, A.H.A. (2020) Artificial Intelligence in Medicine: Where Are We Now? *Academic Radiology*, **27**, 62-70. <https://doi.org/10.1016/j.acra.2019.10.001>
- [24] Durán, J.M. and Jongsma, K.R. (2021) Who Is Afraid of Black Box Algorithms? On the Epistemological and Ethical Basis of Trust in Medical A.I. *Journal of Medical Ethics*, **47**, 329-335. <http://dx.doi.org/10.1136/medethics-2020-106820>
- [25] Kelly, C.J., Karthikesalingam, A., Suleyman, M., Corrado, G. and King, D. (2019) Key Challenges for Delivering Clinical Impact with Artificial Intelligence. *BMC Medicine*, **17**, Article No. 195. <https://doi.org/10.1186/s12916-019-1426-2>
- [26] Leslie, D., Mazumder, A., Peppin, A., Wolters, M.K. and Hagerty, A. (2021) Does "A.I." Stand for Augmenting Inequality in the Era of Covid-19 Healthcare? *BMJ*, **372**, n304. <https://doi.org/10.1136/bmj.n304>
- [27] Kocaballi, A.B., Ijaz, K., Laranjo, L., Quiroz, J.C., Rezazadegan, D., Tong, H.L., Willcock, S., Berkovsky, S. and Coiera, E. (2020) Envisioning an Artificial Intelligence Documentation Assistant for Future Primary Care Consultations: A Co-Design Study with General Practitioners. *Journal of the American Medical Informatics Association*, **27**, 1695-1704. <https://doi.org/10.1093/jamia/ocaa131>
- [28] Hatherley, J.J. (2020) Limits of Trust in Medical A.I. *Journal of Medical Ethics*, **46**, 478-481. <http://dx.doi.org/10.1136/medethics-2019-105935>
- [29] Morrow, E., Zidaru, T., Ross, F., Mason, C., Patel, K.D., Ream, M. and Stockley, R. (2023) Artificial Intelligence Technologies and Compassion in Healthcare: A Systematic Scoping Review. *Frontiers in Psychology*, **13**, Article ID: 971044. <https://doi.org/10.3389/fpsyg.2022.971044>
- [30] Aung, Y.Y., Wong, D.C. and Ting, D.S. (2021) The Promise of Artificial Intelligence: A Review of the Opportunities and Challenges of Artificial Intelligence in Healthcare. *British Medical Bulletin*, **139**, 4-15. <https://doi.org/10.1093/bmb/ldab016>
- [31] Waisberg, E., Ong, J., Paladugu, P., Kamran, S.A., Zaman, N., Lee, A.G. and Tavakoli, A. (2022) Challenges of Artificial Intelligence in Space Medicine. *Space Science & Technology*, **2022**, Article ID: 9852872. <https://doi.org/10.34133/2022/9852872>
- [32] Naudé, W. (2020) Artificial Intelligence vs COVID-19: Limitations, Constraints and Pitfalls. *A.I. & Society*, **35**, 761-765. <https://doi.org/10.1007/s00146-020-00978-0>

- [33] Malik, P., Pathania, M. and Rathaur, V.K. (2019) Overview of Artificial Intelligence in Medicine. *Journal of Family Medicine and Primary Care*, **8**, 2328-2331. [https://doi.org/10.4103/jfmpc.jfmpc\\_440\\_19](https://doi.org/10.4103/jfmpc.jfmpc_440_19)
- [34] Singh, R., Volner, K. and Marlowe, D. (2019) Provider Burnout. StatPearls Publishing, Treasure Island.
- [35] Su, H., Wu, H. and Kao, H. (2021) Artificial Intelligence in Precision Medicine in Hepatology. *Journal of Gastroenterology and Hepatology*, **36**, 569-580. <https://doi.org/10.1111/jgh.15415>
- [36] Rompianesi, G., Pegoraro, F., Ceresa, C.D., Montalti, R. and Troisi, R.I. (2022) Artificial Intelligence in the Diagnosis and Management of Colorectal Cancer Liver Metastases. *World Journal of Gastroenterology*, **28**, 108-122. <https://doi.org/10.3748/wjg.v28.i1.108>
- [37] Davenport, T. and Kalakota, R. (2019) The Potential for Artificial Intelligence in Healthcare. *Future Healthcare Journal*, **6**, 94-98. <https://doi.org/10.7861/futurehosp.6-2-94>
- [38] Levi, R. and Gorenstein, D. (2023) A.I. in Medicine Needs to Be Carefully Deployed to Counter Bias and Not Entrench It. National Public Radio. <https://www.npr.org/sections/health-shots/2023/06/06/1180314219/artificial-intelligence-racial-bias-health-care#:~:text=A%20landmark%202019%20study%20published,to%20predict%20future%20health%20needs>
- [39] Scott, I.A., Carter, S.M. and Coiera, E. (2021) Exploring Stakeholder Attitudes towards A.I. in Clinical Practice. *BMJ Health & Care Informatics*, **28**, e100450. <https://doi.org/10.1136/bmjhci-2021-100450>