

Implementing Artificial Intelligence in Healthcare.

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Abstract – This report will discuss implementing artificial intelligence in healthcare. Artificial Intelligence would be beneficial to healthcare because of the endless opportunities it provides. AI can be used to help detect and cure diseases, help patients with a path to treatment and even assist doctors with surgeries. Within this paper I will talk to you about the benefits of AI in healthcare and how it can be implemented using cyber security. In addition, I will conduct interviews with doctors and nurses to hear their perspective on AI in hospitals and how it is needed as well. As well as create a survey for nursing students at my university to see what their viewpoints are on adding AI unto the field of medicine. The best method to incorporate both user input and research into this paper is to use user input to back up the research. User input will be great addition because it gives the readers a real-world opinion on if this topic is valid.

1. Introduction

The use of AI in healthcare is growing. There are many ways that AI can help healthcare evolve such as reduce cost and increasing safety for patients. In hospitals, AI can be used for surgeries, appointments, and patient care. The biggest part is surgeries. We never have enough doctors on call and an AI arm would revolutionize healthcare. There have been many mistakes inside hospitals where they have been so busy, and patient could not be taken care of. “Thirty-six percent of respondents said a lack of time meant they had to leave necessary tasks undone. They included changing the patient’s position often enough for their safety and comfort, helping them with their dental health and completing records of patients’ care”(Campbell). If healthcare innovated artificial intelligence, respondents would have more time to properly treat patients with care and not brush them off to sit until there co-horsts arrive. As well as hospitals, dentist and doctors could be in use of AI as well. In dentist offices, nurses and dental surgeon can improve their practice by using AI for x-ray’s, teeth cleaning and for the waiting area as well. Instead of having a front desk area all you need is a computer with a sign in screen and lets the doctor know who is checked in and ready for their appointment. The money a dentist office could save on a computer other than a salary is revolutionary. With X-rays you can have patients simultaneously going through an x-ray room because of how fast and efficient AI can have patients in and out consistently.



Figure 1: Artificial Intelligence in use.

The integration of AI in healthcare indeed presents a promising path for transforming the industry. One of the significant areas where AI can bring about substantial improvements is in reducing costs while enhancing patient safety. Within hospitals, AI applications can be employed across various aspects, including scheduling appointments and patient care. However, the most remarkable potential lies in the realm of surgeries. The shortage of available doctors on call has been a longstanding issue in healthcare, leading to situations where necessary tasks are left undone due to lack of time and resources. As a recent survey showed, 36% of healthcare professionals had to forego essential tasks, such as repositioning patients for safety and comfort, dental care assistance, and maintaining patient records. The adoption of AI technologies in healthcare has the potential to address these challenges by streamlining administrative tasks, allowing healthcare professionals to focus on delivering quality care and ensuring patients' well-being. Surgeons and medical staff could significantly benefit from AI-assisted surgeries, improving precision and reducing the margin of error, ultimately enhancing patient outcomes.

Hospitals are not the sole beneficiaries of AI advancements in healthcare; dental offices and general practitioners can also reap substantial rewards. Dental practitioners, for instance, can enhance their practice by utilizing AI for tasks like interpreting X-rays, conducting teeth cleanings, and optimizing patient management in waiting areas. Instead of traditional front desk setups, AI-driven sign-in screens can efficiently inform doctors about patient arrivals, reducing the need for additional staff and the associated costs. The streamlined use of AI for X-rays can allow multiple patients to undergo the process concurrently, increasing efficiency and expediting the overall patient experience. These AI applications not only improve patient care but also present significant cost-saving opportunities, making healthcare more accessible and affordable for patients. The continued innovation and integration of AI in healthcare

hold the potential to revolutionize the industry, ultimately leading to better outcomes, increased efficiency, and improved patient safety.

2. Methodology

This study will use a combination of literature review, user surveys, and a subject-expert interview to collect data and gather results directly related to my thesis. Each methodology is explained as follows:

A. Problem Statement

Artificial Intelligence has the potential to completely transform patient care, being diagnosed, and treatment in the quickly developing sector of healthcare. Nevertheless, there are numerous obstacles to the effective application of AI in healthcare that call for calculated answers. Making sure AI algorithms are compatible and interoperable with current medical systems is a major challenge. Furthermore, one of the biggest challenges in the field of medicine is the creation of reliable AI models that can effectively interpret complicated medical data, including genetic information, medical pictures, and electronic health records. Gaining the approval and trust of both patients and medical professionals will require addressing ethical concerns about patient privacy, data security, and the proper use of AI. Additionally, the differences in economic groups' access to AI-driven healthcare solutions groups and areas provide a serious problem with equity that must be addressed. Given these challenges, developing broad approaches that address technical, ethical, and regulatory issues is crucial to the successful application of AI in healthcare, which will ultimately lead to better patient outcomes and more effective healthcare delivery.

B. Literature Review

A complex environment with a variety of potential and problems in several areas is revealed by the literature on the application of artificial intelligence (AI) in healthcare. Scholars point out how important it is for AI algorithms to be easily integrated into the current healthcare systems in the section on technical challenges. Research emphasizes the importance it is to create solutions that are compatible with a variety of medical systems so that the shift to AI-driven healthcare settings goes smoothly. Furthermore, a significant amount of research in the Technical Challenges area investigates the difficulties involved in creating reliable AI models that can correctly analyze detailed medical data. This covers studies aimed at improving the efficiency of AI algorithms in deciphering genetic data, medical imaging, and electronic health records, all of which can lead to more accurate diagnosis and customizable treatment plans. Concerns about patient privacy, data security, and responsible AI use are highlighted in the literature as a popular theme: ethical considerations. To solve these problems and build a foundation of trust between patients and healthcare professionals, researchers focus on developing ethical frameworks and standards. "Integrating AI into the healthcare ecosystem allows for a multitude of benefits, including automating tasks and

analyzing big patient data sets to deliver better healthcare faster, and at a lower cost" (Intelligence & Intelligence, 2023). The amount of research highlights the need for safe data sharing practices and transparency in AI decision-making processes to reduce any potential ethical red flags related to AI in healthcare. Within the Equity and Accessibility section, the research highlights the difficulties associated with the unfair use of AI-powered healthcare solutions. By comparing access between various socioeconomic categories and geographical areas, researchers can discover obstacles that prevent AI technology from being widely adopted. To guarantee that different populations may benefit from AI in healthcare, strategies for building such as focused interventions and legislation to close the digital divide emerge as important areas of focus in the literature. The literature review taken shows a dynamic and developing field where, to correctly use AI in healthcare and realize its transformational potential, technical improvements must be in line with ethical considerations, equity concerns, and regulatory frameworks.

C. User Surveys

To fully assess the different topics surrounding this paper, I will be conducting a survey to understand the purposes that people play when using network platforms, how verse they are in the security of these platforms, as well as a space to promote the growth and education to promote safety. We will collect data about artificial intelligence in healthcare through conducting surveys. The purpose of the surveys is to understand the type of knowledge people know about security and how aware they are of certain things. We will analyze our findings along with our other sources of information to find patterns and make conclusions and recommendations related to our thesis.

1. On a scale of 1 to 5, how familiar are you with the concept of artificial intelligence in healthcare, with 1 being not at all familiar and 5 being very familiar?
2. Have you personally experienced or witnessed the use of artificial intelligence in healthcare, either as a patient or a healthcare professional? **(Yes/No)**
3. Do you believe that AI can improve the accuracy of medical diagnoses and treatment recommendations? **(Yes/No)**
4. What are the primary concerns or reservations you have about the implementation of AI in healthcare? **(Open-ended)**
5. In your opinion, what are the most promising applications of AI in healthcare today? **(Open-ended)**
6. How do you feel about the use of AI in predictive analytics to identify at-risk patients or potential outbreaks? **(Positive/Negative/Neutral and explain)**

7. To what extent do you think AI can help in reducing healthcare costs and improving access to medical services? (Significantly/A Little/Not at All and explain)

8. Are you concerned about data privacy and security in the context of AI in healthcare? (Yes/No)

9. In your experience, has the use of AI in healthcare led to better patient outcomes and improved healthcare delivery? (Yes/No/Not Sure)

10. How receptive are you to the idea of your healthcare provider using AI to assist in medical decision-making during your treatment? (Very Receptive/Receptive/Neutral/Unreceptive/Very Unreceptive)

3. Results

This section will cover the cumulative results obtained from our research methodology outlined in Section II. Our survey comprised of ten questions, and we had -- respondents complete the study. The appropriate responses of our overview

were a mix of healthcare professionals and compromised of students in a non-computer science background. The discoveries of this study are as per the following. Before the survey results are listed, below will be the questions asked on the survey with the different answer choices.

Answers from Healthcare Professionals:

Question 1:

On a scale of 1 to 5, how familiar are you with the concept of artificial intelligence in healthcare? 1 being not at all familiar and 5 being very familiar?
11 responses

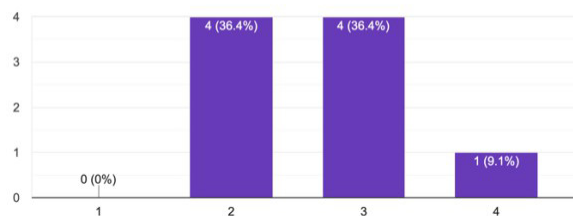


Figure 2: Question One Bar Graph

- 0% responded for Number 1
- 36.4% responded for Number 2
- 36.4% responded for Number 3
- 9.1% responded for Number 4
- 18.2% responded for Number 5

Question 2:

Have you personally experienced or witnessed the use of artificial intelligence in healthcare, either as a patient or a healthcare professional?

11 responses

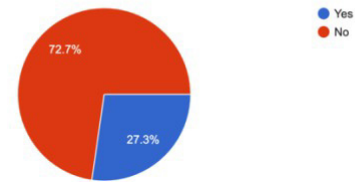


Figure 3: Question Two Pie Chart

- 72.7% responded to No
- 27.3% responded to Yes

Question 3:

Do you believe that AI can improve the accuracy of medical diagnoses and treatment recommendations?

11 responses

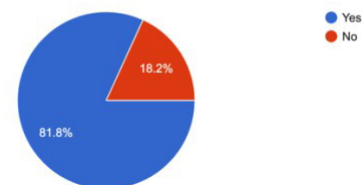


Figure 4: Question Three Pie Chart

- 81.8% responded to Yes
- 18.2% responded to No

Question 4:

What are the primary concerns or reservations you have about the implementation of AI in healthcare?

Answers include:

- Privacy concerns
- AI concept not being properly controlled
- Too reliant on computerized intelligence
- Inaccurate diagnosis
- Misdiagnose of diseases & ailments. Loss of personal touch for patients' well-being.
- I feel a concern that as AI is learning from humans, it follows that they will learn similar biases when it comes to patients and that bias may be harder to spot because of the implicit neutrality we imagine technical systems/AI to have. (There is also the issue of the commodification of AI and the undeniable concern of where the patient information goes, how it is stored, how it is being used by the companies storing it, and because the technology is newer it feels very unclear what allowing AI

access to private information now will mean for the future.)

- Increased number of false positives
- Lack of personal relationship with medical professionals
- I believe humans can make a differential diagnosis and notice things that AI would not.

Question 5:

In your opinion, what are the most promising applications of AI in healthcare today?

Answers include:

- It will help providers think outside of the box on how to help me with my diagnosis and symptoms. Hopefully, get my on the proper medications also.
- being able to perform surgery accurately
- Dx of diseases, tailored treatment options as well as cures of disease.
- Possibly identifying patients' symptoms better and hopefully better outcomes.
- Can help with overall patient population well-being. Potentially lowering costs of healthcare & provide healthcare access to all. Also, can help offset the shortage of Drs facing healthcare today. Possible elimination of prior authorizations through integration with insurance.
- AI can synthesize more cases than even one expert in a field. This would be able to give a specialist level of comparison and research even to those who can't afford or find that care themselves.
- Increased availability of medical care in areas that are lacking services
- Cures and new medications
- Interpretation of radiologic imaging. X-Ray, MRI, CT etc.

Question 6:

How do you feel about the use of AI in predictive analytics to identify at-risk patients or potential outbreaks?
11 responses

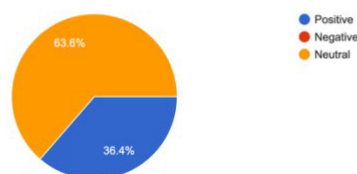


Figure 5: Question Six Pie Chart

- 63.6% responded to Neutral
- 0% responded to Negative
- 36.4% responded to Positive

Question 7:

To what extent do you think AI can help in reducing healthcare costs and improving access to medical services?
11 responses

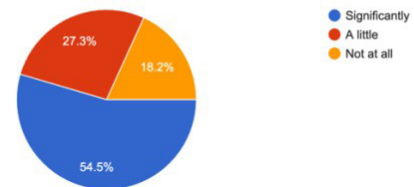


Figure 6: Question Seven Pie Chart

- 27.3% responded to A little
- 18.2% responded to Not at all
- 54.5% responded to significantly

Question 8:

Are you concerned about data privacy and security in the context of AI in healthcare?
11 responses



Figure 7: Question Eight Pie Chart

- 0% responded to No
- 100% responded to Yes

Question 9:

In your experience, has the use of AI in healthcare led to better patient outcomes and improved healthcare delivery?
11 responses

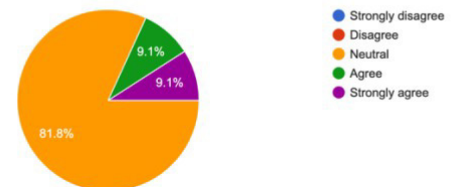


Figure 8: Question Nine Pie Chart

- 81.8% responded Neutral
- 9.1% responded Strongly Agree
- 9.1% responded Agree
- 0% responded Disagree
- 0% responded Strongly Disagree

Question 10:

How receptive are you to the idea of your healthcare provider using AI to assist in me decision-making during your treatment?
11 responses

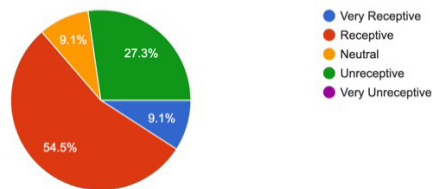


Figure 9: Question 10 Pie Chart

- 54.5% responded Receptive
- 9.1% responded Very Receptive
- 9.1% responded Neutral
- 27.3% responded Unreceptive
- 0% responded Very Unreceptive

Answers from Non-healthcare background:

Question 1:

On a scale of 1 to 5, how familiar are you with the concept of artificial intelligence in healthcare, with 1 being not at all familiar and 5 being very familiar?
203 responses

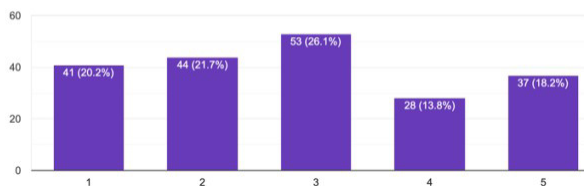


Figure 10: Question 1 Graph Chart

- 20.2% responded 1
- 21.7% responded 2
- 26.1% responded 3
- 13.8% responded 4
- 18.2% responded 5

Question 2:

Have you personally experienced or witnessed the use of artificial intelligence in healthcare, either as a patient or a healthcare professional?
202 responses

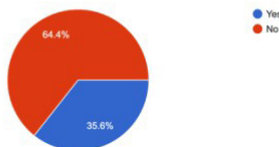


Figure 11: Question 2 Pie Chart

- 64.4% responded Yes
- 35.6% responded No

Question 3:

Do you believe that AI can improve the accuracy of medical diagnoses and treatment recommendations?
203 responses

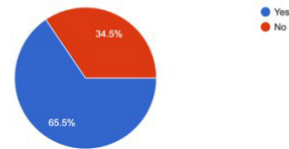


Figure 12: Question 3 Pie Chart

- 65.5% responded Yes
- 34.5% responded No

Question 4:

What are the primary concerns or reservations you have about the implementation of AI in healthcare?

Answers include:

- AI putting people out of jobs
- Loss of human connection and sympathy/understanding.
- Misdiagnosing people based on symptoms the same way we misdiagnose ourselves by googling our symptoms without much context
- It not working properly
- they're not always accurate
- AI isn't always 100% accurate, that can have a life-or-death impact when it comes to medical decisions based on AI
- Ransomware attacks and power outages
- when AI is generating answers will there be a regeneration option to obtain different answers.
- It potentially malfunctioning while I am getting a procedure or something of the sort done.
- Could be programmed the wrong one and cause problems or not be able to diagnose an issue as well as a doctor can
- AI taking over to where doctors will be of no use.
- Wrong diagnosis, lack of jobs for healthcare workers, and inadequate medical treatment

Question 5:

In your opinion, what are the most promising applications of AI in healthcare today?

Answers include:

- Efficiency and execution of medical answers
- It will help with understaffing of hospitals
- it can be accurate in terms of treatment recommendations.
- In my opinion AI in healthcare will allow for more efficient care in the industry as many jobs completed by workers can be nearly trivial and easily completed by AI

- Eliminating some of the duties a healthcare provider must perform which will cause for the turnaround for patients' issues/ diagnosis quicker. Therefore, can potentially prevent the spreading of diseases, etc.
- Gathering information and data analysis
- They will be able to perform difficult surgery surgeons cannot perform
- X rays
- Automated telephone services to help schedule appointments
- extra hands-on deck
- Skincare
- Accuracy
- AI helps with everything in general.

Question 6:

How do you feel about the use of AI in predictive analytics to identify at-risk patients or potential outbreaks?
202 responses

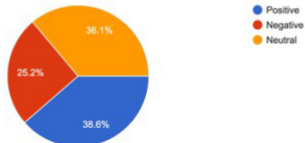


Figure 13: Question 6 Pie Chart

- 38.6% responded Positive
- 25.2% responded Negative
- 36.1% responded Neutral

Question 7:

To what extent do you think AI can help in reducing healthcare costs and improving access to medical services?
200 responses

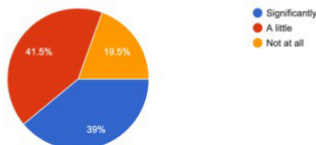


Figure 14: Question 7 Pie Chart

- 39% responded Significantly
- 41.5% responded A little
- 19.5% responded Not at all

Question 8:

Are you concerned about data privacy and security in the context of AI in healthcare?
202 responses

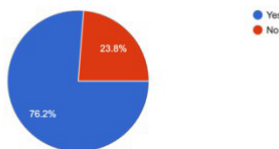


Figure 15: Question 8 Pie Chart

- 76.2% responded Yes
- 23.8% responded No

Question 9:

In your experience, has the use of AI in healthcare led to better patient outcomes and improved healthcare delivery?
201 responses

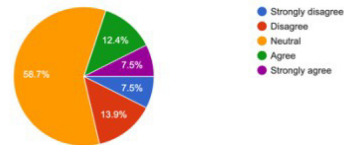


Figure 16: Question 9 Pie Chart

- 7.5% responded Strongly Disagree
- 13.9% responded Disagree
- 58.7% responded Neutral
- 12.4% responded Agree
- 7.5% responded Strongly Agree

Question 10:

How receptive are you to the idea of your healthcare provider using AI to assist in medical decision-making during your treatment?
200 responses

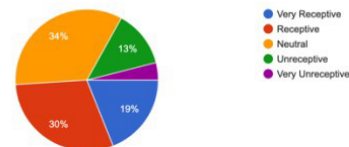


Figure 17: Question 10 Pie Chart

- 19% responded Very Receptive
- 30% responded Receptive
- 34% responded Neutral
- 13% responded Unreceptive
- 0% responded Very Unreceptive

4. Results of Analysis

Students in school need to have the idea of what Artificial Intelligence is and how it is used in school and in healthcare. This 10- question survey includes all that. When looking through the results of this survey most people knew what AI was. When sending out these surveys I did not want all computer science majors filling it out. The more variety the better so I asked different major students to fill it out as well. Ex: Business, Nursing, Finance and even healthcare professionals. As a thought most individuals in college did not complete the short answer questions. I just think that students want a survey with just multiple choice. The

questions that had the closest results was Question 1. The most input questions were Question 3, and Question 8. With Question 3, do you believe that AI improve the accuracy of treatment. I believe that students would understand the question and put their honest opinion. With Question 8, are you concerned about security in healthcare, I know what students have some knowledge about the topic and I can tell that some nursing students have answered the questions as well. While creating the survey it was hard to find questions that people would answer. I had to ask others to post my survey because my reach on social media is weak. Most people I know did not have any knowledge about the topic, but I am glad they took the time to fill it out and gave valid answers. I hope that individuals understand that AI in healthcare is a growing topic and could revolutionize cures and surgeries.

5. Conclusion

In summary, artificial intelligence (AI) in healthcare is a revolutionary step toward improved patient care, diagnostics, and overall operational effectiveness. Artificial intelligence (AI) has many uses, from image identification to predictive analytics, and it has the potential to transform medicine and enhance patient outcomes. Healthcare practitioners can obtain important insights from large datasets by utilizing machine learning algorithms. This allows for more targeted treatments, individualized treatment regimens, and early disease identification. Although the ethical and privacy issues surrounding the use of AI in healthcare shouldn't be disregarded, these issues can be resolved with careful application and strong regulatory frameworks. The combination of human knowledge with AI skills has the potential to usher in a new era of healthcare innovation as the field continues to change.

ACKNOWLEDGEMENTS

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