

Utilization of Ai Technology to Rapidly Synthesize Information, Complete Work, Assist with Clinical Decisions and Improve Patient Outcomes

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Abstract

The study sheds light on the concept of AI technology in healthcare and its importance to improve the patient's conditions. Artificial intelligence and its usage in healthcare is the main focus of the research article. It is identified that most healthcare institutions are using AI-based devices nowadays to enhance sustainability and provide better healthcare service to the patients. The AI-based machines or devices that help the nurses to gain basic medical information about the patients are presented in the research article. Apart from that, the usage of published journals and articles helped to gain data and information about AI technology in healthcare.

Keywords

AI technology, healthcare, improvement, nursing, patients.

INTRODUCTION

Artificial Intelligence (AI) is the modern technology that is used to develop machines and enhance efficiency and effectiveness. The usage of AI technology can be identified in several factors such as the banking sector, businesses, and even in healthcare. AI technology refers to the robotics machines that can work like humans and are more efficient than humans. The article is focused on the concept of AI technology in nursing and healthcare. The usage of AI technology in healthcare along with the pros and cons of the technology is described in the article.

Rationale

Most of the hospitals in the world use AI technology for providing better healthcare services to patients. **Nearly 90%** of hospitals in the world use AI technology and among them, the UK is the country that invests the most in using AI technology in healthcare [7]. Thereafter, Nigeria is the country that needs to use AI technology in healthcare as the usage of technology in healthcare is the lowest in the country [10]. There are AI-based applications that are used in healthcare such as robot-assisted surgery, virtual nursing assistant, fraud detection, preliminary diagnosis, and others.

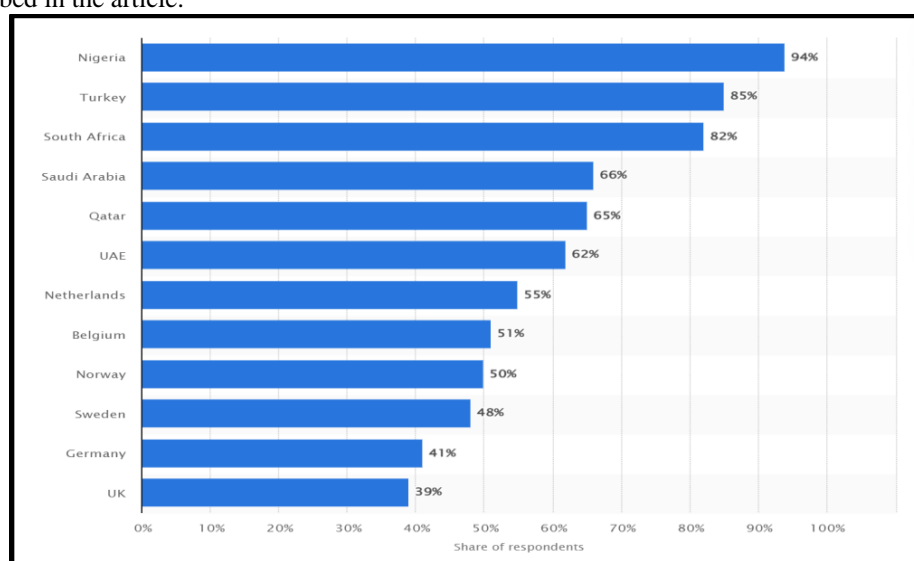


Figure 1: Countries that need to use AI technology in healthcare [10]

Aim and objective and research questions

The aim of the research article is to investigate the importance of AI technology in healthcare and the **objectives** are

- To analyze the importance of AI technology to make clinical decisions effectively
- To describe the usage of AI technology to improve the patient outcome
- To investigate the pros and cons of AI technology for healthcare

On the contrary, there are specific research questions based on the objectives which were used to get a basic idea about the research topic. The **research questions** are

- What is AI technology and how can it be used in healthcare?
- How does AI technology help to improve patient outcomes in nursing?
- What are the pros and cons of AI technology in

healthcare?

LITERATURE REVIEW

Concept of AI technology

Artificial intelligence (AI technology) is described as the simulation revolving around human intelligence that has been processed through machines such as computer systems. It makes use of **natural language** along with **speech recognition** [11]. AI technology has **natural language processing (NLP)** that can be used for **clinical documentation**. The NLP system is helpful for offering unstructured clinical information in the form of clinical notes and provides an insight into information to enhance patient outcomes. The data of patients that can be derived are quantifiable data to make accurate predictions about the patients in the healthcare sector.



Figure 2: Artificial Intelligence [11]

2.2 Pros and cons of AI technology in nursing

Pros of AI technology in healthcare	Cons of AI technology in healthcare
<ul style="list-style-type: none"> • Enhancing real-time data • Time-saving • Better treatment • Faster than humans • Effective and efficient 	<ul style="list-style-type: none"> • Expensive • Requires human surveillance • Requires high technological knowledge • Security risks

Table 1: Pros and cons of AI technology in healthcare [9]

The usage of AI technology in healthcare is undoubtedly beneficial for the patients as well as there are some limitations or risks for using AI technology in healthcare. First of all, the usage of AI technology helps physicians to **get real-time data** which leads to effective decision making. Therefore, effective and efficient decision-making can help the patients to get appropriate treatment which enhances an effective relationship between the physician and the patients [9]. Apart from that, **robotic machines work faster** than humans which helps to **save time** and that is another

beneficial site of AI technology in healthcare. The use of technology is helping people to get better and **faster treatment** which leads to a decrease in the mortality rate in the world. Furthermore, the usage of AI technology makes the healthcare system more efficient and effective which is the biggest benefit of AI technology.

On the other hand, there are some risks or limitations of the AI technology in healthcare which are described in this portion of the study. Firstly, the **infrastructure of AI machines is costly** which impacts the economic condition of

the countries poorly. Apart from that, the usage of AI technology *requires effective technological knowledge* and because of that, the employees of healthcare systems may need a training program [5]. A training program requires a large number of costs which also can impact the economic condition of the healthcare sector of the countries. In addition to that, there are *security risks* as the number of cybercrimes has increased and increased day by day. The number of people who have effective technological knowledge is increasing nowadays and along with that, the usage of that knowledge for hacking devices is also increasing.

Usage of AI technology during COVID-19

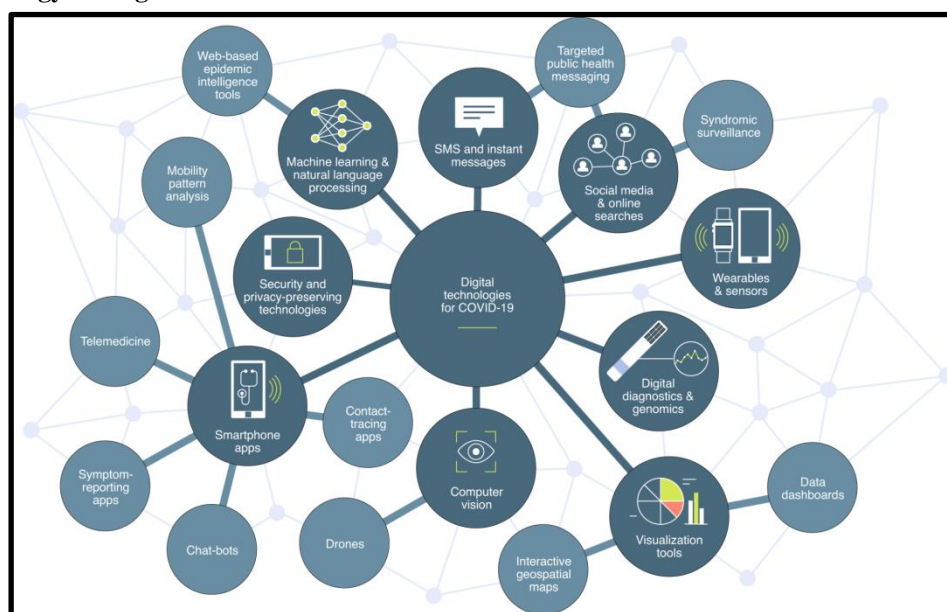


Figure 3: AI technology during COVID-19 [12]

The system makes use of natural language processing that can be customized for understanding patient needs. Speech recognition within AI technology also helps in the oral exchange of information in real-time [1]. Therefore, AI technology is important for understanding the language of patients and improving oral exchange between healthcare professionals and patients. The appointment can be scheduled through AI CDSS that helps in obtaining immediate assistance and in symptom measurement. The healthcare professional can make clinical decisions through reviewing symptoms, constant interaction with patients.

Theoretical framework

Systems theory is an important theory that examines complexity in nature along with society as well as science. This theory emphasizes the interaction between organization

AI technology has a part named *Clinical Decision Support Systems (CDSS)*. CDSS are software-based AI tools that are growing in everyday lives. AI CDSS is effective software that has the power to leverage huge data with the help of *electronic health records (EHR)* [12]. This software of AI technology assists physicians, nurses, and other healthcare workers to make informed decisions. AI clinical decision systems assist in the exchange of different types of information between healthcare professionals and patients. It is an AI software that asks the right question on patient concerns and involves deriving follow-up information to enhance patient outcomes.

and environment. Organizations in the healthcare sector need to look after resources within the organizational environment to offer effective services to customers in the form of patients [3]. The healthcare sector to embrace AI technology will make adjustments in organizational resources. The investment in the system in the form of AI technology will obtain input from the surrounding environment of the healthcare sector to incorporate improvements in patient outcomes. The systems theory refers to the transformation of technology and other aspects into goods and services for people. Thereafter, the usage of technology in healthcare is also focused on providing better services to people. Thus, the usage of systems theory was effective to understand and analyze the concept of AI technology in healthcare.

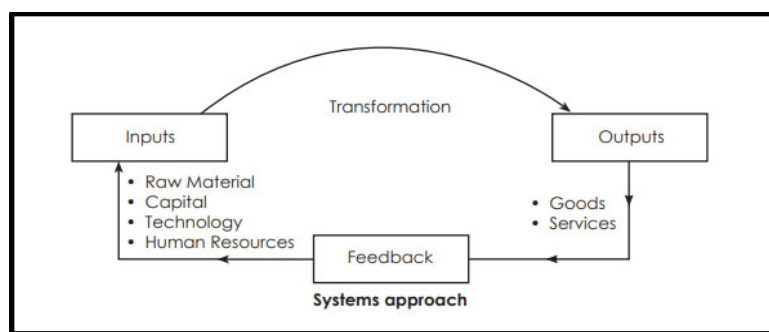


Figure 4: Systems theory [3]

Literature gap

The literature review has not discussed other aspects in AI technology such as visual recognition, text recognition, AI robotics, and others except speech recognition and natural language processing. The research scope has reduced as these areas within AI technology have not been emphasized in this article. However, requirements to make clinical decisions, synthesize information accompanied with making improvements in terms of patient outcomes have been mainly focused on.

METHODS

There is an article that has evidence of usage of AI technology or computer-assisted techniques and this AI technology has been used in rural areas in some of the developing countries. The AI has been incorporated in medicines, healthcare management, clinical decision, diagnosis, and others. For example, **IBM Watson** is one of the effective support systems of AI healthcare that has been used by physicians to review patients' documents. Diagnostic errors are witnessed in the healthcare sector where 5.08% regarding outpatient diagnostic errors has been found in the US [6].

A **convolutional neural network (CNN)** is a distinguished

AI technology that has the power to recognize images and differentiate one image from others. This type of AI has examined a dataset of around **129,450 images** to detect skin cancer [6]. The result revolving around the usage of this AI has shown that dermatologists have been able to classify various skin cancers to make improvements through diagnostic care. The physicians have been able to make clinical decisions prior to the identification of skin cancers.

DATA ANALYSIS

Theme 1: Importance of AI technology in nursing

The usage of AI technology is important in healthcare as well as nursing. There are different AI-based devices that help the nurses to gain information about the medical situation of patients faster which helps the doctors to detect the diseases efficiently. The AI-based devices or machines are **thermometer, peak flow, glucose meter, blood pressure, weight scale, pulse oximeter**, and others [4]. All the devices are important and provide basic information about the patients which is important before starting treatment. Gaining knowledge about the blood pressure level, blood sugar level, temperature, and pulse rate of the patients is the basic duty of a nurse and the devices help the nurses to get this basic information about the patients.



Figure 5: AI-based devices in healthcare [4]

Theme 2: Usage of AI technology in healthcare

The usage of AI technology in healthcare is beneficial not only for doctors and nurses but also beneficial for patients. AI-based devices and machines are able to detect illness and ailments appropriately which helps the patients to get accurate treatment on time. Treatment of diseases is possible after detection of the diseases and the usage of AI-based devices helps doctors to detect the ailments faster [8].

Thereafter, the usage of AI technology helps to enhance the decision-making skills of the doctors which is beneficial for the patients. Apart from that, robotic-based surgeries help to enhance the quality of treatment. Although the infrastructure of AI-based devices is costly, it helps to provide appropriate treatment to the patients which decrease the mortality rates. In addition to that, there are some small AI-based devices that can be used by patients as well to maintain basic healthcare.

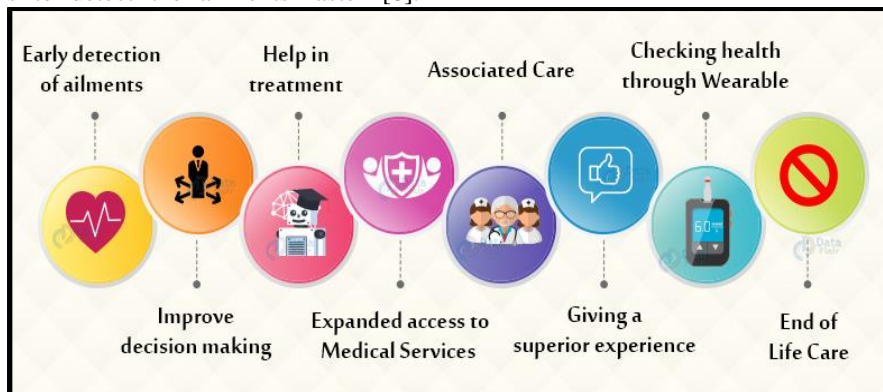


Figure 6: AI technology in healthcare [8]

CONCLUSION AND RECOMMENDATIONS

Conclusion

It is identified that; the usage of AI technology is increasing in healthcare institutions worldwide as well as the improvement in healthcare is also increasing. There are benefits as well as limitations of AI technology in healthcare. AI technology helps to provide effective and efficient healthcare services to patients. Apart from that, the increasing number of cybercrimes indicates the security risks of using AI technology as there is a risk of losing the patient's data. Thus, some recommendations for reducing the number of risks of AI technology is discussed below.

Recommendations

Healthcare institutions must be aware of the risks of using AI technology in healthcare for taking appropriate actions towards the risks. Firstly, security issues are the biggest risk of using AI-based devices. Healthcare institutions should use expensive software for enhancing security (Armstrong, 2018). Enhancing security will help to enhance the privacy of the data of the patients and that will enhance the trust of patients.

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