



## Artificial Intelligence and Machine learning in the Healthcare Sector: A Review

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### KEYWORDS

Healthcare  
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### ABSTRACT

Recently, there has been an increase in the use of technology such as Artificial Intelligence (AI) and Machine Learning (ML) in the healthcare sector. Hence, this research goal is to understand the benefits, challenges, and trends associated with this technology in this sector. Moreover, other technology such as Internet of Things (IoT) and Augmented Reality (AR) also has been reviewed. Articles related to the use of AI and ML has been collected, reviewed, and compared. The AI and ML trend in healthcare sector mainly used to improve the accuracy and computational speed of analysis. Although, the increase of latest technology able to improve the healthcare sector, it should be implemented effectively and maintain compliance with the legal, ethical, quality, and security standards.

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## 1. INTRODUCTION

Healthcare is one sector that has witnessed massive transformation with the developments and advancements in technology. Various information systems were used and implemented in the field of healthcare. There are specific issues and trends associated with information systems and their management in healthcare. Business Intelligence and Big Data are two technologies that are extensively used in healthcare. Business Intelligence and Big Data are medical intelligence tools and applications used for practical analysis and diagnosis of the medical condition [1]. Decision support systems are also used in healthcare and data-driven decisions are made making use of these technologies. The handling and management of the data are significant, and data warehouses are typically done to manage the information [2]. The data associated with healthcare systems are usually multi-dimensional and often analyzed from different aspects for effective use. The use of visualization techniques and technologies is also done along with the utilization of digital dashboards for the purpose of data management in healthcare [6].

Many developments and advancements are being done in the field of Artificial Intelligence (AI). However, the development of AI tools and applications must be done as per the clinical problems and requirements. The technologies shall also be applied such that clinical practices are enhanced as the outcome. Technological development and advancement are done as per the disease and the medical conditions. A lot of research was conducted in the field of AI in healthcare. It is identified that the use of AI is currently done for a few diseases. Some of these include cancer [3], cardiovascular diseases [4], and more.

Various cases of AI applications were identified in the healthcare sector. The first is Machine Learning (ML) that analyzes structured data in medical sciences [5]. These may include imaging records, genetic information, and likewise. Figure 1 shows illustrations demonstrating use of AI in cardiology. The use of data warehouses is for the purpose of integration between different types of databases. The operational databases are significant from BI, and these can be further classified in varied components for healthcare systems and organizations [10]. Clinical active databases, for instance, comprise the medical information of the

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**Fig. 1.** Role of Artificial Intelligence in Cardiology [45].

patients that may include medical records, laboratory outcomes, and likewise. Another form of operational database is the administrative operational database that mainly include business information essential for administrative management. This usually pertains to financial details, details of the employees, and likewise. External operational database is the third type of database included by the external provider, concerning insurance forms, medical forms and medical reports [11].

Thus, with AI and ML, these domains can be used and applied in our daily lives. The use of ML in medical sciences can be done to cluster patient records and medical signs to understand the specific probability around certain medical conditions. The second category under AI makes use of the Natural Language Processing (NLP) [7]. It is the method in which the extraction of information is done from unstructured details that may comprise clinical data and journals so that structured medical information can be effectively managed. The use of these NLP procedures is such that the conversion of textual information or other medical records can be recognized in machine form, which may then be analyzed to understand associated patterns [8].

The paper arranged as follows: After this introduction, the theoretical framework is presented in Section 2, focusing on the literature review of AI and ML in healthcare. Section 3 focuses on approaches in research methodology. The research method used to understand the aspects of information system project management in the healthcare sector is the qualitative research method. Section 4 discusses the results and findings, whilst the recommendation and future work are described in Section 5. Finally, section 6 summarizes and concludes this paper.

## 2. THEORETICAL FRAMEWORK: BUSINESS INTELLIGENCE (BI.) SYSTEMS

There are research studies conducted to determine the various components of business intelligence (BI) systems in healthcare. The use of intelligent technologies is significant so that the massive volumes of data can be effectively handled using the BI. tools [7]. There are various BI. technologies that are being used in healthcare organizations and firms. Some of these include data warehousing, data analytics, data mining [8], knowledge discovery, and a lot more. The use of technology is significant to enable and ensure an integrated view of data and for effective decision-making [9]. Internet of Things, IoT is a technology that is significantly contributing to this area and was successful in integrating the different elements and aspects with each other.

### 2.1 Business Intelligence in Healthcare

The research studies and papers have highlighted a few benefits that are associated with the use of BI in the field of healthcare. There are many reporting and analytical applications that can be executed using BI technology. It is necessary that a robust BI environment is incorporated in healthcare to ensure effective usage [12]. There are several resources associated with healthcare organizations. Effective optimization of these resources can be done using the BI tools and applications. One of the most significant assets is the data that is associated with a healthcare organization. The use of BI. tools is to effectively analyze the data and certify effective predictions are made. The operations and processes running at the back end can also be properly managed [13].

Certain issues and risks have also been highlighted in numerous research studies pertaining to information systems and their use in healthcare. The primary issues that are highlighted include security and privacy risks. BI. tools are often used together with cloud computing platforms and mediums. Similarly, Big Data tools are also attained with cloud-based databases, which include No SQL databases. With the involvement of cloud, a number of security concerns and privacy violations may emerge [14]. These involve network-based security issues, data breaches, loss of the data sets, availability attacks, etc.

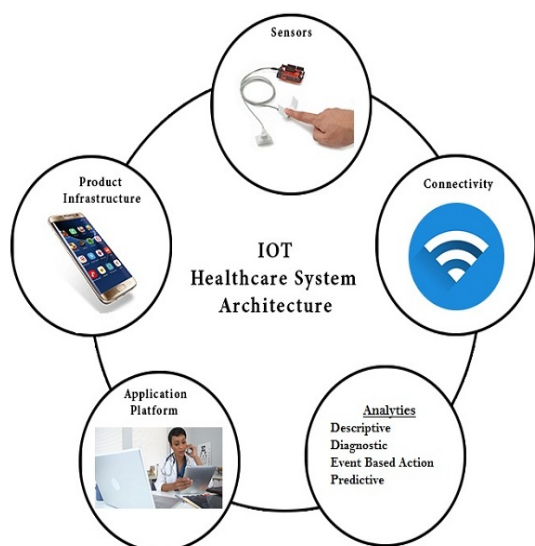
The study covers the benefits of online analytical tools in healthcare to carry out multi-dimensional analysis of information. Thus, quick and streamlined access can be enabled. Moreover, ad-hoc analysis is also made possible to determine hidden patterns associated with the medical information.

### 2.2 Information and System Security in Healthcare

There are various trends that are now emerging in the healthcare field with further advancements in technology, for instance, in the aspect of information security and system security. The use of Blockchain technology is being researched to understand the scope of the technology in promoting healthcare data security [15]. Blockchain networks and applications provide the mechanism to include cryptographic hash functions which makes it possible to properly safeguard information. The increased use and application of IoT is also being witnessed in the field of healthcare as shown in Figure 2. There are smart systems, devices, and applications that are being developed to ensure effective use of technology [16]. Augmented reality and virtual reality technologies can also be incorporated as these technologies can be used to train students in various cases and scenarios associated with healthcare and medical fields. These technologies on one hand help in proper handling of the healthcare operations but on the other hand also be a reason for threats. Threats as in from cyber criminals; all of these technologies are means to digitalize and automate operations and thus if not integrated well with the existing systems can lead to serious disruptions.

### 2.3 Artificial Intelligence (AI) in healthcare

The use of AI systems can be done for oncology and can be useful in the determination of cancer diagnosis [6]. The AI system makes use of the double-blinded validation study. This technology can also analyze clinical images to determine skin



**Fig. 2** IoT healthcare system architecture [44]

cancer and its various types. Another area where the technology can be applied is in neurology. AI in this field can be implemented to restore the control of movement. This can be useful for patients suffering from quadriplegia. The upper-limb prostheses can be managed with the aid of AI technology to control and monitor the spinal motor neurons. Cardiology is one area where the use and application of AI technology can be benefitted. The diagnosis of heart conditions and diseases can be done using AI based on cardiac images. Cardiac MRI image analyses can be done to determine specific medical conditions.

In the field of healthcare, adequate treatment and proper diagnosis play a critical role. A delay in diagnosis can be fatal for patients with severe medical conditions. Therefore, it is necessary that the diagnosis is done in a timely manner. The use of technology in a proper manner can ensure diagnosis and treatment are streamlined [24]. Moreover, early diagnosis can be attained swiftly with the aid of AI. Another potential area of AI is with stroke determination and prediction. Stroke is one of the commonly occurring medical condition that has impacted more than 500 million lives across the globe. It is identified as the major cause of death in China. Additionally, it is determined as the fifth leading cause of death in North America. There are also a lot of expenses that are associated with strokes. Stroke costs was recorded approximately USD 689 billion across the globe. It has also led to significant burdens on people. It is necessary that significant and useful measures are adopted to prevent this medical condition with effective treatment altogether.

With the development and advancements in technology, it is identified that AI techniques can be applied in the treatment and diagnosis of stroke. Here the application of AI can be classified into three major areas. The first is the timely detection and prediction of the medical condition. The second is the treatment of the disease and the third is the evaluation and prediction of the outcomes [17]. The primary reason that leads to stroke in 85% of cases is due to a thrombus in the vessel, often referred to as cerebral infarction. However, there is still lack of identification and judgement from observations, which leads to delayed treatment thus higher fatality rates. There is a

movement detecting equipment that was developed for the prediction of stroke in patients.

#### 2.4 Machine Learning (ML) in healthcare

There are ML algorithms that can be used in the treatment of stroke. The detection of stroke can be done with a defined process that involves the human activity recognition stage and then followed by the stroke-onset detection stage. Movement can be tracked for the patients and the deviation of the patterns can be considered as an alert and reminder for stroke. The use of IoT-based wearable devices can also gather information regarding the patients [18]. These data and its analysis can be utilized to predict for stroke. The gathering of the information and modelling can be executed with the aid of a Markov model. Modelling can also be done using support vector machines. Essentially, this results in the classification of patients at risk and the ones not at risk.

#### 2.5 Integration of AI and ML in Healthcare

A combination of technologies can be realized with neuroimaging techniques and processes, such as MRI and CT scans. The outcomes of these techniques can be analyzed using the technology for effective evaluation. Support vector machine (SVM) can also be used to understand the patients at risk of stroke [19]. Research studies suggested that Bayes classification can be adopted to identify stroke lesions. Furthermore, the incorporation of 3D convolution neural networks can ascertain the lesion segmentation in multi-model brain.

#### 2.6 Emergence of IoT Technologies in Healthcare

Several healthcare-enabled technologies exist, such as connected inhalers, ingestible sensors, depression, mood monitoring, and more. It can be said this way as well that majority of these are now developed using IoT technology. This has led to various innovations in the field of healthcare. These innovations considerably include communication and sensing technologies. IoT-based applications can assist patients suffering from diabetes by carrying out continuous monitoring. Wireless systems and sensors are used to send glucose information by the involvement of smart transmitters, thus frequent data collection can be made. Smartphones are often used to determine the specific patterns and to certify essential information is shared [20]. The study shows that IoT can be implemented in cancer treatments. Patients can wear trackers for a specified period, whereby the information can then be used in the treatment process. The use of IoT in healthcare also ensures adherence to the defined norms. Healthcare devices can be integrated with mobile applications to make sure that self-monitoring of the health conditions can be done by the patients [23]. For example, patients suffering from asthma or other severe respiratory conditions are often required to take inhalers. Wearable devices and smartphones can be used to generate reminders for the patients. Similarly, reminders for medicine intake can also be issued.

IoT cloud is now being integrated into different technologies. These integrate the various sensor nodes and devices with patients' smartphones and other technologies. Access to care was improved with the inclusion of IoT in the field of healthcare. The quality of care can be improved with cost reduction owing to technological usage and inclusion. However, certain risks are also identified with the use of IoT and other technologies in the field of healthcare [21]. There are

corresponding resource constraints being reported and some prevalent limitations associated with performance and energy requirements. There are also issues pertaining to the security and privacy of information sets. These are the various risks exposed from the use of IoT and cloud technologies. Attackers often make use of these vulnerabilities to gain access to patient records.

IoT applications and tools comprises Radio Frequency Identification (RFID) technologies. This technology is used for the purpose of authentication along with the tracking of the patients. User identification is done using RFID together with validation for medical supplies and equipment. The tracking of medical treatments along with medical procedures can also be done using RFID technology [22]. However, there are also risks around privacy with the involvement of RFID. Location privacy and scalability issues was recorded with the use of RFID in the healthcare sector.

### 3. RESEARCH METHODOLOGY: RESEARCH APPROACH

The research method that was used to understand the aspects of information system project management in healthcare sector is the qualitative research method. It is the method of research that relies on non-numerical and unstructured data to determine specific research answers [18]. This method will be used in this case to understand the various benefits, challenges, and trends that are associated with information system project management in the healthcare field.

There is an increased use of technology that can be witnessed in the field of healthcare. One of the most useful aspects is that of medical intelligence. Electronic medical information and records are analyzed to determine the specific trends and patterns. Analytical tools along with a number of other technical tools and applications are being used in the healthcare field [19]. It is necessary that the management of the technology is done in an effective manner. The qualitative research methodology is applied to explore these concepts and applications. Therefore, the various aspects of information systems and tools that are used may also be determined.

#### 3.1 Data Collection Methods

As mentioned above qualitative research methodology was followed but no such primary methods like interviews, surveys or observations been used here. Rather, the research is based on secondary data collected from different articles, journals, and other sources that could provide the researcher with existing data. This that is secondary research includes research materials that was published in research reports and other similar documents [46]. These documents can be accessed from public libraries, academic or company websites, previously done surveys and so on. Apart from that if required government and non-government agencies that store data can also be approached for research purposes and data can be retrieved from them. This research did not require approaching any such government and non-government agencies as the information on the internet were enough to carry out the research. The topic chosen is one of the most talked off *topic* and maybe that made it easy to find relevant data. The reason for choosing secondary research is that it is cost effective [47]. This research is being conducted for academic purpose and thus the budget for the research is limited. In that case, secondary research done in an organized way helped a lot to figure out valuable information.

The steps that were followed to carry out the secondary research are:

- Identifying the topic on which the research is to be done.
- Identifying the research sources.
- Collecting existing data.
- Combining and comparing
- Analyzing the data

Each of the steps that was given above have much significance in the research. Firstly, it was identifying the research topic which was done doing some research on current issues. This helped in realizing what is the need of the situation and requires to be researched on. It was understood that due to COVID, one of the sectors that was worst affected is the healthcare sector. Thus, decision was taken to research on how technologies such as Artificial Intelligence and Machine learning can help the healthcare handle the extra pressure and be ready for similar type of situation in future.

The next main step was identifying the sources that again was divided into sub-steps such as deciding on which websites should be accessed to get the sources, the time range within which the sources should be and so on. For the purpose of this research sites such as Google Scholar and IEEE Explore were visited and all sources taken from these databases. After that the time range was fixed to be 2015 to present so that outdated information not be collected. Then the relevancy of the articles or journals were judged by going through abstracts, key findings, using keywords to sort and so on. In this way it was ensured that all studies selected be highly related to the research.

After this was collection of the data and storing it in an organized way. This helped in sorting out data and eliminating or adding some resources as was needed. Last two steps were comparing and combining and analysis. These can be taken to be one single step as after discussing on the information obtained from each of the sources, proper analysis was done. This helped the researcher get to the conclusion. The healthcare related data and the issues were taken from some recent researches done so that better idea could be obtained.

The limitation of the research was that no primary data was used, using which could have yielded better results. But the situation in not in support of conducting interviews or even online surveys and observations. Here the situation being referred to is that of the pandemic. Thus, secondary research was chosen and to address the limitations, focus was given on the quality of the sources being included in the study.

### 4. DISCUSSIONS

In this section some studies was discussed to add to the information that was obtained in the sections above. Based on the information from all of these studies, results will be obtained. The research provides the understanding of numerous benefits, challenges, and trends associated with information systems project management in healthcare. It elaborates the mechanism to understand the various technologies used in the industry and the associated risks and potential [28]. Several intelligent tools and systems such as clinical decision support systems, robotic surgeries, enhance primary care and triage by means of chatbots and more are currently being used in healthcare. The use of medical intelligence is for the decision-



making processes. The analysis of the medical records and history of the patients is done and analyzed using automated tools, such as Big Data analytics. This provides the ability to understand the associated patterns and trends, which is useful in the diagnosis and treatment processes [29].

In terms of global health management and security, the role of medical intelligence was found to be significant. Currently, there are several health and medical conditions that are being developed [30]. The use of medical intelligence, such as predictive and prescriptive analytics, can be useful in determining the outbreak of medical conditions in advance. The evaluation of the health risks can be done in a timely manner to generate the alerts accordingly. Global health management and security mechanisms using medical intelligence can assist the World Health Organization, WHO and other medical regulatory bodies in maintaining global health [31]. Several success and failures was recorded pertaining to the use of medical intelligence in the past. For example, Ebola and Covid responses were not adequate despite the availability of these advanced technologies. However, medical intelligence and the use of automated information systems were found to be extremely critical in determining the donors for different health conditions. Quick responses had indeed been achieved in this aspect [2].

Intelligent advancements are critical with the goal such that huge volumes of data can be successfully handled by BI. tools. There are different BI innovations being utilized in healthcare associations and firms [32]. The utilization of innovation is critical to ensure that the coordinated perspective on the data is empowered and used for powerful dynamics. Internet of Things, IoT is an innovation that is essentially contributing here and was fruitful in incorporating the various components and angles with one another [33]. The utilization of data warehouses is likewise accomplished with the end goal of incorporating the various types of databases. Operational databases are critical aspects of BI and these can be additionally characterized into various segments for the healthcare systems and associations. Clinical operational databases, for example, involve the medical data of the patients that may consist of medical records and others. Another type of operational database in use is the managerial operational database that chiefly incorporates business data fundamental for the authoritative management [34]. This normally incorporates money related data, subtleties of the workers and the like. External operational database is the third type database incorporated from the external provider.

Research studies and papers have featured various advantages related with the utilization of BI in the field of healthcare. There are countless reporting and analytical applications that can be executed by utilizing BI as innovation [35]. It is essential that a strong BI. climate is accounted for in healthcare to ensure that viable use is achieved. There are a few assets related with healthcare associations. The compelling enhancement of these assets should be made possible by the utilization of BI. tools and applications. One of the most critical resources is the data related with healthcare associations. The utilization of BI. tools never really examines the data to ensure that viable forecasts are made. The activities and cycles running at the back end can likewise be appropriately overseen. There are indeed issues and risks that was featured in various research focusing on the data systems and their utilization in healthcare. The essential portions of issues that are featured incorporate security and privacy risks. BI. tools are regularly utilized

alongside cloud computing platforms and mediums [36]. Additionally, the utilization of Big Data tools is accomplished with cloud-based databases that incorporate the NoSQL databases. The contribution of the cloud may give rise to an enormous number of security concerns and privacy infringement. These comprise organization-based security issues, data penetration, loss of data sets, availability attacks, etc.

The study has secured the advantages of online analytical tools in healthcare to complete multi-dimensional examination of data. Fast and smooth access can be substantially observed. A specially appointed examination that is additionally made conceivable provides the option to decide the concealed patterns related to the medical data. There are different trends that are currently rising in the healthcare field with further improvements in innovation. Data security and system security aspects in healthcare are also being researched upon [37]. Blockchain innovation is being researched as to comprehend the extent of the innovation in advancing healthcare data security. Blockchain organizations and applications would indeed allow the system to incorporate cryptographic hash functions to appropriately defend the data. The expanded use and application of IoT is likewise prevailing in the field of healthcare. There are smart systems, gadgets, and applications that are being created to ensure the successful utilization of innovation [38]. The utilization of augmented reality and virtual reality advancements should likewise be possible in the field of healthcare. One of the most significant angles is the utilization of innovation in preparing and training of healthcare experts. The reproduction of real-world situations could be made possible by utilizing augmented and virtual reality innovations. Medical foundations and universities can harness these advantages to prepare understudies for different cases and situations related with healthcare and medical fields [39].

The study provided an understanding of the various security and privacy issues in-depth. The case scenarios of several security breaches could be analyzed and some of the primary issues determined are the cloud-based security and privacy risks. Cloud usage can be seen in IoT-based tools, AI tools, Big Data tools, and others. Healthcare systems are prone to exposure in terms of vulnerabilities associated with cloud, whereby these security vulnerabilities could be exploited [40]. For example private health details of the patients could be captured, thus compromising security and confidentiality altogether. Malware attacks, denial of service, eavesdropping, phishing, and data breaches could also be identified as prominent attacks.

It could be anticipated that the use of technology will further increase in the years to come. A lot of healthcare firms and entities are looking into offering smart health services to their patients. This will definitely increase the use of technologies such as IoT, AI, AR, etc. Apart from the security and privacy concerns, issues around the implementation and technical errors may also arise [41]. The non-compliance of the legal and ethical policies could also be considered as a major concern.

There is a defined structure and flow that is currently associated with most healthcare firms. The use of IoT, AI, or any other technology will bring about several changes. These changes may impact all the stakeholders involved in the healthcare field. These include patients, medical staff members, owners of the hospitals and healthcare organizations, suppliers,

etc. Some stakeholders accept the changes, whereas others are found to be reserved and resistive [42]. The inability to accept these changes has a considerable impact on the technology used in healthcare. For example, many patients still prefer to visit medical centers or hospitals to carry out face-to-face discussions with medical professionals. In such cases, the significance and relevance of telehealth monitoring tools and applications get somewhat reduced. These concerns are relevant and must be addressed so that appropriate use of the technology can be attained.

Various healthcare-empowered advancements were made and a dominant part of these are currently evolved by utilizing IoT innovations. Different advancements are created in the field of healthcare. These advancements additionally incorporate various communication and sensing innovations, etc.

The utilization of IoT-based applications should be capable of helping the patients suffering from diabetes to complete continuous monitoring. The wireless system and sensors could be utilized to send glucose data via the savvy transmitter, thereby allowing regular information assortment to be possible [25]. The utilization of smartphones should allow decisions to be made from examples all the while ensuring that basic data is shared. The examination study shows that the utilization of IoT should be possible in cancer therapies. Patients could wear trackers for a pre-determined timeframe and the data would then be able to be utilized in the treatment cycle. IoT is additionally adopted in healthcare to ensure adherence with characterized standards. Healthcare devices could be incorporated with versatile applications, thus ensuring remote monitoring of the ailments to be completed by the patients. For instance, patients experiencing asthma or other serious respiratory conditions are frequently needed to take inhalers [26]. The utilization of wearable devices and smartphones should make it possible to produce updates for the patients. Additionally, the updates for the prescriptions could also be prompted. The utilization of IoT cloud could as well incorporate these various advancements. These should allow the coordination of different sensor hubs and devices, patients' smartphones and different innovations to be possible. The admittance to mind was improved with the incorporation of IoT in the field of healthcare. The nature of care could be improved and expenses decreased with mechanical use and incorporation [27]. There are sure risks that are likewise related to the utilization of IoT and different advancements in the field of healthcare. However, there are asset imperatives, which are material. Furthermore, there are likewise limitations related to performance and energy prerequisites. There are discernible issues as far as the security and protection of data sets are concerned. These are the different risks present from the adoption of IoT and cloud. Aggressors would appropriate these weaknesses to access the patient records.

There is a great deal of development and headway being done in the field of AI. Nonetheless, it is essential that the development of AI tools and applications be done according to recognizable clinical issues and prerequisites. These improvements would likely be applied with the goal of enhancing clinical practices as a result [25]. These mechanical development and headway are driven according to the sickness and medical conditions. There is a great deal of scrutiny being directed in the field of AI in healthcare. It is recognized that the utilization of AI is at present, accomplished for a couple of diseases. With the development and advancements in

innovation, it is distinguished that the utilization of the AI methods should be made possible in the treatment and conclusion of stroke [27]. The application of AI in the strokes can be designated into three significant zones. The first is the opportune detection and prediction of the medical condition. The second is the treatment of the sickness and the third is the assessment and prediction of the results. There are ML algorithms that could be utilized in the treatment of stroke. The detection of stroke should be possible with a characterized cycle that includes the human activity recognition stage, which is then trailed by the stroke-onset detection stage. The detection of the development could then be observed by the patients, whereby any deviation from the examples would prompt caution and update for the stroke patient. It is therefore possible for the IoT-based wearable gadgets to assemble the data for the patients. Information such as this and its analysis should make it possible to predict stroke attacks. Furthermore, this could also be enhanced by support vector machines. Hence, any classification of the patients, either at risk or not, could be made possible. Cardiology is one territory that could benefit from the utilization and application of AI innovation. Additionally, detection of heart conditions and diseases could be made possible by utilizing AI on cardiovascular images. The analysis of cardiovascular MRI images should make it possible to diagnose the medical conditions.

The study also highlighted tangible and non-tangible benefits that healthcare organizations could attain with the effective use of technology. There is the competitive edge that can be obtained with the utilization of the latest technology. The expansion of the patient base and market shares could also be achieved.

## 5. RESULTS

From the above discussion and initial literature review, it can be said that machine learning and AI have already made their way into the sector. It can be said that rapid adoption is yet to be done, but the sector has already been introduced to these modern technologies. Use of information systems and their implementation in the healthcare sector is not new, and the extensive use of business intelligence and big data are a proof of it. Decision support systems are also in use in this sector, and apart from this there are other applications as well. The research has tried including all aspects of ML and AI in healthcare. Use of AI, use of IoT, advantages and disadvantages of using these technologies all was figured out. For instance, the readers get to know that AI systems can be used for oncology and can be useful in determining cancer diagnosis, but on the other hand, when using AI, there is a risk of information loss, data breach, and more. Similarly, to add on the advantages different ways AI can aid or aid in healthcare was found out. It is a fact that using analytical and modern tools that sector is better prepared for different operations but then the issues related to privacy cannot be ignored. Use of these technologies in curing different diseases suggests the wide range of applicability of the same. For instance, ML algorithms can be made use of in the treatment of stroke, enhance clinical decision making, in treating cancer, cardiovascular diseases and much more. With the use of AI and ML a department of medical science that is being anticipated to be most benefitted is cardiology. Detection of heart conditions and diseases can be easy with the use of AI on cardiovascular images. Apart from this, the technologies are making it big when being inculcated into wearable devices. This is helping doctors to monitor their patients remotely. All these

advancements can be attributed to the emergence of AI and ML in the healthcare sector. It is also found out that if the technologies get combined together they can even be more helpful. Combining modern technologies to yield even better results in healthcare can be taken under the purview of new trends.

The research findings hint that current usage and future usage are beneficial for the sector only if the security and privacy issues are worked upon. The issues as mentioned above such as capturing of private health details of patients Malware attacks, denial of service, eavesdropping, phishing, and data breaches cannot be ignored. It is good that research and development and simultaneous advancements are happening in the sector with the use of these modern technologies but certainly the negatives are a huge concern.

## 6. FUTURE RESEARCH AND RECOMMENDATIONS

The research has covered the benefits, challenges, and trends around healthcare information systems project management. However, only limited data could be covered and analyzed as part of the research work. It is recommended that the future research activities to include the utilization of much larger data sets. Also, the significance of the latest regulatory controls and policies, such as GDPR could also be determined in terms of its impact on the use of automated tools and systems for the healthcare sector. The future research could also focus on the combination of Blockchain technology and other technologies for the purpose of security [43].

Several benefits from the adoption of healthcare technologies were recognized that could prove beneficial for hospitals and medical organizations. However, there are certain risks and concerns that are associated with these technologies. Notably, security and privacy issues associated with AI, IoT, Cloud Computing and other technologies are still prevalent within the healthcare sector. In the future, research could be directed towards the measures that can be used for the enhancement of security and privacy of these healthcare technologies. Focus should be made on the security of healthcare records and networks along with automated systems and tools being used.

## 7. CONCLUSION

This paper discussed that information systems project management in healthcare is relevant owing to the increase in the use of technology in the sector. Numerous technologies are being used, such as the Internet of Things, Artificial Intelligence, Augmented Reality, and Big Data. The use of such technologies in the field of healthcare comes with benefits and challenges. The handling of electronic medical information was made more accessible. Nonetheless, there are concerning privacy and security issues that have also emerged.

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