

Artificial Intelligence and its Role in Electronic Patient Record

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Abstract

Background: Smart hospitals today use Artificial Intelligence to improve the quality of their services. In this sense, optimizing the patient's electronic medical record is one of the most significant issues that these hospitals face.

Objectives: This study aimed to determine the role of AI in patient electronic records in a smart hospital.

Methods: This study was a systematic review, with keywords searched in PubMed, Scopus, Google Scholar, and SID databases. In Persian and English, the keywords were artificial intelligence algorithms, electronic medical records, service quality, and hospital. The inclusion criteria included publication in Persian or English, full-text papers, current publications, and a focus on the use of AI in electronic medical records. Finally, about 57 papers related to the investigation were picked.

Results: After reviewing previous related studies, it was discovered that AI can play a role in various aspects of electronic patient records, such as disease diagnosis, predicting relapse and recovery periods, improving treatment accuracy and reducing medical errors, digital care, and decision-support systems. This can result in a 20-30% improvement in resource planning, a 30% decrease in wait times, better resource use, and more accurate predictions.

Conclusion: Leveraging AI in electronic patient records is critical for maximizing benefits while minimizing hazards. Despite the limitations, AI has the potential to become a critical tool for smart hospitals in improving healthcare delivery and efficiency. Accordingly, healthcare leaders that incorporate AI algorithms into their systems can give more effective and up-to-date care to their patients.

Keywords: Electronic Record, Artificial Intelligence, Patient, Algorithms, Hospitals

1. Background

Improving Information and Communication Technology (ICT) infrastructure and environmental data analysis capabilities can help organizations and businesses gain a competitive advantage.¹ While the aspects of digital transformation are extensive, researchers and organizational managers refer to the Fourth Revolution, which has been studied since 2011.²

The Fourth Revolution is currently known as Industry 4.0, both in industry and academia.³ Industry 4.0 is a road that provides organizations a competitive advantage and, as a result, makes it necessary for businesses and industries to survive; thus, all organizations must prepare themselves for such competitive conditions and the business climate.⁴

Today, technologies and digital systems have influenced many parts of our daily life. The employment of digital tools has resulted in considerable advancements in the field of health care.⁵ Smart instruments, for example, are used to diagnose and cure a variety of ailments.⁶ As a result, the development of such technologies, as well as the knowledge, education, and attitudes of medical staff

and patients toward smart technologies, have given rise to a new concept known as the smart hospital.⁷

Healthcare businesses are utilizing smart technology to cut costs and increase efficiency in order to maintain patient safety, eliminate medical errors, improve care quality, and comply with laws and regulations.⁸ A smart hospital is outfitted with remote control systems, Internet-connected sensors, and other intelligent technologies.

This equipment is used in hospital smartening to provide services such as patient record keeping, patient request notification, status monitoring, and more.

These hospitals provide a variety of services and expertise that are tailored to the various needs of patients.⁹

Delays in gathering and processing medical data are common in traditional hospitals, which can be hazardous to important patients. Smart hospitals avoid these challenges by ensuring effective and intelligent communication among doctors, patients, and equipment.¹⁰

Healthcare is currently one of the government's top development priorities, and it requires special attention as it transitions to novel management models based on

modern medical concepts and digital technologies.¹¹ Artificial Intelligence (AI), as one of the most recent and widely used fields of computer science, seeks to provide critical applications in a variety of technologies, including medical science, by making computers and machines intelligent in order to achieve a high success rate in disease diagnosis and treatment.¹²

1.1. Smart Hospital

The purpose of developing a smart hospital is to use cutting-edge technology in all areas of the hospital, such as the operating room, emergency department, Intensive Care Unit (ICU), radiology, pharmacy, and other departments.¹³ Smart hospitals have transformed the delivery of healthcare services by increasing efficiency, quality of treatment, process improvement, and patient satisfaction.¹⁴ Furthermore, smart hospitals tend to rely heavily on new technologies like AI to tackle these issues.¹⁵ Despite the benefits of adopting AI and automating activities, its adoption has been slow in various industries, including healthcare.¹⁶ However, there is no escaping the maturity of technology, and the increased usage of new technologies in healthcare is expected in the near future.¹⁷ Smart hospitals can not only improve service delivery and quality in hospitals, but they can also be used in larger ecosystems such as smart cities to provide healthcare services.¹⁸

The following are some of the main topics that might be considered while managing hospital systems optimally: 1) Dimensions of hospital systems; 2) Understanding performance and recognizing system issues, such as patient wait times; 3) Improved performance; 4) Investigating the system's response to high workload;¹⁹ thus, given the significance of smart hospitals as a whole concept, we shall analyze the research conducted in this area.

1.2. Electronic Patient Record

The patient's electronic record is a document that mostly describes the periodic care provided by medical centers but is also prepared in hospitals and other medical service centers such as specialized units or health centers. An electronic patient record is a specific sort of personal health record. An electronic patient record is a systematic collection of patient health information kept digitally. These records can be exchanged between medical centers. Records are distributed via massive networked enter information systems or other information and exchange networks. This information could include identifying information, medical history, drugs and allergies, immunization status, test results, radiological pictures, vital signs, personal data like age and weight, and billing information.²⁰

Electronic patient records are also intended to store data with high accuracy and monitor a patient's condition over time. This eliminates the need to follow earlier paper

medical records, ensuring that the patient receives correct and understandable information. This may be repeated because only one file can be modified, which increases the likelihood that the file is up to date and eliminates the risk of losing paper data. As digital information is searchable and stored in a single file, it can be valuable for evaluating potential patient issues and long-term changes.²¹

First, we'll look at AI algorithms like artificial neural networks, genetic algorithms, and evolutionary algorithms. Then, we'll look at how these algorithms can help improve healthcare services. Next, we will look over the benefits and drawbacks of adopting AI algorithms in this field. Finally, we will look at the value of smart hospitals and the role of AI algorithms in electronic patient record.

1.3. Applications of AI

AI in the healthcare and patient record area has resulted in notable advances:

Disease diagnosis: AI and deep learning algorithms can help diagnose diseases. They can detect indications and symptoms of illnesses in medical test results and medical imaging such as MRI and CT scans.

Disease prediction and pre-diagnosis: By analyzing patient data and relevant large-scale information, AI can forecast when an individual will develop a disease. This app can help with prevention and enhancing access to healthcare services.

Digital care: AI can serve as a "digital caregiver" by improving patient-physician contact and assuring treatment compliance. These applications include the design of smart hospitals as well as the implementation of supported programs for medication management and medical appointment scheduling.

Decision support systems: These systems can help clinicians make medical judgments. Machine learning algorithms can be used to diagnose diseases, predict therapy outcomes, and provide Following, we have presented many useful AI methods for optimizing electronic patient record in hospitals:

1. **Deep learning:** These algorithms use deep neural networks to extract vast volumes of information from medical data and uncover patterns, relationships, and knowledge within it. As a result, this knowledge can be used to diagnose diseases, predict future outcomes, make treatment decisions, and reduce medical errors.²²

2. **Machine learning algorithms:** These algorithms learn from facts and experiences in their surroundings and make judgments accordingly.²³

3. **Neural networks:** Neural networks are models based on the anatomy of the human brain. These networks are made up of a number of units or neurons that are connected together. Weighting functions on these connections, as well as each neuron's activation function, allow these networks to learn complicated patterns from input.²⁴

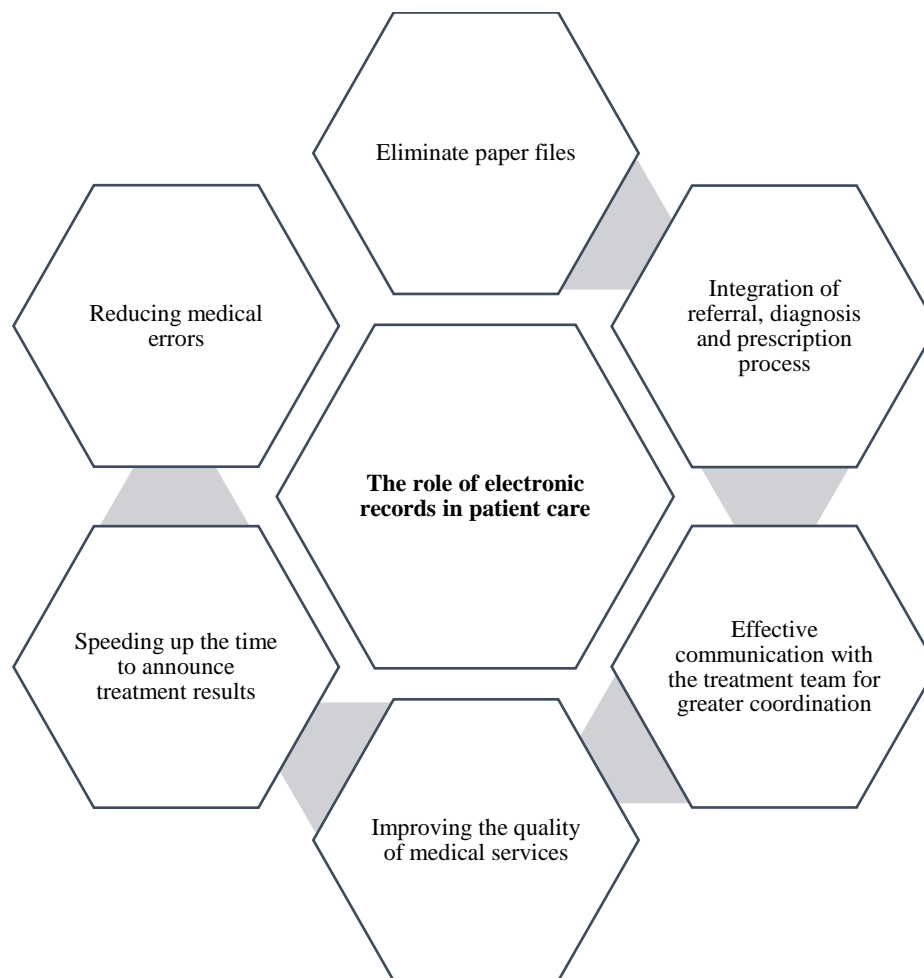


Figure 1. The Role of Electronic Records in Patient Care in a Smart Hospital (Researcher's finding).

4. Evolutionary algorithms: Evolutionary algorithms use methodologies inspired by life and natural evolution processes to optimize and reevaluate the objective problem. In machine learning, evolutionary algorithms can be used to create and refine learning patterns and issue parameters. Genetic algorithms and evolutionary techniques are two examples of evolutionary algorithms that are utilized in machine learning.²⁵

Given that human intelligence learns by adapting to various challenges and problems in its environment and changing its behavior accordingly, computers and machines equipped with AI technology help to predict and solve potential problems, reduce human error, and increase operational speed by making decisions based on similar principles that typically require levels of human intelligence and experience. Figure 2 depicts the link between deep learning, machine learning, and AI.

According to a study of prior research, multiple studies have addressed various elements of emerging technologies in health and medicine. However, no study was identified that took a complete approach to the use of AI algorithms in electronic patient record in the medical business, resulting in an explanation of smart hospital technologies.

Currently, hospitals around the country have taken steps to optimize patient health data; nevertheless, there are still numerous gaps in the field of smart hospitals. As a result, the primary focus of this study is the significance of applying AI algorithms in the field of enhancing electronic patient record.

The study's findings have implications for patients, hospitals, and health policymakers in terms of thoroughly equipping connected institutions with new technology and establishing a competitive advantage in these domains.

Tjoa and Guan (2020) concluded in their study that AI systems in electronic patient record must safely manage sensitive patient information and adhere to existing data protection rules. Adherence to regulations governing patient confidentiality and privacy is critical. Additionally, ongoing monitoring and refining of the AI system is required to improve its performance over time. The system should be constantly examined and upgraded to respond to changing conditions. Feedback from healthcare practitioners and patients can assist identify areas for development and fine-tune the system's capabilities.²⁷

In another study, Nouha (2023) said that by accessing patient data such as genetic information, medical history,

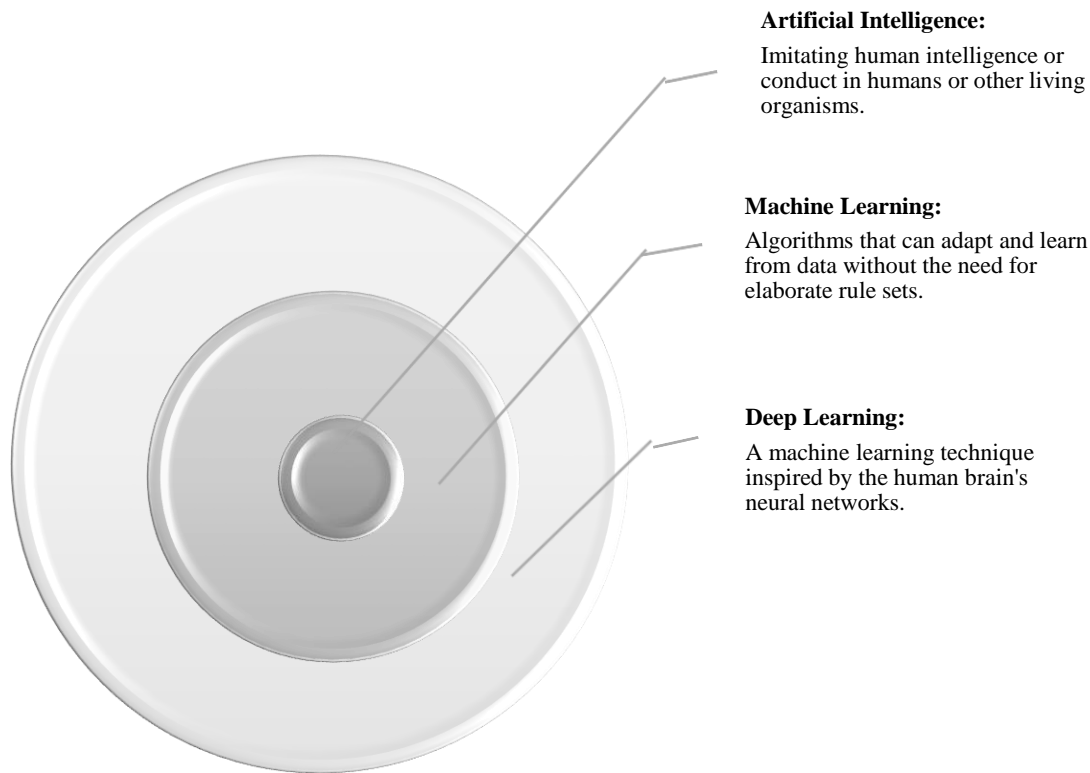


Figure 2. The Relationship between AI, Machine Learning, and Deep Learning.²⁶

Table 1. Smart Hospital Architecture with Electronic Patient Record (Researcher's finding)

Layer	Components	Description
Data Layer	Unified Data Warehouse	Stores information about patients, staff, drugs, equipment, electronic patient record, and more.
	Information Integration Platform	Collects and integrates data from various sources, including electronic patient record.
	Data Supporting Platform	Stores and manages data, including electronic patient record.
Application Layer	Management Decision Application	Assists physicians and nurses in making patient care decisions, using information from electronic patient record.
	Electronic Patient Record Management System Application Layer	Creates, stores, manages, and shares electronic patient records.
Network Layer	Network Transmission Platform	Transmits data between different components of the smart hospital, including electronic patient record.
	Network Integration Technology	Connects different networks, including networks used for electronic patient record.
	Communication Network	Includes local area networks, mobile networks, and wireless networks that are used to transmit electronic patient record.
Access Layer	Access by Fixed Network	Allows users to access the smart hospital and their electronic patient record through wired networks.
	Access by Mobile Network	Allows users to access the smart hospital and their electronic patient record through mobile networks.
	Access by Wireless Network	Allows users to access the smart hospital and their electronic patient record through wireless networks.
Perception Layer	Patient	Includes information about the patient's condition, such as vital signs, medical history, electronic patient record information, and more.
	Doctor	Includes information about the doctor's specialty, skills, and experience, as well as access to relevant patient electronic patient records.
	Nurse	Includes information about the nurse's skills, experience, and duties, as well as access to relevant patient electronic patient records.
	Medical Equipment	Includes information about the type, function, and status of medical equipment, and records data in electronic patient record.
	Medical Waste	Includes information about the type, volume, and disposal of medical waste.
	Hospital Environment	Includes information about temperature, humidity, light, and other environmental conditions, which may be recorded in electronic patient record.

and lifestyle factors, AI models can help healthcare providers make better treatment decisions. These algorithms can examine big datasets to find patterns and connections between patient features and treatment outcomes. Healthcare providers can use AI to generate tailored treatment suggestions, forecast the efficacy of various interventions, and optimize care plans based on individual patient needs. This leads to better patient outcomes, less trial and error in therapy selection, and more effective healthcare delivery.²⁸

With the growing volume of medical information and the requirement for immediate and correct access to this data, managing electronic patient record has become a major concern in the healthcare business. The key issue is the complexities of collecting, organizing, and storing medical information, which can present substantial challenges for physicians and healthcare facilities. Historically, paper-based records were employed, which included medical history, test results, prescriptions, and other pertinent documents. However, as information technology has advanced, many of these documents are now being saved electronically in computerized systems. This has led to the following challenges:

1. **Large Volume of Data:** The rapid growth of data, combined with an increasing number of patients and tests, has resulted in an exponential rise in the volume of medical information. Managing and processing such a

large volume of data can result in concerns such as sluggish speed, insufficient data storage structures and procedures, and difficulties searching and extracting information.

2. **Data Intercorrelation:** Patient medical records are frequently interrelated and complex. For example, a patient's medical history may contain visits to numerous doctors, test results, medication history, and other data that must be analyzed to detect patterns and linkages.

3. **Security and Privacy:** Medical records include sensitive patient information such as diagnoses, family history, and other personal information. Ensuring data security and patient privacy is critical, and extreme caution and attention must be given when accessing and using this information.

4. **Coordination and Communication:** Electronic patient record management requires excellent coordination and communication between physicians, specialists, and healthcare facilities. The ability to effectively share and transmit information between individuals and systems is critical for successful electronic patient record management.

The issue of managing electronic patient records using AI algorithms to organize, rapidly and accurately access medical information, optimize decision-making, and improve healthcare services has the potential to address some of the most pressing challenges and demands in this industry.

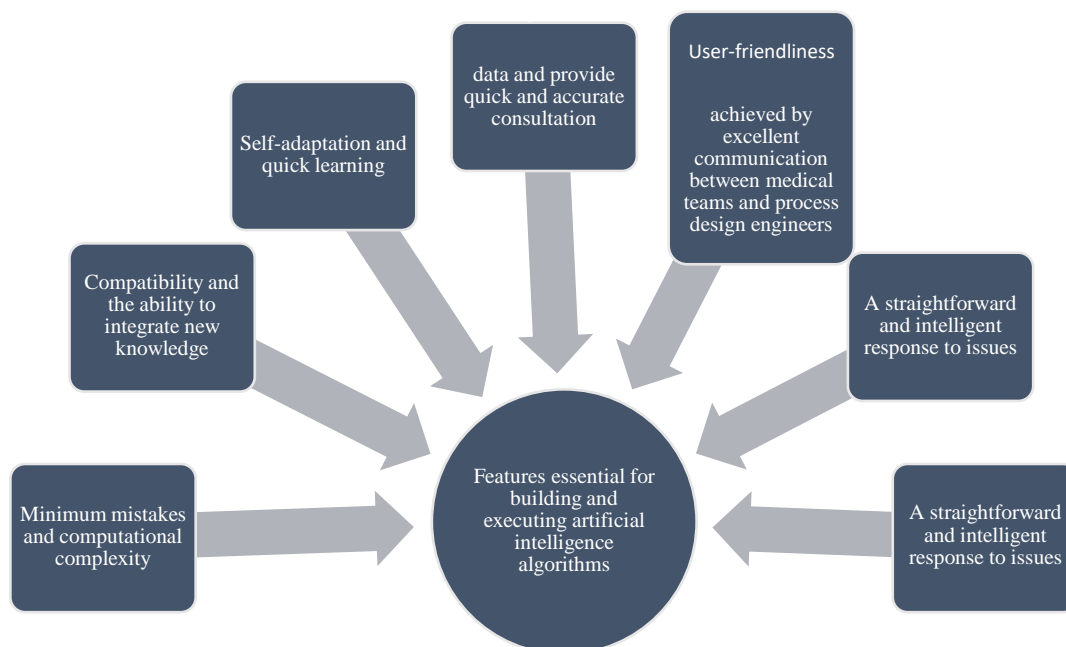


Figure 3. Required Features for Designing AI Algorithms in Electronic Patient Record (Researcher's finding).

2. Objectives

In the medical profession, managing and optimizing electronic patient record is a critical and demanding undertaking. With the rapid advancement of technology

and the collecting of more medical information, there is a greater demand for robust systems to organize this data and connect clinicians and healthcare facilities. These systems can give clinicians with comprehensive patient

information, allowing the enhancement of healthcare services. However, due to the vast amount of information and complexity involved in electronic patient record administration, AI algorithms are required to optimize this process. AI algorithms combine artificial neural networks, genetic algorithms, and evolutionary algorithms.

The AI algorithms can be used to handle challenges including information extraction, diagnostic and treatment decision-making, disease outcome prediction, and time and resource optimization in the electronic patient record management process.

This system includes standardized social and cultural, legal, security, and commercial infrastructures, as well as benefits such as improved information organization, hospital finances, care quality, documentation correctness and completeness, and reduced medical errors.²⁹ The limitations for implementing this system include a lack of adequate budget for purchasing the required hardware and software, fear of change and user resistance, insufficient clinical staff skills to work in an electronic environment, and a lack of adequate training opportunities for them.³⁰

As a result, this study investigates the use of AI algorithms to optimize electronic patient record, emphasizing how these methods might assist patients receive better healthcare services.

3. Methods

The current work is a systematic review. To perform this study, relevant keywords were searched through scientific databases such as PubMed, Scopus, Google Scholar, and SID, as well as search engines. A list of terms used to illustrate the role of AI algorithms in the health domain was retrieved, reviewed, and used from published studies to ensure accurate search results. In both Persian and English, the keywords included artificial intelligence

algorithms, electronic medical records, service quality, and hospital.

The study's inclusion criteria were publication in Persian or English, availability of full-text papers, recent articles (typically within the last ten years), and an emphasis on the use of AI in the electronic medical record. The exclusion criteria included the publications' lack of comprehensiveness in clearly articulating the study's aims. After analyzing the abstracts of the searched articles, the full-text of the relevant articles and those with a possible subject relevance were downloaded and saved. Some studies that did not match the inclusion or exclusion criteria were deleted from the review. The relevant articles, as well as those with a questionable thematic relationship, were then investigated in greater detail.

A qualitative content analysis of the papers was used to extract important themes and concepts on the role of AI in the electronic medical record. The findings were then grouped according to these themes and concepts. Finally, the whole text of the publications was studied, and key points were identified.

This study's strengths include a thorough search of reliable information sources, the use of exact inclusion and exclusion criteria for article selection, and a detailed and qualitative data analysis.

This area allows the use of machine learning algorithms such as artificial neural networks, decision trees, genetic algorithms, and natural language processing. These algorithms can help optimize processes connected to the patient's medical record, resulting in more accurate disease diagnosis, treatment progress assessment, and complication prevention. Furthermore, AI algorithms can be used to uncover hidden patterns and relationships in massive datasets, as well as to analyze medical data and make intelligent therapeutic decisions.

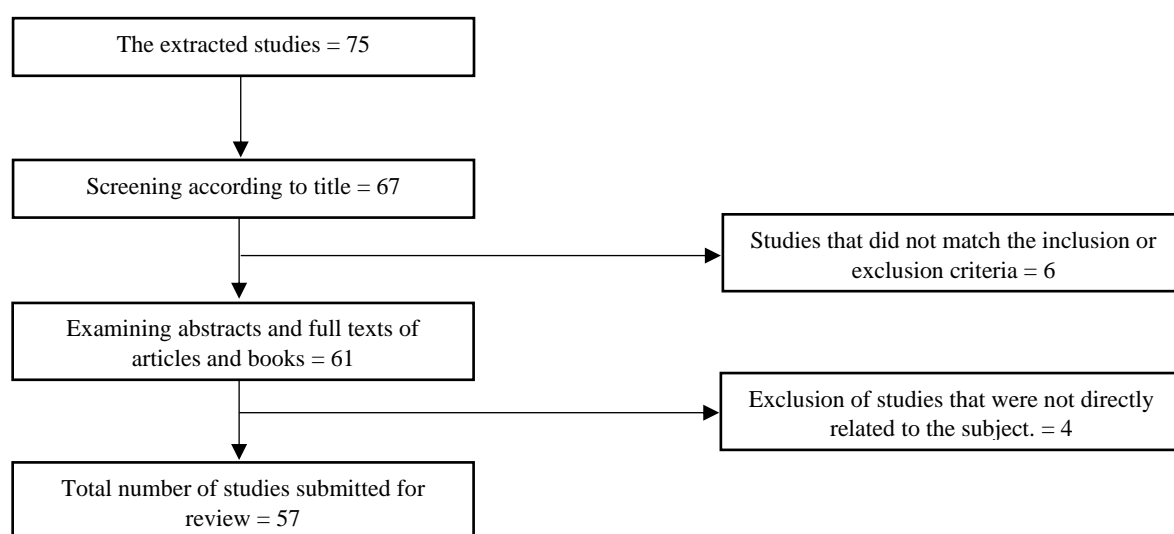


Figure 3. Flowchart of Included Studies

Table 2. Advantages of Using AI Algorithms in a Smart Hospital

The benefits	Description	Source
Improved resource planning	AI algorithms can optimize hospital resources like equipment, staff, and rooms. These algorithms can rationally and logically arrange hospital treatments and operations, as well as allocate resources depending on patient preferences and needs. Overall, AI systems can improve hospital resource usage by up to 20-30%.	31
Reducing Waiting Time	By evaluating each patient's condition and analyzing priorities, these algorithms can divide patients into priority groups based on the severity and kind of their sickness, allowing them to receive healthcare services in a more timely and urgent manner. The actual percentage reduction in waiting time is determined by several factors, including the type of healthcare service, access to medical resources and equipment, healthcare system structure, and local conditions. Patient wait times can be reduced by up to 30% using AI algorithms that improve scheduling and resource allocation.	32
Improving Resource Utilization	These algorithms can offer effective therapies in various medical departments based on patient history, test findings, and past research, helping to enhance healthcare quality. For example, by carefully assessing and evaluating patients' situations, AI algorithms can make suggestions for drug dosage modifications, treatment method selection, and proper review and test scheduling. These suggestions help physicians and healthcare professionals provide the best possible treatment to patients, resulting in improved healthcare quality.	33
More Accurate Forecasting	Using machine learning and neural networks, these algorithms can diagnose advanced diseases and recommend appropriate treatments based on patient history and laboratory data. Using AI algorithms in disease and complication prediction can result in considerable gains.	34

4. Results

The employment of AI algorithms in smart hospitals has the potential to enhance electronic health records and improve healthcare services overall. Table 2 summarizes some of the advantages of applying AI algorithms in smart hospitals.

In general, applying AI algorithms to electronic patient record in smart hospitals can result in improved healthcare services and quality. These algorithms, by harnessing advanced technologies, have the potential to convert hospitals into more intelligent, efficient, and safe environments.

AI algorithms can improve healthcare services in a

variety of ways. Here are a few instances of how these algorithms are utilized to enhance healthcare:

1. **Predicting Disease Relapse and Recovery:** AI algorithms can use patient recovery prediction methods. Algorithms can predict patient recovery by using potentially relevant data such as physiological indications, medical history, and other aspects.

2. **Decision Support Systems:** AI algorithms may be used in healthcare decision support systems. By collecting patient information, clinical factors, and treatment protocols, algorithms can assist physicians and nurses in making better treatment decisions for patients.

Table 3. Advantages and Challenges of using AI Algorithms in Patients' Electronic Records

Advantages and challenges	Items	Description	Source
Advantages	Access to Information	AI algorithms can be used to collect, evaluate, and organize medical and other healthcare data. This access to information can help healthcare decision-makers make more accurate diagnoses and find better treatment options based on statistical and observational data classification.	35
	Increased Speed and Efficiency	AI algorithms can help to streamline and expedite healthcare processes. For example, AI algorithms can help in disease diagnosis and symptom recognition.	36
	Accuracy and Certainty	AI algorithms often have great precision and low mistake rates. These algorithms can be used to improve precision and certainty in fields such as disease diagnosis, radiological image processing, and treatment dosage estimation.	37
	Improved Patient Adherence	The application of AI algorithms can help patients adhere to their treatment programs. These algorithms are capable of providing timely medication reminders, nutritional recommendations, and medical counseling.	38
	Reduced Costs and High Efficiency	Using AI algorithms can reduce healthcare-related costs. These algorithms can assist reduce costs associated with specific medical devices due to their restricted capabilities while also increasing the usage and efficiency of healthcare resources.	39
Challenges	Need a lot of data	Access to massive databases of patient records, including medical history, lab results, and prescriptions, is required for AI algorithms to perform properly. However, acquiring this amount of data might be difficult due to both privacy and security problems. Furthermore, electronic patient record data is frequently insufficient or inconsistent, limiting the accuracy of AI systems.	40
	Prediction error	AI algorithms, like other statistical models, can make incorrect or misleading predictions. This can have major consequences for patients, including misdiagnosis, ineffective therapy, and other negative effects.	41
	Deficiency in the connection between the performance of algorithms and human decision-makers	AI algorithms can digest large volumes of data quickly and uncover patterns that humans cannot detect. However, they frequently cannot clearly explain how they reached their conclusions, which can be difficult for medical practitioners who must make decisions based on the algorithms' outputs.	42
	Ethical issues and privacy	The employment of AI algorithms in electronic patient records poses a number of ethical and privacy problems that must be addressed before these technologies become generally deployed. To address these difficulties, it is critical to create strong ethical and privacy standards for the use of AI algorithms in electronic patient record. These frameworks should address challenges like as ensuring AI algorithms' safety and effectiveness, preventing bias and discrimination, protecting patient privacy, and obtaining consent.	43

Table 4. Role of AI in Systems related to Electronic Patient Record

Systems	Role of Artificial Intelligence	Source
Electronic medical record	<ul style="list-style-type: none"> Obtaining informed consent electronically for access to records. Ability to record and retrieve numerous diagnoses. 	44
Electronic nursing record	<ul style="list-style-type: none"> The ability to create separate access pages for nurses who have access to patient records. The ability to manage medication usage using electronic cardex. 	45
Bed Management Information System	<ul style="list-style-type: none"> Ability to extract bed occupancy rates Ability to transfer patients to multiple departments. 	46
Hospital Nutrition System	<ul style="list-style-type: none"> The ability to track and provide nutritional plans. Nutrition advisors can register patients' snacks. 	47
Medical Dosage System	<ul style="list-style-type: none"> Ability to register and change orders across the hospital. Ability to register and change orders in exterior departments of the hospital. 	48
Admission Information System	<ul style="list-style-type: none"> Register and amend patient demographic information. Can assign a unique code to each patient's file for each visit. 	49
Outpatient Information System	<ul style="list-style-type: none"> Ability to book and update outpatient appointments. View previous medical records. 	50
Medical Laboratory Information System	<ul style="list-style-type: none"> Transfer test orders from departments to the laboratory unit. Ability to accept outpatient tests. 	51
Blood Transfusion and Blood Products Information System	<ul style="list-style-type: none"> Record blood products obtained from the transfusion organization. Define blood product types and expiration dates. 	52
Radiology Information System	<ul style="list-style-type: none"> Ability to register and save radiography requests and images. Can provide services with consumables like films, syringes, and gloves. 	53
Operating Room Information System	<ul style="list-style-type: none"> Available to arrange and book operating rooms for experts. Capability to record organized operational descriptions. 	54
Medical Records Information System	<ul style="list-style-type: none"> Unified and integrated patient hospitalization records. Search for the status of formed files in the hospital. 	55
Discharge Information System	<ul style="list-style-type: none"> View a list of patients awaiting release from inpatient departments. Send patient financial files electronically to medical documentation system, including sender and recipient user information. 	56

3. Resource Optimization and Scheduling: AI algorithms can help optimize and schedule resources in healthcare environments. Using optimization techniques, expensive and time-consuming processes can be improved, and patient records can be streamlined and optimized, eliminating human error.

Overall, the adoption of AI algorithms can increase the quality and efficiency of healthcare services while saving time and money. However, trust in algorithms requires privacy, privacy legislation, data security, and mutual oversight by algorithms and people.

4.1. Advantages and Challenges of Using AI Algorithms in Patients' Electronic Records

The usage of AI algorithms can provide numerous benefits. These algorithms can be used to solve or mitigate difficulties and challenges in the healthcare sector. However, there are several limitations to adopting AI algorithms that must be considered. Table 3 shows some of the pros and challenges.

4.2. The Significance of Smart Hospitals and the Use of AI Algorithms

Smart hospitals and AI algorithms play critical roles in the healthcare system. Here are some of their meanings and functions:

1. Enhanced Hospital Management Systems: These systems can manage and process patient data, improve

resource planning, handle patient traffic and waits, and control medical equipment. Furthermore, by giving easy and rapid access to patient information and creating reliable reports for hospital executives, these systems can help improve organizational performance.

2. Disease Diagnosis and Prediction: AI algorithms can automatically recognize disease patterns from enormous amounts of medical and clinical data, as well as anticipate diseases using intelligent methodologies. This capacity helps physicians and other healthcare workers improve public health and implement disease preventive strategies.

3. Improved Diagnostic and Treatment Accuracy: AI algorithms can improve treatment outcomes by comprehensively examining disease data and making more reliable and accurate diagnoses. These algorithms help physicians and healthcare providers make better and more educated decisions based on their patients' conditions, potentially lowering treatment time and costs.

4. Skilled Healthcare Services: Smart hospitals can provide more intelligent and skilled healthcare services. For example, AI algorithms can cut patient wait times in front of doctors' offices, detect pharmaceutical errors during prescriptions, and present related medications as reminders to the physician.

Overall, smart hospitals and AI algorithms can improve healthcare quality by increasing diagnostic and treatment accuracy, lowering costs, and improving hospital management.

As a result, using AI algorithms to optimize electronic patient record can help to improve the performance of healthcare and care systems, so contributing significantly to higher healthcare quality. Table 4 depicts the impact of AI on several departments involved in the health case.

5. Discussion

The smartening of hospitals and healthcare centers is one of humanity's most significant achievements, representing a critical step toward cost-effective, comprehensive, and highly efficient intelligent treatment approaches. Factors such as speed, accuracy, and reliability in the healthcare sector, as well as the vulnerability of the healthcare system to human errors, make smartening healthcare centers, in addition to patient comfort and convenience, a critical factor in improving and promoting health indicators, lowering costs, and becoming one of the fundamental pillars of growth and development.⁵⁷

A smart hospital is a system in which AI algorithms are employed to improve healthcare. AI algorithms use AI technologies to evaluate data and develop algorithmic predictions to improve healthcare delivery.

The goal of this project is to investigate the use of artificial intelligence in patient electronic medical records. In this regard, by examining existing studies in this sector, the benefits and drawbacks of employing this technology in patient electronic medical records in smart hospitals were identified. Identifying and assessing these examples can assist managers and decision-makers in making the required adjustments to the design, implementation, and application of artificial intelligence algorithms in patient electronic medical records.

6. Conclusion

AI has the potential to be a valuable tool for smart hospitals seeking to improve healthcare quality and system efficiency. With responsible development and deployment of AI in electronic patient records, we can create a brighter future for healthcare in smart hospitals.

This review study has focused on the tremendous potential of AI in electronic patient records and improving healthcare quality in smart hospitals.

AI has the potential to significantly improve electronic patient record features such as disease diagnosis, forecasting relapse and recovery times, enhancing treatment accuracy and minimizing medical errors, digital care, and decision support systems.

One of the study's shortcomings is a lack of comparable studies on the application of AI algorithms in Iran. As a result, it is advised that studies be conducted in accordance with the country's existing technology, health-care legislation, and the provision of fundamental services in smart hospitals.

The outcomes of this review illustrate the effectiveness of applying AI algorithms in healthcare, which can

ultimately result in lower costs for both the government and patients. Given the multiple benefits of modern technology in healthcare, authorities and planners in the country must pay attention to this issue so that Iran can keep up with worldwide advancements. Furthermore, because the concept of smart hospitals is relatively new in Iran, additional research is needed in the field of its implementation to achieve peak performance.

Research Highlights

What Is Already Known?

AI systems have had a substantial impact on electronic patient records, safely maintaining sensitive patient information, and adhering to established data security regulations. AI models can help healthcare providers make more informed treatment decisions by providing access to patient data such as genetic information, medical history, and lifestyle factors.

What Does This Study Add?

It was found that AI algorithms can be used to optimize the electronic patient record in various fields.

Author Contributions

Authors contributed equally to this work.

Conflict of Interest Disclosures

All authors declared that they have no conflict of interest.

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