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A REVIEW ON ARTIFICIAL INTELLIGENCE IN HEALTHCARE MANAGEMENT AND DRUG DISCOVERY

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ABSTRACT

The application of Artificial Intelligence (A.I.) in healthcare has led to significant advancements and transformative developments in various areas. Medical imaging and diagnostics benefit from A.I.'s ability to analyze and interpret complex imaging data, enabling moreaccurateand timely diagnoses.

AI-driven disease prediction and risk assessment models aid in identifying potential health risks early, enabling proactive interventions and preventive measures.

Additionally, A.I.'s involvement in drug discovery and development accelerates the search for new medications and treatment options, promising advancements in the pharmaceutical industry.

Virtual assistants and chatbots equipped with A.I. capabilities provide personalized support, answering medical queries and offering guidance to patients and healthcare providers.

KEYWORD: *Artificial Intelligence,healthcare management,technology Evolution,Advantages and Disadvantages.*

- **INTRODUCTION TO HEALTHCARE MANAGEMENT**

The fourth edition of Introduction to Health Care Management is driven by our continuing desire to have an excel- lent text that meets the needs of the health care management field, health care management educators, and students enrolled in health care management programs around the world.[1]

The inspiration for the first edition of this book came over a good cup of coffee and a deep- seated unhappiness with the texts available in 2004

For this edition, many of the same master teachers and researchers with expertise in each topic revised and updated their chapters. A third editor, Bobbie Kite, joined the Buch- binder/Shanks team for this new edition in an effort to bring greater knowledge of several increasingly important areas in the health field, bringing expertise in health information systems and population health.

Several other new contributors stepped forward to revise several chapters and write completely new cases for this text. This was the result of our listening to you, our readers and users. With a track record of more than 12 years in the field, we learned exactly what did or did not work in the class- rooms and online, so we further enhanced and refined our student and professor Friendly. [2]

As before, this text will be useful to a wide variety of students and programs. Undergraduate students in health care management, nursing, public health, nutrition, athletic training, and allied health programs will find the writing to be engaging. In addition, student in graduate programs in discipline- specific areas,

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- **ARTIFICIALINTELLIGENCE**

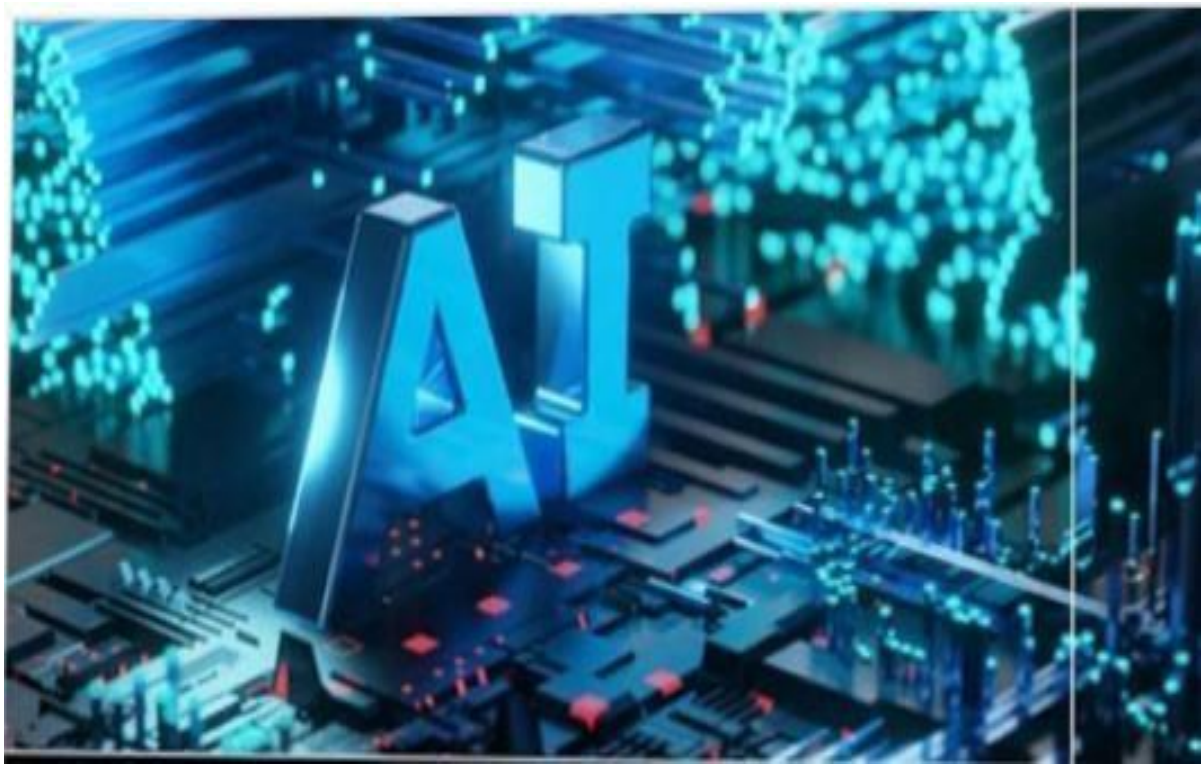


Fig.1

- **INTRODUCTION TO ARTIFICIAL INTELLIGENCE**

Artificial intelligence (AI) has emerged as a powerful tool that harnesses anthropomorphic knowledge and provides expedited solutions to complex challenges.RemarkableadvancementsinAItechnology and machinelearning present a transformative opportunity in the drug discovery, formulation, and testingofpharmaceuticaldosageforms.ByutilizingAIalgorithmsthatanalyze extensivebiological data, including genomics and proteomics, researchers can identify disease-associated targets and predict their interactions with potential drug candidates.

- **Preliminary Features of AI**
  - Categorization
  - Classification
  - Machine learning
  - Deep learning
  - Reinforcement learning
  - Robotics
  - Natural language processing
  - Recommender system
  - Computer vision
  - Collaborative refinement

- **Working process of AI**

  Most tasks in many contemporary organization are not automated. Intelligence powered smart functionality is need of the hour. AI in enterprise domain can be defined as the ability of organizational intelligence to acquired knowledge and apply it to produce superior results.

  The learning aspect of AI programming focuses on data acquisition.

1. Reasoning relates to the AI capability of selecting to most appropriate algorithms

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2. Self-correction focuses on AI ability to improve and enhance results.

- **Origins of AI**

The modern field of AI dates back to1956, when you term AI used in proposal for an academic conference at Dartmouth College . It was built around the assumption that the human brain can be controlled by a machine to produce smart results in a sustained format.[5]

- **ARTIFICIALI MNTELLIGENCE: HEALTHCAREAND MANAGEMENT**



Fig.2

Artificial intelligence is a field of science concerned with building computers and machines that can reason, learn, and act in such a way that would normally require human intelligence or that involves data whose scale exceeds what humans can analyze.

AI is a broad field that encompasses many different disciplines, including computer science, data analytics and statistics, hardware and software engineering, linguistics, neuroscience, and even philosophy and psychology.

- **Artificial Intelligence in healthcare**
- **Background/Introduction**

Artificial intelligence (AI) in the healthcare sector is receiving attention from researchers and health professionals. Few previous studies have investigated thistopicfromamulti-disciplinaryperspective,includingaccounting,business and management, decision sciences and health professions.

Before AIsystems can be deployed in healthcare applications, they need tobe 'trained' through data that are generated from clinical activities, such as screening, diagnosis, treatment assignment and so on, so that they can learn similargroupsofsubjects,associationsbetweensubjectfeaturesandoutcomes of interest. These clinical data often exist in but not limited to the form of demographics, medical notes, electronic recordings from medical devices, physical examinations and clinical laboratory and images.[12]

Topic 1: Balancing technology and humanity

- **Perspectives on AI in healthcare**

This indicates the balance between technology and humanity in the health care sector. Particularly focusing on the patient centered approach within hospital employing AI

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Topic2: AI for public health and population Health Management.
This topic explore the potential of Artificial intelligence transforming public health and population management, particularly in resources constrained setting.
It discuss how AI, through machine learning algorithms and digital health practices.

Topic3:Explainable AI in health care amultidisciplinary perspective.
Focusing on the multi-disciplinary aspect of Explain able AI in healthcare,this topic examine the integration of machine learning tools to improve healthcare delivery and personalized treatment.

Topic4: Challenges and limitations of Explainable AI in healthcare .
Highlighting the challenge and limitations of Explainable AI implementation in healthcare this topic provide valuable insights into navigating the complexities of AI – driven healthcare system

Topic5: **Exploring Explainable AI in health care challenges and future direction**
Focusing on the importance of Explainable AI in health care this topic discuses it's role in providing transparent explanation for machine generated prediction.

Topic1: balancing technology and humanity perspective on AI in healthcare
In this professionals are focusing on fostering agility, making work more accurate and time saving, avoiding application, and good decision – making for the short term and long term welfare of healthcare industries.

To enhance strategic capabilities, human must embrace learning agility , an environment of innovation ,and talent and knowledge development practices .

The topic discuses HealthCare's growth and development with AI and patient priorities.
In this AI revolution association of human and technology in the healthcare sector is a great transformation with the acceleration of artificial intelligence.

Acceptance of this revolution with the balancing ratio is very important with the assurance of empathy, compassion, and patient centered care remaining at the center.

The adoption of AI in healthcare give heterogeneous experience and transformation in treatment, diagnosis of disease, socially practical, and legal consideration, etc.

Topic2:AI for Public Health and Population
Health Management
Artificial intelligence (AI) has great promise for changing the healthcare industry , especially in resources – constrained setting.
From the discovery of medications to publish health artificial intelligence has reshaped traditional approaches to health innovation .
It applications are well documented : machine learning algorithms have been employed by electronic health record (HER) system to identify data and perform predictive analysis to alert doctor to co – morbidities and high risk situation.

Electronic health records , mobile health , telemedicine artificial intelligence and other digital health practices , together with smart phone – healthcare solutions,areeffectiveinstrumentsinthebattleagainstinfectiousillnessesthat are prone to pandemics.

IT is possible to hunt down those who are infected by using sign – monitoring devices.
AI Powered gadgets that constantly track the vitals of patient along with medical metrics can help healthcare professionals recognise the beginning stages of DRPs or poor response.

Topic3: Explainable AI in Healthcare: Amulti-Disciplinary Perspective
Itisobservedthatthemasfiveamountofhealthcaredatawhichhasbeengenerated everyday without electronic health records.

In turn, the healthcare provides take a more predictive approach to come out with a more unified system which concentrate on clinical decision support , clinical practice development guidelines , and automated health care system, thereby offering a broad range of features previse manner such as improving patient data for better diagnosis , medical research for future references.

This topic provide a complete overview of a typical ML workflow comprises the predominant phrases, namely data collection , data

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pre- processing , modelling,training,evaluation,tuninganddeploymentandtheroleexplainable artificial intelligence mechanism assist to integrate interoperability and explain ability into the ML workflow.

The ultimate aim lies in Explaining the interaction to the end user lead to truth worthy environment .
In addition to that XAI assures the privilege the regards to the healthcare domain are dimensions reduction, features importance, attention mechanism, knowledge distillation surrogate representation used to develop and validate a decision supporting tools using XAI.

Topic4: Challenge And Limitations of Explainable AI in healthcare
Explainable A1(XAI) is at the forefront of healthcare innovation. It has the potential to revolutionize clinical decision-making, improve patient care, and transform Healthcare delivery.

Despite having said that, the integration of (XAT) into Health Care systemis not devoid of challenges and limitations.

This topic explores the multifaceted landscape of shortcomings faced in the process of implementation of XA1 in healthcare, providing valuable insights into the complexities and hurdles that need to be given direction in order to utilize its full potential in interpreting Al in enhancing healthcare results.

One of the initial challenges encountered in implementation of XAI is the is it my love complexity of healthcare data.
This topic is an attempt to identify and address challenges and embrace a collaborative commitment to transparency, fairness, sad accountability. and also to navigate the complex nature of the Explainable Al in the process of implementation in lead to a new age of interpretable and trustworthy Al- generated healthcare system.

Topic5: Exploring Explainable AI in healthcare challenges and future direction
Artificial intelligence (AI)has revolution ized the health care industry by making decisions similar to human intelligence.

However, the need to illustrate Al predictions based on healthcare data is a challenging task. To address this, Explainable AI (EXAI) has emerged toprovide transparent explanations for machine-generated predictions and ensure accuracy in healthcare. This review emphasizes the importance of adopting EXAI in healthcare and discusses its concept of providing reliable AI- based solutions.

The authors analyze the most recent developments in EXAI-based technologies and present research findings on their extensive implementation aspects, including the challenges and limitations of existing models. The importance.

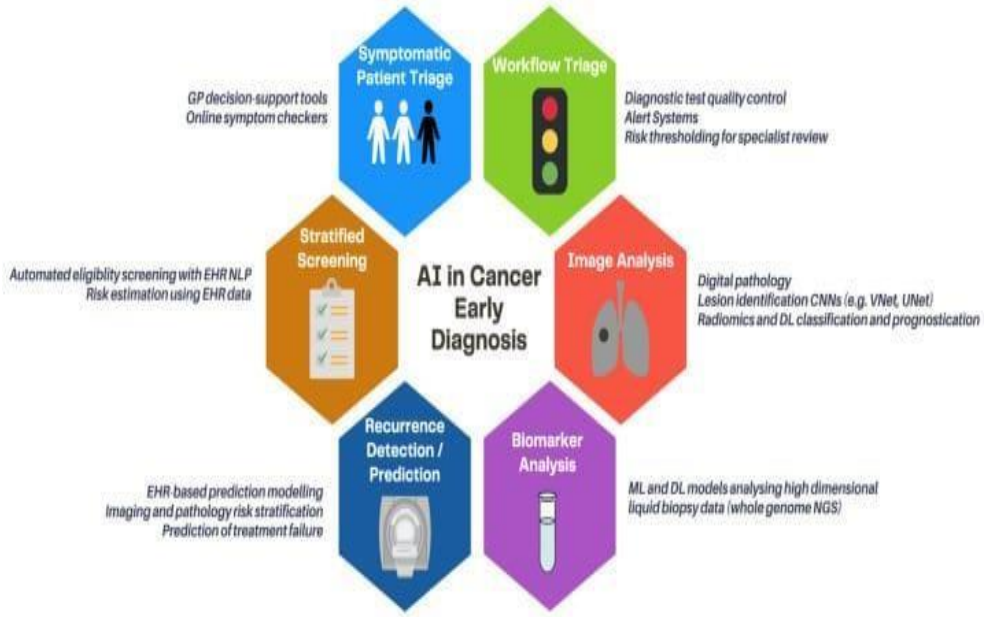


Fig.3

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- **Artificial Intelligence Application in disease cancer care.**
  - **Introduction**

Over the course of the last 50 years, the field of cancer care has undergone a transformative journey, achieving unprecedented success and consistently evolving to enhance patient outcomes. This remarkable progress is evident in the continuous stream of innovations, discoveries, and advancements that have reshaped the way we understand, diagnose, and treat various forms of cancer (1).

These successes have gone hand in hand with increasing complexity of modern cancer care. The continuous advancements have been achieved through a high level of effort and an intricate web of human input.

The complexity arises from the integration of cutting-edge technologies, personalized treatment approaches, a continuously updating number of treatment options and scheduling, and the multifaceted nature of addressing the physical, emotional, and psychosocial aspects of cancer.

This cancer workforce is expected to deliver complex cancer care for an ever- increasing number of people, who are invariably now living much longer than in previous decades

- **Diagnosticgenomics**

Diagnostics: genomics The development and delivery of optimal management plans for patients with cancer relies on the provision of personalized medicine.

Next generation sequencing (NGS) has revolutionised cancer medicine by facilitating the achievement of high precision medicine through identification of cancer associated mutations in the genome as well as characterisation of tumour heterogeneity.

While significant progress has been made in cancer genomics using NGS, there are limitations due to the high-dimensional and great heterogeneity of datasets within cancer medicine that may be targeted using Al approaches.

Given how both Al and genomic medicine are data-driven sciences, there is great scope for integration of Al and genomics to reshape what can be achieved in terms of precision and reliability.

Applications of Al in genomic medicine include the discovery of biomarkers to aid in patient stratification, the prediction of gene function and identification of aberrant protein interactions and genetic mutations.
The possibility of integrating machine learning, specifically deep learning

- **Treatment**
  - **Drug Choice**

The selection of drug treatments most likely to be efficacious for individual patients is essential for the delivery of personalised care.
Supervised machine learning algorithms, which are algorithms trained on a labelled dataset, contribute to the prediction of cancer patients' responses to specific drugs, informing strategic decisions for optimal treatment

Algorithms grounded in support vector machine (SVM) methodology have proven effective in forecasting individual patient reactions to conventional chemotherapeutic drugs by analysing gene-expression patterns . The application of machine learning-derived prediction algorithms, leveraging correlations between molecular profiles across various cancers and their reactions to therapeutic drugs, shows potential for advancing treatment efficacy
By analysing molecular profiles, machine learning algorithms can identify unique characteristics of individual patients' cancers which would enable the development of personalised treatment strategies that target specific molecular markers associated with cancer..

- **Cancer Research**

Al is playing an increasingly important role in cancer research, particularly in the areas of diagnosis, prognosis, and treatment. Al algorithms can analyze large volumes of medical imaging data and assist doctors in detecting early-stage cancers, which can improve the effectiveness of treatment and patient outcomes.

cancers, which can improve the effectiveness of treatment and patient outcomes.[13]
Al can also be used to predict a patient's prognosis by analyzing various data sources, including medical images, electronic health records, and genomic data.

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This can help doctors develop personalized treatment plans for their patients.In addition, Al can assist in drug development for cancer treatment. By analyzing large amounts of genomic data, Al can identify potential new drug targets and predict the effectiveness of drugs in specific patient populations.

This can accelerate the drug discovery process and bring new treatments to patients more quickly. Overall, Al has the potential to revolutionize cancer research and improve patient outcomes by assisting doctors in making more accurate diagnoses, developing personalized treatment plans, and accelerating the drug discovery process.

- **Cancer Research**
- **Healthcare Technology Evolution**

In the healthcare sector from traditional healthcare practices to Al transformation is a great achievement for diagnosing diseases, taking care of patients, shaping medicines future, and many more Alpromises the best service when it joins with healthcare for the welfare of the HealthCare sector as well as the patient . [13]

Best practices of doctors, futuristic approach of medicines, accurate and quick diagnosis results, etc. Health professionals provide a variety of facilities to the patient's early-stage diagnoses of diseases, clarity in medical images, personalized medical plans, maintenance of speed, and accuracy in emergencies, and data privacy.

Engagement of patients increases with doctors with the help of Chatbot and viral health assistants, trust.
Patents and healthcare professionals are the links that create of build trust in Artificial lintelligence. It is the responsibility of health care professionals to keep transparency with the patient at the time of diagnosis with technology.

Building trust is humanity and careful behavior toward patients from professionals. Professional training and development programs are important for healthcare professionals to make them more responsible.

- **Advantages of Balanced Al and Healthcare**

1. **Enhanced Diagnosis:** Through pattern recognition and advanced data analyzingthecapabilityofartificialintelligencediagnosisbecomeaccurateand less time-consuming.
2. **Customized Treatment:** According to the needs and characteristics of patients treatment plans will be customized with the help of AI algorithms.
3. **ElaboratedPatientsResults:** patients results will be better and improve with
4. **Organized work:** with the help of advanced technologies and Al-driven healthcare professionals streamlined workflows take less time, in this way. Professionals communicate with patients without any time constrains.
5. **Accessincrease:** underserved areas as well as remote areas, both get telemedicine and virtual treatment with the help of artificial intelligence. Al extended medical facilities all over the world.
6. **Prognostic Analytics:** Predictions of diseases are in progress with the help Of advanced technology and timely diagnoses and information to the patient While keeping the patient-centered approach. .
7. **Enhancement in Research:** Artificial intelligence enhances medical research 7 programs on drugs, big data analysis, medical facilities, etc.
8. **Efficiency & Effectiveness in Healthcare with Al:** Artificial intelligence increases the efficiency and accuracy in the diagnosis of medical issues in
9. **Reduction of cost:** With artificial intelligence in healthcare necessary proceduresprevention,losersthepriceofadministration,andproperutilization
10. **Decision-Making Support Legally**: In various complex situations artificial intelligence support sethicaldecision-makingforhealthcareproviders.

- **Disadvantages Artificial Intelligence and Healthcare**

1: Concerns with Privacy of Data: There is sensitive information or medicalhistoryofpatientssodataprivacyisoneoftheimportantconcernswith artificial intelligence.

2: Biasness in Algorithms: baise in the algorithm is dangerous for the Patient because it leads to in accuracy of diagnosis and many more things effects fromit.So,itisabigdisadvantageforhealthcareprofessionalsandpatientston

3: **Limited Access on healthcare facilities:** Some of the healthcare centersdonothaveadvancedtreatmentsorsomemachineriesaretherebutthere by a lack of skills. So it affects the healthcare centers and patients too.

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4: **Costing of Treatments** : Due to these advanced terminologies and techniques .These things are expensive for the patients and they can't avail the facility

- **Need of AI in the healthcare**

Al in field of Pharmacy It is one of the top technologies shaping the future of pharmacy. Pharma industries has been developing cure & treatment for centuries. Traditionally the design & manufacturing of drug requires several years, lengthy clinical trials & huge costs with the rise of 21st century technologies, this has been changing..[14]

In future we will see completely different drug designs, manufacture &clinical trials. Collaboration between pharma and Al companies: The future of Al in pharma will depend on collaboration between pharmaceutical companies and Al technology providers. Partnerships between these two sectors can help to accelerate the development and adoption of Al technologies in the pharmaceutical industry.

Pharmaceutical Industry can accelerate innovation by using technological advancements. An estimate by IBM shows that entire healthcare domain has approx. 161 billion GB of

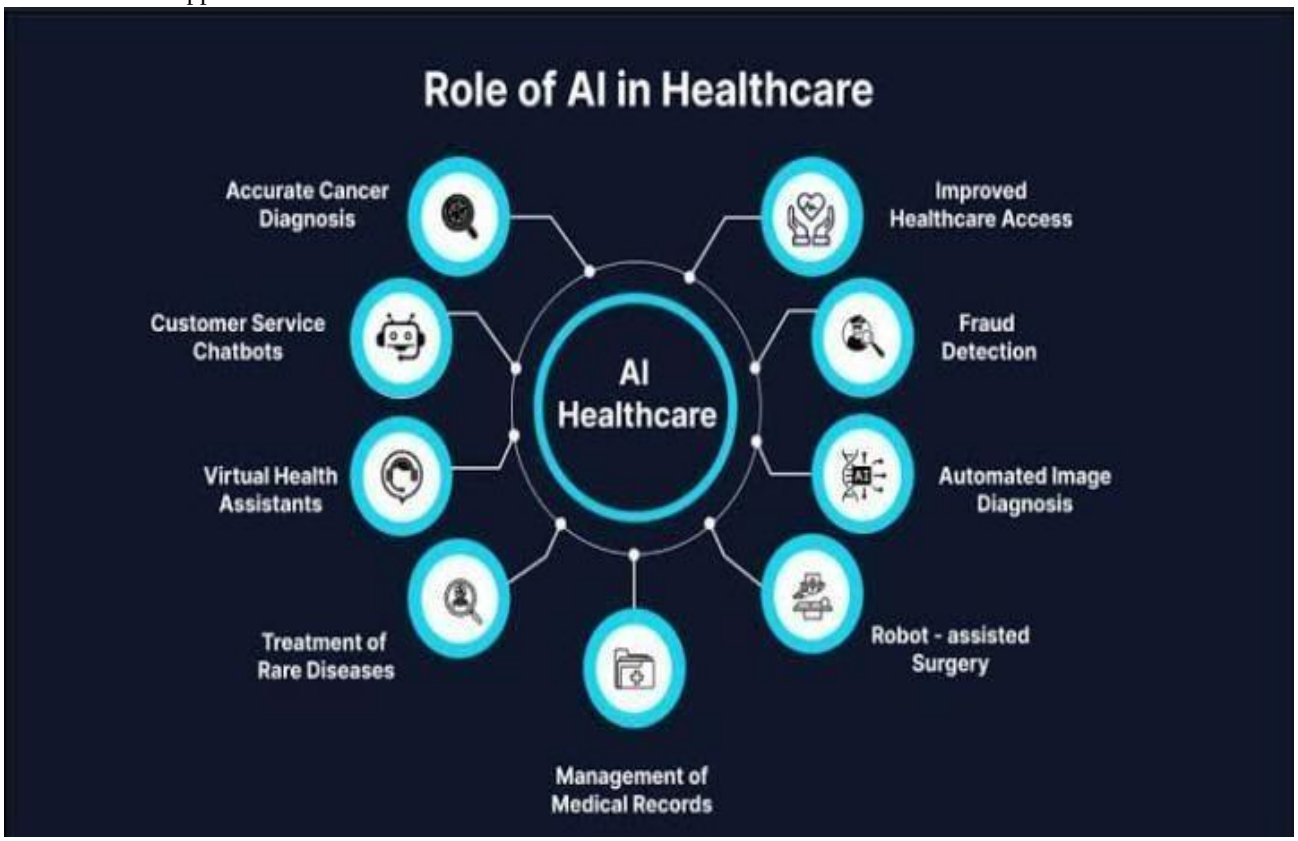


Fig.4

- **Application of Al healthcare**

- **Disease Identification:** Berg, an innovative US biopharma company, is using Al to research and develop diagnostics and therapeutics in the fields of oncology, endocrinology, and neurology.
  Their unique Al-based Interrogative Biology platform combines patient biology and Al- based analytics to identify differences between healthy and disease environments
- **Radiology and Radiotherapy**: This is an area in which Al has been speculated to play a major role in the future.
  Presently, Google's Deep Mind Health is working on machine learning algorithms to detect differences between healthy and cancerous tissues.
  Thegoalistoimprovetheaccuracyofradiotherapyplanningwhileminimizing damage
- **Clinical trial Research:** Advanced predictive analytics can analyze genetic information to identify the appropriate patient population for a trial.
  ArtificialIntelligencecanalsodeterminetheoptimalsamplesizesforincreased efficiency and reduce data errors such as duplicate entries.
- **Drug discovery:** A study published by the Massachusetts Institute of Technology (MIT) has found that only 13.8% of drugs

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successfully pass clinical trials.
Furthermore, a company can expectto paybetween$161 millionto$2billion for any drug tocomplete the tire clinical trial sprocess and get FDA approval

- **Healthcare Future with Artificial Intelligence**

Alkingaboutthefutureofhealthcarewithartificialintelligence,advanced technologies, Chatbot, and other advancements is bright if there is a combination of technology and most importantly humans.

If technology is quick, accurate, better, and transparent then human is the amalgamation of all because of its kindness to the patients because they are human too. Healthcare providers cannot with the patients, understand them ,listen to them ,and show humanity to them after technology plays thei rrole, so human Al is having an amazing future together. Moreover, this evolution in technology will guide patient centered care, kindness, and the importance of humanity in the digital era. Administrative tasks, repetitive data entries, and many more of these kinds of work will become easier with Al, and health professionals will have more time to interact and communicate with patient.[15]

- **Drawbacks**
- **Data Collection Concern**

The first problem is the inaccessibility of relevant data. The healthcare business has a complex issue with information accessibility. Because patient records are often regarded as confidential, there is a natural reluctance among institutions to exchange health data.

- **Algorithms Developments Concern**

Potentially distorted outcomes might be the consequence of biases in the data collection processes used to inform model development. For instance, under- representation of minorities as a consequence of racial biases in dataset Development might lead to subpar prediction results.

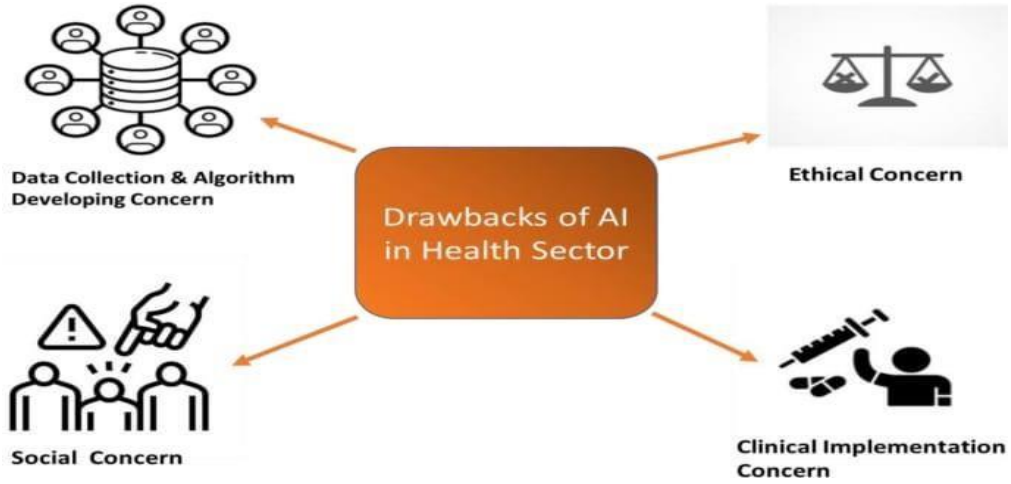
- **Ethical Concerns**

Artificial intelligence has had ethical concerns raised about it ever since it was first conceived. The main problem is accountability, not the data privacy and security issues previously noted. Because of the gravity of the consequences, the current system requires that someone be held accountable when poor decisions are made, especially in the medical field.

Humans have always feared that artificial intelligence (AI) in healthcare might eliminate their jobs. Some people are skeptical about and even hostile to AI- based projects because of the threat of being replaced. This perspective, however, is largely based on a misinterpretation of Al in its various manifestations

- **Clinical Implementation Concerns**

Lack of empirical data validating the effectiveness of Al-based medications in planned clinical trials is them ain obstacle to successful deployment. Most research on AI's application has been conducted in the business setting; thus, we lack information on how it affects the final results for patients



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- **Conclusion**

  A Review on Artificial Intelligence in Healthcare Management and Drug Discovery In conclusion, the integration of Artificial Intelligence (AI) into healthcare management and drug discovery holds transformative potential for the medical field. Al has already demonstrated significant improvements in areas such as personalized medicine, diagnostic accuracy, predictive analytics, and operational efficiency in healthcare settings. By automating routine tasks, analyzing complex datasets, and offering novel insights, Al supports clinicians in making more informed decisions and optimizing treatment plans for patients.

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