Survey on Companies Shaping Healthcare with Artificial Intelligence
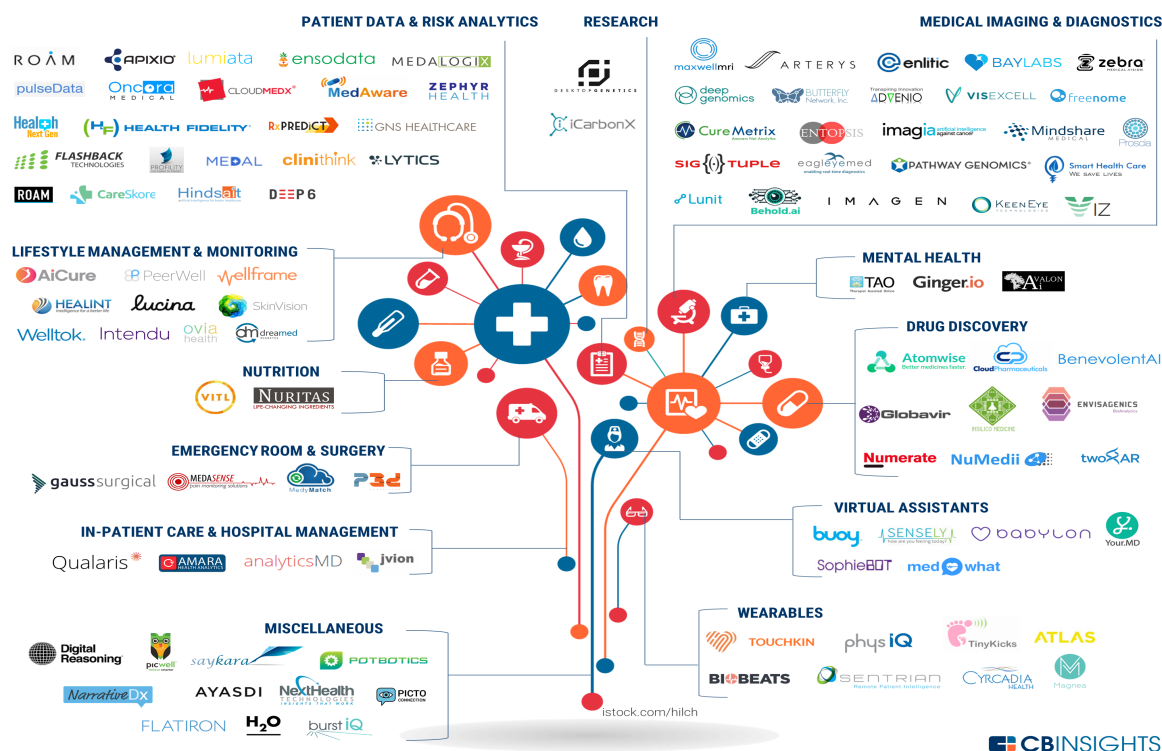
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Abstract

This project explores the role of artificial intelligence (AI) startups in shaping healthcare, focusing on 106 companies leveraging AI technologies across various healthcare domains. Through systematic data collection, categorization, and analysis, we identify key trends, patterns, and innovations within the AI healthcare landscape. Our findings shed light on the diverse applications of AI in healthcare, from

patient data analysis to drug discovery and virtual assistance. We also examine the challenges and opportunities inherent in the integration of AI technologies into healthcare systems. By providing insights into the strategies and innovations of AI startups, this research contributes to the growing body of knowledge on AI in healthcare and informs future research, policy, and innovation efforts in this rapidly evolving field.

The code, data, analysis, and results can be accessed on GitHub at: https://github.com/SukruthiV/group4$_i$$nf$$o$5506

Keywords: AI, Startups, Companies, Medicines, Healthcare, Revolutionizing, Diagnostics, monitoring, Drug Development

1 Introduction

Artificial intelligence (AI) has spread its wings to healthcare systems widely and in recent years it has succeeded in providing sophisticated solutions to several problems. The divergent AI algorithms mainly Machine Learning, Deep Learning, and NLP (Natural Language Processing) are playing a crucial role in healthcare management and also provided a wide ray of hope in the development of Precision Medicine. Furthermore, the contribution of AI in developing advanced and accurate diagnostic methods, and virtual assistance chat bots for patient care was commendable. With unparalleled precision, artificial intelligence (AI) algorithms can analyze intricate patterns and detect minor signs of disease by utilizing a large array of medical data, including genetic information, medical imaging, and electronic health records. This feature benefits not just medical practitioners in making more accurate diagnoses but also enables early detection of diseases, leading to timely interventions and improved patient outcomes.

Furthermore, predictive analytics driven by AI has become a useful tool for identifying and reducing health risks. AI algorithms can assist healthcare professionals in taking preventative measures to avert complications and lower healthcare expenses by evaluating a variety of datasets and discovering patterns suggestive of disease progression or unfavorable outcomes. Predictive analytics enables healthcare companies to prioritize interventions based on patient requirements and spend resources efficiently, from anticipating readmission's to identifying patients who are at a higher risk of developing chronic illnesses.

Artificial intelligence (AI) is transforming treatment approaches by enabling the creation of personalized medicine techniques, going beyond diagnostics and predictive analytics. By combining information unique to each patient, including genetic profiles, lifestyle variables, and AI algorithms can produce customized therapy suggestions based on a patient's medical history, maximizing therapeutic success while reducing side effects. The promise of precision healthcare is a paradigm change that will lead to more targeted and effective interventions, which ultimately will enhance patient happiness and quality of life.

AI is also optimizing resource allocation, streamlining workflows, and changing administrative procedures in healthcare companies. AI technologies allow healthcare providers to concentrate their time and expertise on patient care by automating repetitive operations like billing, appointment scheduling, and medical coding. This improves operational efficiency and lessens administrative responsibilities for healthcare providers. Furthermore, chat bots powered by AI and virtual assistants are enabling patients to conveniently manage appointments, obtain information, and seek medical advice, thus increasing patient satisfaction and engagement.

In recent years, startup companies have emerged as pivotal players in the AI healthcare landscape, driving innovation and pushing the boundaries of what's possible. These startups are harnessing AI algorithms to tackle complex healthcare challenges, from enhancing diagnostic accuracy to optimizing treatment approaches. Moreover, they are leveraging predictive analytics to identify and mitigate health risks, thereby reshaping preventative care strategies.

But there are drawbacks to the broad use of AI in healthcare. For AI to be implemented responsibly and fairly, ethical concerns about algorithmic bias, patient privacy, and data security must be addressed. Standards and legal frameworks pertaining to AI in healthcare must shift as well in order to protect patient rights and advance accountability and transparency.

Understanding how startup companies are utilizing AI in healthcare is very important for several reasons. Firstly, it offers insights into the different technologies and methodologies being developed to tackle complex healthcare challenges. Also, this study contributes to the growing body of knowledge on AI in healthcare, paving the way for future research and innovation in this rapidly evolving field.

The primary objectives of this research are to investigate the strategies and innovations employed by startup companies leveraging AI in healthcare, identify key trends and patterns emerging from the efforts of these startups

2 Overview

The Literature Review section provides an overview of existing research and developments in AI-driven healthcare innovation. The Methodology section outlines the research approach, data collection methods, and techniques employed in this study. The Then the results of our analysis, including

the identification of key trends and patterns among startup companies in the healthcare domain will be discussed. Finally, the Conclusion section summarizes the main findings of the study and offers recommendations for future research and practice.

3 Literature Review

Young et.al underlines how AI has the ability to completely transform healthcare, but it also stresses how crucial it is for different stakeholders to work together, including governments, insurance companies, tech companies, and healthcare systems, to guarantee that these advances are successfully adopted. The main ideas are outlined as follows: AI has the ability to lower costs, expand access to care, and enhance patient outcomes. Developing patient trust in AI-powered systems, protecting data security and privacy, and managing complicated legislation are some of the challenges. In order to overcome these obstacles and implement AI in healthcare, cooperation is essential. Ignat Kulkov's article, "Next-generation business models for artificial intelligence start-ups in the healthcare industry," appeared in the International Journal of Entrepreneurial Behavior & Research in 2023. The study looks into the ways AI startups are adding value in the field of healthcare. It highlights three main areas—drug development, therapy, and diagnostics—where AI is having a significant influence . To create a framework that other businesses and researchers might adopt, the researchers examined the business plans of nine European AI healthcare startups. Google also has an initiative called the Google for Startups Growth Academy: AI for Health. This program is designed to partner with and support startups that are leveraging AI to revolutionize healthcare.

Here are the key takeaways from the blog: **Focus:** This initiative is the first of a series focused on applying AI to address social challenges. **Target Audience:** Seed to Series A startups working on AI solutions for healthcare and well-being. **Program Structure:** The program is a three-month hybrid program with workshops and mentorship opportunities. Founders will collaborate with Google and industry experts to Enhance their business growth and Share best practices and also to ensure responsible development of AI in healthcare. A recent study by Davied et.al delves at 2,747 AI-powered healthcare firms across the globe, offering valuable perspectives on developments in artificial intelligence in the field. "Future of healthcare start-ups in the era of digitization: bibliometric analysis a study by Suresh.et.al summarizes the following

- **Importance of Digital Health Startups:** The study highlights the crucial role healthcare startups can play in propelling advancements in healthcare through digitalization.
- **Collaboration is Key:** The research suggests that established healthcare organizations see promise in collaborating with, or even acquiring, digital health startups to expedite their own technological advancements.
- **Investment Opportunities:** The report indicates that not only startups, but also major healthcare players are interested in investing in the realm of digital health. Established companies might choose to invest or develop their own digital health initiatives to stay competitive.
- **Economic and Job Growth Potential:** The study emphasizes that healthcare startups have an impact beyond just the healthcare system, potentially creating economic growth and new jobs.
- **Policy and Regulation:** The research concludes by underscoring the need for adjustments in legislation to foster innovation from digital healthcare startups and other actors involved in digitizing the healthcare system, with the ultimate goal of achieving better healthcare delivery.

4 Methodology

We began by conducting an extensive search that was focused on identifying startups and companies leveraging AI technologies specifically for healthcare applications. Upon gathering initial data, we were able to curate a comprehensive list of 106 startup companies working in the healthcare domain with a focus on AI-driven solutions. Each company was thoroughly assessed for its relevance to the healthcare sector and the extent of its utilization of AI technologies. Then we designed a systematic approach to categorize all this identified companies based on their primary focus areas and applications within the healthcare sector. This categorization process involved meticulous analysis of each company's core offerings, target markets, and technological innovations. 12 distinct categories were identified through this process: - Patient Data and Risk Analysis - Research - Medical Imaging and Diagnostics - Lifestyle Management and Monitoring - Nutrition - Emergency Room and Surgery - Patient Care and Hospital Management - Mental Health - Drug Discovery - Virtual Assistant - Wearables - Miscellaneous.

We collected data by searching for each company's name on Google, primarily aiming to find their official website. The curated list of 106 companies was compiled into an Excel spreadsheet for efficient data management and analysis.The spreadsheet was structured into seven columns to accommodate relevant information for each company: - Healthcare Domain Category - Company Name - Website Link - Previous Company Name (if applicable) - Acquirer Company Name (if applicable) - AI Technology Utilized - Healthcare application - Comments The categorization of companies into specific domains was based on a set of predefined criteria, including their stated mission, core products or services, and technological capabilities. Each company was carefully assessed to determine its primary contribution to the healthcare sector

and its alignment with one or more predefined categories. To ensure the accuracy and reliability of our findings, each company's categorization and relevant details were cross-verified through multiple reputable sources, including official company websites, press releases, and industry publications. Despite our efforts, we encountered challenges with data availability for some companies. Approximately 18 companies were excluded from our analysis due to a lack of available data. This resulted in a final dataset of 88 companies for our analysis, representing a diverse range of AI applications in healthcare.Any discrepancies or ambiguities in the data were addressed through further research and verification processes. While most companies had an official website listed, some did not, or their website was under construction. In such cases, we sought alternative sources for information. We found the website PitchBook particularly helpful, as it provided insights into companies that may have ceased operations due to reasons like lack of funding.
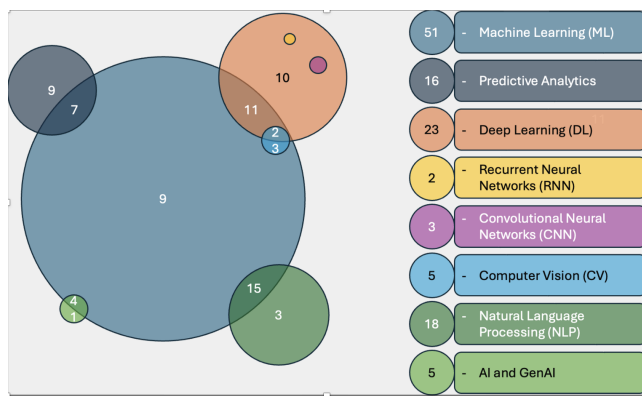
5 Results and Analysis

Figure 01: Types of algorithms incorporated in various startups

Figure.01 explains the types of algorithms incorporated into the various 106 startups which we have analyzed. 51 companies chose to use Machine learning, Predictive analytics algorithm was chosen by 16 companies whereas 23 companies chose Deep Learning. 18 startups chose to incorporate Natural Language Processing as their algorithm. Number of companies which chose Recurrent Neural Networks, Convolutional Neural Networks, Computer Vision and AI and GenAI were 2,3,5 and 5 respectively. In healthcare, wearable devices that are designed with AI technology capabilities have the potential to remote patient monitor, manage chronic diseases and preventive care. By continuously monitoring vital signs, detecting anomalies, and reporting early warning signs of health issues, all these devices can make individuals to take proactive steps to maintain their health and enable healthcare providers to deliver timely interventions. As an example, company named PhysiQ has developed wearable biosensor technology and AI-powered analytics platforms

to monitor and analyze a person's physiology on a real-time basis. Their goal is to improve outcomes for patients, improve clinical decision-making, and lead to innovation in healthcare through data-driven insights and personalized medicine.

The companies in lifestyle and monitoring category represent a diverse range of applications within the lifestyle and monitoring AI sector. Some of them try to work on predicting pregnancy complications, boasting a reduction in racial disparities and improved maternal outcomes. As an examples company called OviaHelath supports individuals/ families throughout their reproductive journey with a suite of mobile apps and online platforms, providing personalized insights, educational content, and community support.

In the field of nutrition, both Nuritas and Vitl stand out for their innovative approaches to personalized health and wellness. One of them uses AI Magnifier technology to discover the properties of natural ingredients that too specifically bio-active peptides, for various health applications including food, supplements, pharmaceuticals, and cosmetics.

When researching about drug discovery and AI, several companies are pioneering innovative approaches for the identification and development of novel medicines. They are trying harness RNA splicing to develop RNA-based therapeutics, employing AI and computational biology to target diseases such as cancer and neurodegenerative conditions. Some of them utilize machine learning and predictive modeling to generate small molecule candidates for oncology and infectious diseases.

In the category of mental health, companies are utilizing AI and technology to improve the accessibility and effectiveness in mental healthcare, accounting the evolving needs of users who are seeking support and guidance. Ginger.io is a company cost-effective mental healthcare via a digital platform, and TAO Connect provides online therapy resources and tools for individuals dealing with mental health concerns.

In patient care and hospital management, companies are using predictive clinical analytics software that utilizes machine learning, natural language processing, and real-time physiological signal processing to support clinicians in early detection of critical disease states.

AI-driven diagnostics and imaging companies are using deep learning, a subset of machine learning that involves training neural networks on large datasets of medical images. Convolutional neural networks (CNNs) are particularly prevalent in this domain due to their ability to extract hierarchical features from images. These networks are trained to recognize patterns indicative of various diseases or abnormalities, allowing them to assist healthcare professionals in interpreting medical images with high accuracy.

The companies in patient risk and analysis group have utilized advanced machine learning and data analytics techniques to analyze diverse healthcare datasets, such as clinical, genomic, and real-world evidence, to extract insights for personalized medicine, drug discovery, and healthcare optimization. For example, CliniThink specializes in clinical natural language processing (NLP) and machine learning solutions to analyze unstructured clinical text data, enabling insights for clinical decision-making and research.
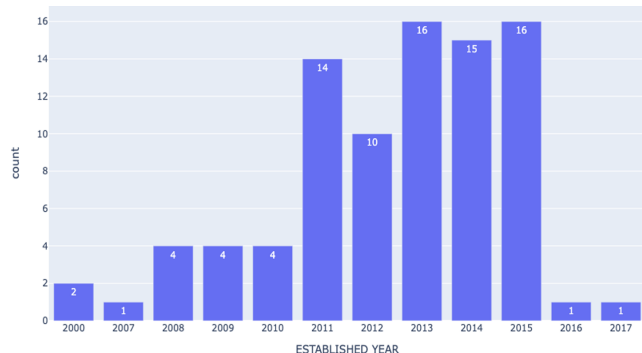

Figure 02: Statistics of AI-based Healthcare Startups

Similarly Figure.02 explains the number of startups which were incorporated from the year 2000 to 2017. We can see that the image clearly explains least number of startups established from the onset of 2000, whereas a spike in the startups and entrepreneurship from the year 2011 to 2015 and mild amount of startups established in the years 2008-2010 and we also see a decline in the years 2016-2017. Diagnostic Imaging (Approximately 20 companies):These companies utilize AI to enhance diagnostic imaging, improving accuracy and efficiency in detecting various conditions. Aidoc: Their AI algorithms analyze medical images (such as CT scans) to detect abnormalities like hemorrhages, fractures, and lesions, aiding radiologists in prioritizing urgent cases. Zebra Medical Vision: Zebra offers AI tools for radiology, detecting conditions like osteoporosis, liver disease, and cardiovascular issues, assisting in early detection and prevention. Quantib: Specializing in neuroimaging and oncology, Quantib's AI solutions provide quantitative analysis of MRI scans, aiding in diagnosing conditions like Alzheimer's disease and brain tumors. These companies aim to reduce diagnostic errors and improve patient outcomes by providing radiologists with AI-powered tools for faster and more accurate analysis of medical images. Drug Discovery and Development (Approximately 15 companies):These startups leverage AI to expedite drug discovery, aiming to bring new treatments to market faster. BenevolentAI: BenevolentAI's AI platform analyzes vast amounts of biomedical data to identify novel drug candidates and predict their efficacy, accelerating the drug discovery process. Atomwise: Atomwise uses AI for virtual screening of small molecules against disease targets,

enabling the discovery of new drugs and the repurposing of existing ones for different conditions. Recursion Pharmaceuticals: Using machine learning and automation, Recursion screens thousands of potential drug candidates to identify compounds that could treat genetic diseases like cystic fibrosis and cancer. These companies seek to revolutionize drug development by leveraging AI to identify promising drug candidates and optimize their efficacy, potentially reducing the time and cost associated with bringing new drugs to market. Personalized Medicine (Approximately 10 companies):These companies offer personalized healthcare solutions tailored to individual patients' genetic makeup and medical history. 23andMe: 23andMe provides direct-to-consumer genetic testing kits, offering insights into ancestry, health predispositions, and carrier status for genetic diseases. Tempus: Tempus analyzes molecular and clinical data to provide personalized cancer treatment options based on patients' genetic profiles, optimizing therapy selection. Color: Color offers genetic testing services for hereditary conditions like hereditary cancer and cardiovascular diseases, providing actionable insights and personalized health recommendations. These companies aim to empower patients and healthcare providers with personalized information to guide treatment decisions, ultimately improving patient outcomes and reducing adverse effects. Clinical Decision Support (Approximately 15 companies):These startups develop AI systems to assist healthcare professionals in making informed decisions by analyzing patient data. IBM Watson Health: Watson Health offers AI-driven clinical decision support tools that analyze patient data, medical literature, and treatment guidelines to assist clinicians in diagnosis and treatment planning. Infermedica: Infermedica's AI platform provides diagnostic and triage support by analyzing symptoms and medical history, helping patients and healthcare providers determine the urgency of medical conditions. VisualDx: VisualDx offers a clinical decision support system that provides visual diagnostic support by analyzing symptoms, medical images, and patient history, aiding in diagnosing various medical conditions. These companies aim to improve diagnostic accuracy, treatment planning, and patient outcomes by providing healthcare professionals with AI-driven insights and recommendations. Virtual Health Assistants (Approximately 10 companies):These companies develop AI-powered virtual assistants to provide remote medical advice, support, and monitoring. Babylon Health: Babylon's AI-powered platform offers virtual consultations, symptom checking, and health monitoring, providing accessible and convenient healthcare services. Gyant: Gyant's virtual health assistant uses AI to provide personalized medical advice and triage services, guiding patients to appropriate care pathways based on their symptoms. K Health: K Health's AI-driven platform offers personalized health insights and virtual consultations, empowering users to make informed decisions about their health. These companies aim to increase access to healthcare services and

improve patient outcomes by providing convenient, timely, and personalized medical support through virtual platforms. Patient Engagement and Behavior Change (Approximately 15 companies):These startups focus on engaging patients in managing their health and promoting behavior change through AI-driven interventions. Omada Health: Omada offers digital health programs for managing chronic conditions like diabetes and hypertension, providing personalized coaching, support, and feedback. Lark Health: Lark's AI-powered virtual health coach offers personalized advice and support for managing chronic conditions and improving health behaviors like diet and exercise. Welltok: Welltok develops AI-driven health engagement platforms that use behavioral science principles to motivate individuals to adopt healthier lifestyles and adhere to treatment plans. These companies aim to empower individuals to take control of their health by providing personalized coaching, support, and incentives for adopting and maintaining healthy behaviors. Administrative Efficiency (Approximately 20 companies):These companies focus on using AI to streamline administrative tasks in healthcare, reducing costs and improving efficiency. Olive: Olive's AI platform automates repetitive administrative tasks like prior authorizations, billing, and claims processing, reducing administrative burdens on healthcare organizations. Cedar: Cedar's AI-driven patient financial engagement platform simplifies billing and payment processes for patients and providers, improving revenue cycle management and patient satisfaction. SyTrue: SyTrue's AI solutions automate medical coding and billing processes, ensuring accuracy and efficiency in revenue cycle management for healthcare providers. These companies aim to improve operational efficiency, reduce costs, and enhance the patient experience by automating and optimizing various administrative processes in healthcare organizations.

Case Studies

The above companies designed the software technologies in order to solve the problems in the health industry. Here are some of the real life case studies done by the companies partnering with healthcare firms.

1. Apixio: Enhancing Risk Adjustment Accuracy Challenge: A large Medicare Advantage plan struggled with accurately identifying and documenting chronic conditions in patient records, impacting risk scores and reimbursement. Solution: AI platform analyzed unstructured medical records, extracting pertinent clinical data and identifying missed diagnoses. Result: The Medicare Advantage plan increased its risk-adjusted revenue by 12implementing Apixio's solution. Improved coding accuracy led to more precise risk scores and higher reimbursement.

2. **EnsoData:** Improving Sleep Disorder Diagnosis Challenge: A sleep clinic faced challenges in timely analysis and interpretation of sleep study data, resulting in delayed diagnosis and treatment. Solution: AI-powered platform automated the analysis of sleep study data, providing rapid and accurate insights for clinicians. Result: The clinic reduced report turnaround time from 7 days to less than 24 hours, enabling quicker diagnosis and treatment initiation for patients. Clinicians reported increased confidence in diagnoses, leading to improved patient outcomes.

3. Medalogix: Reducing Hospital Readmissions in Home Health Care Challenge: A home health agency aimed to reduce hospital readmission's among its patients, a common issue in the industry. Solution: Predictive analytics software identified patients at high risk of readmission and tailored care plans to address their needs. Result: The agency achieved a 25readmission's within six months of implementing Medalogix's solution. This not only improved patient outcomes but also led to cost savings for the agency.

4. Pulse Data: Optimizing Patient Flow in Emergency Departments Challenge: An urban hospital faced challenges with overcrowding and long wait times in its emergency department. Solution: Pulse Data's predictive analytics platform forecasted patient admissions, allowing the hospital to optimize staffing and resource allocation. Result: The hospital reduced average wait times by 30increased patient satisfaction scores by 15improved efficiency, and the hospital saw a decrease in costs associated with overcrowding.

5. Oncora Medical: Personalizing Radiation Therapy for Cancer Patients Challenge: Oncologists sought to improve the effectiveness of radiation therapy for cancer patients while minimizing side effects. Solution: Analyzed patient data to provide personalized radiation therapy recommendations based on clinical evidence. Result: Oncologists using Oncora Medical's platform achieved a 15improvement in treatment response rates and a 20reduction in treatment-related side effects. Patients experienced better outcomes and reduced toxicity from treatments.

6. CloudMedx: Population Health Management for a Health System Challenge: A health system aimed to improve population health outcomes but faced challenges in analyzing and acting on patient data effectively. Solution: Aggregated and analyzed clinical data, enabling population health management initiatives. Result: The health system reduced hospital admissions for chronic conditions by 20screenings among high-risk populations. Care coordination improved, resulting in better patient outcomes.

7. MedAware: Preventing Medication Errors in a Hospital Challenge: A hospital struggled with medication errors and adverse drug events, leading to patient safety concerns. Solution: Analyzed electronic health records to identify and prevent medication errors and adverse reactions. Result: The hospital reduced medication errors by 40within the first year of using MedAware's solution. Clinicians reported increased confidence in medication prescribing, resulting in safer patient care.

Some companies have also been into drug development and included their drug for preclinical and clinical trials. Benevolant AI is one such company. its drug is used to treat

the following: Neurodegenerative Diseases: BenevolentAI is actively researching and developing treatments for neurodegenerative diseases such as Alzheimer's and Parkinson's disease. These conditions are characterized by the progressive degeneration of neurons in the brain, leading to cognitive decline and motor impairments. BenevolentAI's pipeline includes drug candidates that target key mechanisms involved in these diseases, such as amyloid beta aggregation in Alzheimer's or dopamine dysregulation in Parkinson's. Oncology: In the field of oncology, BenevolentAI is working on developing new cancer therapies. This includes both traditional small molecule drugs and innovative biologics, such as monoclonal antibodies or cell therapies. The pipeline targets various types of cancer, including solid tumors and hematologic malignancies, with a focus on precision medicine approaches that target specific genetic mutations or pathways driving cancer growth. Rare Diseases: BenevolentAI recognizes the importance of addressing rare diseases, which often lack effective treatments due to their low prevalence and complexity. The company's pipeline includes drug candidates for rare genetic disorders, metabolic diseases, and other rare conditions. These projects aim to develop targeted therapies that address the underlying cause of the disease, providing much-needed treatment options for patients with rare disorders. Autoimmune Disorders: Autoimmune disorders occur when the immune system mistakenly attacks the body's own tissues, leading to chronic inflammation and tissue damage. BenevolentAI's pipeline includes drug candidates for autoimmune diseases such as rheumatoid arthritis, lupus, and multiple sclerosis. These projects focus on modulating the immune response and restoring immune tolerance to prevent further damage to affected tissues. Infectious Diseases: BenevolentAI is also involved in the development of treatments for infectious diseases, including viral, bacterial, and fungal infections. This includes antiviral drugs for diseases like HIV and hepatitis, antibiotics for drug-resistant bacterial infections, and antifungal agents for invasive fungal infections. The pipeline targets both common infectious diseases and emerging threats, with the goal of developing novel therapeutics to combat infectious agents. Overall, BenevolentAI's pipeline represents a diverse range of therapeutic areas and disease indications. The company employs cutting-edge AI technology to accelerate the drug discovery process and identify promising drug candidates for various diseases. By leveraging data-driven approaches and advanced analytics, BenevolentAI aims to bring innovative treatments to patients faster and address unmet medical needs across different areas of healthcare. Similarly, Deep Genomics is a biotechnology company focused on using artificial intelligence (AI) to develop and discover new genetic medicines. They leverage AI to analyze vast amounts of genomic data, uncovering insights into the genetic causes of diseases and identifying potential therapeutic targets. Deep Genomics aims to revolutionize drug discovery and development by predicting

how genetic variations impact disease mechanisms and response to treatment. Their approach allows for the rapid and efficient design of precision medicines tailored to individual patients. Through cutting-edge AI technology, Deep Genomics strives to accelerate the development of innovative therapies for a wide range of genetic diseases, ultimately improving patient outcomes and quality of life.

6 Future work

Expanding the Objectives of Research Globally: To present a comprehensive overview of global advances, data from startups in AI healthcare, small to medium-sized enterprises, and major companies situated on several continents will be gathered in the future. This extension improves our understanding of the unique healthcare concerns that different technologies address and the geographical variations in AI adoption. Insights on how AI is incorporated throughout the healthcare spectrum could be gained by incorporating a variety of industries, including biotechnology, pharmaceuticals, and healthcare services.

Delving into deeper analysis: The long-term plan for improving the analysis of artificial intelligence in healthcare includes a thorough approach to comprehending the significance and possibilities of AI technologies via diverse research methodologies. Longitudinal studies will be essential to track and assess AI's efficacy. These studies will span several years and concentrate on important metrics like better patient outcomes, operational efficiencies, and cost-benefit analyses to identify the practical benefits and areas that still require improvement. To create strong policies and frameworks that preserve moral norms and safeguard patient data, an in-depth evaluation of ethical and regulatory issues will also address concerns about AI bias, privacy, and data security. Furthermore, gathering creative case studies of effective AI implementations would provide benchmarks and priceless insights. Performing such kind of analysis will describe the technological prowess, operational strategies, and management techniques used by different organizations to overcome obstacles and successfully utilize AI's potential. This will serve as a model for innovation and best practices in the healthcare industry. This comprehensive strategy opens the door to better healthcare outcomes and delivery by ensuring a full understanding and responsible advancement of AI applications in the field of healthcare.

As part of the future work we have also done a study analyzing the market report related to AI in healthcare for next ten years(2023-2033). The current Market Value of AI in healthcare market is valued at USD 30.66 billion in 2023 and the future Projections are expected to reach over USD 684.88 billion by 2033. The Growth Rate: Projected Compound Annual Growth Rate (CAGR) of 36.43 percent from 2024 to 2033. The Key Growth Drivers expected from this

study are Increased demand for personalized treatment options, Need to reduce overall healthcare costs and Expansion and utilization of large patient-related digital data sets.

Advantages This study's thorough methodology provides a solid basis for understanding the surroundings of AI-driven healthcare startups. The study ensures an in-depth examination of various uses of artificial intelligence in healthcare by carefully choosing 106 companies and dividing them according to separate domains. The detailed searches and verification procedures carried out as part of the careful gathering of information and cleaning plan enhance the precision and reliability of the results. The fact that the study advances our knowledge of AI-driven healthcare innovation serves as one of its primary benefits. This study gives a thorough summary of the present scenario by combining a variety of literature as well as including ideas for new projects and research. Moreover, the research offers major insights into the latest strategies and improvements shaping the healthcare sector by pointing out essential patterns and trends among start-up companies. Furthermore, the study fills in an important vacuum by demonstrating the strategies and ideas utilized by startups using AI in healthcare. acquiring an understanding of these techniques is crucial for everyone involved, from investors to health care providers, as it offers information about the potential impact of artificial intelligence on outcomes for patients and healthcare delivery. In summary, this study adds knowledge about AI-driven healthcare innovation as offering stakeholders helpful advice regarding how they can take benefit of the possibilities that this rapidly evolving environment offers. The study provides the way for further study and development in AI-driven healthcare by offering a thorough understanding of the approaches, trends, and challenges facing the field.

7   Limitations

Although our study seeks to provide an extensive review of startups using artificial intelligence in healthcare, it is essential to recognize limitations which impact the scope and complexity of our findings. A notable obstacle is the wide range in access to information and quality among various sources. The lack of consistency in present data might have introduced gaps and inconsistencies into our collection of information, impacting the accuracy and comprehensiveness of our findings, additionally despite our rigid search procedures. Another limitation is the challenges of categorizing businesses based on AI (Artificial Intelligence) algorithms. Startups may be simplified, or their technological strategies lie about because of the constantly changing character of AI technologies, making it hard to correctly classify them according to the underlying algorithms. Further, our study could have been biased towards startups from specific industries or geographic areas because of an absence of diversity

in the startup selection procedure, that could limit the generality of our findings. Finally, startups in this sector encounter enormous difficulties in managing the ethical and legal concerns related to AI in healthcare. The environment for regulation becomes more complex by issues related to privacy, security of data threats, and biases in algorithms. As a result, startups must ensure adherence while seeking innovation in this rapidly changing field. These limitations emphasize the importance of careful interpretation and additional research for dealing with the many aspects of AI-driven innovations in healthcare

8   Conclusions

This survey concludes by pointing out the critical role that AI-powered startups are playing in transforming the healthcare industry. It is evident from examining an array of companies and their use from efficiency in administration to tailored medicine that AI is changing every aspect of medical care delivery. While AI has immense potential, issues like bias in algorithms and data privacy have yet to be addressed. This study shows how important it is to conduct additional studies, interact with others, and consider ethical issues to effectively use AI to enhance healthcare. AI has enormous potential to enhance outcomes for patients and change the healthcare industry via careful development and use.

9   Acknowledgments

10   Author contributions

Harika Vanukuri oversaw the data collecting for businesses numbered 1 through 25 throughout the project's first phase. Her critical analysis was essential to the discussion of the survey's limits, good results, and conclusion. To guarantee the correctness and integrity of our dataset, she thoroughly reviewed each element of information in the Excel sheet.

Padmaja Vemula inspected the data for organizations numbered 26 through 50 and played a key role in managing the Excel database. Through thorough inspection, she ensured data accuracy while upgrading the Excel sheet's organization and effectiveness. The code written in Python that supported our data analysis procedures was greatly enhanced by Padmaja's contributions as well. Her efforts also included making sure that the project presentation was coherent and

aligned throughout, which added to the conclusions of the study.

Sukruthi Vengala outlined the purpose and objectives of the survey, wrote the project's introduction, and was instrumental in creating the project methodology. She gathered and validated information for businesses 51 through 75, and then used Python to create insightful visualizations that accurately and easily illustrated complex data and trends.

Vandita Stella Marie handled the collection of data for companies 76 through 106 and oversaw the thorough data analysis portion of our investigation. She made a significant contribution to the creation of case studies and the examination of market reports, offering a more thorough grasp of the current scenario. Furthermore, she added to the literature review as well, strengthening the academic rigor of our work and making sure that every piece of data in the Excel sheet was carefully double-checked.

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