www.ijecs.in
International Journal Of Engineering And Computer Science
Volume 10 Issue 12 December 2021, Page No. 25453-25463
ISSN: 2319-7242 DOI: 10.18535/ijecs/v10i12.4643

Utilizing AI for Health Promotion and Disease Prevention

Arun Kumar Ramachandran Sumangala Devi

Architect II- Software Testing

Abstract

The emergence of advanced AI technologies such as expert systems, fuzzy logic, neural networks, and genetic algorithms can directly address people's health needs by providing personalized advice to users while at the same time collecting valuable data related to aspects of diseases and treatments. These technologies have been in use for quite some time and have evolved to the point where they have matured into practical decision support systems that can be used to assist people in health management and promotion efforts. This chapter presents a survey of the current progress and ongoing research in the area of health-related AI technology and end-user products. With the ever-growing trajectory of technology and the increasing demand to reduce healthcare costs while providing better quality healthcare, employing AI as part of or adjunct to medical processes will become increasingly important from both economic and social perspectives. The classical problems of the healthcare industry include providing people with new and better treatments, more effective ways of preventing, detecting, and combating multifaceted chronic diseases, and ways of caring for the ever-increasing numbers of senior citizens.

Keywords: Advanced AI technologies, Expert systems, Fuzzy logic, Neural networks, Genetic algorithms, Personalized health advice, Disease treatment data, Decision support systems, Health management, Health promotion, AI in healthcare, End-user health products, Healthcare technology, Reducing healthcare costs, Quality healthcare, Medical processes, Chronic disease prevention, Senior citizen care, Multifaceted disease detection, Economic and social healthcare perspectives

1. Introduction

When it comes to long-term health, the focus traditionally remains on treatment. However, using large-scale data and the benefits of recent advances in AI, there is great promise to shift our focus towards finding ways to proactively enlarge the positive extent of health. This report closely examines the different initiatives that have already shown early promise in this health-promoting area supported by AI applications. It delves into work that could be done to further improve its use. To start a big-picture view, we also included examinations of promoting health needs of populations at large, specific health-promoting strategies, and possible pathways that leverage AI's benefits the most. As a developed society, we are starting to see that unburdened access to health is not sufficient to achieve robust national health goals. Promoting health obliges stepping in at the earliest stages by giving families and individuals the resources to live to their full health potential in their context. Funding both preventive health care and

upstream determinants, as well as surveillance efforts, are starting to align with these philosophical goals. We now have the tools needed to make real strides toward the realization of national health objectives. However, to effectively achieve this aim, there will be several challenges to work through. Currently, very few artificial intelligence projects aim to fill the significant gap in health promotion, not only in comparison to disease treatment but also to other more reactive late-model societal applications. These early approaches urgently need to be broadened and deepened. This report begins with a concise means-section explanation of health promotion endeavors and the differentiated rationales for changing these AI efforts soon.

1.1. Background and Significance

Artificial intelligence (AI) technologies have shown considerable potential for health promotion and disease prevention. The majority of these facets directly contribute to lifestyle activities and self-management of health-related activities through data collection accuracy, contextual data, and real-time data assessment, monitoring, and support to people for better health monitoring and for providing the correct health intervention when it is needed. Utilizing AI for health promotion and disease prevention can help reduce the global disease burden and can also let people have more control over their health-related matters, reducing healthcare costs.

There are multiple opportunities and benefits in utilizing AI in the field of health promotion and disease prevention, including an increase in life expectancy, improving mental and physical health, solving missing life activities and health monitoring issues of institutionalized older adults, improving preventive screening, early diagnosis, and disease management through continuous monitoring, promoting physical activities, mental fitness, and nutritional health, risk prediction and personalized health recommendations, self-managing health information, reducing risks and injuries, preventing diseases, and maintaining health, personalized medication management and adherence, fitness tracking, and access to better health services and patient screening in telemedicine. An advanced model is proposed to be utilized in AI-based health supporting systems, aiming to optimize the wide range of AI applications in various health promotion and disease prevention facets.

Fig 1 : Artificial Intelligence in Healthcare

1.2. Purpose of the Paper

This paper outlines how artificial intelligence (AI) can be used to promote public health and prevent disease by applying a holistic approach to health. This paper is organized as follows: Part 2 outlines the purpose of this paper; Part 3 is a background section that provides a theoretical framework; Part 4 outlines the underlying methodological logic used in this paper; Part 5 explains the issues involved in utilizing AI for health promotion and disease prevention; Part 6 presents health promotion and disease prevention measures throughout the life cycle; Part 7 presents the methods of ethical education for AI; Part 8 presents the research results; Part 9 suggests methods for educating ethicists at AI companies; and Part 10 presents policy implications of this paper.

The main purpose of this paper is to make connectivity proposals and suggestions using AI for health promotion and disease prevention. Health is an individual's most important value, and social progress is achieved through individuals who are healthy both physically and mentally. Improving people's overall quality of life and reducing health costs for individuals and nations will strengthen their economic and social viability. Public health is

a function of the level and amount of social and institutional connectivity. To maintain an optimal level of health, the following three factors are important: 1. The functioning of the immune system—to resist infections; 2. Appropriate psychological adaptation—to prevent internal upheaval pertinent to life events such as birth, growth, reproduction, aging, and death; and 3. The absence of disease. Public health is a function of the level and amount of social and institutional connectivity, and examining health from this comprehensive and social-connectivity-specific approach provides clues to solutions for maintaining comfort and peace of mind in everyday life for everyone. In addition, healthcare systems themselves should aim to assist people throughout their life course. The purpose of this paper is to propose and guide AI as a tool for improved public health resulting from health promotion and disease prevention.

Equations 1 : Personalized Health Interventions

AI can provide personalized recommendations for health promotion by analyzing an individual's health data and making tailored suggestions for behavior change (e.g., weight loss, smoking cessation).

$$I_{intervention}(P) = g(D, S, N, T)$$

Where:

$Iintervention(P)$ = Recommended health intervention for patient P

D = Diet and nutrition data (e.g., daily calorie intake, nutrient profile)

S = Sleep patterns (e.g., duration, quality of sleep)

N = Physical activity levels (e.g., steps per day, exercise intensity)

T = Temporal data (e.g., age, stage of health progression, seasonal factors)

The function g represents an AI model (e.g., deep learning or decision trees) that generates health recommendations tailored to an individual's data.

2. AI Applications in Health Promotion

Artificial intelligence (AI) has been utilized in health promotion and disease prevention for over a decade. AI research has targeted the individual, group, and societal levels for the promotion of health and the prevention of diseases. AI applications across the fields of health, sports, and medicine are reviewed to discern semantic contents and natural language patterns to present a comprehensive insight into how AI technologies can contribute to individuals' health and societies' objectives in this domain.

AI applications in the health promotion field are reviewed. The reviewed applications include, but are not limited to, AI chatbots in health coaching; AI in mental health intervention; AI in fitness; and AI in diet management. The views of research publications on the keyword "health promotion" combined with "AI" are analyzed. First, the AI technologies used in the reviewed applications are carefully identified. The interests of today's AI community in health promotion from different AI technological categories are revealed, so we urge AI researchers to adopt up-to-date AI technologies to help promote health. The remaining article is organized as follows. AI applications in health promotion are reviewed first. Then, AI applications in fitness promotion and mental health intervention are discussed. AI applications in diet analysis and management are thereafter presented. AI contributions in other health-related topics, such as cancer, are discussed next. The binary diary management system, which is proposed for parents of young kids, is then presented. In the section hereafter, health recommendations using semantically enriched health API are discussed. Finally, we provide some concluding remarks, which summarize the article, list its limitations, and acknowledge contributors.

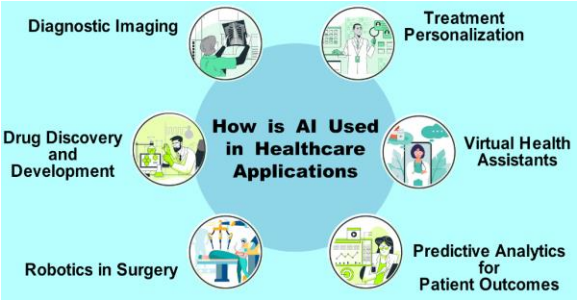

Fig 2 : Health Care Applications used in AI

2.1. Machine Learning in Personalized Health Recommendations

In recent times, machine learning, deep learning, as well as artificial intelligence, have been seeing rapid growth in the field of health informatics. AI has the potential to generate new knowledge and discover relationships due to healthcare data. One interesting application of using AI-based machine learning models for health promotion and disease prevention is the ability to generate personalized health recommendations based on a patient's lifestyle preferences. Machine learning in developing a personal health recommendation system requires the use of user data characteristics combined with health features. Furthermore, machine learning-based recommendation algorithms can allow patients to have the flexibility in receiving the type of recommendations and can be on-demand to fit into the user's lifestyle at the current time. This will allow those who are less health-conscious or have fewer resources to utilize the related services without high interest and financial burden, as well as high engagement for applications.

With most potential also come challenges in personalizing the recommendations for each individual; different personal characteristics need to be taken into account. The two major types of features that are important for personalized recommendations are the characteristics of the health/fitness services, which include the goals, location, service type, cost, rating, and service description; and the users' characteristics, which include user profile data, internal and external state conditions, such as stress, weather conditions, time of day, etc. All of this information can provide a complete view of what type of recommendations the user prefers and fit into the current habits of the users. The relationship between a user's characteristics and the characteristics of the health/fitness services is regarded as a cross-domain relationship, and it is important to consider this relationship when creating a user model and a recommendation model. Because the fusion of a user's health/fitness service preferences increases the modeling complexity, research to personalize health-related service recommendations that incorporate user health factors is still lacking in this field.

2.2. Natural Language Processing in Health Education

Cross-sectional internet search keyword queries facilitated the collection of layperson health information that can be used to train a chatbot conversational agent and answer relevant healthcare questions. The topic popularity ranking and potential objective of queries were calculated by quantifying absolute search volume and popular language models to frame sequential keyword entities. A total of 56.6 million queries were assembled from 2.6 million visitors, which resulted in 1,366 foundation-level health education topics, arranged in four main categories. "Heart" and "cancer" attracted the highest absolute search volume. Mental and occurrence-related topics gained the most increasing popularity. Visitors searched more for diseases than prevention or symptoms, considering the exception of HIV. Additionally, "HIV" and "herpes" were the only terms from this study that did not match the popular language models in predicting health information topics.

Given tasks that would be practically feasible, and the abilities of laypeople to use them, this study's results essentially match existing NLP applications for medical-related tasks, implying the importance and relevance of these intended methods and processes. The Ad Hoc team reports that their

proposed generative models perform well when compared to the existing statistical methods and the developed fake news list for healthcare information. Researchers believe that the performance can be further developed with more intricate models and training architectures, where a user could directly ask these models about any outstanding general medical questions. Users may feel more comfortable conversing with models that can maintain and return a more intricate dataset. Of course, trust is fundamental when utilizing machines in such influential ways. Studies that assess trust in conversational agent-based models are led in a separate direction.

3. AI in Disease Prevention

The role of artificial intelligence (AI) in healthcare is to facilitate quick and precise decision-making and encourage people to take part in their health. AI models are built on pattern recognition by using a combination of different parameters. AI improves by incorporating continuous fine-tuning to understand health at a deeper level. Preventive care has the power to change what is physically possible in the future, often rendering cures irrelevant. More resources should be directed toward proven preventive efforts to increase robustness and reduce risks. Precision prevention uses personal data to better tailor interventions and maximize effectiveness and efficiency. Health information is enormous, and data architectures can combine a wide range of data sources and analytics to enable precision prevention. It is possible to couple digital health information with AI to derive actionable prevention insights by using data from a single individual through big data analytics.

Early disease prediction and addressing risk factors with predictive models can diminish the likelihood of encountering chronic illnesses. The use of AI in preventive decisions could encourage sound nutrition based on the values of dietary advice, considering individual conditions and the availability of natural foods. AI can be employed to develop prevention decision support systems for isolated elderly people. AI enhances safety assurance for social assistance robots. Reinforcement learning is used to implement assistant robots against accidental tipping or falling. Business intelligence tools help individuals, communities, businesses, and public bodies measure health risks and monitor health behavior trends. Business intelligence techniques contribute to the prevention of environmental hazards, among other factors. AI can deliver timely pharmacological advice by uncovering potential medication interaction risks and avoiding incarceration.

Technical support powered by AI can provide recommendations for physical and mental health during telerehabilitation. Using context-aware computing and aspects related to behavioral risk-based predictions, personalized health fitness programs can be developed. The sensors and activewear embedded with AI chips help in active alerts for fall-related complications, and robots can act as caretakers for stroke survivors, thereby preventing unforeseen accidents. AI can improve surveillance and track compliance to understand how well a particular prevention plan is working.

Prevention saves lives and billions of dollars in healthcare, making it a very cost-effective investment. The organizing principle is to reduce modifiable risks triggered by prior life experiences. Increasing these dimensions enhances our collective capacity to prevent illness in everyone, everywhere throughout life. We recognize that while microbiomes, epigenomes, and social determinants of health contribute to vulnerability, they are less mutable than lifestyle, behavior, and environmental challenges. They examine person, place, and time variables for opportunities to intervene. For prevention, the rate of innovation can accelerate. Though challenges are daunting, so are the opportunities. Increasing our military approach to implementing vaccines and other population prevention strategies will prevent morbidity, meaning illness evolution and potential long-term effects. Preventing illness reduces premature mortality and disability, increases lifespan, quality

of life, and longevity, and reduces the burden of chronic disease. The emphasis on prevention is optimistic. Personalizing prevention and tailoring wellness strategies offers better outcomes.

3.1. Predictive Analytics for Early Detection

A key area with AI for health is predictive analytics. With the application of AI, researchers have attempted to utilize patient data to predict individuals' future conditions and enable early detection of unnoticed health deterioration. A predictive model was built to predict patient deterioration on an hourly basis by combining extensive artificial neural networks and regularized logistic regression. Data was collected from over 65,000 adult and pediatric hospitalized patients. The results showed that the model can predict future patient deterioration up to 24 hours in advance with clinically acceptable lead times. There is a huge scope to use such predictive models for early detection of chronic diseases.

An AI model demonstrated using patient data for the prediction of multiple chronic conditions. Diagnostic information was derived from historically structured electronic health records data of more than 2.4 million patients. A probabilistic model, multi-output Gaussian processes, was found to effectively learn the statistically complex interactions of multiple chronic conditions. The model outperformed standard baselines in predicting benchmarks for diagnostic realizability and could be used for personalized medicine and chronic disease management. The optimization of chronic mental illness management was shown. The study used an AI-based predictive model from a database of 306,411 US veterans. The model demonstrated the potential to both reduce the care burden on providers and also increase the quality of care provided to an important subpopulation.

Fig 3 : Predictive Analytics In Healthcare

3.2. Virtual Health Assistants for Lifestyle Management

With rapid advances in AI technology, we have seen increasing interest and significant progress in the development of virtual health assistants. Their use and applicability can be developed along several lines, including people's health and wellness, health conditions management, health self-management, and personalized and precision medicine. Our notion of a Virtual Health Assistant, in its most comprehensive way, refers to a 24-hour easily accessible health partner with intelligent natural language conversation capacity and the ability to answer health questions, provide information and reminders, interact in verbal communication, encourage, persuade, provide emotional support, provide health monitoring, generate reports, provide consistent continuous messages and information, learn from the interaction experience and from receiving feedback. It also has cognition and problem-solving capabilities, controls the actual physical and information flow of health systems, and integrates existing health services.

In this paper, we focus on the use of VHAs in the context of promoting health and preventing diseases, particularly chronic non-communicable diseases, which are largely related to unhealthy lifestyles and can be prevented by appropriate lifestyle modifications and management. Even

though AI technology can help manage and prevent chronic diseases through decision support, evidence-based protocols, and other clinical tools, it is not our primary focus in this paper. Lifestyle interventions delivered via human coaches, group interaction, and other channels have already been demonstrated to be powerful solutions in disease management, stress prevention, performance enhancement, and well-being achievement. In this context, whether VHAs can effectively deliver similar kinds of interventions, and how they might compare with human coaches and group disciplines, are still under-explored issues.

Equation 2 : Optimizing Health Interventions

AI can optimize interventions to minimize disease incidence. For example, optimization models can help determine the best mix of interventions to maximize health outcomes. This can be formulated as:

$$\max H = \sum_{i=1}^{n} w_i \cdot I_i \quad \text{subject to} \quad \sum_{i=1}^{n} c_i \cdot I_i \leq C$$

Where:

H is the overall health outcome (e.g., improvement in population health),

wi is the weight assigned to each intervention Ii,

ci is the cost of intervention Ii,

C is the total budget or available resources.

The goal is to maximize the health outcome H while keeping costs under a predefined limit.

4. Challenges and Ethical Considerations

The development and implementation of AI in health promotion and disease prevention face challenges and ethical issues. First, for many individuals at true risk, health promotion and prevention are often not prioritized until their health deteriorates. The user acceptance of health promotion tools is low due to the lengthy time to effect and sustained lifestyle changes, engagement and motivation strategies, connectivity of wearable devices, and reluctance to share personal tracking data with healthcare providers. Indeed, many individuals with direct-to-patient health promotion and wellness program subscriptions consider an annual check-up to be a complementary business model instead of being the primary function of a healthcare facility. There are also challenges stemming from data processing and data quality, including the absence of accepted species typing, missing, unreliable, sequential data, or more complex situations like data obtained from smart homes. Obstacles related to predictive modeling, data preparation, and infrastructure are the primary reasons why digital health data is not used within enterprises.

Several educational barriers impair the actionability provided by big data, like the quantitative cognitive skills to discern the potentially significant effects of large epidemiological studies, including several confounding variables. In medical school, the emphasis is typically on teaching students to memorize predefined disease patterns so that letters of recommendation reflect the students' observations. This occurs despite the inefficient usage of precious clinical training time. Therefore, currently, data science and medical curricula are worlds apart. There are also significant considerations relating to the ethics of citizen safety and personal data protection when it comes to personalized AI. Issues like responsibility in healthcare, the consequences if something goes wrong or is misdiagnosed, and exonerating insurance companies are only a few of the problems. Failing to think about what comes next, taking the impact on patient care, physician satisfaction, and burnout into account, dealing with various underwriting considerations, a flood of indistinguishable healthcare bad debts, and the need to track fitness and health have the potential to undermine various operational needs. Keep in mind in general that a new diagnostic modality has a

range of consequences that should not be ignored, considered, if necessary, challenged, and discussed.

4.1. Data Privacy and Security

Artificial intelligence (AI) technologies have various applications for human health and can be used for obtaining and analyzing health and infection data. However, the use of such data entails the risk of privacy invasion, thus requiring the adoption of privacy-preserving data usage methods. Data security is also important as infection data contain personal information, and their leakage can cause damage. In this report, we provide an overview of methods associated with data privacy and security and discuss their significance in health promotion and disease prevention. Data privacy and security are required for reliable data usage. Patient information data utilization entails various privacy-related problems that occur in the biomedical field, including difficulties in sharing and using data. The progress of machine learning under data poverty is not sufficient, and if an appropriate amount of data cannot be obtained, the output quality easily becomes problematic. When using infection data, the international tendency of some countries to be unwilling to disclose personal information, wherein personal information can be traced even if it is anonymized, is also a problem. To resolve these issues, a data usage method has been proposed that blends the shared and utilized data. By creating the observational indexes of the utilized data in the shared data and making the shared data structure strong, the privacy of the data effectively increases. An encryption method is used so that medical researchers can use the shared data to calculate the indexes, but the information provider cannot use the shared data to reproduce the original data. Through this method, privacy protection is enhanced. Data security is also important when utilizing personal infection data. Personal data is sensitive information, and its leakage not only leads to economic damage but also creates potential victimization. Personal infection data sharing must be carefully implemented to avoid leaks. In this paper, we provide a detailed discussion of the issues in data privacy and security for health promotion and disease prevention, along with the solutions.

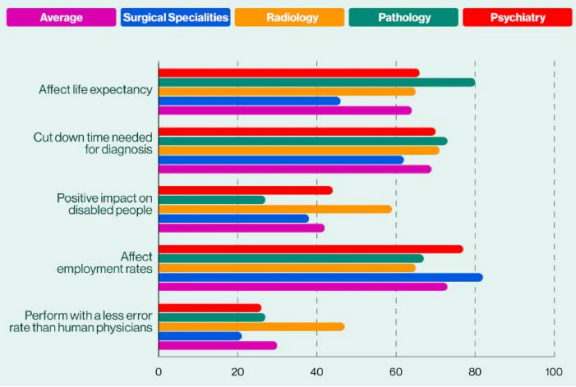

Fig 4 : AI in Healthcare Statistics

4.2. Bias and Fairness in AI Algorithms

Health disparities have deep social roots, and they appear in nature. Biases and social preconceptions are often baked into our dataset curation. We learn social biases and class stereotypes from nuances in data organization and class annotation. When we use this data to create AI and data-driven models, we are transferring human biases to algorithms, sometimes through unintended ways. These thoughts raise a fair concern when AI and data-driven models are being used for public health issues, especially in scenarios where there might be a potential negative impact on a certain group of people, for example, when a job promotion decision is computer-aided. It is crucial to address fairness and social biases in AI models to make reliable predictions and informed support for public health policy. Issues of potential model-induced greater effects on already disadvantaged groups are oversampled in models' learning outcomes. Analysts often rely on tracking performance metrics across different social groups to expose hidden biases within their machine-learning models. However, blindfolded testing often wraps these potential biases in the layers of assumptions and generalization methodologies, and their built sanitation becomes self-fulfilling prophecies.

5. Conclusion

The rapidly increasing application of AI to health promotion and disease prevention necessitates the development of comprehensive, universally accepted public health road maps. The rapid development of AI presents diverse opportunities to impact the field of health promotion. These include defining AI-driven innovative population-level strategies, developing national guidelines and standards, developing certification and training programs that address ethical and security concerns, and developing a variety of organizational factors needed to ensure the successful wide applications of AI. More specifically, there is an evident need to capitalize on joint public and private global investments in biomedical big data infrastructures tailored to boost biomedical big data by integrating raw research data from different sources worldwide through ethical and secure, federated, and privacy-preserving biomedical AI hubs feeding on advanced computing-driven deep learning, health citizen-inspired reasoning, AI medical imaging reading, preselection AI-driven data transfer and storage management, and AI-optimized network, and knowledge representation management.

Equation 3 : Monitoring Health Trends Using AI

AI systems can continuously monitor health trends in a population through real-time data analysis. A simple equation for continuous health monitoring could be:

$$M(t) = \sum_{i=1}^{N} (P_i(t) \cdot w_i)$$

Where:

$M(t)$ is the overall health metric at time t,

$Pi(t)$ is the health parameter (e.g., blood pressure, glucose level) of individual i at time t,

wi is the weight associated with each individual i's health parameter based on their health profile,

N is the total number of individuals being monitored.

This equation allows the system to aggregate individual health data over time and adjust recommendations for the entire population.

5.1. Future Trends

The new paradigm of biomedical science is shifting the emphasis from treatment to healthcare. Health behaviors and the environment play a significant role in health promotion and risk reduction. In the past few decades, much knowledge has been accumulated, and many technology-based tools have been developed to help people improve their health conditions. To acquire such tools, individuals and clinicians look at massive health data to gain knowledge and insight for intelligent health decision support. This review has covered the major concepts and applications, along with some representative works, in the three streams of health promotion, monitoring, and support. Consequently, we hope that this review could serve as a snapshot of future developments and a reference for future studies and deployment. In the past, most of the data used in research were laboriously collected through surveys and interviews. Now, web-based platforms such as social media, lifestyle apps, or tracking devices output massive data for big data health research. The larger the datasets, the more informative the analysis, and the higher the probability of discovering knowledge and patterns that might not have been previously recognized. The knowledge can therefore be better exploited for insightful decisions in health initiatives.

Chronic diseases are the most common and costly of all health problems, and diet and physical activity are the most effective means of reducing their burden. However, most of us are unable to achieve and maintain healthy behaviors. Artificial intelligence has proven to be a powerful tool for changing individuals' health behaviors in specific areas. Personalized recommender systems and intelligent healthcare support platforms have shown their capability to provide relevant insights to individuals. Personal digital assistants also improve individual adherence through personalized strategies based on self-monitoring data. On the other hand, sentiment analysis, as the current state-of-the-art subfield in AI, can discover public

opinion. By exploring this opinion, prevention campaigns are improved in presentation, accuracy, messaging, and reach to attract and promote health initiatives. Powered by massive data, deep learning has been successfully implemented in health image understanding. The development is not limited to diagnosis, as it can express attention distribution in an image, which provides a potential bird's-eye view for identifying positive cues in food images.

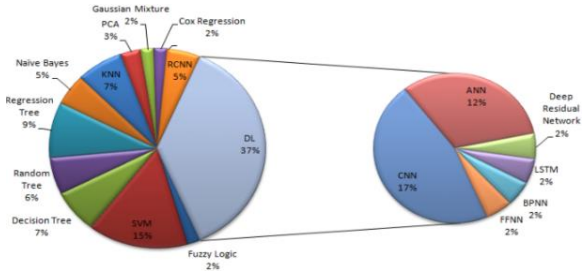

Fig 5 : Artificial intelligence in disease diagnosis

6. References

1. Avacharmal, R. (2021). Leveraging Supervised Machine Learning Algorithms for Enhanced Anomaly Detection in Anti-Money Laundering (AML) Transaction Monitoring Systems: A Comparative Analysis of Performance and Explainability. African Journal of Artificial Intelligence and Sustainable Development, 1(2), 68-85.
2. Vaka, D. K. “Artificial intelligence enabled Demand Sensing: Enhancing Supply Chain Responsiveness.
3. Mahida, A. A Review on Continuous Integration and Continuous Deployment (CI/CD) for Machine Learning.
4. Mandala, V., & Surabhi, S. N. R. D. (2021). Leveraging AI and ML for Enhanced Efficiency and Innovation in Manufacturing: A Comparative Analysis.
5. Chintale, P. (2020). Designing a secure self-onboarding system for internet customers using Google cloud SaaS framework. IJAR, 6(5), 482-487.
6. Bansal, A. (2021). OPTIMIZING WITHDRAWAL RISK ASSESSMENT FOR GUARANTEED MINIMUM WITHDRAWAL BENEFITS IN INSURANCE USING ARTIFICIAL INTELLIGENCE TECHNIQUES. INTERNATIONAL JOURNAL OF INFORMATION TECHNOLOGY AND MANAGEMENT INFORMATION SYSTEMS (IJITMIS), 12(1), 97-107.
7. Korada, L. (2021). Unlocking Urban Futures: The Role Of Big Data Analytics And AI In Urban Planning–A Systematic Literature Review And Bibliometric Insight. Migration Letters, 18(6), 775-795.
8. Vaka, D. K. " Integrated Excellence: PM-EWM Integration Solution for S/4HANA 2020/2021.
9. Mahida, A. A Comprehensive Review on Generative Models for Anomaly Detection in Financial Data.
10. Mandala, V., & Surabhi, S. N. R. D. (2020). Integration of AI-Driven Predictive Analytics into Connected Car Platforms. IARJSET, 7 (12).
11. Chintale, P. SCALABLE AND COST-EFFECTIVE SELF-ONBOARDING SOLUTIONS FOR HOME INTERNET USERS UTILIZING GOOGLE CLOUD'S SAAS FRAMEWORK.
12. Bansal, A. (2021). INTRODUCTION AND APPLICATION OF CHANGE POINT ANALYSIS IN ANALYTICS SPACE. INTERNATIONAL JOURNAL OF DATA SCIENCE RESEARCH AND DEVELOPMENT (IJDSRD), 1(2), 9-16.
13. Vaka, D. K. (2020). Navigating Uncertainty: The Power of ‘Just in Time SAP for Supply Chain Dynamics. Journal of Technological Innovations, 1(2).
14. Mahida, A. Cross-Border Financial Crime Detection-A Review Paper.
15. Bansal, A. (2020). An effective system for Sentiment Analysis and classification of

Twitter Data based on Artificial Intelligence (AI) Techniques. International Journal of Computer Science and Information Technology Research, 1(1), 32-47.

16. Dilip Kumar Vaka. (2019). Cloud-Driven Excellence: A Comprehensive Evaluation of SAP S/4HANA ERP. Journal of Scientific and Engineering Research. https://doi.org/10.5281/ZENODO.11219959