

Early Helthcare Dignosis Report

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Abstract -

Heart attack alternatively known as Myocardial Infarction is one of the primary reasons of morbidity on the planet. Therefore, the diagnosis and prediction of heart disease is persuading many researchers to develop intelligent medical decision support systems. Machine Learning has been demonstrated to be viable in helping with decision making and predictions from the huge amount of clinical data delivered by the medical care. This paper aims to improve the accuracy of machine learning models which can help to make informed decision and prediction of heart attack. We have applied six machine learning classification algorithms: Support Vector Machine, Random Forest, K Nearest Neighbors, Gaussian Naive Bayes, Decision Tree and Logistic Regression. Additionally, an extensive comparison of machine learning techniques has been carried out. Our research work suggests that machine learning methods with data balancing techniques are effective tools for stroke prediction with imbalanced data. Therefore, Synthetic Minority Over-Sampling Technique (SMOTE) has been applied in our model. Hence, it is anticipated that Random Forest excels with the highest accuracy of 96% in heart attack prediction regarding performance metrics.

1.INTRODUCTION

Users must manually navigate between hospitals, pharmacies, diagnostic centers, and digital health platforms due to the highly fragmented nature of healthcare access today. Long wait times, inadequate medical advice, misplaced prescriptions, and the absence of a single system to handle their health data are common problems for patients. Simultaneously, the quick development of digital health technologies has brought attention to the necessity of an intelligent, integrated healthcare system that guarantees timely, convenient, and transparent medical service delivery. Inefficiency, poor communication, and delays in receiving care—particularly during emergencies—are caused by the lack of a centralized system.

2. Literature Survey

Digital healthcare has become one of the most rapidly evolving fields in modern technology, driven by increasing demand for remote medical services, real-time monitoring, and accessible patient care. According to global studies by the World Health Organization (WHO) and OECD, fragmented healthcare systems, long waiting times, limited access to specialists, and decentralized medical data continue to create significant challenges for patients worldwide. Research indicates that millions of patients face delays due to poor appointment management, low doctor-to-patient ratios, and inadequate digital infrastructure. The rapid growth of mobile

health (mHealth) applications highlights the need for centralized platforms that provide reliable diagnostics, medical consultation, and data management—all in one place.

Mobile healthcare applications have emerged as efficient tools for enhancing patient engagement and ensuring continuity of care. Platforms such as Practo, 1mg, and My Chart have demonstrated how digital appointment systems, online pharmacy services, and telemedicine can reduce patient burden and improve accessibility. Studies show that mHealth solutions significantly improve patient adherence, reduce travel time, and enable remote clinical monitoring. Despite these advancements, most applications focus on a single healthcare component such as doctor booking or medicine delivery, lacking comprehensive integration of diagnostics, AI guidance, health records, and insurance support. This gap motivates the development of Mission-Heart—a unified, intelligent, and patient-centered healthcare ecosystem.

Research in healthcare information systems highlights the importance of integrating digital tools to streamline patient journeys. According to Agarwal and Gao (2018), digital transformation in healthcare leads to increased efficiency, reduced operational costs, and improved clinical outcomes. Further studies by Reddy et al. (2020) emphasize that fragmented medical records and lack of interoperability between healthcare institutions result in miscommunication and medical errors. Cloud-based electronic health records (EHR) have been recognized as a key solution for providing secure and accessible medical data.

In the context of telemedicine, researchers like Kahn et al. (2019) note that virtual consultations significantly reduce patient load in hospitals and provide timely access to specialists, especially in remote areas. Meanwhile, diagnostic digitization is explored by Sharma and Mathur (2021), who show that digital lab test booking and online report delivery minimize delays and improve accuracy. With advancements in Artificial Intelligence, studies by Thomas and Patel (2022) demonstrate how AI-driven symptom checkers and predictive analytics support early diagnosis and preventive healthcare. However, literature consistently indicates that most systems remain isolated and do not combine consultation, diagnostics, pharmacy, AI support, and insurance guidance in a single platform—demonstrating a clear need for Mission-Heart.

2.1 Problem Statement

Healthcare access today is highly fragmented. Patients must navigate hospitals, pharmacies, diagnostic centers, and various digital health platforms on their own. This disconnected system creates confusion, inefficiencies, and delays in receiving proper medical care. Many patients face long waiting times, limited medical guidance, misplaced prescriptions, and challenges managing their personal health records because

there is no unified platform. Despite rapid advancements in digital health technologies, no centralized system seamlessly connects healthcare providers, laboratories, pharmacies, and patients. As a result, poor communication and lack of coordination often cause delays and reduce transparency in treatment processes. These issues become even more critical during emergencies, where quick access to accurate medical information and immediate care can greatly affect patient outcomes. There is a strong need for a smart, integrated healthcare solution that centralizes services, improves communication, increases transparency, and ensures efficient and timely delivery of healthcare services.

The lack of an integrated healthcare system not only affects the patients, but it also affects the healthcare professionals and institutions. The lack of an integrated healthcare system affects the hospitals and clinics, where they have their own record-keeping systems. This makes it difficult to share patient information in a secure and efficient way. This can lead to repeated tests, medication errors, and unnecessary administrative burdens. This can also affect pharmacies and diagnostic centers, where delays in prescription verification and report sharing can slow down the treatment process. This effect will be more pronounced in rural areas, and this will increase the gap in healthcare accessibility. Therefore, to overcome these difficulties, a digital healthcare ecosystem is the need of the hour, which will connect all the stakeholders, communicate in an efficient way, and provide real-time access to healthcare services.

2.2 Objectives

The main aim of the proposed system is to create a centralized and integrated healthcare system that incorporates hospitals, pharmacies, diagnostic centers, and patients into a single and cohesive entity. The aim of the proposed system is to ease healthcare services by providing users with an opportunity to make appointments, obtain digital prescriptions, and receive timely medical advice through a single interface. The second aim of the proposed healthcare system is to reduce waiting periods and enhance communication between healthcare services and patients by providing real-time updates and data sharing. The proposed healthcare system also has an aim of providing transparency and ease of service delivery by reducing paperwork and data loss, and providing a secure data storage facility for healthcare services. Finally, the proposed healthcare system has an aim of providing easy and quick access to emergency services by providing accurate and retrievable patient information.

2.3 Proposed System

The main aim of the proposed system is to create a centralized and integrated healthcare system that incorporates hospitals, pharmacies, diagnostic centers, and patients into a single and cohesive entity. The aim of the proposed system is to ease healthcare services by providing users with an opportunity to make appointments, obtain digital prescriptions, and receive timely medical advice through a single interface. The second aim of the proposed healthcare system is to reduce waiting periods and enhance communication between healthcare services and patients by providing real-time updates and data sharing. The proposed healthcare system also has an aim of providing transparency and ease of service delivery by reducing paperwork and data loss, and providing a secure data storage facility for healthcare services. Finally, the proposed healthcare system has an aim of providing easy and quick

access to emergency services by providing accurate and retrievable patient information.

In addition, the proposed system will utilize advanced technologies such as cloud technology, data encryption, and artificial intelligence-based analytics for the safe management of data. The proposed system can also provide personalized health recommendations, appointment scheduling, and follow-up or health risk alerts based on the patient's history.

2.4.1 Key Features of Food-Guard

The key features of the proposed healthcare system will be a digital health record system, online appointment booking, e-prescriptions, online report sharing, coordination of pharmacy and diagnostic services, and emergency access to patient data.

- Centralized digital health record management.
- Online appointment booking with real-time availability.
- E-prescriptions and digital medical report access.
- Telemedicine and virtual consultation support.

2.4 System Architecture

The system architecture of the proposed healthcare platform is designed in a modular and scalable manner in order to ensure reliability, security, and integration of all stakeholders. At the core of the system architecture is a centralized server in a cloud environment for managing data storage, processing, and communication between various modules. The user layer consists of various interfaces for patients, doctors, pharmacies, diagnostic centers, and administrators in the form of web and mobile applications..

Diagram :

The architecture diagram of the proposed healthcare system visually represents how different components interact within a structured, multi-layered framework. At the top, the **Presentation Layer** includes user interfaces such as mobile applications and web portals used by patients, doctors, pharmacies, and administrators.

The system architecture diagram also represents the deployment structure and the communication flow of the system, ensuring reliability and scalability. In general, the system architecture diagram includes the client machines, such as the smartphone or the computer, connected to the system through the internet. The client machines interact with the web server or the application server. The application server handles the requests from the users and communicates with the centralized cloud database for data storage. The diagram may include load balancers for efficient communication, ensuring the availability of the system. In addition, the diagram may include security components such as firewalls, authentication servers, or encryption tools for the efficient transmission of data. Furthermore, the architecture diagram represents the modularity of the system, which enables the inclusion of new services or healthcare providers in the future, thereby ensuring the expansion of the system.

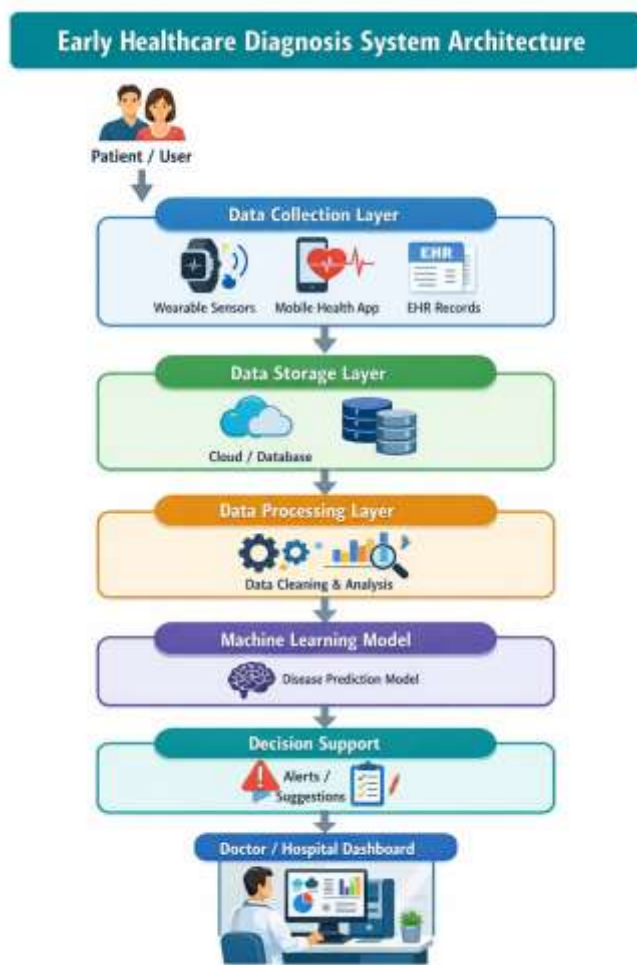
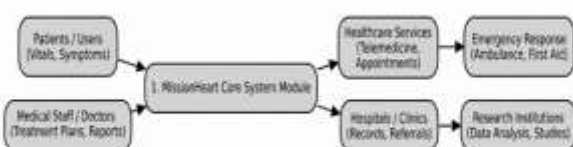


Fig -1: Figure

A Data Flow Diagram (DFD) for the proposed healthcare system illustrates how data moves between users, processes, and data stores within the platform. At the highest level (Level 0 or Context Diagram).



In Level 1 DFD, the system is broken down into major processes such as user management, appointment scheduling, medical record management, e-prescription handling, diagnostic coordination, billing and payment processing, and notification services.



2.5 Methodology

The methodology for developing the proposed healthcare system is based on a specific and scientific approach to ensure efficiency, reliability, and security in the system. Initially, in the requirement analysis phase, specific information is obtained from patients, doctors, pharmacies, and healthcare institutions to understand their needs and problems. Following this phase, in the system design phase, architecture diagrams, database design, DFDs, and user interface design are created to understand the overall design of the system. In the development phase of the system, the system is designed using specific technologies for the front-end, back-end, and cloud-based data storage using APIs for integration. Following this phase, in the testing phase of the system, specific tests are conducted to ensure that the system is working correctly and is reliable for storing specific health data. Finally, in the deployment phase of the system, the system is implemented in a healthcare environment. In the maintenance and evaluation phase of the system, specific changes are made to ensure that the system is updated and improved for use in various healthcare situations.

2.6 Implementation

The implementation of the proposed healthcare system involves deploying the designed architecture into a real-world environment using appropriate technologies and infrastructure. The frontend is developed as a responsive web and mobile application to provide an intuitive interface for patients, doctors, pharmacies, and administrators. The backend is implemented using a secure server-side framework that manages business logic, authentication, appointment scheduling, e-prescriptions, report handling, and payment processing.

A centralized database is configured on the cloud to store electronic healthcare records, prescriptions, diagnostic reports, and transaction information securely using encryption and role-based access control. Secure APIs are integrated into the system to enable secure communication with hospitals, laboratories, pharmacies, and insurance providers. While implementing the system, appropriate tests, data validation, and security practices such as multi-factor authentication and secure data transmission using HTTPS are ensured. Once implemented, the system is continuously monitored for performance, security updates, and scalability to ensure reliable and efficient integration into healthcare services..

2.7 Results and Discussion

The implementation of the proposed integrated healthcare system has resulted in better coordination, reduced waiting times, and better accessibility of healthcare services. This has helped patients book appointments online, receive digital prescriptions, and store their medical records. This has greatly reduced paperwork and waiting times. Healthcare providers can also get quick access to patient information, communicate effectively with pharmacies and diagnostic centers, and better manage appointments and billing services. The centralized database has helped store patient information securely and efficiently, reducing the chances of data loss and duplication of tests.

3. CONCLUSIONS

In conclusion, the proposed integrated healthcare system resolves the key issues of the fragmented healthcare services by

creating a central and unified digital platform. The integration of hospitals, pharmacies, diagnostic centers, and patients in one digital platform will increase coordination, reduce waiting times, and improve data management, resulting in timely access to healthcare services. The inclusion of features like digital patient records, e-prescriptions, online appointment systems, telemedicine, and cloud storage will greatly increase the efficiency, transparency, and patient satisfaction of the healthcare services. Additionally, the proposed system will improve decision-making by organizing the data and facilitating real-time communication between the healthcare stakeholders.

Therefore, this smart healthcare system will greatly contribute to the quality of services, efficiency, and accessibility of the healthcare services, making it a reliable and efficient way to manage modern healthcare services..

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