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Disease Prediction and Drug Recommendation Using ML

Swetha S[1], Sowmya S R[2], Pratishta S[3]

[1]UG Scholar, Dept. of EIE, R.M.K. Engineering College, Chennai, Tamil Nadu, India.

[2]UG Scholar, Dept. of EIE, R.M.K. Engineering College, Chennai, Tamil Nadu, India.

[3]UG Scholar, Dept. of EIE, R.M.K. Engineering College, Chennai, Tamil Nadu, India.

Emails: *swet211121.ei@rmkec.ac.in[1], sowm21119.ei@rmkec.ac.in[2], prat21115.ei@rmkec.ac.in[3]*

Abstract

In today's dynamic healthcare landscape, the integration of technology has become indispensable. The project sets out to create a cutting-edge healthcare solution that will transform the very foundations of healthcare decision-making by utilizing the powerful powers of machine learning. The main objective of this project is to develop a dual-dashboard system that will serve both patients and medical staff. The main objective is to reduce the gap between patients and healthcare professionals, which has existed for a long time. It makes it possible for people to receive highly personalized health assessments, enables efficient appointment scheduling, and provides doctors with recommendations for data-driven treatments. Ultimately, this project aims to profoundly impact the accessibility and quality of healthcare services. It seeks to enhance the patient experience, augment the precision of medical decision-making, and foster seamless collaboration between individuals and their healthcare providers.

Keywords: *Healthcare, Patients, Doctors, Machine Learning, Random-Forest.*

1. Introduction

In today's rapidly evolving society, health and pharmaceuticals have gained paramount importance. Technology is now a formidable ally in the battle against a wide spectrum of ailments [1-3]. Factors such as lifestyle choices and environmental conditions expose individuals to a myriad of health issues. Shockingly, over 70% of the Indian population experiences common ailments like the flu, colds, coughs, and viral infections every two months. What many are unaware of is that these seemingly minor health problems can be early indicators of more serious underlying conditions. The lack of timely detection is a leading contributor to global mortality rates, encompassing diseases like cancer and diabetes [4]. Early disease identification is critical to avert unfavorable outcomes. Machine learning emerges as a pivotal player in this endeavor, as it empowers computers to learn from data and experiences. The training and testing phases enable the creation of models that analyze data swiftly, providing quicker results. In this context, our proposed system utilizes machine learning techniques, such as Gaussian Naive Bayes Algorithm and Random Forest Classifier, to predict diseases based on symptoms and offer general medication advice [5-7].

2. Methodology

2.1 Random Forest

An extremely popular supervised machine learning approach for classification and regression problems is the Random Forest Method. A Random Forest Algorithm becomes increasingly accurate and capable of addressing problems as it contains more trees. To increase the predictability of its output, a classifier known as Random Forest uses the average of many decision trees on different subsets of a given dataset [8]. Its foundation is the idea of ensemble learning, which is the combination of numerous classifiers to solve a difficult issue and improve the model's performance. Ensemble denotes the blending of various models. The two main approaches used by Ensemble are parallel bagging and sequential boosting. There are three main hyper parameters for random forest algorithms that need to be set before

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training. Node size, the number of trees, and the number of features sampled are some of these parameters [9-11]. The random forest classifier can be used to tackle problems related to regression or classification.

2.2 Gaussian Naive Bayes

Multiple categorization applications can benefit from the use of Naive Bayes, a probabilistic machine learning technique. Its foundation is the Bayes Theorem (Figure 1). Since the algorithm includes features in its model that are unrelated to one another, the name "Naive" is employed [12]. It is expected that each feature's value is independent of all other features' values and that modifications to one characteristic's value have no effect on the algorithm's other features' values. In actual use, naive bays classifiers are frequently found to be highly effective, especially when the feature set has a lot of dimensions.

3. Block Diagram

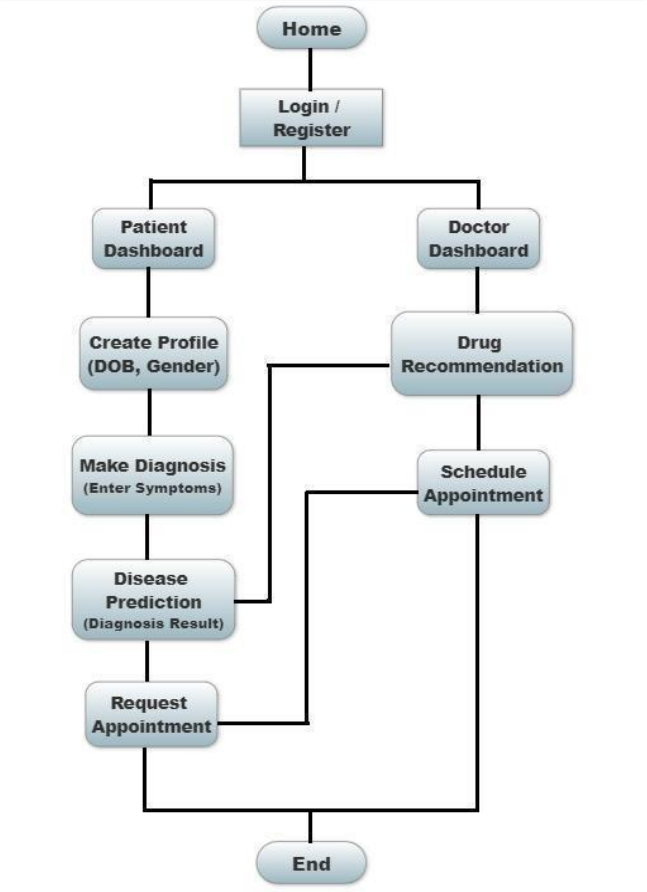

Figure 1 Flow Chart

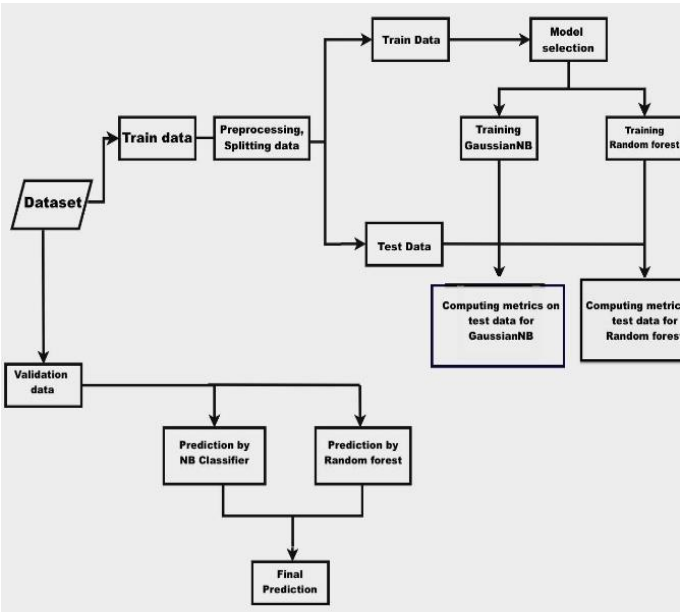

Figure 2 Workflow of ML model

4. Working

The proposed solution is a Django web application featuring dual dashboards for patients and doctors [13]. The patient dashboard employs a disease prediction model to offer health assessments based on user input, enabling appointment requests. Meanwhile, the doctor dashboard utilizes a drug name recommendation model to suggest medications based on patient data and facilitates appointment scheduling (Figure 2). The tech stack includes React for frontend, Django for the backend, MySQL for the database, and machine learning algorithms like Random Forest and Gaussian Naive Bayes for disease prediction and drug recommendation. This holistic system enhances healthcare decision- making and patient-doctor interactions.

5. Result

With a well-designed and properly trained machine learning model, this disease prediction system could achieve a high level of accuracy [14]. This means this project correctly predicts diseases based on the input data a large percentage of the time. Through the analysis of the data, this project might uncover patterns and correlations that were not apparent before [15]. These insights can contribute to medical research and understanding of diseases, potentially leading to new discoveries and advancements in the field. Results are shown in Figures 3 to 8.

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Figure 3 Home Page

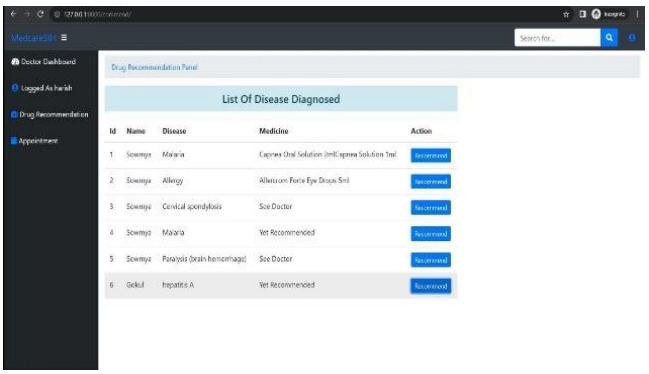

Figure 7 Doctor Dashboard

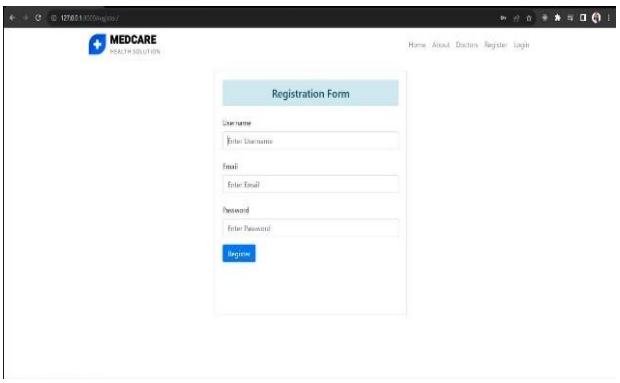

Figure 4 Registration Page

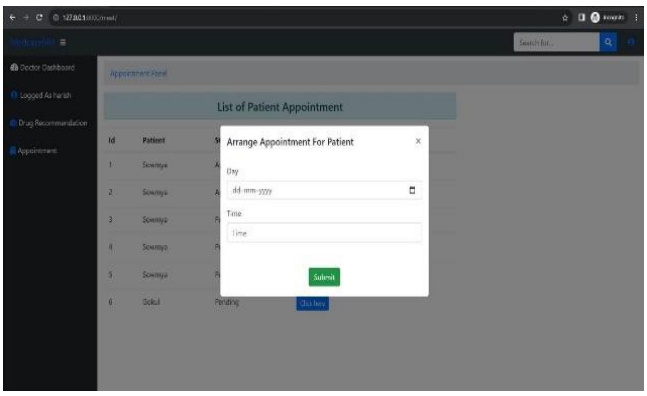

Figure 8 Arrange Appointment Page

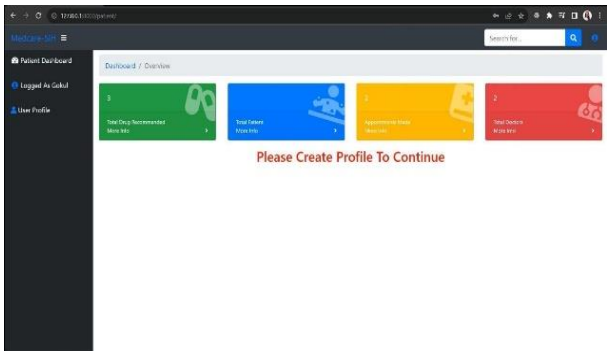

Figure 5 Patient Dashboard

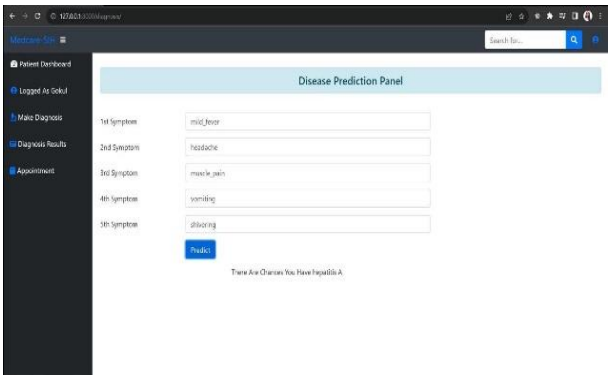

Figure 6 Disease Prediction Panel

Conclusion

In conclusion, our healthcare project represents a pivotal step forward in the realm of healthcare technology. By combining the power of machine learning, real-time interactions, and a user-centric approach, we have created a comprehensive solution that bridges the gap between patients and healthcare providers. By providing disease prognosis, medication suggestions, and effective appointment scheduling, we enable people to take control of their health. As we move forward, our commitment to innovation and data privacy remains unwavering, and our dedication to improving healthcare accessibility and quality drives us. This project marks the beginning of a new era in healthcare, one where technology enhances the patient experience, enables data-driven decision-making, and ultimately transforms lives for the better.

Future Enhancement

Future enhancements for the project encompass integrating voice and Chabot interactions for enhanced user engagement. Additionally, patient

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education modules will be incorporated to empower users with health knowledge. To broaden accessibility, the project will support multi-language options, ensuring that healthcare services are available to a diverse range of users.

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