International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Care Path Ai: A Predictive Patient Journey and Automatic Doctor Allocation Platform

S. Sai Charan[1], Nutakki Sai Geethika[2], Sadhu Harini[3], Darsi Ravi Chandu[4], Kondamuri Lokesh Kumar[5]

[1]M.Tech, Asst. Professor, Kallam Haranadhareddy Institute of Technology, Kallam Haranadhareddy Institute of Technology Chowdavaram, Guntur, Andhra Pradesh, India
[2,3,4,5]Kallam Haranadhareddy Institute of Technology, Chowdavaram, Guntur, Andhra Pradesh, India

Abstract

In recent years, the adoption of machine learning in healthcare has significantly improved the ability to predict diseases and provide intelligent medical assistance. However, early disease identification and access to appropriate medical guidance remain challenging for many individuals, especially in areas with limited healthcare facilities. Many users are often unsure about which doctor to consult or what initial medication to consider based on their symptoms. This creates a need for an automated system that can provide preliminary healthcare support.

To address this problem, this paper proposes a Disease Prediction and Doctor & Medicine Recommendation System, a web-based application that allows users to input their symptoms through an interactive interface. The system processes the input using a trained machine learning model to predict the most probable disease. Based on the prediction, it further recommends suitable doctors and medicines. The system is fully automated, where the backend handles prediction and recommendation without requiring any direct admin interaction during usage, ensuring a seamless user experience.

The proposed system utilizes machine learning algorithms such as Decision Tree and Random Forest to achieve accurate predictions based on symptom data. It aims to reduce the time required for initial diagnosis and improve accessibility to basic healthcare guidance. Although the system does not replace professional medical consultation, it serves as an effective preliminary diagnostic tool that assists users in making informed decisions about their health.

Keywords: Disease Prediction, Machine Learning, Doctor Recommendation, Medicine Recommendation, Random Forest, Decision Tree, Healthcare System

1. Introduction

In recent years, the healthcare sector has witnessed rapid advancements with the integration of machine learning and web technologies. Despite these developments, early disease detection and access to proper medical guidance remain significant challenges, particularly in rural and underdeveloped regions. Many individuals face difficulty in identifying the nature of their illness based on symptoms and are often uncertain about which medical specialist to consult. This delay in initial diagnosis can lead to worsening health conditions and increased medical costs.

With the growing availability of digital platforms, intelligent healthcare systems can play a crucial role in

assisting users by analysing symptoms and providing preliminary recommendations. Machine learning algorithms have proven effective in identifying patterns in medical data and predicting diseases with reasonable accuracy. By leveraging these technologies, it is possible to design systems that not only predict diseases but also guide users toward appropriate medical support, thereby bridging the gap between patients and healthcare services.

This paper presents a Disease Prediction and Doctor & Medicine Recommendation System, a web-based application designed to assist users in identifying potential diseases based on their symptoms. The system collects user input through a frontend interface, processes it using a backend machine learning model, and provides disease predictions along with recommendations for suitable doctors and medicines. The proposed system aims to enhance healthcare accessibility, reduce diagnosis time, and support users in making informed health decisions.

2. Literature Survey

Several research studies have been conducted in the field of healthcare systems to improve disease diagnosis and patient management. Early approaches such as traditional patient triage systems, as discussed by FitzGerald et al. (2010), relied on manual symptom assessment and prioritization of patients. Although these systems helped in identifying critical cases, they were often inefficient, time-consuming, and prone to human errors. The lack of automation in such systems highlighted the need for more advanced and reliable solutions.

With the advancement of technology, researchers began exploring symptom-based disease prediction using machine learning techniques. Kononenko (2001) demonstrated that machine learning models could significantly improve diagnostic accuracy compared to traditional rule-based systems. Further studies, such as those by Chen et al. (2017), applied supervised learning algorithms like Decision Trees, Naïve Bayes, and Random Forest for disease classification based on symptoms. These approaches showed promising results in terms of accuracy and efficiency but lacked real-time implementation and integration with practical healthcare services.

In addition, Clinical Decision Support Systems (CDSS), as proposed by Shortliffe and Sepúlveda (2018), combined knowledge-based methods with machine learning to enhance clinical decision-making. While these systems improved diagnosis accuracy, they primarily focused on post-diagnosis support and did not provide complete solutions such as doctor and medicine recommendations. Therefore, there exists a gap in developing a fully integrated system that not only predicts diseases but also guides users by recommending appropriate doctors and medicines. The proposed system aims to bridge this gap by providing an end-to-end automated healthcare recommendation solution.

3. Proposed System

The proposed system is a Disease Prediction and Doctor & Medicine Recommendation System, designed as a web-based application that provides preliminary healthcare assistance to users. The system allows users to input their symptoms through an interactive and user-friendly interface. These symptoms are then processed by a backend system integrated with a machine learning model, which predicts the most probable disease based on the given inputs. The system is designed to be fully automated, ensuring quick and efficient responses without requiring manual intervention.

In addition to disease prediction, the system includes a recommendation module that suggests appropriate doctors and medicines based on the predicted disease. This feature helps users understand the next steps

they can take for treatment, thereby reducing confusion and saving time. The frontend of the system is developed using web technologies such as HTML, CSS, and JavaScript, while the backend handles data processing and communication with the machine learning model. The model is trained on a dataset containing symptoms and their corresponding diseases, enabling it to generate accurate predictions.
The system does not include a visible admin interface for end users, as it operates automatically once deployed. Administrative tasks such as model training, dataset updates, and system maintenance are handled by the developer during the development and maintenance phases. The proposed system aims to improve healthcare accessibility, provide fast preliminary diagnosis, and assist users in making informed decisions before consulting medical professionals.

4. System Architecture

The system architecture illustrates the interaction between the key components of the Disease Prediction and Doctor & Medicine Recommendation System. As shown in Figure 1, the architecture comprises five major layers: the Patient Application, REST API interface, Backend Server, Machine Learning Pipeline, and the Database.

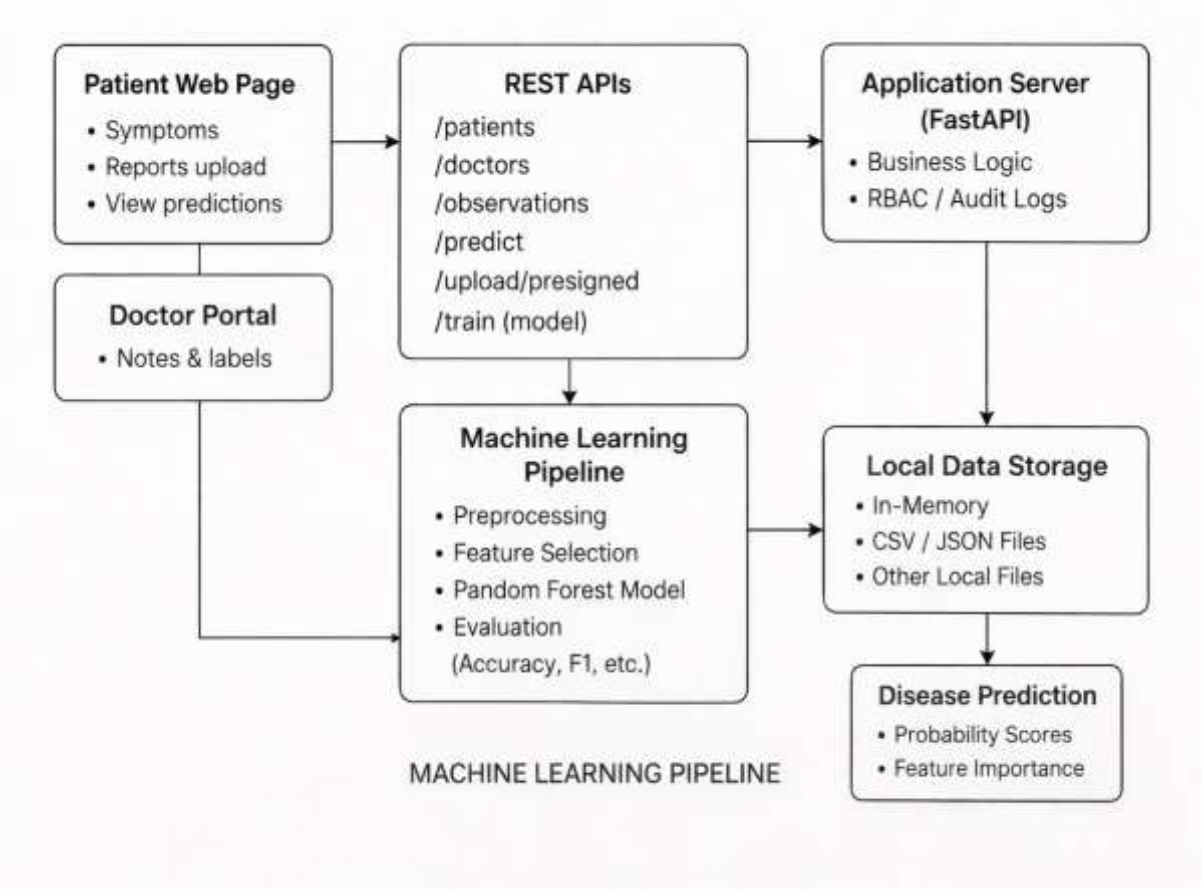

Figure 1: System Architecture of the Disease Prediction and Doctor & Medicine Recommendation System

The Patient Application serves as the frontend, where the user selects symptoms, uploads reports, and views prediction results. A separate Doctor Portal allows doctors to add notes or labels when required. User data is transmitted through REST APIs (e.g., /predict) to the Backend Server built on FastAPI. The

backend processes the data and invokes the Machine Learning Pipeline, which performs data preprocessing and applies a trained Random Forest model to predict the disease. Evaluation metrics are used to assess prediction accuracy.The Disease Prediction Module generates the final output with probability scores, and the results — including disease name, doctor recommendation, and medicine suggestion — are returned and displayed to the user.

5. Methodology

The system follows a structured seven-step methodology to process user input and generate healthcare recommendations:

1. User selects symptoms through the interface.
2. Data is sent to the backend via REST APIs.
3. Data preprocessing is performed to clean and normalize input.
4. Processed data is passed to the machine learning model.
5. The model predicts the most probable disease.
6. The system recommends an appropriate doctor and medicine.
7. Results are displayed to the user on the frontend interface.

6. Output

The following figures illustrate the key screens of the implemented system, demonstrating the user interface and the results generated by the Disease Prediction and Doctor & Medicine Recommendation System. The output of the proposed system is the predicted disease along with recommended doctors and medicines based on the user's selected symptoms. After the user inputs symptoms through the interface and clicks the "Predict" button, the system processes the data using trained machine learning models such as Decision Tree and Random Forest.

The system then displays the most probable disease with a high level of accuracy. In addition to the prediction, it provides suggestions for appropriate doctors (specialists) who can be consulted for the identified condition. It also recommends basic medicines that may help in initial treatment.

The output is presented in a clear and user-friendly format, enabling users to easily understand their possible health condition and take necessary actions. This helps in reducing the time required for initial diagnosis and supports users in making informed healthcare decisions. However, the system is intended for preliminary guidance only and does not replace professional medical consultation.

7. Conclusion

This paper presented a Disease Prediction and Doctor & Medicine Recommendation System that utilizes machine learning techniques to assist users in identifying possible diseases based on their symptoms. The system integrates a user-friendly web interface, backend processing, and a trained machine learning model to provide accurate disease predictions. By automating the prediction process, the system reduces the time required for initial diagnosis and improves accessibility to basic healthcare guidance.

In addition to disease prediction, the system provides recommendations for suitable doctors and medicines, making it more practical and useful for users. The use of algorithms such as Decision Tree and Random Forest ensures reliable and efficient predictions. The system operates in a fully automated manner without requiring a visible admin interface, which enhances usability and simplifies user interaction.

Although the system provides helpful preliminary guidance, it is not intended to replace professional medical consultation. It serves as a supportive tool that helps users make informed decisions about their health. Future improvements can focus on increasing prediction accuracy, integrating real-time medical data, and expanding the system to support a wider range of diseases and treatments.

8. Future Work

The proposed system provides a foundation for intelligent healthcare assistance; however, there is significant scope for further improvement and enhancement. One of the primary areas of future work is to improve the accuracy of disease prediction by training the model on larger and more diverse datasets. Incorporating real-time medical data and continuously updating the dataset can help the system make more reliable and up-to-date predictions.

Another important enhancement is the integration of advanced technologies such as deep learning and natural language processing (NLP). This would allow users to describe their symptoms in natural language instead of selecting predefined options. Additionally, the system can be extended to include a mobile application, making it more accessible and convenient for users. Features like real-time chat with doctors, appointment booking, and hospital recommendations can also be added to improve the overall functionality.

Furthermore, a dedicated admin panel can be introduced for better system management, allowing administrators to update datasets, manage doctor and medicine information, and monitor system performance. Security and privacy measures can also be enhanced to protect sensitive user data. These improvements will make the system more scalable, efficient, and suitable for real-world healthcare applications.

References

1. G. FitzGerald et al., "Emergency Department Triage Revisited," Emergency Medicine Journal, 2010.
2. Igor Kononenko, "Machine Learning for Medical Diagnosis: History, State of the Art and Perspective," Artificial Intelligence in Medicine, 2001.
3. Min Chen et al., "Disease Prediction by Machine Learning over Big Data from Healthcare Communities," IEEE Access, 2017.
4. Edward H. Shortliffe and Molly Sepúlveda, "Clinical Decision Support in the Era of Artificial Intelligence," JAMA, 2018.