DJANGO WEBSITE FOR DISEASE PREDICTION USING MACHINE LEARNING

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ABSTRACT

Many diseases are prevalent in people currently as a result of their lifestyle choices as well as the state of our surroundings. Therefore, it's growing crucial to foresee diseases early on. However, it grows too challenging for the clinician to make an accurate forecast based just on indications. The hardest difficulty is accurately predicting the illness. To get around this issue, data mining is crucial for disease prediction. The quantity of data in medical research is growing significantly every year. Accurate medical data analysis has been facilitated by early patient care due to the growing volume of data in the medical and healthcare fields. Data mining uses illness data to uncover hidden patterns in the vast volume of medical data. Based on the patient's symptoms, we suggested making general disease predictions. We use the Convolutional Neural Network (CNN) and K-Nearest Neighbor (KNN) machine learning algorithms to accurately predict diseases. Disease symptom datasets are necessary for disease prediction. The accuracy of this general disease prediction depends on the individual's lifestyle as well as medical history. CNN outperforms the KNN method in terms of general disease prediction accuracy, with an accuracy of 84.5%. Furthermore, KNN requires more memory and time than CNN. Once general disease has been predicted, this approach can determine if the risk of general disease is higher or lower.

Keywords: Django, Disease Prediction, Machine Learning, Healthcare Application, Web-based Diagnosis.

1.INTRODUCTION

Intelligent technology has increased computer intelligence and given it the ability to process information. The study of machine learning is a subfield of artificial intelligence that is examined in many research projects. Insight cannot be produced without learning, according to various analysts. Various types of machine learning approaches exist, including reinforcement, adaptive learning, deep learning, semi-supervised learning, unsupervised

learning, and supervised learning [1]. Using these insights, massive amounts of information may be swiftly classified. Therefore, for quick categorization of large information as well as precise disease prediction, we employ the K-Nearest Neighbor (KNN) and Convolutional Neural Network (CNN) machine learning algorithms. Data analysis performs a vital role in the classification of enormous datasets using machine learning, and as medical data is growing daily, using it to accurately anticipate diseases is a significant task. However, processing big data is also highly important in general. Understanding how to accurately diagnose patients through medical inspection and assessment is crucial.

Decision support systems that rely on computers may play an essential role in compelling decisions. The health care industry generates a lot of information about clinical evaluation, reports about patients, cures, follow-up meetings, medications, and other topics. It is difficult to coordinate properly, and poor data management has affected the quality of data associations. Data upgrades require a legitimate method to focus and process information effectively and efficiently [2]. One of the many machine learning applications is used to create a classifier that can separate the data according to its characteristics. The data set is divided into both or more than two classes. These classification algorithms are used for disease prediction and medical data analysis. These days, machine learning is so ubiquitous that it may be used frequently throughout the day without anyone realizing it. CNN classifies a hospital's organized and unstructured data. Because they keep the complete data as a training dataset and employ sophisticated calculation methods, other machine learning algorithms are sluggish and only function with structured data. They additionally need a lot of computing time.

An method for multimodal illness risk prediction based on convolutional neural networks (CNNs) that incorporate both organized and unorganized hospital information has been suggested[3]. In order to raise the precision of disease risk assessment, the study emphasizes the significance of utilizing a variety of data sources, such as textual notes and clinical records. 43] with the goal of enhancing the effectiveness and dependability of collecting data in real time in a variety of scenarios. The platform collects and transmits data across a network using IoT devices and sensors, allowing for quick decision-making and continuous surveillance. According to their investigation, the Internet of Things can improve the precision of data, decrease human involvement, and automate data collection procedures. The investigation illustrates the promise of IoT technology in domains like smart systems, healthcare, and environmental monitoring.

The proposed research highlighted developments in telehealth networks, emphasizing the use of sophisticated technology for communication to improve remote medical treatment

[5]. Through the use of data data analysis, wireless networks, and smart devices, the study investigates how telehealth platforms might enhance tracking of patients, being diagnosed, and therapeutic results. The researchers emphasize important advancements such as patient-centered treatment designs, system scalability, and real-time health data transmission. The significance of adaptive communication technologies in facilitating effective, readily available, and superior delivery of healthcare is highlighted by their research.

2.PROPOSED SYSTEM

The machine learning algorithm is the foundation of the suggested general disease prediction system. Since medical data is developing rapidly these days and must be processed in order to accurately diagnose a disease based on symptoms, we used KNN and CNN algorithms to classify patient data. KNN technology, which we are implementing in this research and it provides some benefits. In order to handle the increasing amount of healthcare information as well as the requirement for precise illness prediction based on patient symptoms, our study suggests a general disease prediction system based on machine learning algorithms. In particular, researchers classify patient data using the K-Nearest Neighbors (KNN) and Convolutional Neural Network (CNN) techniques.

Simple and Intuitive: Even individuals with little experience with machine learning can use KNN because it is a straightforward algorithm that is simple to comprehend and apply.

Non-parametric: KNN does not assume anything about the distribution of the underlying data, making it a non-parametric algorithm. It can effectively adjust to different kinds of information and boundaries for decisions because of its flexibility.

Instance-Based Learning: Since KNN is an instance-based learning technique, no particular training is necessary. Rather, it keeps track of every case that is accessible and categorizes new occurrences according to how closely they resemble preexisting information.

Effective with Big Datasets: Since KNN doesn't require the training of models and can effectively handle high-dimensional data, it's a good fit for datasets with a lot of instances or features. The goal of our disease forecasting algorithm is to give reliable and precise forecasts according to patient complaints by utilizing the benefit of KNN technology. By using this method, medical practitioners can make intelligent choices and take preventive initiatives for early detection and care, which eventually improves the condition of patients and improves the quality of healthcare.

2.1 SYSTEM ARCHITECTURE:

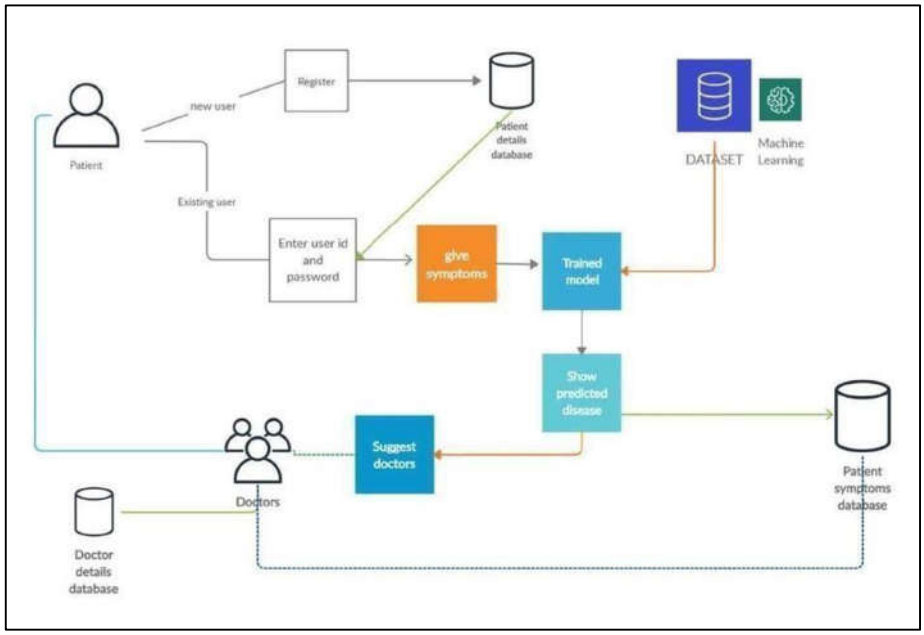

Figure.1: Architecture of symptom registration to doctor Recommendation

Figure.1 displays From symptom registration to doctor suggestion, the application architecture has been carefully designed to provide users with a smooth experience. Fundamentally, the user interface (UI) layer acts as the gateway, assisting users with registration and submitting symptoms through an easy-to-use interface. After registering, users utilize interactive interfaces to enter their symptoms, with the help of auto-complete recommendations for quick entry. In order to ensure rapid access and modification of crucial data, the database safely saves user information, symptom data, and doctor details behind the scenes. Algorithms submitted by users are processed by the analysis engine, which uses advanced medical issue recognition to produce correct diagnoses. Using such evaluations, the procedure recommends physicians who are qualified to treat the health issues that have been detected, taking availability and proximity into account. Scheduling appointments and sharing data are streamlined for effective healthcare access thanks to a strong communication module that enables smooth contact between users and suggested physicians. It is crucial to protect user privacy and data security. To protect sensitive data from unwanted access, the security layer employs strict safeguards including encryption and access controls.

A user-centric healthcare experience is provided by this comprehensive architecture, which combines simple approach sophisticated investigation, and rigorous safety precautions for optimal effectiveness and user satisfaction. In the meantime, the API layer facilitates

smooth interaction between system components, offering endpoints for user registration, symptom submission, and doctor recommendations. Lastly, the infrastructure is deployed on servers or cloud platforms, carefully managed to ensure flexibility, dependability, and efficiency.

Interface for Symptom Registration: This part acts as the user interface where patients enter their symptoms. It could be an interactive voice response (IVR) system, web site, or mobile application. Patients describe their symptoms in detail, including their intensity, duration, contributing circumstances, and any pertinent medical history.

Symptom Database: Patient symptom data is kept in a centralized database. The volume and complexity of the data will determine whether this database is relational or does not use SQL. In addition to guaranteeing data security and integrity, it should be built to effectively store and retrieve symptom information.

Preprocessing of Data: Before analysis, patient symptom data may need to be pre-processed. This stage entails preparing the data for analysis by cleaning it, dealing with values that are missing, standardized forms, and maybe modifying it.

Symptom Analysis Engine: The symptom data is analyzed and valuable insights are extracted using machine learning algorithms and data analysis techniques. This could entail finding trends, connections, and associations between symptoms and possible illnesses.

The intricacy of the analysis needed will determine which algorithms—K-Nearest Neighbors (KNN), Decision Trees, or Convolutional Neural Networks (CNN)—are used.

Recommendation Generation: The system makes suggestions for medical professionals based on the examination of symptom data. Potential diagnoses, recommended examinations, available treatments, or referrals to specialists are a few examples of these guidelines. The suggestions ought to be customized based on the symptoms, medical background, and other pertinent variables of each patient.

Doctor Interface: To examine patient symptoms and recommendations, medical professionals log in to the system via a specific interface. The aforementioned interface can be offered as an independent program or incorporated into current electronic health record (EHR) systems. Based on the information supplied, doctors can examine the symptoms of their patients, see the recommendations that are created, and take the necessary action.

Collaboration and Communication: The system might have tools for healthcare providers to collaborate and communicate with one another. To help with coordinated patient care, this could involve collaborative decision-making tools, virtual consultations, or encrypted texting. Techniques for gathering patient feedback should be included in the framework.

Feedback and Iteration: Patients as well as healthcare providers should work together to constantly enhance the precision and potency of the technique of registering symptoms and making recommendations. Over time, this feedback loop aids in improving the system's algorithms and suggestions.

To improve patient care and results, symptom registration to doctor recommendation technique's design involves combining a number of features to facilitate the easy collection, evaluation, and creation of tailored recommendations for medical professionals.

2.2 HARDWARE REQUIREMENTS:

Table 1 : Hardware Requirements

System	Pentium IV 3.5 GHz or Latest
Hard Disk	40 GB
Monitor	14’ColorMonitor
Mouse	Optical Mouse
Ram	1GB

2.3 SOFTWARE REQUIREMENTS:

Table 1 : Software Requirements

Backend	Django(python-based web framework).
Database	PostgreSQL
Tools	PgMyadmin,Orange

2.4 SOFTWARE DESCRIPTION:

A. FRONT END:

HTML (Hypertext Markup Language):

- The common markup language for building web pages is HTML (Hypertext Markup Language). It uses a collection of preset tags to provide the webpage's structure and content. HTML tags
- Configure different components, including lists, headings, paragraphs, photos, links, and more.

- You can use HTML to create a webpage's basic structure, which includes text, pictures, links, and other media components.

CSS (Cascading Style Sheets):

- The language used to style HTML components on a webpage is called CSS.
- You may manage the presentation, look, and arrangement of your HTML information with CSS.
- Styles like colors, fonts, margins, padding, borders, and more can be defined with CSS.
- Developers of websites may construct aesthetically pleasing and adaptable webpages by using CSS to separate the appearance and information layers.

Bootstrap:

The famous front-end framework Bootstrap is used to create mobile-first and responsive websites and apps. For your project, it offers a set of pre-made JavaScript and CSS elements that are simple to incorporate. In addition to responsive tools, Bootstrap provides a grid system, buttons, modals, carousels, navigation bars, and forms. With Bootstrap, developers can rapidly and effectively construct websites that appear modern and professional without having to start from scratch with bespoke CSS.

JavaScript:

A high-level, interpreted programming language called JavaScript is used to give web pages dynamic behaviour and interactivity. You can work with HTML components, manage user interactions, check input, do computations, and send asynchronous calls to services using JavaScript. All current web browsers support JavaScript, which is frequently used in web development for client-side scripting. It is essential for developing dynamic web apps and improving user experience.

JQuery:

AJAX interactions, event handling, animation, and HTML page traversal and manipulation are all made easier with jQuery, a quick, light, and feature-rich JavaScript toolkit. A simple and straightforward API for carrying out routine web design operations is offered by jQuery. It enables developers to write less code and accomplish greater functionality by abstracting away

the complexity of raw JavaScript code. Because of its huge plugin ecosystem, cross-browser interoperability, and versatility, jQuery is frequently used in web development.

B. BACKEND

High-level Python web framework Django is renowned for its capacity to support quick development without sacrificing functionality. Developers can concentrate on particular facets of their application's functionality thanks to its Model-View-Template (MVT) architecture, which provides a clear division of responsibilities. Among the many tools and features offered by the framework is an Object Relational Mapping (ORM) system that facilitates code reuse and streamlines database interfaces. Django's integrated admin interface is one of its best features; it offers a user-friendly platform for controlling site content and user authentication securely. Additionally, Django places a high priority on security, including defense against major online threats like SQL injection, cross-site scripting (XSS), and cross-site request forgery (CSRF).

Whereas the template framework allows for the development of flexible and reusable HTML templates, Django's URL routing technology helps developers establish clear and search engine friendly URLs for their applications. Django's inclusion of translation and internationalization makes it easier to create multilingual web applications, guaranteeing that research will be seen by people all over the world. Along with its main features, Django provides form handling to make data entry and validation easier, scalability options to handle huge datasets and high traffic, and middleware support to customize the request-response cycle. It is the best option for developers looking to use Python to create safe, scalable, and maintainable web apps because of its comprehensive documentation and active community.

DATABASE:

Durability and conformity to SQL standards are hallmarks of PostgreSQL, a powerful open-source relational database management system (RDBMS). Data integrity requirements, flexibility through new data types and functions, and multi-version concurrency control (MVCC) for excellent efficiency in multi-user scenarios are some of its sophisticated capabilities. PostgreSQL supports native JSON, full-text search, and a variety of indexing techniques. With features like encryption, role-based access control, and auditing, security is given first priority. PostgreSQL also offers scalability possibilities and has a thriving tool and extension ecosystem and community. PostgreSQL is an all-around packed with features and adaptable database system that may be used for a variety of purposes.

3.RESULTS AND DISCUSSION

Figure 2:Home page

The site is shown in Figure 2. A brief overview of illness forecasting is provided here.

Figure 3:Login model

Figure 3 displays the page where users log in. like a doctor, administrator, and patient. As users mentioned earlier, we can log in.

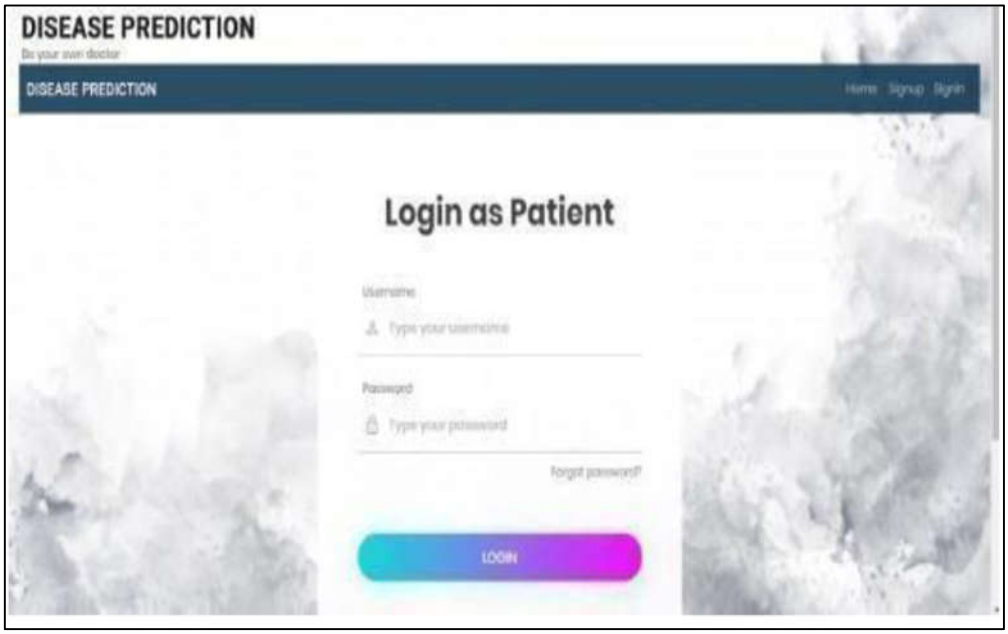

Figure 4 Login as Patient

Figure 4 displays the patient login. We may log in here as patients. Making use of the sign-in or sign-up options.

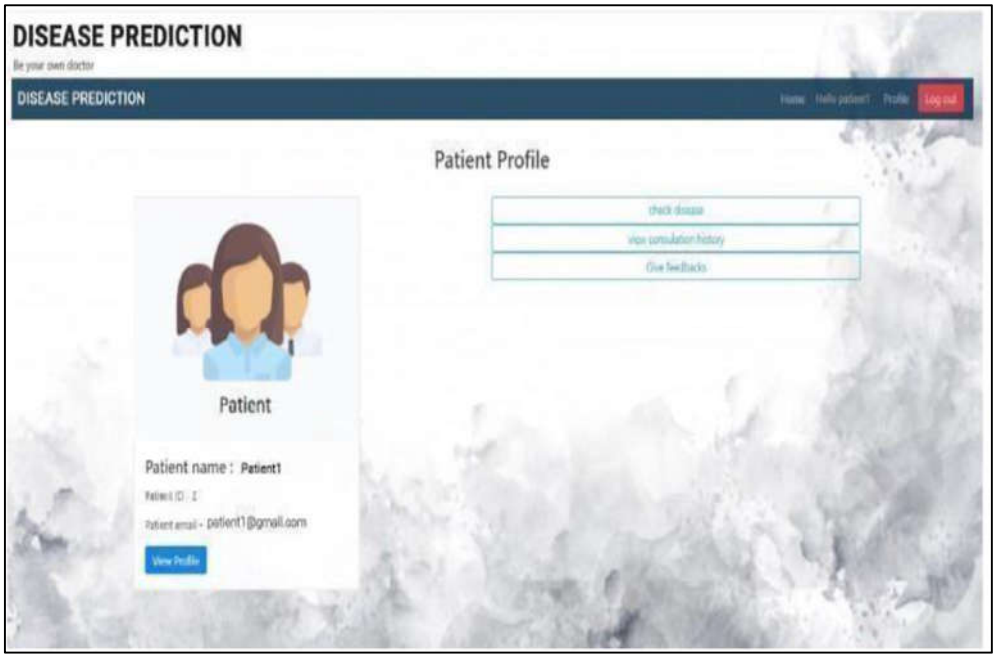

Figure 5 : Patient UI

The patient user interface is shown in Figure 5. The patient's information is displayed here, along with the following areas for disease check and doctor consultation. The sickness can be predicted at this stage.

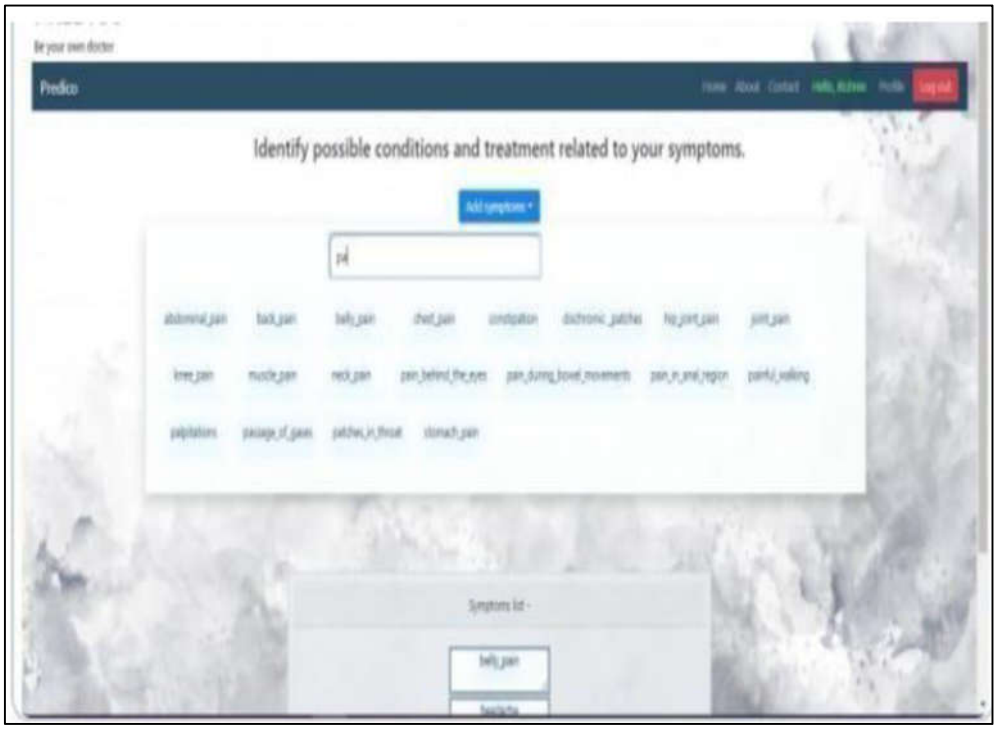

Figure 6: Disease finding with symptoms

Identifying an illness with symptoms is shown in Figure 6. Using their symptoms, patients can look up the ailment with a specialist.

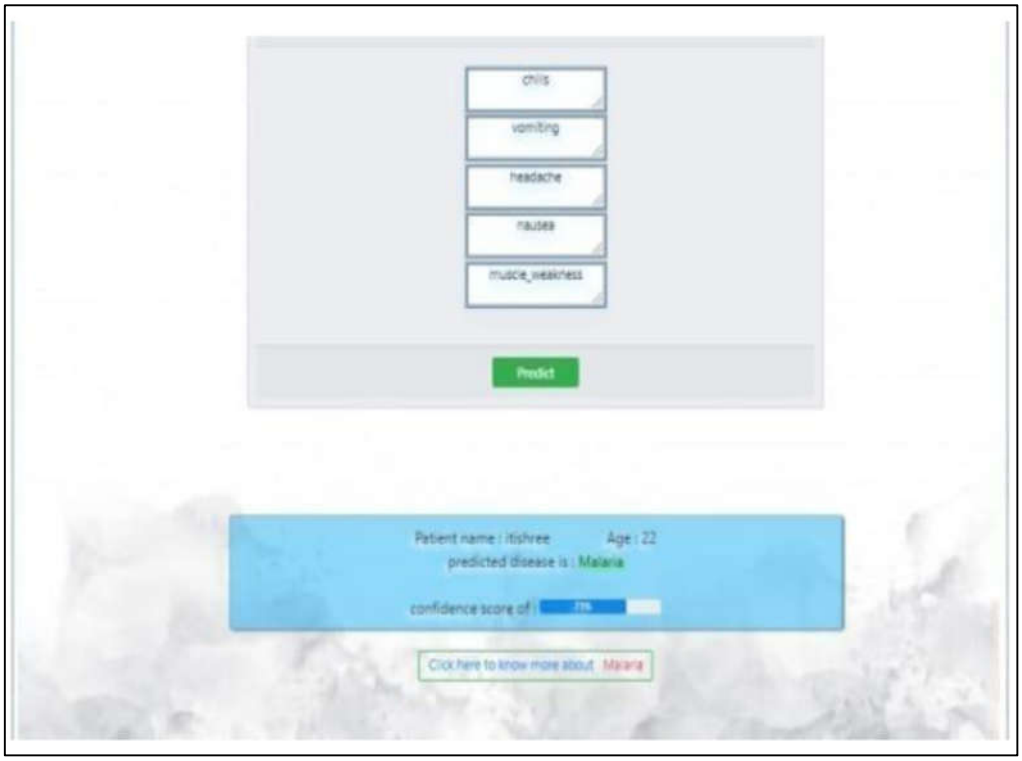

Figure 7: Disease Prediction

Figure 7 shows the page for disease prediction. This page displays the patient's details and the specialized doctor's details along with the final disease prognosis result.

4. CONCLUSION

In result, by facilitating early identification and proactive management, our disease prediction study has shown how machine learning algorithms have the potential to completely transform healthcare. Convolutional Neural Network (CNN) and K-Nearest Neighbors (KNN) techniques have been used to create a dependable system that can correctly identify information about patients according to symptoms.

The research uses the benefits of KNN technology to meet the increasing amount of medical data and the requirement for accurate disease prediction. KNN is a perfect fit for disease forecasting technology because of its ease of use, non-parametric nature, and efficacy with big datasets. Researchers can give medical professionals important information to help consumers make judgments and take preventative measures for early intervention and therapy by including patient symptoms in the model. Additionally, our system gains another level of sophistication with the incorporation of CNN algorithms, which enables more intricate identification of patterns and extraction of features from medical records. This improves our disease prognosis model's precision and dependability, which eventually improves the results for patients and the provision of healthcare. Our illness prediction project's success shows how crucial it is to keep researching and developing new ways to use machine learning techniques in healthcare

systems. Researchers can improve the efficacy and practicality of illness forecasting techniques in healthcare by tackling issues like quality of data, comprehension, and interoperability. Ultimate objective is to equip medical professionals with the knowledge and resources necessary for offering proactive, individualized treatment and enhance the general health and wellbeing of their patients.

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