Instamedi: Healthcare Consultation System

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Abstract- It might have occurred so many times when you or someone you know requires quick medical attention, but they are unavailable for any reason. The Health Prediction system is a project for end-user assistance and online consultation. We offer in this paper a system that enables users to obtain timely advice on their health problems via an intelligent health care system online. Numerous symptoms, as well as diseases/illnesses associated with various systems, are input into the system. The system may be used by users to convey their symptoms and difficulties. It then examines the user's symptoms to look for any ailments that may be related to them. Use clever data mining techniques to determine the most likely disease related to a patient's symptoms. When a doctor logs into the system, he may examine his patient's details as well as the report for that patient in the doctor module.Doctors may check details about the patient's search and what the patient searched for based on their prognosis. Thedoctor has access to his information. Admin can add new illness details to the database by stating the kind and symptoms of the condition. The data mining system operates based on the disease's name and symptoms. Admin has access to a database of ailments and symptoms.When the user defines the symptoms of his sickness, our system will give appropriate recommendations.

I.INTRODUCTION

In today's circumstance, where there is a covid epidemic and people are racing to healthcare facilities, hospitals and clinics are swamped. Doctors and medical experts have been extremely busy, and some do not have time to meet with their patients. Patients who have not been infected areunable to be diagnosed because COVID patients are givenprecedence. This is an issue since Certain symptoms might be lethal in a short period. As a result, we suggest developing a system that can anticipate sickness based on symptoms provided by the patient, andthen the patient may contact the doctor online without leaving the comfort of their own home.

II. REQUIREMENT GATHERING AND ANALYSIS

A. Eliciting Requirements:

PRODUCT: Prediction may be used to rank resumes automatically. Prediction is useful when there are several solutions to a single problem. Many different types of algorithms, including agglomerative algorithms, can be utilized. When data is used to forecasta category, supervised learning is sometimes referred toas classification. When there are just two options, it is referred to as two-class or binomial classification. That is a grouping of the closest approximate value.

B. Implementation:

We suggest developing a system in which the patient describes his or her symptoms and the disease is anticipated. To train the model, we want to apply the testand train split approach of Machine Learning. We will obtain a dataset of illnesses from Kaggle, divide it, and use it to first train and then test the model. After a successful disease prediction, the patient is advised to see a doctor and offered the option of consulting a doctorwith related expertise. After picking a doctor, the patient can consult with him or her and be diagnosed. Thepatient's symptoms are shown on the screen, and the doctor can consult as needed. The consultation history issaved in both the patient and doctor profiles.
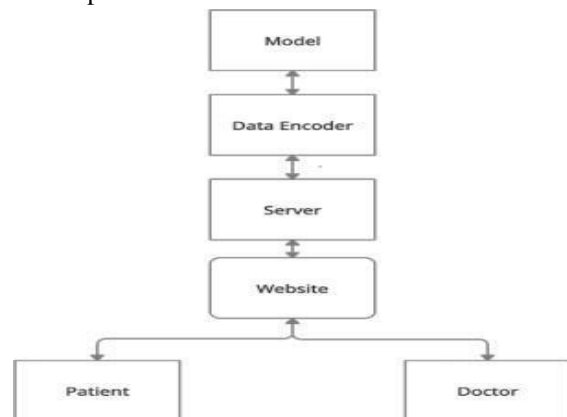
II.3 Analyzing Requirements:

The first issue is that doctors have been overworked as a result of the epidemic. Because the patient's record is preserved on paper, the patient must keep a file. If the patient misplaces a piece of paper, the diagnosis may have to be redone. Another issue is that the doctor is unable to keep track of symptoms and hence may miss a vital symptom. The doctor is unable to consult with many patients at the same time.

II. TECHNOLOGIES USED Algorithms:

Random Forest Algorithm

Random Forest is a well-known machine learning algorithm from the supervised learning approach. It may be applied to both classification and regression issues in machine learning. It is based on the idea of ensemble learning, which is the act of merging numerous classifiers to solve a complicated issue and enhance the model's performance. Random Forest is a well-known machine learning algorithm from the supervised learning approach. It may be applied to both classification and regression issues in machine learning. It is based on the idea of ensemble learning, which is the act of merging numerous classifiers to solve a complicated issue and enhance the model's performance.

Why use Random Forest?

When compared to other algorithms, it requires a shorter training time. It predicts output with great accuracy and operates efficiently even on big datasets. It can also retain accuracy when a major chunk of the data is absent.

Random Forest works in two stages: the first is to create the random forest by combining the N decision trees, and the second is to make predictions for each tree generated in the first phase. The steps and pictures below illustrate the working process:

Step 1: Choose K data points at random from the training set. Step 2: Create the decision trees linked with the data points you've chosen (Subsets). Step 3: Decide on the number N for the number of decision trees you wish to create. Step 4: Repetition of Steps 1 & 2. Step 5: Find the forecasts of each decision tree for new data points and allocate the new data points to the category that receives the most votes.

The Benefits of Random Forest

Random Forest can handle both classification and regression problems. It can handle huge datasets with high dimensionality. It improves the model's accuracy and avoids the over fitting problem.
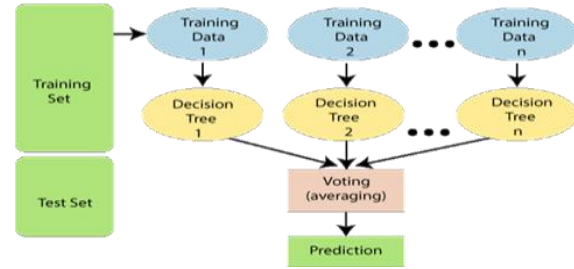
DECISION TREE ALGORITHM

Decision Tree is a supervised learning technique that can be used for both classification and Regression problems, but mostly it is preferred for solving Classification problems. It is a tree-structured classifier, where internal nodes represent the features of a dataset, branches represent the decision rules, and each leaf node represents the outcome. In a Decision tree, there are two nodes, which are the Decision Node and Leaf Node. Decision nodes are used to make any decision and have multiple branches, whereas Leaf nodes are the output of those decisions and do not contain any further branches. The decisions or the test are performed based on features of the given dataset. It is a graphical representation for getting all the possible solutions to a problem/decision based on given conditions.

Why use Decision Trees?

Decision Trees usually mimic human thinking ability while making a decision, so it is easy to understand. The logic behind the decision tree can be easily understood because it shows a tree-like structure.

Steps for Decision tree

In a decision tree, for predicting the class of the given dataset, the algorithm starts from the root node of the tree. This algorithm compares the values of the root attribute with the record (real dataset) attribute and based on the comparison, follows the branch and jumps to the next node. For the next node, the algorithm again compares the attribute value with the other sub-nodes and moves further. It continues the process until it reaches the leaf node of the tree. The complete process can be better understood using the below algorithm:

Step-1: Begin the tree with the root node, says S, which contains the complete dataset. Step-2: Find the

best attribute in the dataset using the Attribute Selection Measure (ASM). Step-3: Divide the S into subsets that contain possible values for the best attributes. Step-4: Generate the decision tree node, which contains the best attribute. Step-5: Recursively make new decision trees using the subsets of the dataset created in step -3. Continuethis process until a stage is reached where you cannot further classify the nodes and called the final node as a leafnode.

Advantages of Decision tree also: It is simple to understand as it follows the same process that a human follows while making any decision in real life. It can be very useful for solving decision-related problems. It helps to think about all the possible outcomesfor a problem. There is fewer requirements for data cleaning compared to other algorithms.
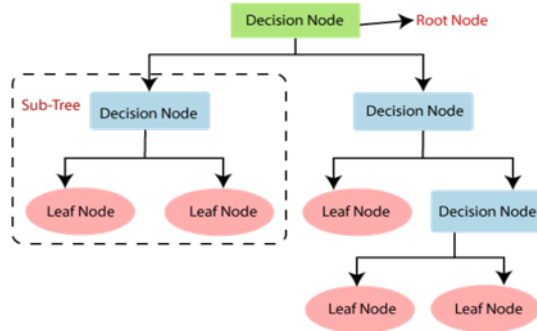
Technology Stack
This project made use of Python-based Data Science and Machine Learning libraries. Jupyter Notebooks were theprimary coding tool. For data analysis, Pandas and Numpy were utilized. The web application's user interface was created using Streamlit. Finally, machine learning models from the Scikit Learn library, such as decision trees and random forest algorithms, were employed for model training and assessment.

Software Architecture
The software architecture follows an encoded path from the model to a hosted website on the user side, where the user has access to patient portal information and thedoctors can see the database for all previously evaluated symptoms and predictions, giving the doctor administrator rights to check and consult with the patientbased on severity.

Design Architecture
It is a project for end-user assistance and online

consultation. In this paper, we present a system that provides users with real-time advice on health concerns via an online intelligent health care system. The system isgiven numerous symptoms as well as the disease/illness that causes those symptoms. Users will be able to discusstheir symptoms and problems with the system. It then examines the user's symptoms to look for any ailments thatmay be related to them. In this case, we employ clever data mining algorithms to predict the most likely sickness thatmay be related to a patient's symptoms. When a doctor logs into the system, he may access his patient's details andthe report in the doctor module. Doctors may check detailsabout the patient's search and what the patient searched for based on their prognosis. The doctor has access to his information. Admin can add new illness details to the database by stating the kind and symptoms of the condition. The data mining system operates based on the disease's name and symptoms. Admin has access to a database of ailments and symptoms. When the user defines the symptoms of his sickness, our system will give appropriate recommendations. In this proposal, we offer a user-friendly solution for receiving quick health advice via an online health care system.

III. APPLICATIONS

The patient's immediate symptoms may be examined, and the system provides a confidence score. The patient does not have to leave the house to see the doctor. The system remembers a patient's history and diagnosis, reducing the need to retain a file. Both the doctor and the patient can keep a record of the patient's medical history and developing symptoms. The patient may consult thedoctor no matter where the doctor is in the world. The doctor sees numerous patients at the same time. A full healthcare institution may be administered virtually without the requirement to purchase land or build a hospital/clinic. Where there is a shortage of a physical clinic or hospital, the system might be beneficial.
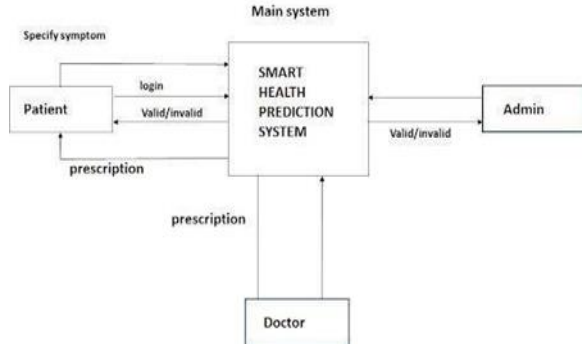
IV. RESULT

Individuals empowered by machine learning can address issues and limitations that would otherwise have been troublesome in a judicious manner. Machine learning techniques help to extract insights from data to evaluate trends and construct models to make predictions. Having machine learning techniques used in the health sector advantages for processing massive volumes of data beyond the limit of human abilities, vivid predictions to becreated using machine learning models, and effective diagnosis help for clinicians. All of those time-consuming and laborious operations may be sped up to save both time and labour. Our research, dubbed 'The Health Prediction System,' assists in determining potential illness signs. However, the problems remain unresolved. Models are prone to over fitting, which can result in incorrect predictions. Diagnosis cannot be made just based on symptoms; there are several circumstances about the patient that might contribute to illness. They include things like lifestyle, gender, ancestry, and so on. Models that forecast illness based on criteria otherthan symptoms must be developed, allowing clinicians to depend on these models for accurate disease prediction.

CONCLUSION

The healthcare business will become safer and more efficient with the introduction of this system. Currently, the system of keeping medical records is rather archaic and has needed modernizing for many years. Regardless of the distance between the patient and the doctor, the greatest doctors can provide a diagnosis to the patient from home.

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