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Voice Prescription System For Doctors

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ABSTRACT_ The traditional method of writing prescriptions by hand is still prevalent,posing a risk ofillegibility and errors, which can be harmful to patients. If a pharmacist gives the patientthe wrong medication due to the illegible writing, the patient may experience severe harm or negative drug reactions. Voice-based prescription systems have been developed to address this problem, transforming voice input to text. Additionally, most hospitals lack an electronic health record system, which can provide valuable information for patient treatment. In this computer era, the usage of technology solutions in the healthcare industry has significantly improved as a result of the need to improve healthcare and deliver effective healthcare. This study also proposes a medical diagnosis system using machine learning (ML) algorithms to accurately predict diseases unlike the traditional way. A software application was developed to reduce the workload of doctors by allowingthem to narratethe prescription to the patient, which is then converted from audio to text and extracted for medical terms. Categorised tokens were used to produce a PDF prescription. Thus our application aims to provide a potential solution for automating theprescription generation system and improving healthcare delivery.

1.INTRODUCTION

Medication side effects are the leading cause of death worldwide, and medication or prescription errors are responsible for tens of thousands of deaths worldwide each year. Most mistakes are made by nurses takingthe wrong medication or dose due to unclear handwriting, drug interactions, confusing drug names, etc. The introduction of speech recognition mobile applications can reduce some of these errors because prescription information can be retrieved and heard with voice responses instead of a medical script.

In medical facilities around the world, particularly in developing nationswhere the practice process is typically laborious and paper-based, this method can save money and lives. In India, subpar medications kill thousands of people, and common illnesses severely disable the population. Your voice is mentioned in the script. It plays a crucial part in efficient communication between people and computers. Virtualapplication numbers can

be triggered by speech recognition scripts. Although the two scenarios above are different, you can draw connections between them to address the issue of speech medicine.

The solution described in this project is aimed at medical practices and clinics that still write prescriptions by hand on paper and cannot afford to use one of the existing electronic health record systems. Avoiding using the wrong medication for common disorders is the goal.The idea is to avoid prescribing the incorrect medication for common illnesses including fever, cough, cold, and body discomfort by developing a voice-based virtual applicationfor prescription medicines. Implementing a voice-based medical alert system will allow us toidentify the issue of misplaced prescriptions during review. Additionally, by introducing digital prescriptions that can be viewed directly from the document file, we can reduce the need for paper.Machine learning (ML) technique has been successfully used to a variety of technologies, including disease forecasting. The goal of creating a classifier framework using MachineLearning (ML) models is to greatly aid in addressing health-related concerns by assisting the doctors in anticipating and analysing illnesses at an early stage.

2.LITERATURE SURVEY

The voice prescription system will use speech recognition and natural language processing to produce electronic prescriptions. This section reviews different methods ofimplementing this voice based prescription system and also various disease prediction systems.

In Ref. [1], with the aid of Google's speech recognition API, the prescription is taken in voice format and converted to text transcript. To perform name entity recognition (NER)and extract medical entities from text, this text transcript was acquired. This will result inthe creation of the digital prescription. The NER task is carried out using Bi-LSTM and CRF networks. The system was built using the MERN stack. The authors have concluded that a voice prescription system aids in the real-time management of electronic health records while protecting the patient's privacy. This digital solution will speed up patient record access while maintaining the highest levels of security and privacy.

In Ref. [2], the authors have built a system that uses speech recognition, natural languageprocessing and block chain technology to produce an electronic prescription. A patient can access their

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digital prescription record that is kept on a block chain network by scanning a QR code with their smartphone. A patient will be able to provide a new doctoraccess to previous prescription history. The System gives the patient control over how their personal health record is private. Only the patient's smartphone's QR code can be used as an identity to access the patient's health record. The approach suggested in this study is intended for medical practices that still write prescriptions by hand on paper andare unable to afford the available electronic health record systems. The authors have concluded that the method that has been devised and put into place intends to cut down on the time needed to create and access patient records. Moreover, it offers EHRfunctionalities via a mobile application. In order to address the issue of illegible handwritten prescriptions, authors put out a novel solution.

In Ref. [3], authors provide a framework for employing speech recognition technologiesto prescribe medications. Even one smartphone can be used to operate the system to its fullest. Avoiding using the wrong medication for common disorders is the goal. The goal

is to avoid prescribing the incorrect medication for common diseases including fever, cough, cold, and body discomfort by developing a virtual application that uses voice- based prescription technology. The proposed system is implemented using google API and android studio. The authors concluded that the workflow of a doctor only needs to be slightly altered by voice-based e-prescription, but in the long run, it will have a significant impact on the creation of a patient-centred digital ecosystem.

In Ref. [4], a framework for using voice recognition technology for prescription medication was provided. This system implements fundamental voice recognition theories such as pre-emphasis, feature extraction, and pattern comparison. Fuzzy decisionlogic is introduced here for the selection of the proper medication because there is considerable fuzziness in the prescription of medication for a single condition or symptom. Hence, the suggested method will administer medication in response to a voiced ailment. By compiling a corpus of symptoms for five people, system performance is evaluated. Voice recognition has been proven to be 90% accurate.

3.PROPOSED SYSTEM

In this computer era, the usage of technology solutions in the healthcare industry has significantly improved as a

result of the need to improve healthcare anddeliver effective healthcare. This study also proposes a medical diagnosis system using machine learning (ML) algorithms to accurately predict diseases unlike the traditional way. A software application was developed to reduce the workload of doctors by allowingthem to narrate the prescription to the patient, which is then converted from audio to text and extracted for medical terms. Categorised tokens were used to produce a PDF prescription. Thus our application aims to provide a potential solution for automating theprescription generation system and improving healthcare delivery.

3.1 IMPLEMENTATION

It's crucial to realise that all of this information is useless if we can't put it to use in manycontexts and have an influence on humanity at a time when machine learning and deep learning are blooming.

The major goal of this dataset is to apply knowledge to the field of medical science and make physicians' jobs easier. On the basis of the 132 parameters in this dataset, 42 distinctdiseases can be predicted.

Complete Dataset is divided into two CSV files. The first is used for training, while the second is used to test our model. There are 133 columns per CSV file. An individual endures 132 of these columns of symptoms, and the final column is the prognosis. Thesesymptoms are associated with 42 different diseases that we can categorise them under. Our model must be tested on test data after being trained on test data.

B: Data Pre-processing

The adjustments made to our data prior to feeding it to the algorithm arereferred to as pre-processing. Data pre-processing is a method for transforming unclean data into clean data sets. In other words, anytimedata is acquired from various sources, it is done so in araw manner that makes analysis impossible.

In machine learning projects, data pre-processing is mostly utilised to improve the resultsfrom the applied model, thus the format of the data must be correct. For example, the Random Forest algorithm does not tolerate null values, hence null values must be handledfrom the original raw data set in order to execute the Random Forest algorithm. Some specific Machine Learning models require data in a specific format.

Data Pre-processing Techniques

Removing the null column: We shall remove the null column when reading the dataset. This dataset is free of null values,

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and each feature only contains 0s and 1s.

Balancing the Dataset: Every time we complete a classification operation, we must determine whether or not the target column is balanced. To determine whether the datasetis balanced or not, a bar plot might be utilised.

Suitable change of datatypes in column: The datatype of the target column must be verified. For instance, object datatype is not appropriate for machine learning model training. Therefore, the target column can be changed to the numerical data type using a label encoder. Label Encoder gives each label a specific index, which transforms the labels into numerical form. If there are n total labels, then each label will havea numberbetween 0 and n-1.

Outliers: An outlier deviates greatly from the average of the numbers and is too far fromit. Outlier figures like this are typically the result of faults or systematic errors. The standard deviation can be used toeliminate these.

4.RESULTS AND DISCUSSION

Voice prescription window:

The fields that are circled with red are buttons and the user needs to givevoice commandafter those buttons are pressed.

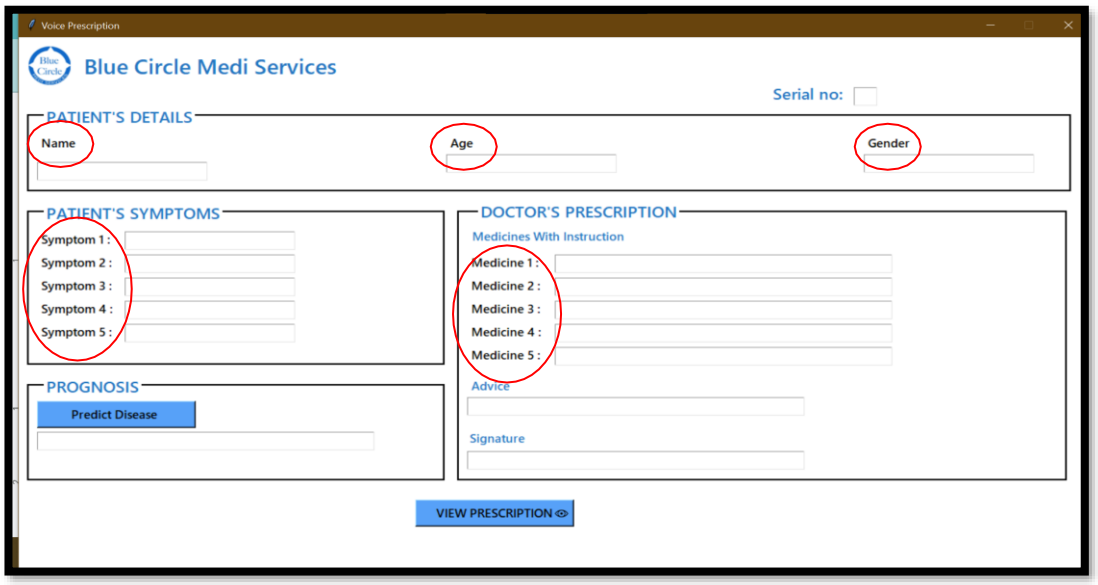

Fig 1 : Buttons in voice prescription window

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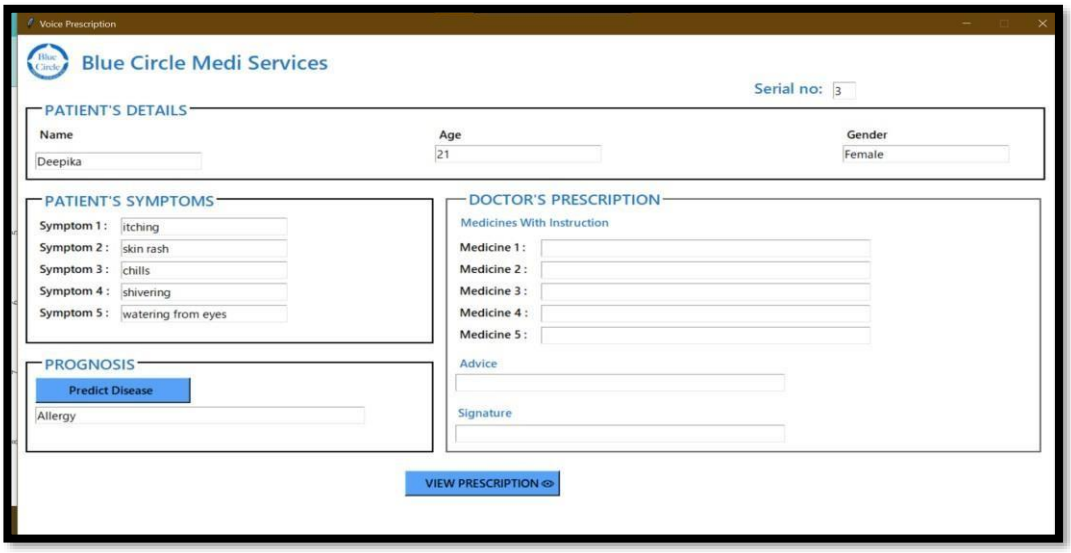
After the voice commands are given, they get converted in the form of text using speech-to-text conversion and are entered in the entry field



present after every button.

Fig 2: Voice prescription after the details of patient are entered

Disease Prediction: The predict disease button is used to provide prognosis based on thesymptoms entered by the patient. This predict disease function uses a decision tree algorithm to predict the disease.

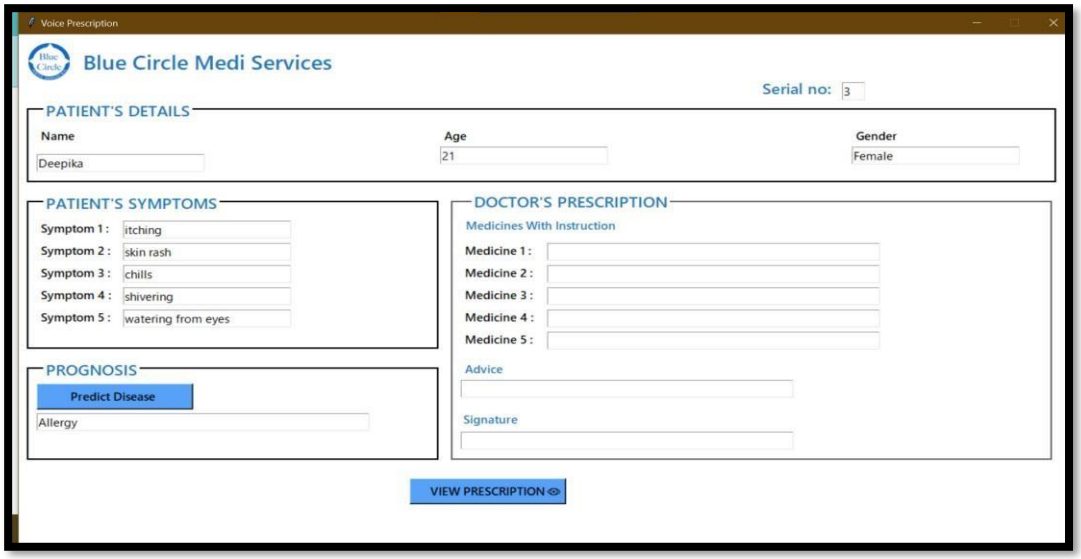


Fig 3 : Prediction of disease based on symptoms entered by patient

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Medication and advice by doctor: The above predicted disease is justa prognosis and this disease needs to be confirmed by a doctor as there are multiple diseases possible forthe symptoms.

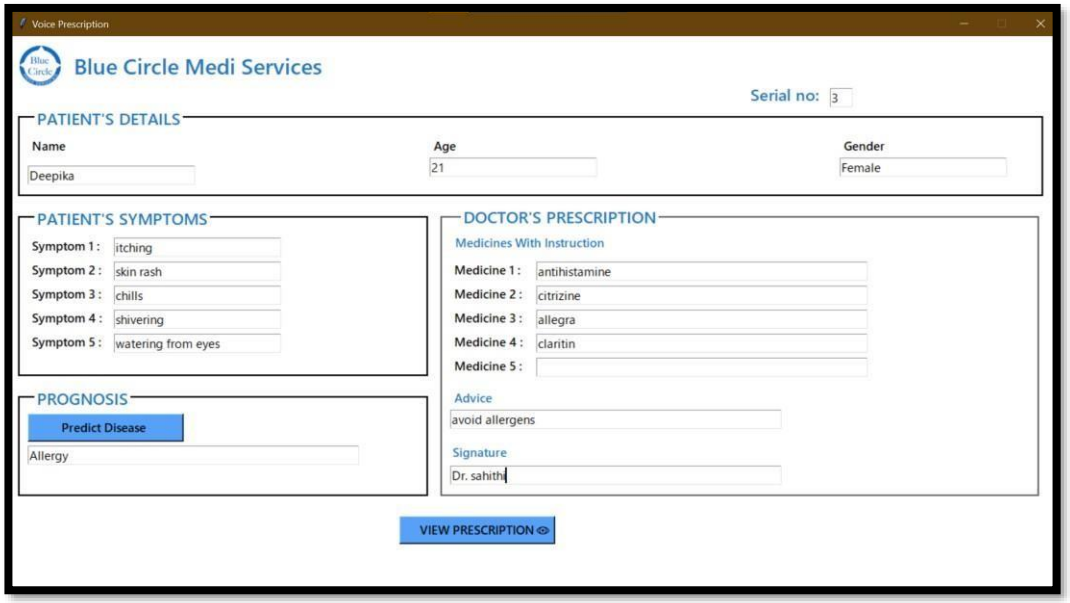

Fig 4 : Medication and advice by doctor

View Prescription: After all the details are given, they are entered intothe prescriptiontemplate and can be viewed by using view prescription option.

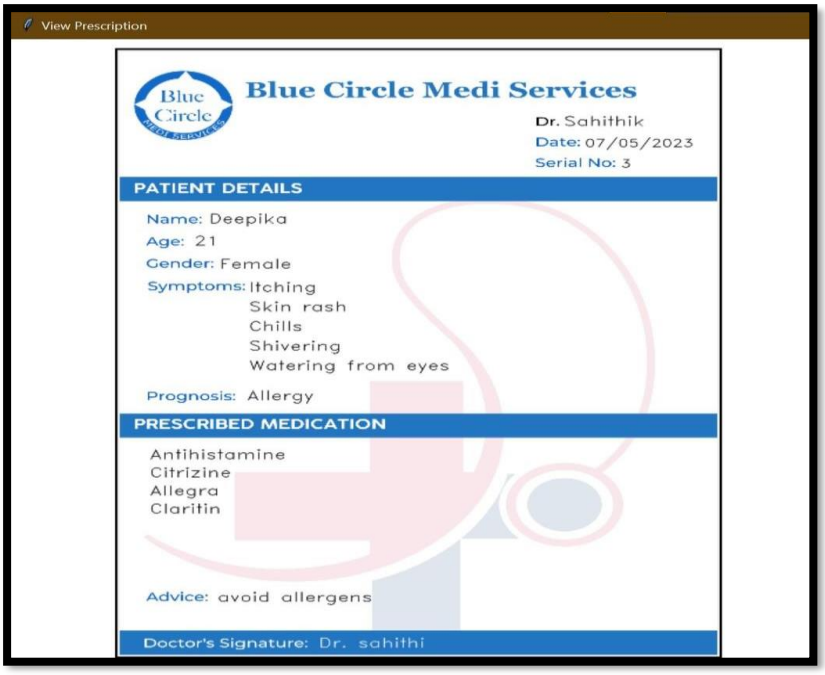

Fig 5 : Generated prescription

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Save prescription: The generated prescription is saved using saveprescription optionpresent in view prescription window.

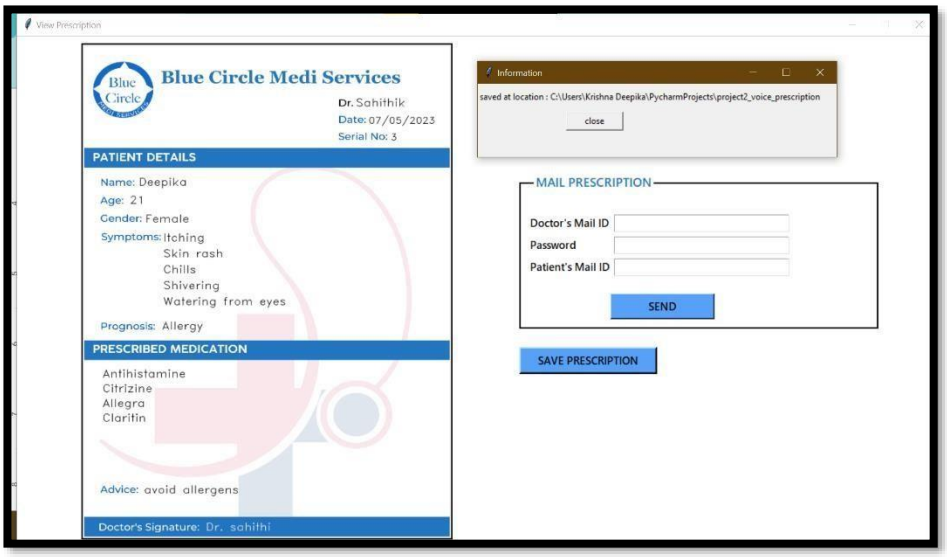

Fig 6: Saving the prescription

Mailing the prescription: The saved prescription is mailed by givingdoctor's email Id,password and patient's email ID.

Fig 7 : Sending mail through application

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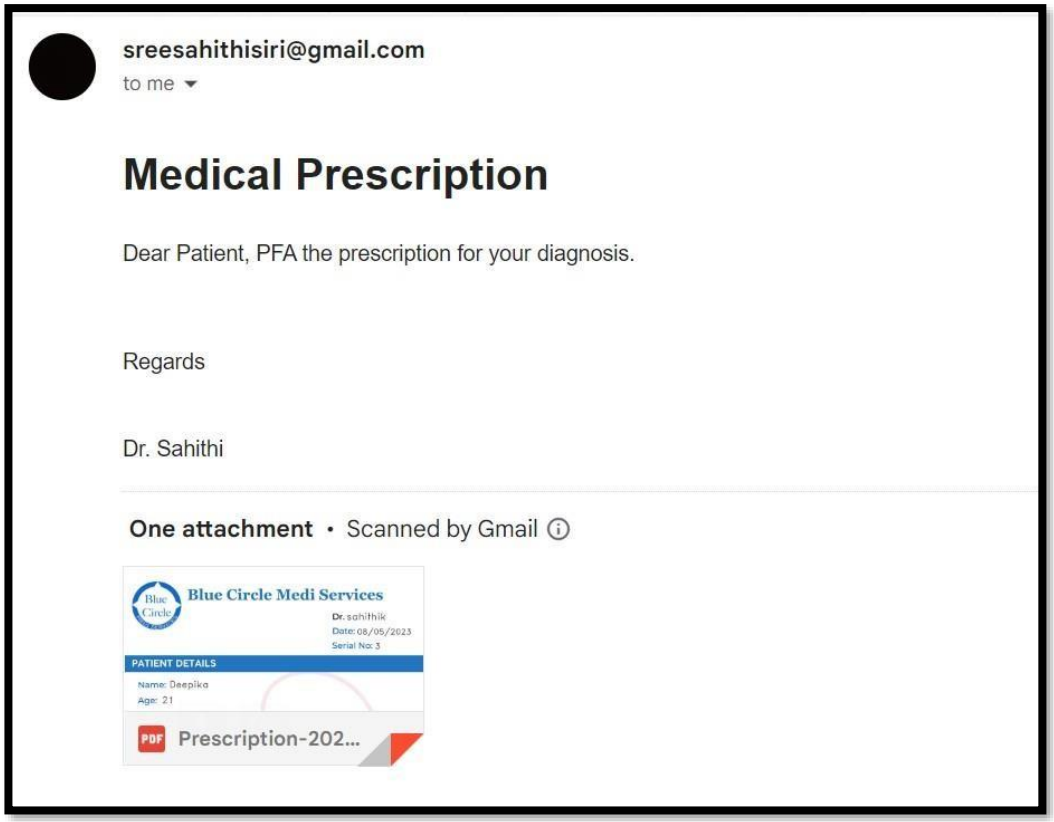

Fig 8: Mail received by patient

5.CONCLUSION

Till today, in major parts of the world, many doctors still practice the method ofhandwritten prescriptions. This can become a serious as many of the doctors' handwriting is illegible to a common man and moreover for a person without any prior medical knowledge it's really difficult for him/her to understand the medication that the doctor has given. If a pharmacist gives the patient the wrong medication due to theillegible writing, the patient may experience severe harm or negative drug reactions. To address these problems our project is aimed to simplify the prescription delivery process for doctors and patients by using voice commands. Our system allows doctors to speak the prescription, which is then transcribed into text and delivered to the patient. The patient will be provided with a neat, legible and clear prescription unlike the traditional handwritten ones. Through our project, we explored the use of Natural Language Processing (NLP) and machine learning algorithms to improve the

accuracy and efficiency of the system. We also proposed a medical diagnosis system using machinelearning (ML) algorithms to accurately predict diseases unlike the traditional way. Our application can predict the disease beforehand based on the symptoms provided by the patient. This helps in improvingthe quality of treatment. We have discussed multiple reallife scenarios where our application can come into the usage. We have also summarized our research work we have done for implementing our disease prediction feature.Different machine learning models have their own strengths and weaknesses, and the decision tree was chosen for disease prediction due to its simplicity and speed compared to other models like random forest, gradient boost, XGBoost, naive Bayes, logistic regression, artificial neural networks (ANN), and support vector machines (SVM). It is important to consider the limitations of each model before selecting one for a specific task. We have also briefed about the several potential future implementations and scopes for our project, such as improving voice recognition accuracy, implementing robust security measures, integrating our system with healthcare technology, wearable devices, and pharmacies. By continuing to improve and expand the functionality of our system, we can help improve the quality of healthcare delivery and patient outcomes. We believe that our project has significant potential to simplify the prescription delivery process andimprove the accessibility of healthcareservices.

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