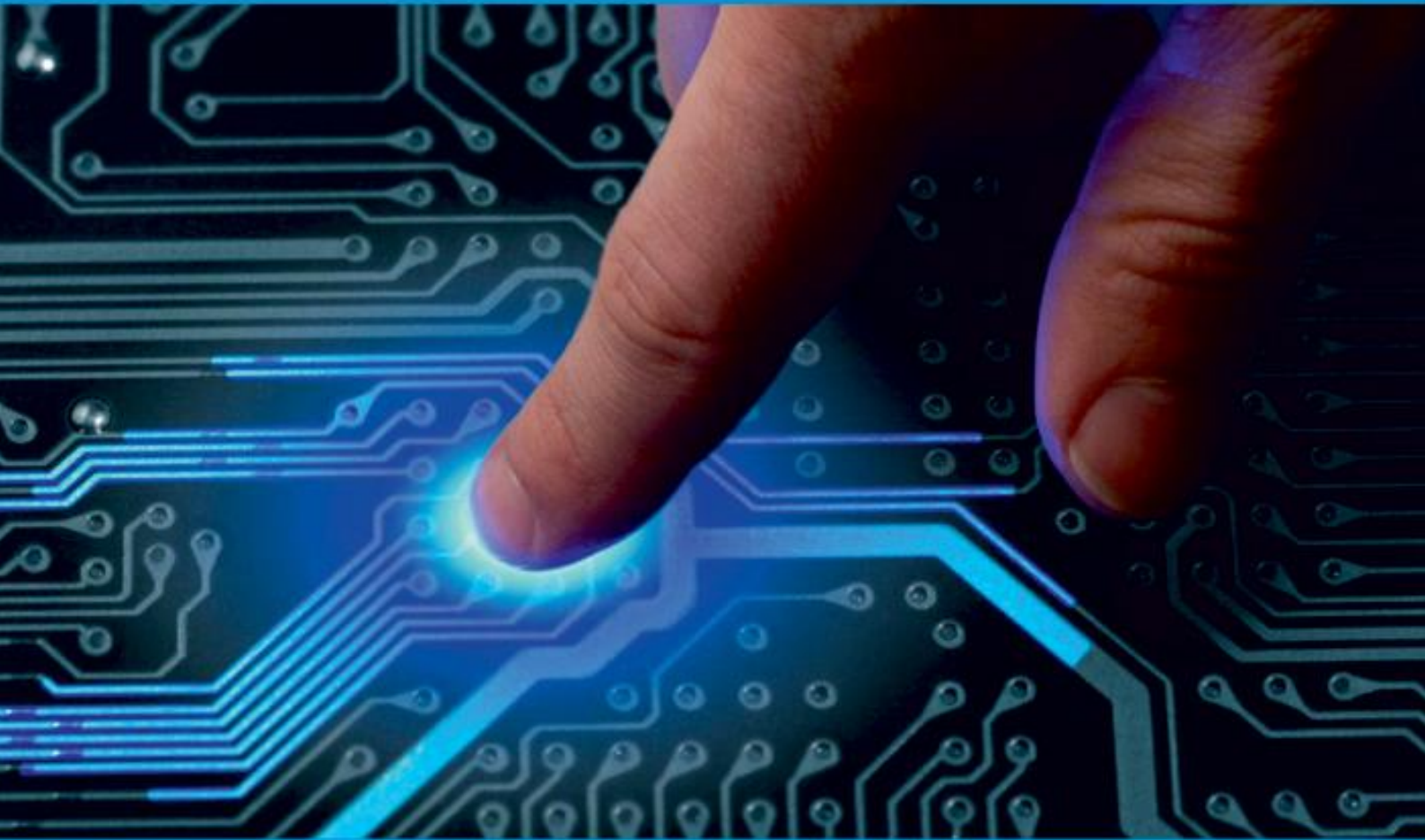




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E-Prescription using Speech-Recognition

Harshwardhan Shinde, Siddharth Khubikar, Abhishek Unde, Shreyas Shirke, Prachi Pathak

B.E Student, Dept. of C.S., Dr. J. J. Magdum College of Engineering, Jaysingpur, India

B.E Student, Dept. of C.S., Dr. J. J. Magdum College of Engineering, Jaysingpur, India

B.E Student, Dept. of C.S., Dr. J. J. Magdum College of Engineering, Jaysingpur, India

B.E Student, Dept. of C.S., Dr. J. J. Magdum College of Engineering, Jaysingpur, India

Assistant Professor, Dept. of C.S., Dr. J. J. Magdum College of Engineering, Jaysingpur, India

ABSTRACT: In our nation, medical prescriptions are still manually penned. However, there are times when the pharmacist cannot read the handwriting, which can lead to serious issues like patients consuming the incorrect drugs or insufficient amounts of those drugs. According to World Health Organization (WHO) statistics, medical and prescription errors cause 2.6 million deaths annually. Many mistakes in healthcare are caused by caretakers giving patients the incorrect medication or dosage because of unclear handwriting, medication interactions, unclear drug names, etc. The continuation of the medication process can occasionally be miscommunicated if there is no prior medical history. Additionally, the patient must keep getting in touch with the doctor repeatedly if they neglect the name or dosage of their medication. Our voice-based "E-prescription" will be crucial in resolving these problems. We are converting the provided voice input to text format using Natural Language Processing (NLP). For English, Hindi, and Marathi, we use Android Intents

KEYWORDS: Speech Recognition, NLP, Android Development, Authenticated Prescriptions, Kotlin, Doctor Authentication, Firebase.

I. INTRODUCTION

E-prescribing, also known as electronic prescribing, is a digital process that allows doctors and other healthcare professionals to create prescriptions and send them to patients or pharmacists via an application rather than using the more conventional handwritten or faxed recommendations. The electronically generated prescription is fully automatic, easy to understand, precise, and error-free. The creation of the E-prescription app is a way to reduce the risks that rise with routinely prepared manual prescriptions. The goal of our project is to develop a simple interface for doctors that accepts voice notes as input and converts them into text to create paperless prescriptions that are accessible in English, Hindi, and Marathi.

The main issue in India is that the majority of prescriptions are still penned by hand. If a doctor has prescribed certain medications, such as "Valcyte" or "Valtrex" only pharmaceutical professionals, such as pharmacists, can interpret these medications. People without medical backgrounds are unable to properly read prescription medications and cannot confirm whether the medication given by the pharmacist is in accordance with the prescription or not. We have suggested our application, which enables patients to recognize the names of the drugs and the quantity of each, in order to prevent patients from misinterpreting the doctor's handwriting on the prescription.

We have also given dosages so that the patient understands how, when, and in what quantity the drugs should be taken. We have provided extra cloud storage for prescriptions in order to safeguard prescriptions and patient information.

The doctor can easily replace a prescription if a patient misplaces it. In addition, we have provided customizable watermarks so that the prescriptions can be readily identified. A digital signature from a doctor is also given for authentication. There are numerous applications accessible today, such as Blue doc, E-prescription, and others, that generate prescriptions only in English.

a. Problem Formulation

Formulation of Problem plays an important role in determining the purpose, requirement, and usage of the project that is made. So the problem statement of this project can be formulated as, Developing and android application which takes

voice note as an input and generate digitally signed E-Prescription. This application uses speech recognition and pdf generation intents.

II.LITERATURE SURVEY

There are a few solutions on the Indian market that provide a technique to digitized the generation and storage of prescriptions. The concept of an electronic prescription is not new. some of the work described below:

[1] Voice Recognition System: Speech-To-Text, by Pranab Das and Vijay Prasad. This project's primary goal is to create a system that will enable the computer to convert voice commands and dictation into text utilizing MFCC and VQ techniques. Utilizing the Vector Quantization technique and Mel Frequency Cepstral Coefficients, features will be extracted and matched. A .mat file will be used to store the extracted feature. When comparing the unknown speech signal with the speech signal database, a distortion measure that is based on reducing the Euclidean distance will be applied. [2] In Voice Based Prescription Generation using Artificial Intelligence, by Kajal Ghadage, Laxman Reddy, Deepak Borate, Omkar Dalavi, Prof. S.P.Aundhakar. The voice prescription system will require only minor changes to doctor's workflow. It will also have a significant impact on the development of a digital EHR system for patients and doctors. A voice prescription system aids in the real-time management of electronic health records while protecting the patient's privacy. This digital system will shorten the time it takes to access a patient's record while maintaining high security and privacy of patient data. [3] Speech to Text Conversion for Multilingual Languages, by Yogita H. Ghadage, Sushama D. Shelke. The proposed system for Marathi language achieves a 93.625% accuracy using MFCC for feature extraction, Minimum Distance classifier, and SVM combination for classification. The proposed system outperformed the MFCC-feature extraction technique and CDHMM-classifier, which yielded an accuracy of 88.80% for the Marathi language. The proposed system achieved an accuracy of 91.6667% for English and 90.625% for English-Marathi mix languages.

[4] An Electronic Prescription System powered by Speech Recognition, Natural Language Processing and Blockchain Technology. by Jitendra Mahatpure, Dr Mahesh Motwani, Dr Piyush Kumar Shukla. The proposed and implemented system aims to cut down on the time spent creating and accessing patient records. The authors devised a novel solution to the problem of illegible handwritten prescriptions. Voice-based e-prescription requires only a minor change in the doctor's workflow, but it will have a significant impact on the development of a digital ecosystem for patients in the long run. E-prescription systems aid in real-time EHR management while protecting the patient's privacy. [5] Voice Based E-Prescription. by Kuldeep Choudhary, Tanmay Agrawal, Ridhi Dama, Dr. Mansing Rathod. The planned and executed project aims to reduce the amount of time it takes a doctor to communicate with a patient. Here is an innovative solution to the problem of not understanding handwriting. Voice-based Prescription is a minor change in the doctor's workflow, but it will have a significant impact in developing a digital eco system for patients in the long run. Here, the developers intend to integrate a payment gateway in accordance with the requirements, as well as plan a successful checkout process.

III.PROPOSED METHODOLOGY AND DISCUSSION

In India still prescriptions are in hand-written format that's why there is chances of mis-spell or mishearing, from that there is chance to get wrong medicine and also not every patient can understand dosages of the medicine so for that we are developing an android application which takes voice note as an input and generate digitally signed E-Prescription. This application uses speech recognition and pdf generation intents.

There is a registration panel for new users where doctors can build their profiles. Patients' medical histories are saved in a database, and if the patient is new to the doctor, a patient registration panel is given. In this project, voice inputs are provided and converted to text using a speech recognition technique based on the necessary languages. After converting to text, the content is assigned to specific text boxes using launchers. After text translation with the iText7 library, a pdf file is created and saved in the database. In addition, a sharing option is provided, through which the pdf is immediately shared with the patient. A duplicate of the pdf is also saved on the machine.

A. *Speech Recognition:*

The capacity of a machine or program to recognize words spoken aloud and translate them into readable text is known as speech recognition, also known as speech-to-text. Basic speech recognition software can only pick out words and phrases that are spoken distinctly and has a small vocabulary. In order to recognize words in spoken English, speech recognition is used. With the aid of a speech recognition software, spoken words can be recognized and translated into

readable text. In the E-prescription software Using android.speech.RecognizerIntent, the vocal input is recognized and converted to text.

B. Pdf Generation:

For the purpose of creating PDFs, this stage uses generated text from android.speech RecognizerIntent. These texts are given to the appropriate blocks, for example, the word "paracetamol" is assigned to the column "medicine." Patients' names, visit dates, medications, and symptoms are all noted in pdf files. To keep track of patients' medical histories, one duplicate of that pdf is kept in the database. The produced pdf is then sent to the following module for further processing. For authorization and legal prescriptions, this application adds a watermark that is a digital signature of the doctor to the generated prescription.

The Android.itextpdf library is used to generate PDF files from written text. We make use of several tools to format the pdf: com.itextpdf.kernel.font.PdfFontFactory, com.itextpdf.kernel.pdf.PdfDocument, com.itextpdf.kernel.pdf.PdfWriter, com.itextpdf.layout.Document, com.itextpdf.layout.element.Paragraph, com.itextpdf.layout.font.FontProvider, com.itextpdf.layout.font.FontSet, com.itextpdf.layout.property.HorizontalAlignment, com.itextpdf.layout.property.Property, com.itextpdf.layout.property.TextAlignment

Sharing pdf:

Android offers intents for sharing data, files, pdfs, and so on. The created pdf is shared with the patient by providing the intent.Action parameter and the file path. The pdf's file path is given to the intent to share the pdf directly to the patient's email, WhatsApp, telegram, and so on.

D. Database:

The Firebase Database is a database that is stored in the cloud. Data is saved in JSON format and is synchronized in real time to all connected clients. When you create cross-platform applications using our iOS, Android, and other platforms. The real-time database of Firebase is a NoSQL database housed in the cloud that allows you to store and sync data between your users in real- time. We're using Firebase because it's cheap.

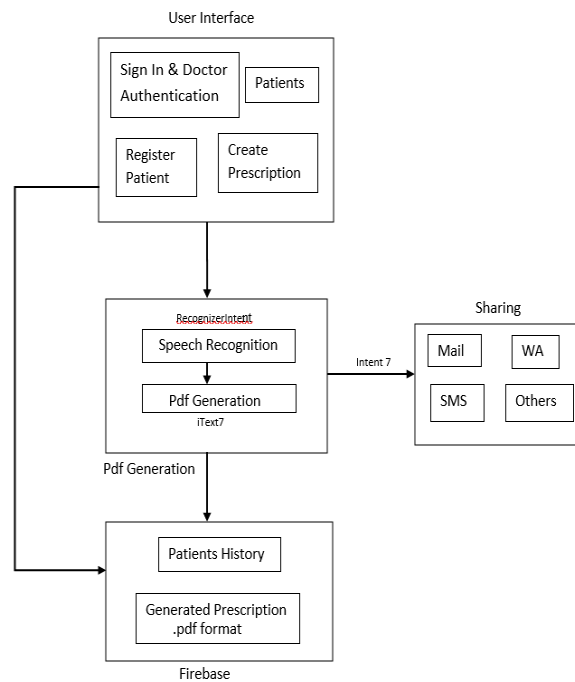


Fig.1: System Architecture

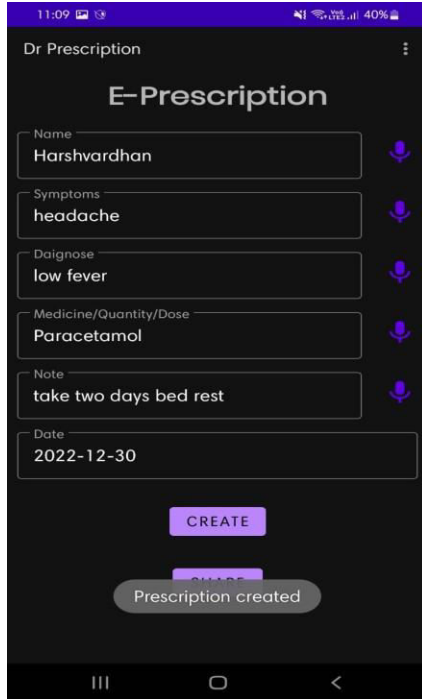


FIG.2: SPEECH RECOGNITION

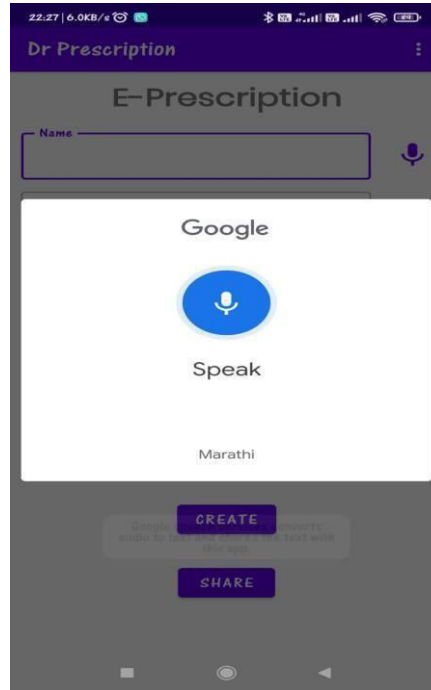


FIG.3: GENERATED TEXTS

By using android Speech-Recognition the voice notes are taken as input and converted into text format. And those texts are assigned to the particular textboxes with respect to their headings. In this step after speech recognition the generated texts are assigned to the respected headings then the pdf is generated. For that we have provided a button 'CREATE' by clicking on that button the pdf will be generated. Then the generated pdf will be shared directly to the patients via various sharing ways like email, WhatsApp, telegram, etc.

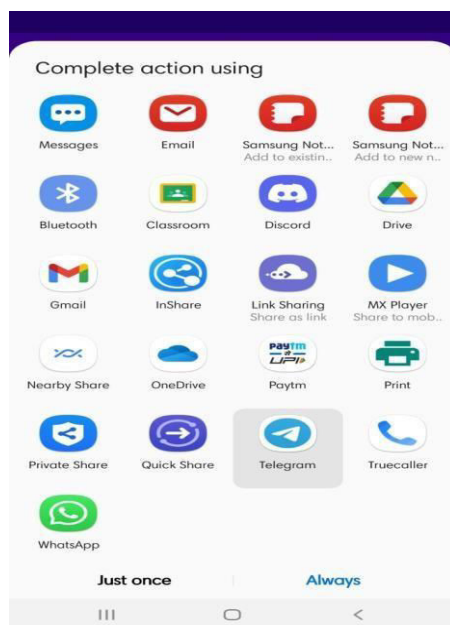


Fig.4: Sharing Window



Fig.5: Language Options

We have provided three languages to doctors: English, Hindi, and Marathi, in which they can make prescriptions. After creating the prescription, we have provided another button called "SHARE." The sharing window will open when you select the share button.

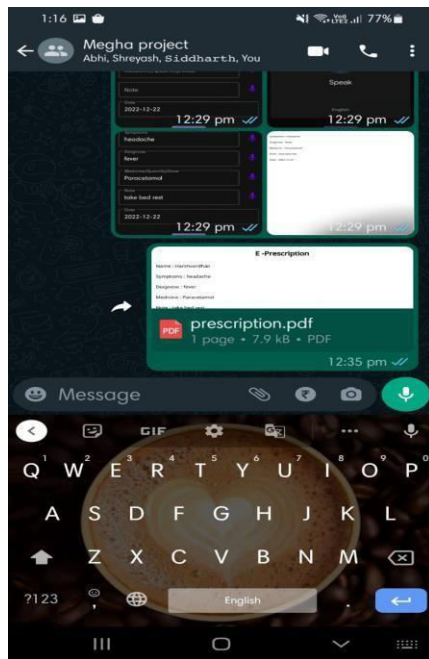


Fig.6: Sharing to WhatsApp



Fig.7: Sharing to Telegram

V. CONCLUSION

The purpose of the carefully thought out and carried out project is to shorten the time a doctor needs to speak with a patient. Doctors can access this framework using their smartphones. A valid and authorised prescription can be created using an electronic prescription, which can also store and manage the patient's medical history files. A UID (user id) can be assigned to each patient by an E-Prescription system, which can also create a comprehensive prescription with dosage. Fraud can be avoided with the help of this method.

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