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VOICE BASED PRESCRIPTION

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Abstract

With the increasing number of patients, it is very difficult for the doctors to write prescriptions manually. A major issue in India is that generally prescriptions are still written by hand and the readability of such handwritten prescription is very limited. Several cases have come to light, where an error in understanding the prescription by chemist has led to the wrong medication, which caused severe health issues to the patient. The proposed system will provide a platform for the doctors to dictate their prescription orally instead of typing or writing it manually with the help of speech recognition and natural language processing. This saves a lot of time for doctors as well as the patients and avoids human errors to a greater extent.

Keywords— Prescription, Chemist, Medication, Speech Recognition, Natural Language Processing.

I. INTRODUCTION

The requirement to enhance healthcare and provide effective healthcare has exceedingly improved the use of technology solutions in the healthcare sector. The Internet has received significant attention in recent years, but the voice is still a common convenient and direct way to communicate person-to-person or person-to-computer.

The adoption of voice-based application could eliminate redundant paperwork, thereby facilitating more efficient and effective delivery of patient care.

Google Speech API technology enables users to communicate with the Internet utilizing speech-

recognition technology simultaneously with voice commands. Google's API is a new standard for developing major voice and pitch control applications. NLP enables computers to understand natural language as humans do. Whether the language is spoken or written, natural language processing uses artificial intelligence to take real-world input, process it, and make sense of it in a way a computer can understand. Just as humans have different sensors such as ears to hear and eyes to see computers have programs to read and microphones to collect audio. And just as humans have a brain to process that input, computers have a program to process their respective inputs. At some point in processing, the input is converted to code that the computer can understand.

This technique decreases the expenses and develops writing efficiency. Voice assist systems are incorporated in various fields, including data providers such as warehouses, air travel, financial institutions,

customer service, e learning, and various areas.

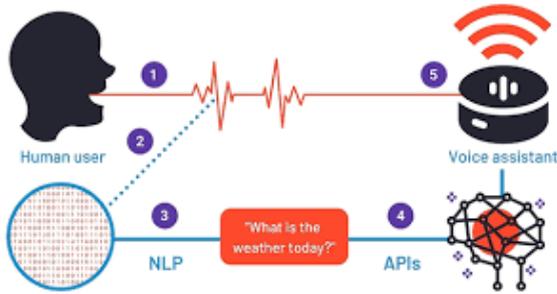


Fig 1: Working of voice recognition

II. OBJECTIVES

- The objective is to avoid taking the incorrect medication for general diseases.
- The purpose is to bypass the wrong medication for common diseases viz. fever, cough, cold, body pain, etc. by designing a virtual application on voice-based medicine prescription.

III. LITERATURE SURVEY

Speech Recognition by Machine: A Review

The design of Speech Recognition system requires careful attentions to the following issues: Definition of various types of speech classes, speech representation, feature extraction techniques, speech classifiers, database and performance evaluation.

The objective of this review paper is to summarize and compare some of the well-known methods used in various stages of speech recognition system.

Review of Various Approaches towards Speech Recognition

Speech recognition is an important application that enables interaction of human beings with machines. The various stages in speech recognition system are pre-emphasis, feature extraction and recognition stage. This paper emphasizes on existing techniques in each of these stages of speech recognition system and elaborates on their comparison.

Electronic Prescription Writing using automatic speech recognition

From this we got to know about how to automate the Process of prescribing medications, without compromising the convenience of the traditional notepad.

The use of such a system would also reduce the occurrence of prescription errors, since the element of handwriting is removed from the prescription process. This system consists of two parts: speaker verification and automatic speech recognition.

E Prescription

Electronic prescribing or e-prescribing (e-Rx) is a computer-based electronic generation, transmission and filling of a medical prescription by replacing the papers and faxed prescriptions. E-prescribing allows a physician, nurse practitioner, or physician assistant to electronically transmit a new prescription or renewal authorization to a community or mail-order pharmacy.

IV. EXISTING PROBLEMS

The following are some of the existing problems:

Handwriting

The readability of the hand written prescriptions written by doctor are very difficult to understand.

Medication Errors

An error in understanding the prescription by chemist has led to the wrong medication, which caused severe health issues to the patient.

Security

The details of patients and prescription is also an important fact to considered.

Paper Prescription

The paper is used to write prescription.

Time

The amount of time required to write the prescription manually is more.

V. WORKING MODEL

Modules involved in working of the project.

- **Speech Recognition**

Speech recognition, as the name suggests, refers to automatic recognition of human speech. This module has various methods and functionalities which helps to recognize the speech and converts it to text format.

- **NLTK**

NLTK (Natural Language Toolkit) is a suite that contains libraries and programs for statistical language processing. It is one of the most powerful NLP libraries, which contains packages to make machines understand human language and reply to it with an appropriate response. It contains text processing libraries for tokenization, parsing, classification, stemming, tagging and semantic reasoning.

- **SpaCy**

SpaCy is a free, open-source library for advanced Natural Language Processing (NLP) in Python. It can be used to build information extraction or natural language understanding systems, or to pre-process text for deep learning. spaCy comes with pretrained NLP models that can perform most common NLP tasks, such as tokenization, parts of speech (POS) tagging, named-entity recognition (NER), lemmatization, transforming to word vectors etc.

- **python-docx**

python-docx is a Python library for creating and updating Microsoft Word (.docx) files. With the help of its various functions and methods we can create a prescription that includes various details regarding the patient and his medications from the extracted data from the various modules and also it can be editable by the doctor if needed.

- **tkpdfviewer**

tkpdfviewer is a python library which helps to embed the pdf file in tkinter GUI and also to load and view

pdf document.

- **docx2pdf python**

docx2pdf is one of the python library which helps to convert docx file into pdf file.

- **Smtplib**

The smtplib module defines an SMTP client session object that can be used to send mail to any Internet machine with an SMTP or ESMTP listener daemon. With the help of this module we send the prepared prescription to the patient email.

- **Tkinter**

Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI applications. Tkinter provides a powerful object-oriented interface to the Tk GUI toolkit.

Algorithm

Natural Language Processing

Natural language processing (NLP) is a subfield of linguistics, computer science, and artificial intelligence concerned with the interactions between computers and human language, in particular how to program computers to process and analyze large amounts of natural language data. The goal is a computer capable of "understanding" the contents of documents, including the contextual nuances of the language within them. The technology can then accurately extract information and insights contained in the documents as well as categorize and organize the documents themselves. There are various NLP libraries available such as NLTK and Spacy Which helps to process data.

Steps Involved

Step 1) Input recorded audio file or Live recording.

This is the initial step of the project, in which the input is given either as a recorded file or we can record it live using inbuilt microphone with the help of Speech Recognition module which takes help of the pyaudio to work with microphone.

Step 2) Converting the audio file into text.

On successfully completing the first step the input which was given by the user is converted into text format which is needed to process it further.

Step 3) Extracting the details from the text file.

In this step the various keywords or named entities such as patient name, age, drug name, dosage, etc are extracted from the converted text file with the help of natural language processing libraries called nltk, spaCy which uses some inbuilt functionalities to extract the required entities.

Step 4) Preparing the Prescription.

After extraction of required entities from the text file, the prescription need to be prepared, here in this step it can be done with the help of pydox module and displayed Infront of doctor to verify the details.

Step 5) Verifying the prescription.

And then as a continuation to the previous step, the prescription format is once again verified by the doctor and processed further.

Step 6) Converting and previewing the document

Docs2Pdf helps to convert the prescription from docs format to pdf format and tkpdfviewer helps to preview the document.

Step 7) Sending verified prescription to patients.

Here in this last step the prescription will be sent the patient via email, this can be achieved with the help of smtplib module.

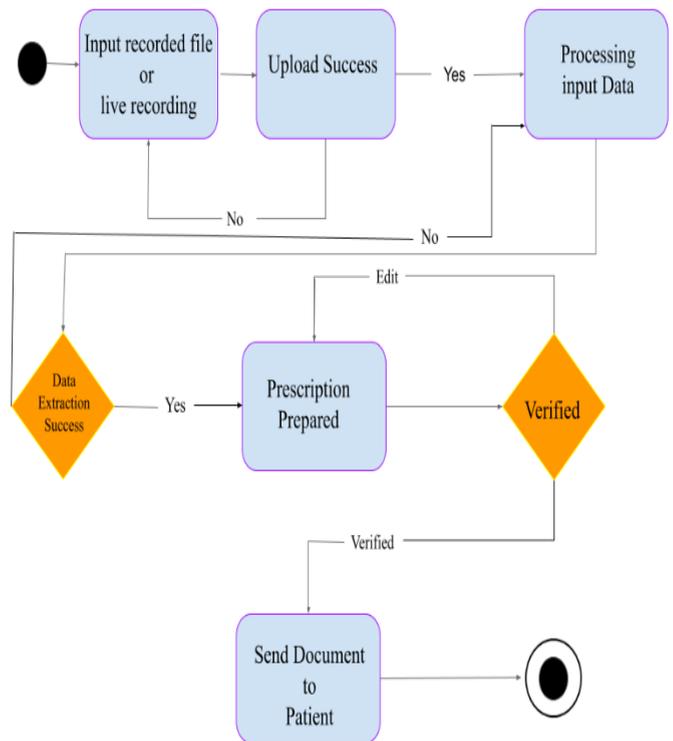


Fig 2: Activity Diagram

V. CONCLUSION

The proposed project aims to reduce the amount of time consumed in creating and accessing patient records. The Main aim of the project is to solve the problem of illegible handwritten prescriptions. Voice-based e-prescription needs a minimal change in the workflow of a doctor but in the long run, it will create a huge impact in developing a digital ecosystem for patients.

VI. EXPECTED OUTCOMES

- An electronically generated prescription with the details about patient and his medicines and dosage.
- No more handwriting errors in the generated Prescription.
- Saves time of doctor and paper as well.

VII. SCREENSHOTS OF RESULT

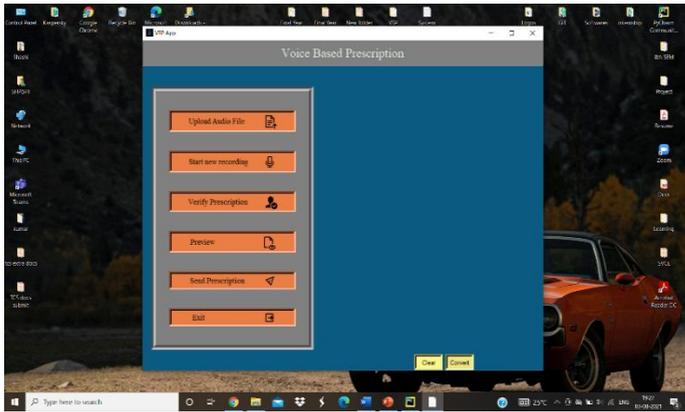


Fig 3: Homepage

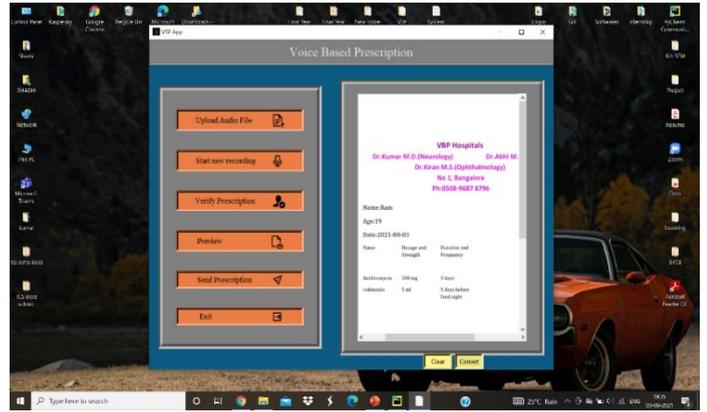


Fig 6: Preview

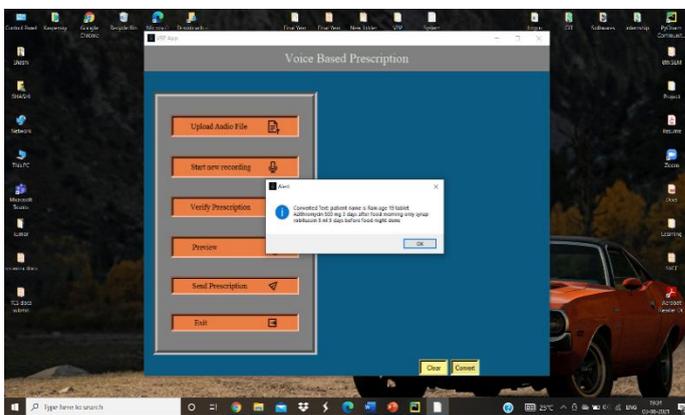


Fig 4: Conversion of speech to text

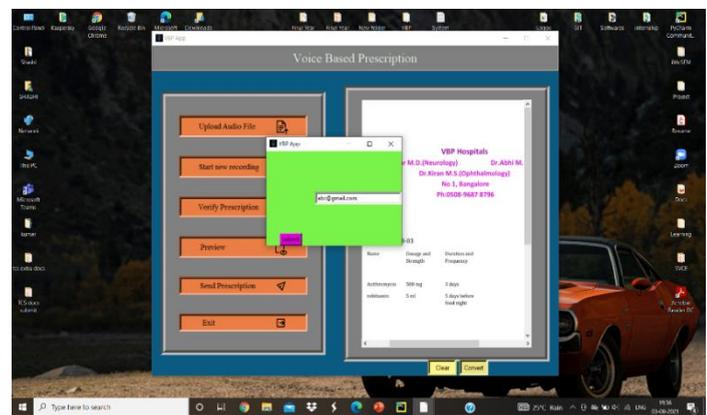


Fig 7: Sending prescription via email

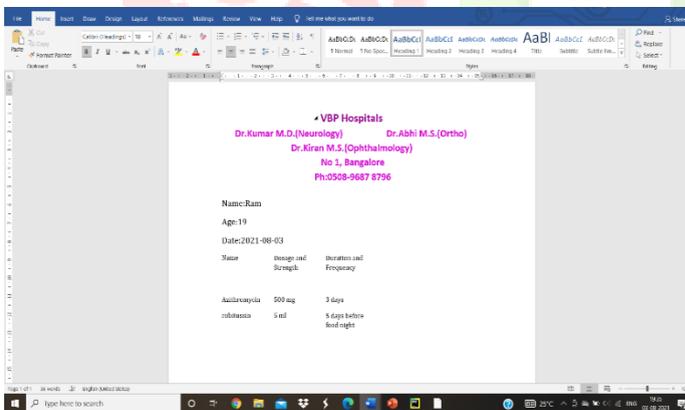


Fig 5: Prescription Generated and Verified

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