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Medical Based Voice Prescription

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Abstract: This paper resents a new healthcare system that would change the way of storing and processing health records. It will digitize the complete healthcare process. The system will generate an electronic prescription using speech recognition and natural language processing. It is a combination of a group of 5 modules working together. Those modules include Python Fast API server for Natural Language Processing or text processing, a React JS based admin panel and a React-Native based mobile application for Doctors and patients.

Keywords — : **Healthcare System, Natural Language Processing, Mobile Application, Block Chain Network.**

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I. INTRODUCTION

Since prescriptions are still written by hand, the illegible handwriting may lead to a major problem. Medical transcription is still the primary mechanism for a physician to clearly communicate with other healthcare providers who access the patient record, to advise them on the state of the patient's health and past/current treatment, and to assure continuity of care. In medical science field there are various medicine prescription apps are available. These apps are based on different platforms such as Windows, Android etc. The summary of relevant theories every application have their unique operation. Some applications are designed for medical administration and some for clinical data management. But very few applications are designed for medicine prescription which also has certain limitations. The motive behind this paper is to design sophisticated virtual application that prescribe medicine for normal Ailments and operates on spoken symptom by user. The paper is arranged as fallows. Section 2 describes overall block architecture and system flow. Next two sections discriminates design of ASR through MFCC and DTW.

II. MOTIVATION

Since prescriptions are still written by hand, the illegible handwriting may lead to a major problem. Medical transcription is still the primary mechanism for a physician to clearly communicate with other healthcare providers who access the patient record, to advise them on the state of the patient's health and past/current treatment, and to assure continuity of care

III. RELATED WORK

1) Web Scrapper Web scraping refers to the extraction of data from a website. We used the Beautiful Soup in python to perform web scrapping and extract medical data from various sites. Input : Medical Sites Output: Scrapped Text File

2) Text Preprocessing Converting into Lowercase Removing Stop Words Removing punctuation Lemmatization Input : Text Data. Output : Pre-processed data

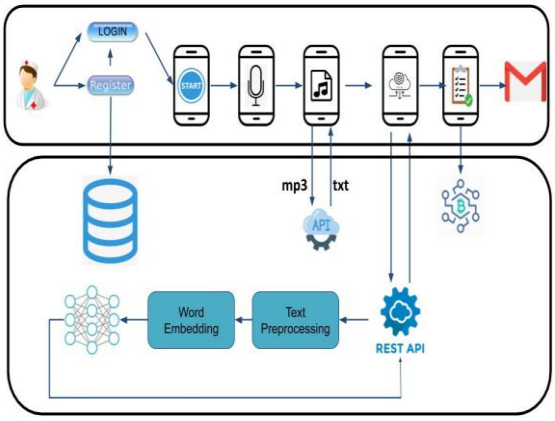
3) Annotate Dataset Annotation tool helps to annotate the meaningful words from the sentence to make it usable for machine learning understand the string of words and give the answers accordingly. We used Doccano Annotation tool for our dataset. Input Pre-processed data Page 2 Output : Annotated Data

4) Embeddings Model Input : Text. Output : Word2Vec, Char2Vec.

5) NER Model (Training a model) Input: Word2Vec, Char2Vec. Output: Entities.

6) Build U I

IV. SYSTEM ARCHITECTURE



Our system looks something like this. We will make use of Flutter. After authentication and login, the doctor can dictate the prescription. Google API will convert the speech to text. From this text the prescription information will be extracted and the formatted prescription will be mailed to the patient. Working would be like this. Doctor will register himself. Then he/she can sign in. Doctor will start dictation by clicking on the start button. An audio file will be generated. The audio file will be sent to the Google speech recognition API. The transcript obtained is taken for further processing. It will be sent to the REST API server for prescription extraction. Removal of stop words, etc. is done for text preprocessing. The preprocessed text is given to the trained model for required entity recognition. Model will give output in format PERSON, DRUG, DOSAGE, SYMPTOMS STRENGTH, DURATION. This result is then sent back to the app where it is verified and stored in the Block chain database. Now the verified result is sent to the patient via mail.

V. ALGORITHMS

1. LSTM networks are a type of RNN that uses special units in addition to standard units. LSTM units include a 'memory cell' that can maintain information in memory for long periods of time. A set of gates is used to control when information enters the memory, when it's output, and when it's forgotten. This architecture lets them learn longer-term dependencies.

2. We use the CRF (Conditional Random Field) algorithm to calculate the loss of our Bi-LSTM network as it could add some constraints to the final predicted labels to ensure they are valid.

3. RNNs have feedback loops in the recurrent layer. This lets them maintain information in 'memory' over time. But, it can be difficult to train standard RNNs to solve problems that require learning long-term temporal dependencies. Vanishing gradient problem.

VI. CONCLUSION

The proposed and implemented system aims to reduce the amount of time consumed in creating and accessing patient records. We have implemented an innovative solution to solve the problem of illegible handwritten prescriptions. Voice- based e-prescription needs a minimal change in the workflow of doctor but in the long run, it will create a huge impact in developing a digital ecosystem for patients. E-prescription system helps in managing EHR in real-time while maintaining the patient's privacy. The implemented system will reduce the patient record access time and maintain high security and privacy of patient data.

VII. FUTURE SCOPE

We are planning to make our speech recognition algorithm. Now our proposed system is only supports Indian English language but in near future it can also supports multiple languages. Unified models for both NER and Relation Extraction. This would also allow the doctors to easily find out relationships between drug and

ADEs so that such drug can be monitored carefully.

VIII. REFERENCES

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