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Physician Voice Automated Prescription Generator And Management System

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ABSTRACT

Common people, people within the pharmaceutical industry and sometimes the fellow doctors have great difficulty in deciphering the prescription of the doctor. The main motive is to digitalize medical prescriptions and elimination of handwritten prescriptions altogether. There by eliminating the issues, mistreatments and death caused by misread/misinterpreted drug names attributed to the illegible handwriting of medical practitioners. There have been numerous devices designed to electronically read the handwriting of doctors, including electronic character recognition, keyword spotters, and post processing approaches, though the gradual shift to electronic health records and electronic prescriptions may alleviate the need for handwritten prescriptions all together. Thus, to entirely eliminate the very traditional handwritten prescription we have come-up with the idea of voice command based automated prescription generator. Speech to text with command-based prescription typing with AI algorithm is the core innovation of the project. Prescription thus developed and generated will be followed by digital signature of the doctor. The digital signature of the physician is used as the attestation for the generated prescription. Prescription will be provided in the digital form, via email to the patient/ guardian. Storage of the prescription in the EHR (Electronic Health Record) will follow the HIPAA norms (Health Insurance Policy and Accountability Act) in the concerned hospital.

Keywords: Electronic character recognition, EHR (Electronic Health Record), Digital signature.

I. INTRODUCTION

Prescription- The term often refers to a health care provider's written authorization for a patient to purchase aprescription drug from a pharmacist. The report 'To Err is Human' by the Institute of Medicine (IoM) states that medical errors cause at least an estimated 44,000 preventable deaths annually in the United States of America alone, of which 7,000 deaths are attributable to sloppy handwriting. Anecdotal evidence led to believe that the situation in India is far worse. A former editor of a leading

publication in Assam was admitted to GNRC, suffering from convulsions. While the investigations could pinpoint no reason, a chance discovery by an attentive nurse revealed that a doctor in Delhi had prescribed her DUODIL – an analgesic, but what was bought and consumed was DAONIL – a medicine for diabetics. This was causing a sudden fall in her blood sugar levels, leading to the convulsions. Such a grave consequence, simply because of the illegible handwriting of the doctor who treated her in Delhi. To mention one more, Death of a 42-year-old patient was caused by an American Cardiologist since his prescription of Isordil, a drug for chest pain was misread as Plendil which is a drug for treating hypertension. Thus, the proposed system aims to digitalize medical prescriptions and elimination of handwritten prescriptions to overcome the problems and issues due to illegible handwriting of doctors. The application writes formatted prescriptions based on dictation from doctor (speech to text). The application also provide facility to sign the prescription and also send it to the patient directly via email. The method of storing the Electronic Health Record (EHR) should follow relevant compliance laws like Health Insurance Portability and Accountability Act (HIPAA).

II. LITERATURE SURVEY

In 2019, Roger Achkar, presented "Medical Handwritten Prescription Recognition Using CRNN". This method demonstrates how Artificial Neural Networks (ANN) is used to develop a system that can recognize handwritten English medical prescriptions. Using the Deep Convolution Recurrent Neural Network to train this supervised system, input images are segmented and processed to detect characters and classify them. This system is Simple and easy to implement.

In 2019, Sidra Ejaz presented "Framework to Develop Computerized Physician Order Entry System for a Medical Specialty". This method demonstrates the use of a Computerized Physician Order Entry (CPOE) system has been of primary interest. This is crucial both for patient safety as well as quality of care. Sophisticated system with all details necessary for the system considered.

In 2020, Ms Shivani Butala, presented "Natural Language Parser for Physician's Handwritten Prescription". This system simplifies the process of comprehending such handwriting by the methods for handwriting recognition utilizing the OCR techniques. The function of the currently existing input device, a pen is that it is be used by a physician to write the prescription which is simultaneously transforming the handwritten text into a printed form and display it online. System has additional diagnostic. Classification and treatment suggestion module.

III. SYSTEM ANALYSIS

1. EXISTING SYSTEM

The current system existing mostly revolves around post processing of handwritten prescription. The main difficulty in character recognition or parsing the drug name or the entire prescription is accuracy. All machine learning or deep learning models involving character recognition or parsing aren't accurate. Still many doctors stick with handwritten prescription in developing countries like India, which makes it extremely difficult to read or understand from common human point of view. Recently Commonly employed practice is manually typing the prescription in which doctors formally are not expertise with computers. Though the manually typing in computers is widely followed doctors find it difficult to get trained and it's also initially time consuming and confusing with drugs spellings.

2. PROPOSED SYSTEM

The system is in effect with the neural network which is specifically trained with huge datasets of audio wav files of drug names for speech to text of prescription form filling. This is the backbone of the web app developed. The web is voice driven and is with commands. All the details in the prescription are voice typed (speech to text). The fields filled being Drug type, Drug name, strength, dose, duration like in any doctor prescription. This is followed by digital sign of the responsible doctor. Then prescription is generated in the form of a pdf and mailed to patient's or guardian's mail address and is also stored in the database of the hospital for EHR (Electronic health record).

IV. METHODOLOGY

The system architecture is given below. Where the consultation of the doctor/physician is either in offline or online mode.

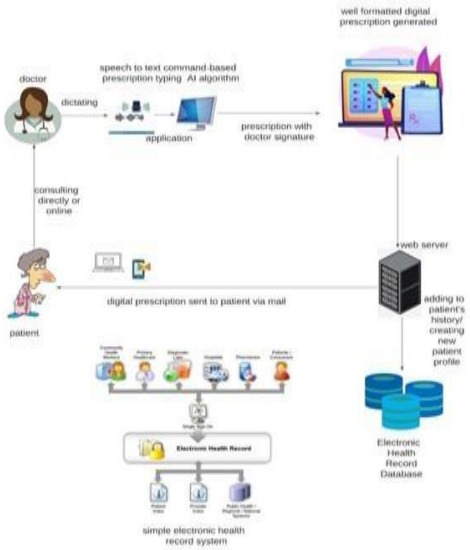
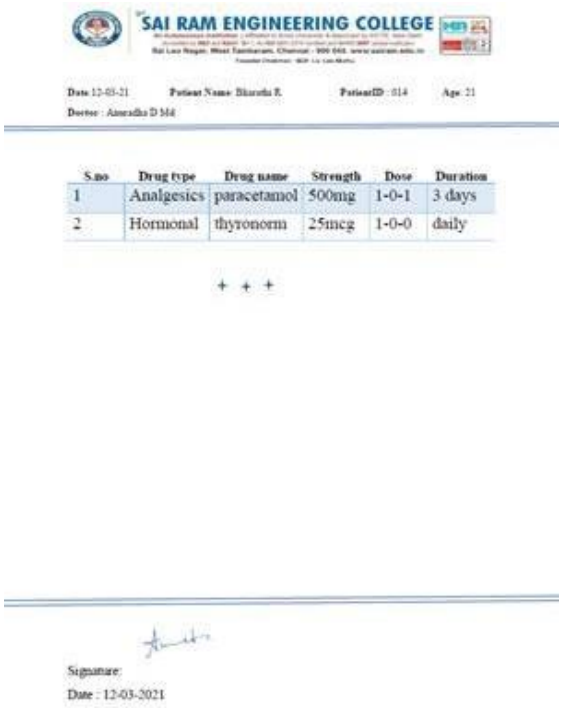


Figure 1: Workflow of the proposed approach

V. RESULT

The result of Voice typing in action is illustrated below:

Figure 2: Generated pdf



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Date 12-03-21 Patient Name: Bharathi R PatientID : 014 Age: 21

Doctor : Anuradha D Md

S.no	Drug type	Drug name	Strength	Dose	Duration
1	Analgesics	paracetamol	500mg	1-0-1	3 days
2	Hormonal	thyronorm	25mcg	1-0-0	daily

+ + +

Signature

Date : 12-03-2021

Figure 3: Prescription pdf

VI. CONCLUSION

Miss interpretation of drugs while referring the prescription provided by other doctor may lead to mistreatment and even to death of a person. Though there are different methods available to decrypt the handwritten prescriptions but their accuracy in decrypting the prescription is not high as lives are at stake. We have come up with the system generating a prescription with the voice command of the physicians. In order to ensure the authenticity of the prescription the voice of the physician is identified and is used to provide the attestation at the end of the prescription and is shared to the patient through mail and is stored in the database under the prescribed physician's records.

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