Doctor Prescription analyzer

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Abstract

In this innovative application, we present a Machine Learning-based Doctor Receipt Analyzer system empowered by Optical Character Recognition (OCR) technology. The system represents a transformative leap in the processing of medical receipts by seamlessly integrating advanced OCR algorithms. Capable of extracting critical information from scanned or photographed receipts, the solution automates the traditionally manual task of deciphering handwritten or printed text, enhancing both accuracy and efficiency. Tailored for effortless integration into healthcare administration, the system intelligently decodes essential details such as patient names, dates, services provided, and associated costs. The synergy of machine learning and OCR not only streamlines billing processes for healthcare professionals but also promises to elevate the overall efficiency of medical documentation and financial management, marking a significant advancement in healthcare technology.

Keywords: OCR, receipt analyzer, Machine Learning, NLP.

INTRODUCTION

Introducing a cutting-edge solution, our Machine Learning-based Doctor Receipt Analyzer system harnesses the power of OCR technology to revolutionize the way medical receipts are processed. By leveraging sophisticated Optical Character Recognition algorithms, the system adeptly extracts crucial information from scanned or photographed receipts. This innovative approach not only automates the traditionally manual and time-consuming task of deciphering handwritten or printed text but also enhances accuracy and efficiency. Seamlessly integrating into healthcare administration, the system intelligently decodes patient names, dates, services provided, and associated costs. The synergy of machine learning and OCR not only streamlines the billing and record-keeping process for healthcare professionals but also promises to elevate the overall efficiency of medical documentation and financial management.

This groundbreaking Machine Learning-driven Doctor Receipt Analyzer signifies a paradigm shift in healthcare management. By seamlessly merging the capabilities of OCR technology with advanced algorithms, our system revolutionizes the processing of medical receipts. Its prowess lies in its ability to adeptly extract vital information from diverse receipt formats, be they scanned or photographed. Beyond automating the traditionally labor-intensive task of deciphering handwritten or printed text, the system significantly boosts accuracy and operational efficiency. Tailored to seamlessly integrate into healthcare administration workflows, it intelligently decodes key elements such as patient names, dates, services rendered, and associated costs. This harmonious blend of machine learning and OCR not only simplifies billing and record-keeping for healthcare professionals but also holds the promise of elevating the overall efficiency of medical documentation and financial management to unprecedented levels.

LITURATURE SURVEY

- This paper utilizes the existing recommendation models either give only one recommendation (however, there may be a variety of drug combination options in practice) or cannot provide the confidence level of the recommended result. To fill these gaps, a Drug Recommendation model based on Message Propagation neural network (denoted as DRMP) is proposed in this paper. Then, the Drug-Drug Interaction (DDI) knowledge is introduced into the proposed model to reduce the DDI rate in recommended drugs. Finally, the proposed model is extended to Bayesian Neural Network (BNN) to realize multiple recommendations and give the confidence of each recommendation result, so as to provide richer information to help doctors make decisions. Experimental results on public data sets show that the proposed model is superior to the best existing models. [1].
- This study builds a drug recommendation system for patients who have diabetes. One method applied in a recommendation is Case Base Reasoning (CBR). The CBR method calculates based on the similarity of the old case to the new issue. In calculating the similarity of the problems using the Nearest Neighbors algorithm. Although there have been many studies on drug recommendations, no studies have added risk factor variables. Risk factors can influence results more accurately. The results of this study are in the form of a prescription drug recommendation system for diabetic patients based on the type of diabetes they suffer from. They are testing the accuracy of this system using the Confusion Matrix with an accuracy of 80.60\%. Suggestions for further research are to add several types of similarity. It is necessary to research different kinds of diseases. It is expected to produce an integrated system that can provide drug recommendations for various conditions. [2].
- In this paper, we design and implement a drug recommender system framework that applies sentiment analysis technologies on drug reviews. The objective of this research is to build a decision-making support platform to help patients to achieve more significant choices in drug selection. Firstly, we propose a sentimental measurement approach to drug reviews and generate ratings on drugs. Secondly, we take how much the drug reviews are useful to users, patient's conditions, and dictionary sentiment polarity of drug reviews into consideration. Then, we fuse those factors into the recommendation system to list appropriate medications. Experiments have been carried out using Decision Tree, K-Nearest Neighbors, and Linear Support Vector Classifier algorithm in rating generation and Hybrid model in recommendation based on the given open dataset. The analysis is carried out to tune the parameters for each algorithm in order to achieve greater performance. Finally, Linear Support Vector Classifier is selected for rating generation to obtain a good trade-off among model accuracy, model efficiency, and model scalability. [3].
- This research focuses on prescriptions of GuiZhi Decoction, which is from Zhongjing Zhang's Treatise on Cold Pathogenic Diseases. First, we constructed the database for prescriptions of GuiZhi Decoction based on the prescriptions' names, the concept extraction and formal expression. Then we generate the formal context and optimized it by use of the mathematical theory of formal concept analysis and the relationship between prescriptions and herbs in database. In the formal context, the prescriptions are objects and the herbs are attributes. Next the structural partial-ordered attribute diagram is generated, so as to visualize the knowledge of prescriptions of GuiZhi Decoction. Finally, through the analysis of structural partial-ordered attribute diagram, more comprehensive, objective and multileveled knowledge are discovered. [4].

AIM & OBJECTIVES

- To Eliminate manual efforts involved in extracting information from doctor receipts by employing OCR to recognize and extract text seamlessly.
- To Design the system to be adaptable to various receipt formats, accommodating the diversity in documentation styles used across different healthcare providers.

MOTIVATION

The motivation behind developing a Machine Learning based Doctor Receipt Analyzer system using OCR technology stems from the desire to address significant challenges in the current healthcare administration landscape. Manual processing of doctor receipts is time consuming and prone to errors. The motivation is to enhance the efficiency of healthcare administration by automating the extraction of crucial information from receipts, reducing the burden on healthcare professionals. Handwritten or varied receipt formats can pose challenges in accurate data extraction.

SYSTEM ARCHITECTURE

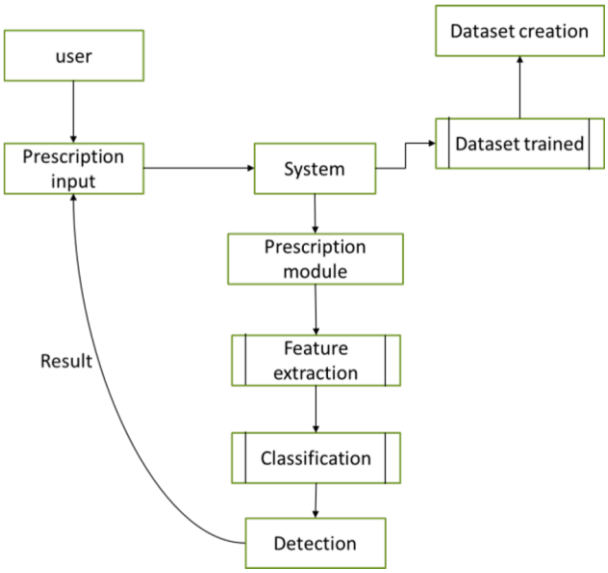

Fig -1: System Architecture Diagram

DETAILS OF MODULE

- **User Interface Module:** This module provides a user-friendly web interface for healthcare professionals to interact with the system. It includes features for user authentication, receipt uploads, and access to system functionalities.
- **Image Preprocessing Module:** Responsible for optimizing receipt images before OCR processing. This module ensures that images are standardized, enhancing OCR accuracy.
- **Text Extraction and Parsing Module:**
  Processes the OCR-converted text, extracting relevant information such as patient names, dates, services provided, and costs. This module employs machine learning algorithms for pattern recognition and data extraction.

APPLICATION

- Patient Record Integration: Integrates receipt data into patient records, creating a comprehensive view of financial transactions associated with patient care.
- Research and Audit Support: Facilitates research activities and audit processes by providing accurate and organized receipt data for analysis.
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- Enhanced Financial Transparency: Provides a transparent view of financial transactions, contributing to improved financial transparency within healthcare institutions.

ALGORITHM

1. **Data Input and Integration:** The system integrates with electronic health records (EHRs) to retrieve comprehensive patient information, including previous diagnoses and prescriptions.
2. **Natural Language Processing (NLP):** NLP algorithms process and analyze free-text inputs, extracting relevant information from patient descriptions of symptoms and medical history.
3. **Data Preprocessing:** Preprocessing techniques are applied to clean and structure the data, including text normalization, tokenization, and removal of stop words and irrelevant information. 4. **Machine Learning for Symptom Analysis:** Machine learning models analyze the preprocessed symptom data, taking into account the patient's medical history, to generate a list of potential diagnoses and associated probabilities.
5. **Drug Database Query:** The system queries a comprehensive drug database to retrieve information on available medications, dosages, side effects, and potential interactions.
6. **Personalized Drug Recommendations:** The machine learning algorithms consider factors such as the patient's medical history, allergies, and potential drug interactions to generate personalized medication recommendations based on the diagnosed condition.
7. **Clinical Guidelines Integration:** The system aligns medication recommendations with established clinical guidelines and best practices to ensure that prescribed medications meet medical standards.
8. **Prescription Analysis:** Concurrently, the system evaluates doctor prescriptions in real-time, comparing them to clinical guidelines, identifying potential drug interactions, and optimizing the medication choices for individual patients.

CONCLUSION

In conclusion, the Machine Learning-based Doctor Receipt Analyzer system harnessing OCR technology marks a significant leap forward in healthcare administration. This innovative solution has successfully automated and streamlined the intricate process of processing doctor receipts, transcending the limitations posed by diverse formats and handwritten entries. By seamlessly integrating machine learning algorithms, the system not only enhances the accuracy and efficiency of data extraction but also promises to revolutionize financial management and decision-making within healthcare institutions. Its adaptability, commitment to data security, and potential for future advancements position it as a pivotal tool in the evolving landscape of healthcare administration. As we embrace this cutting-edge technology, we anticipate a future where administrative workflows are further optimized, allowing healthcare professionals to allocate more time and resources to the core of their practice – delivering exceptional patient care.

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