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Design and Develop Drug Recommender Framework System Based on Multilingual Sentiment Analysis Using RNN

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A B S T R A CT

In recent days digital era healthcare is one among the major core areas of the medical domain. generally people may refer reviews on drugs to make the right decision .but may be passed get infected when drug not recommended by the physician in in existing system the research sentiment analysis of drug review was studied to build a recommender system using different types of machine learning classifier such as logistic regression perceptron multinominal navy Viya's ridge classifier ,linear SVC can be applied in proposed system drug can be evaluated using five different Metrix , precision , recall, F1 score, accuracy, AUC score. which reveal that the learn SVC, TF, IDF out performance all other models with 93% accuracy. The comparison of different over sampling technique using different values Of N grams and optimization of algorithm to improve the performance of recommendation system.

Keywords: Digital era healthcare, medical domain, Reviews on drugs, Recommender system, Machine Learning Classifier

1. Introduction

The coronavirus outbreak has caused a global physician shortage, particularly in rural areas where there are fewer medical professionals than in urban areas. A doctor needs spend six to twelve years finishing their education. As a result, it is impossible to raise the number of doctors quickly. A Telemedicine framework needs to be powered up as much as possible in this difficult time. Clinical blunders happen frequently today. Over 200 000 people in China and 100,000 persons in the USA are affected by drug errors each year. Experts regularly (more than 40% of the time) misprescribe medications since they simply have a relatively little amount of information at their disposal. choosing the Choosing the ideal medication is crucial forpatients in need of doctors that are well-versed in patient care, antibacterial medications, and microscopic organisms. New studies are released daily, and more drugs and diagnostic equipment are made available to medical experts. It becomes increasingly challenging for clinicians to select a course of treatment or medication for a patient based on indications and prior clinical experience. The rapid growth of the internet and the sector of web-based businesses has led to an increase in the relevance of item reviews. Before making a purchase, people all around the world have grown accustomed to reading reviews and visiting websites. While the majority of earlier study mostly focused on assessing expectations, clinical therapies or the provision of medical care have not been the got a lot of suggestions in the area of online commerce. Because they are worried about their health, more people are looking for a diagnosis online. A 2013 Pew American Research Center survey found that approximately 60% of respondents searched for health-related topics online, with about 35% of users looking for information on diagnosing medical conditions. To help patients and medical professionals better comprehend drugs for specific medical issues, a framework for medical recommendations is critically important. A common system called a "recommender framework" suggests products to users based on their needs and benefits. The results to the customer questionnaires are analyzed using this framework, and recommendations are then made depending on the specific needs of the consumer. The person who recommends drugs Based on patient reviews, the system employs feature engineering and sentiment analysis to conditionally provide drugs. Identifying and extracting emotional information from languages, such as opinions and attitudes, requires the use of a variety of methodologies, methods, and tools known as sentiment analysis. On the other hand, feature engineering—the process of adding new features from those that already exist—improves the performance of models.

EXISTING WORK

Drug Review Dataset (Drugs.com), which was collected from the UCI ML repository, served as the study dataset. This dataset has six attributes: the name of the drug used (text), the review of the patient, the patient's condition, the useful count (numerical), the date (date) of the review entry, and a 10star patient rating (numerical), which indicates how satisfied the patient is overall. There are 215063 incidents in all.

II. Related work

Healthcare has benefited greatly from the abundance of knowledge that has been made available by the explosive growth of user-generated content online in recent years. Drug recommendation systems are one significant area where user reviews play a crucial role. These systems use sentiment analysis techniques to glean insightful information from user evaluations and aid in the medicine recommendation process. This article examines relevant research in the area of machine learning-based drug recommendation systems that incorporate sentiment analysis of user evaluations.

1. Sentiment Analysis in the Medical Field

The goal of sentiment analysis, commonly referred to as opinion mining, is to identify the sentiment contained in a document. It is a branch of natural language processing. Sentiment analysis has been used in the healthcare industry for a number of purposes, including identifying adverse drug reactions, analysing patient satisfaction, and developing drug recommendation systems. To categorize sentiment in texts pertaining to healthcare, researchers have investigated a variety of machine learning methods, such as support vector machines (SVM), recurrent neural networks (RNN), and convolutional neural networks (CNN).

2. Drug Recommendation Systems

Drug recommendation systems are designed to help patients and healthcare professionals make wise drug selections. These systems take into account a patient's medical history, symptoms, and preferences, among other things. User evaluations and the opinions stated in them offer important insight into a drug's efficacy, side effects, and general level of satisfaction. The accuracy and dependability of drug recommendation systems can be improved by including sentiment analysis techniques.

3. Sentiment Analysis of User Reviews

Sentiment analysis of user reviews in the healthcare industry has been the subject of several studies. Researchers have created methods to categorize user-generated reviews into positive, negative, and neutral attitudes automatically. To analyse attitudes in reviews of drugs, these studies used machine learning techniques like SVM, RNN, and deep learning models. The annotated datasets used to train the sentiment analysis models contain manual sentiment labels added by human specialists to a collection of reviews. Then, attitudes in fresh, unread reviews are classified using these models.

4. Machine Learning Methods for Sentiment Analysis

Sentiment analysis has greatly benefited from the use of machine learning methods. Different techniques have been investigated by researchers to successfully extract sentiments from textual data. There has been extensive usage of conventional methods like SVM, naive Bayes, and decision trees. Convolutional neural networks (CNN), long short-term memory (LSTM), and recurrent neural networks (RNN) are a few examples of deep learning models that have demonstrated promise in sentiment analysis applications. These models are better able to classify emotion because they can identify intricate connections and patterns in textual input.

5. Integration of Sentiment Analysis into Drug Recommendation Systems

Researchers have incorporated sentiment analysis methods into the recommendation process improve drug recommendation systems. These systems can better comprehend the efficacy and user satisfaction connected to certain pharmaceuticals by taking into account the opinions expressed in user reviews. Sentiment analysis enables customised suggestions based on user preferences by recognizing positive and negative feelings associated to drug experiences. and findings from sentiment analysis.

The related research on machine learning-based drug recommendation systems that incorporate sentiment analysis of user evaluations emphasizes the value of sentiment analysis in improving drug recommendation systems. Researchers have shown how to extract insightful information from user reviews using sentiment analysis, resulting in more precise and individualized prescription recommendations. In sentiment analysis tasks, the incorporation of machine learning techniques, such as SVM, RNN, and deep learning models, has produced encouraging results. Using sentiment analysis to enhance patient care and decision-making, this research lays the path for the creation of more advanced drug recommendation systems.

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Evidence-based medicine (EBM) is the deliberate, clear, and prudent use of the best available research to guide decisions for the treatment of specific patients. Getting usable information out of large amounts of text can be difficult. In order to analyse the collection, a generative probabilistic aspect mining model is employed. High frequency noun phrases are extracted using a frequency-based technique in aspect-based opinion mining, and aspects are identified using a relation-based approach based on the aspect-sentiment relationship in reviews. However, authors of drug reviews do not always make clear mention of some factors, and the descriptions of side effects and user experiences vary.

PROPOSED WORK

In addition to Bow, TF-IDF, and Word2Vec, I proposed using some feature engineering approaches to manually extract features from the review column to develop another model called manual feature. 1) Bow: In natural language processing, the bag-of-words algorithm counts how many times each token appears in a document or review.

MODULES

USER

SYSTEM

ALGORITHM

RNN

A Recurrent Neural Network (RNN) is a type of artificial neural network designed for processing sequences of data, where the order of elements matters. Unlike traditional feedforward neural networks, which process inputs in a one-way flow from input to output, RNNs have connections that loop back on themselves, allowing them to maintain a form of memory or context from previous steps in the sequence.

The key feature of RNNs is their ability to capture sequential dependencies and patterns in data. They are particularly well-suited for tasks involving time-series data, natural language processing (NLP), speech recognition, and other tasks where the order of elements matters.

Step-1: Data Preparation:

Gather and preprocess your training data, including sequences of input data and corresponding target outputs.

Step-2: Network Architecture:

Choose the type of RNN you want to use, such as vanilla RNN, LSTM, or GRU.

Step-3: Initialize Parameters:

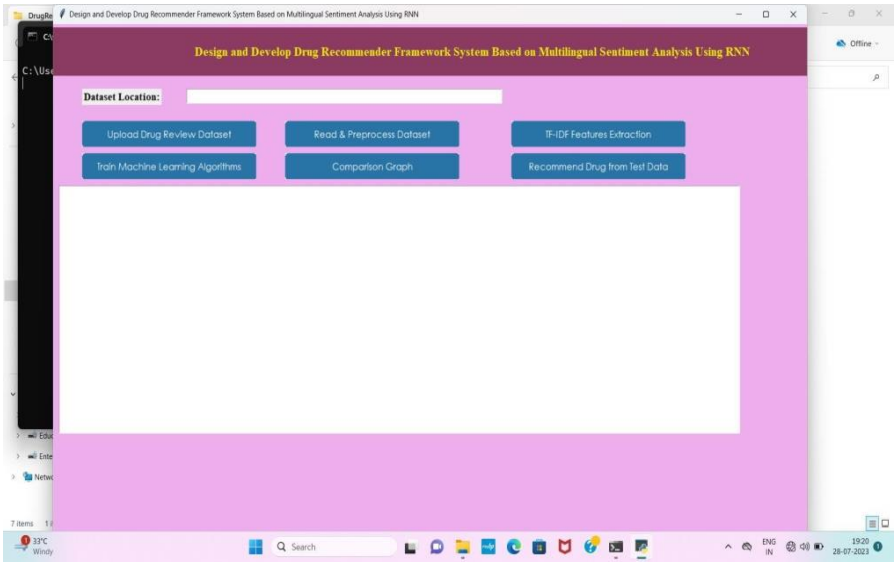
Initialize the weights and biases of the RNN, as well as any additional layers you might be using (e.g., fully connected layers).

Step-4: Forward Propagation:

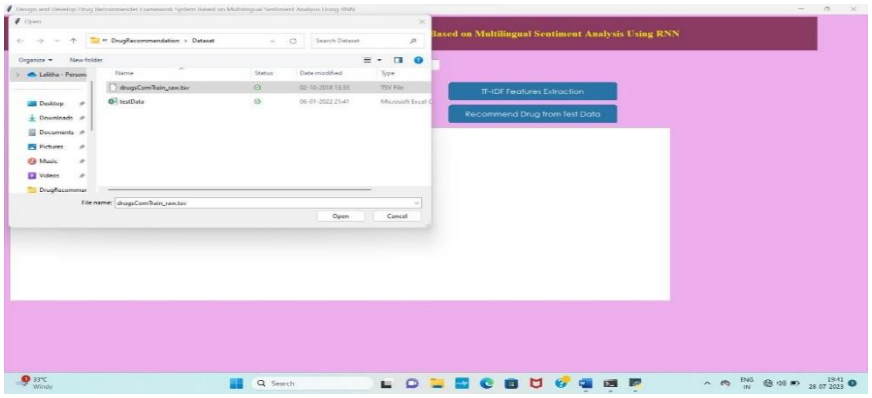
Iterate through each time step in the input sequence.

Calculate the hidden state at each time step based on the input data and the previous

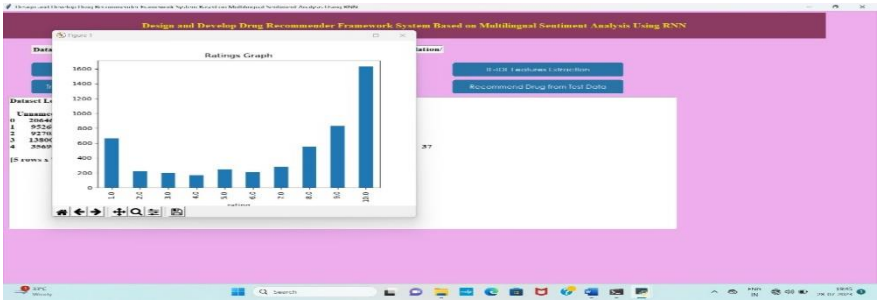
Sample Screens: -



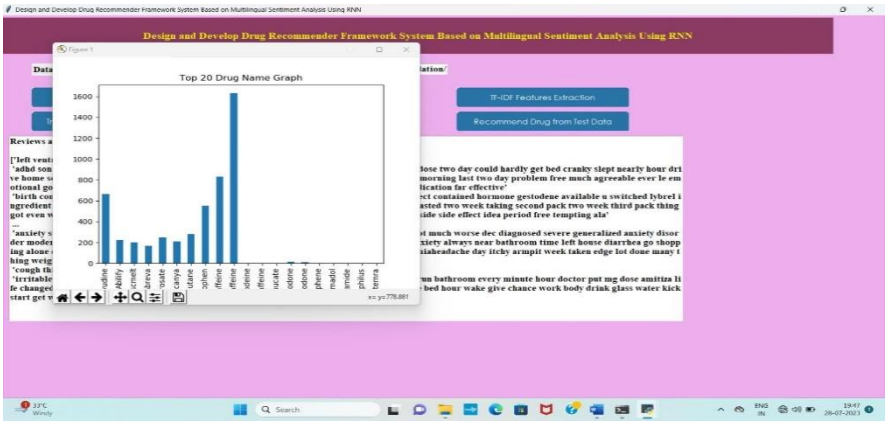
HOME PAGE



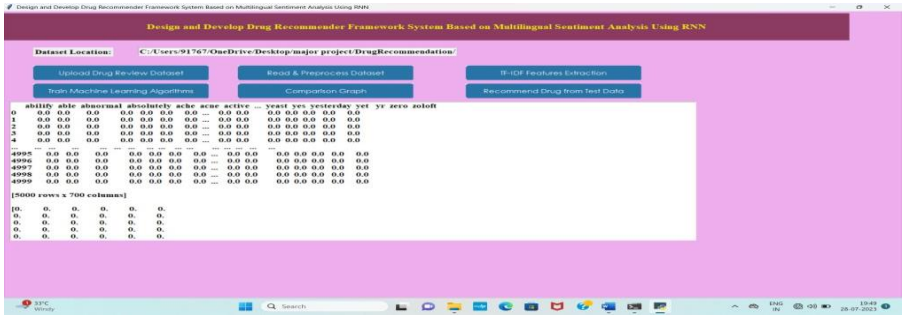
DRUG DATA SET



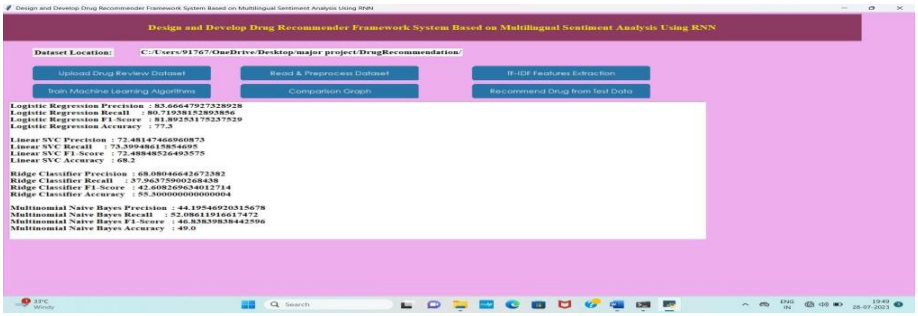
RATING GRAPH



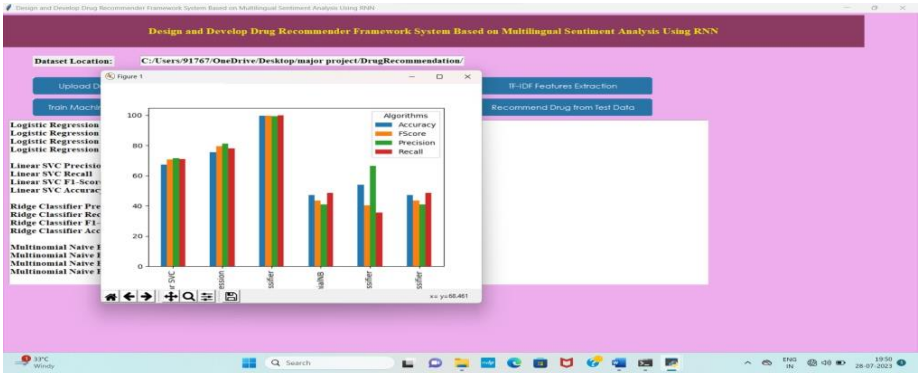
TOP 10 DRUG NAME GRAPG



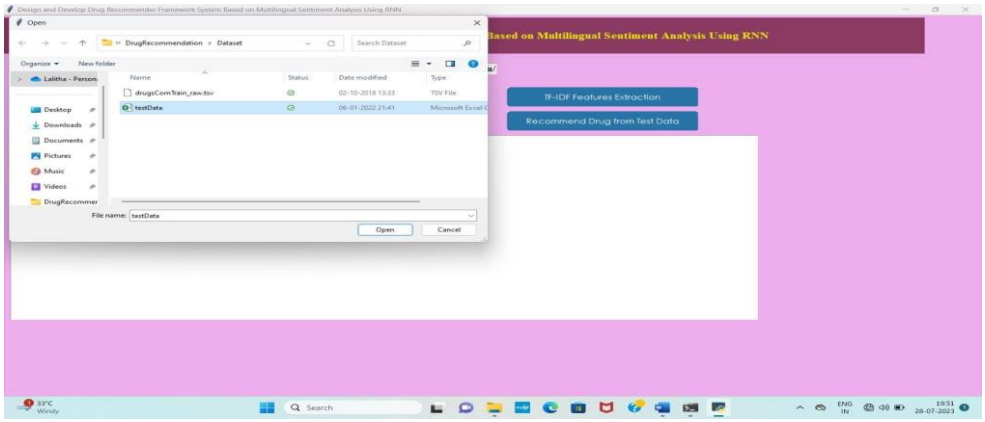
TF-IDF FEATURE EXTRACTION



TRAIN MACHINE LEARNING ALGORITHM



COMPARISION GRAPH



TEST DATA

RECOMMEND DRUG FROM TEST DATA

Conclusion

Finally, I'm coming to the conclusion that reviews are playing a bigger and bigger role in our daily life. We constantly check reviews before dining out, shopping, or making an internet purchase to inform our decisions. This was the driving force behind the sentiment analysis of drug evaluations conducted in this study, which utilized a number of machine learning classifiers to create a recommender system.

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