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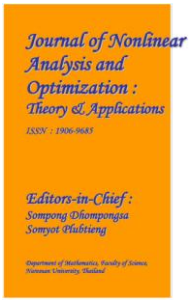

DRUG RECOMMENDATION SYSTEM USING MACHINE LEARNING

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ABSTRACT: Recommender systems on the internet are being employed by pharmaceutical companies, hospitals, and doctors more and more. Nowadays, the vast majority of consumers research potential prescriptions online before consulting their doctors for a variety of medical issues. When pandemics, floods, or cyclones occur, the medical recommendation system may come in handy. Using fewer resources, recommender systems provide more precise, dependable, and accurate clinical predictions in the era of machine learning (ML). The patient receives trustworthy information regarding the medication, dose, and potential side effects from the medication recommendation system. The patient's symptoms, blood pressure, diabetes, temperature, and other factors are taken into consideration before administering medication. Drug recommendation systems enhance the functionality, privacy, and security of patient data while offering accurate information at any time.

1. INTRODUCTION

These computer-assisted computational techniques were first explored in the 1950s and have since been applied to cheminformatics, bioinformatics, and drug discovery. A traditional approach to drug discovery has been used, with a focus on comprehensive treatment. Medical researchers benefit greatly from the increasing amount of Electronic Health Records (EHRs). Given the current global situation, people's concerns about their health and difficulties receiving medical diagnoses are growing. A poll found that 55% of people with Internet access look up health-related information on it. An investigation into the true frequency of health-related web searches was conducted by looking at the search terms entered into popular search engines. Furthermore, preliminary work on characterizing and grouping these questions needs to be completed. The National Cancer Institute

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REVIEW OF LITERATURE

1) Recommendation System Based On Patient Reviews

AUTHORS: S. Garg

Since the coronavirus emerged, there has been a severe scarcity of legitimate clinical resources, including physicians, nurses, and other healthcare professionals, as well as appropriate supplies, medications, and equipment. Many people are losing their lives as a result of the problems facing the medical community as a whole. People began taking medications on their own without proper consultation since they were unavailable, which made their health worse than usual. Recently, machine learning has proven useful in many applications, and creative work pertaining to automation has increased. The goal of this study is to provide a medicine recommendation system that can significantly

lower the backlog of specialists.In this study, we developed a medication recommendation system that use a variety of vectorization techniques, including Bow, TF-IDF, Word2Vec, and Manual Feature Analysis, to predict the sentiment from patient evaluations. This system can then be used to prescribe the best medication for a specific illness based on a variety of classification algorithms.

2) APPLICATION OF ML IN DRUG DISCOVERY

AUTHORS:A. Abdelkrim, A. Bouramoul and I. Zenbout

The pipelines involved in drug development and discovery are complex, multidimensional, and dependent depending on a number of variables. A set of tools known as machine learning (ML) techniques can enhance discovery and decision making for well-defined situations with copious amounts of high-quality data. ML is applicable to all phases of the drug discovery process.

process. Examples include prognostic biomarker identification, target validation, and the analysis of digital pathology data in drug trials. The methodology and environment used in different applications have varied, with some approaches yielding accurate forecasts and insights. The primary barriers to machine learning (ML) adoption are the outcomes of ML's interpretability and repeatability issues, which might limit ML's application. In every domain, the creation of thorough and organized high-dimensional data is still required.

3) Medication Rating Creation and Suggestion from Sentiment Analysis of Medication Reviews using Machine Learning

AUTHORS:M. D. Hossain, M. S. Azam, M. J. Ali and H. Sabit

A recommendation system can help the user synthesize requirements and make knowledgeable decisions according to a wealth of intricate data. Suggestions derived from sentiment evaluation appear to be extremely difficult because user-generated information is expressed in a variety of intricate ways utilizing human language. There's been an dearth of investigation on medical and health issues, with most studies concentrating on popular topics like restaurant, movie, and electrical product reviews. An examination of patient sentiment toward healthcare in general and specific medication experiences in particular

can provide important insights into how to prioritize enhancing public health and make the best choices. In this study, we develop and put into practice a framework for a drug recommender system that analyzes drug reviews using sentiment analysis methods.

2. RELATED WORK

The Drug Recommendation System's current iteration was mostly built using the Decision Tree categorization method. Although competent, the first system's accuracy of 99% demonstrated a high degree of drug recommendation reliability. It was observed, although, that the current method only covered a smaller range of medication classes, which might have limited the range of treatment recommendations.

A salient feature of the current system was its dependence on a limited number of attributes. To recommend drugs, the algorithm simply took into account a small number of important factors, including age, blood pressure, blood sugar, temperature, and general health.

The suggested Drug Recommendation System is a major improvement over the current framework, resolving major flaws and adding improvements to boost accuracy and functionality all around. The Random Forest Classifier and the Decision Tree Classifier, in particular, are two sophisticated classification algorithms that are used in the suggested system. By moving away from a purely Decision Tree-based approach, the system is better equipped to identify complex correlations in the dataset,

The proposed system includes a wider range of medication classes in response to the limitations of the current system's limited selection. The proposed approach intends to provide more detailed and comprehensive information on ten different groups that include a range of medical diseases, such as allergies, chickenpox, chronic colds, diabetes, fungal infections, GERD, jaundice, malaria, and pneumonia.

Classification report

A classification report gives you an in-depth examination of your model's performance on each class and the way it strikes a balance between recall and precision.

Here we can mainly describe about the two algorithms that have been used in the project along with the precision call on each disease.
A machine learning performance evaluation tool is a confusion matrix, which displays the accuracy of a classification model. It displays the number of true positives, true negatives, false positives, and false negatives.
Diseases like :

- **itching :** Yes or No
- **skin_rash :** Yes or No
- **nodal_skin_eruptions :** Yes or No
- **continuous_sneezing :** Yes or No
- **shivering :** Yes or No
- **chills :** Yes or No
- **stomach_pain :** Yes or No
- **ulcers_on_tongue :** Yes or No
- **vomiting :** Yes or No
- **cough :** Yes or No
- **chest_pain :** Yes or No
- **yellowish_skin :** Yes or No
- **loss_of_appetite :** Yes or No
- **abdominal_pain :** Yes or No
- **yellow_urine :** Yes or No
- **weight_loss :** Yes or No
- **restlessness :** Yes or No
- **headache :** Yes or No
- **diarrhoea :** Yes or No
- **muscle_pain :**Yes or No
- **red_spots_over_body :** Yes or No
- **runny_nose :** Yes or No
- **breathlessness :** Yes or No
- **fast_heart_rate :** Yes or No
- **dark_urine :** Yes or No

3. CONCLUSION

In conclusion, a major step has been taken in improving the effectiveness and accuracy of medication recommendations during critical healthcare scenarios with the development and evolution of the An AI-Powered Medication Suggestion System in Medical Emergencies. The research started by analyzing the shortcomings of the current system, which was based mostly on the Decision Tree classification algorithm, had a 99% accuracy rate, and could only work with a small number of medication classes and features. The suggested system is a revolutionary improvement that tackles the drawbacks of the previous version. Through the use of sophisticated algorithms, namely the Random Forest Classifier and the Decision Tree Classifier, the system was able to get an astounding 100% accuracy on both training and test datasets. This enhancement highlights the system's resilience and capacity to recognize complex relationships.The feature set has been increased to 30 factors and the number of pharmacological classes has been expanded to 10 unique categories, allowing for a more thorough insight of patient health. The added ability to identify underlying illnesses from given parameters enhances the diagnostic procedure and guarantees more precise. The system's ability to remain up to date with changing medical knowledge is made possible by its dedication to dynamic adaptation, which enhances its continued relevance. Furthermore, the system's design incorporates ethical and regulatory concerns to guarantee that it adheres to best practices in machine learning and healthcare applications.

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