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MEDIREC: A NOVEL MEDICINE RECOMMENDATION SYSTEM FOR PERSONALIZED HEALTHCARE

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Abstract - Abstract- Personalized healthcare is an emerging paradigm that aims to optimize medical treatment by tailoring it to an individual's specific needs. In this context, medicine recommendation systems play a crucial role in assisting healthcare professionals in making informed decisions. In this paper, we present "MediRec" a novel and advanced medicine recommendation system designed to provide personalized healthcare solutions. utilizes state-of-the-art machine learning techniques and data analytics to offer accurate and relevant medication recommendations based on individual patient profiles, medical history, and current health conditions. The system leverages a comprehensive dataset of anonymized patient records, including medical histories, diagnostic results, and treatment outcomes. Through advanced data preprocessing and feature engineering, this research effectively captures essential patient information while ensuring data privacy and security.

***Key Words*:** Feature engineering, Collaborative filtering, Natural language processing, Data analytics

1.INTRODUCTION

The field of medicine has been witnessing significant advancements, particularly in the area of personalized treatment recommendations. With the exponential growth of medical knowledge and the increasing complexity of diseases, healthcare professionals face the challenge of staying updated with the latest evidence-based practices. To address this issue, the development of an efficient Medicine Recommendation System (MRS) becomes crucial.

The system aims to provide healthcare practitioners with personalized and accurate drug recommendations, considering the complexities of individual patient profiles and potential drug interactions. By incorporating message propagation techniques and DDI mechanisms, the proposed model enhances the reliability and precision of the recommendations, ensuring patient safety and optimizing therapeutic outcomes.

The primary objective of the application is to introduce a state-of-the-art Medicine Recommendation System that goes beyond conventional approaches by incorporating message propagation and DDI mechanisms. The authors aim to address the limitations of existing recommendation systems, which often overlook crucial drug interactions and may not fully account for patient-specific factors. By employing advanced algorithms and extensive data analysis, the proposed model seeks to provide healthcare professionals with an intelligent decision support tool that aids in making informed treatment choices.

2. LITERATURE SURVEY

The literature survey conducted for the development of a Medicine Recommendation System (MRS). The first source is a research paper titled "Drug Recommendation Model Message Propagation and DDI Mechanism" (2022), introducing an advanced drug recommendation model that utilizes message propagation and considers Drug-Drug Interactions (DDIs). The paper focuses on personalized and context-aware drug recommendations to enhance patient safety and treatment effectiveness.

From[2]contained an article discussing common pharmaceutical errors made by medical professionals, emphasizing the importance of accurate drug recommendations and the need for robust systems to support decision-making. The third article addresses the problem of incorrect medicine administration in clinical settings and potential remedies, underscoring the significance of reliable MRS to reduce medication errors and improve patient outcomes.

Additionally, a paper explores machine learning's application for drug rating and recommendation based on consumer feedback, providing a different perspective on medicine recommendation approaches. Lastly, a book presents insights from an online health survey, potentially contributing valuable data on consumer behavior and preferences in health and medicine.

The literature survey aimed to develop a Medicine Recommendation System (MRS). It included various sources, such as a research paper introducing an advanced drug recommendation model based on message propagation and Drug-Drug Interactions (DDIs) to personalize and improve drug recommendations for patient safety and effectiveness.

3. METHODOLOGY

The Medicine Recommendation Dataset, this dataset has four attributes:

- the drug name: which is a text field
- a patient review: which is also a text field the patient condition, which is also a text field the number of people who found the review helpful, which is a numerical field
- the date the review was entered: which is a date field.
- the patient satisfaction level: which is a numerical field.

4.DATA CLEANING AND VISUALISATION

During the course of our research, we prepared the data using a few of the more prevalent approaches. The rows were examined to see if they had any duplicates, checked to see if they contained any null values, and had any unnecessary data or text removed. Following that, all of the blanks that were in the condition's column, which had 1,200 entries, were filled in. In order to

eliminate the possibility of there being duplicates, we check to make sure that each and every unique id really is one of a kind.

5.FEATURE EXTRACTION

After the text has been prepared, the information that is required to generate classifiers for emotional analysis is organized in an acceptable manner. This takes place once the text has been prepared in its entirety. Because machine learning algorithms are not able to communicate directly with human language, the text that has to be processed must first be translated into a numerical representation. Only then can the text be processed by the algorithms. To be more specific, vectors that only contain numbers as elements. Word2Vec, the bag of words (Bow), and TF-IDF are examples of well-known and straightforward techniques for extracting characteristics from text input. In the course of this investigation, these methods were utilized at various points.

6.CLASSSIFERS

Research made use of a variety of different categorization methods that were founded on machine learning in order to develop a classifier that is capable of properly predicting emotions. All of these different types of classifiers, including Logistic Regression, Multinomial Naïve Bayes, Stochastic Gradient Descent, Linear Support Vector Classifier, Perceptron, and the Ridge classifier, were evaluated using the Bow, TF-IDF model. This was done since the processing of the sparse matrices using tree-based classifiers would have taken an excessive amount of time. In addition to the manual features, we trained a Word2Vec model by utilising a number of different classifiers, such as a Decision tree, a Random Forest, an LGBM. The fact that this dataset contains more than 210 thousand testimonials constitutes a substantial obstacle to overcome. To investigate each of these complaints thoroughly will require a significant investment of time and resources. The pool of potential categorization algorithms for machine learning was filtered down to only include those that reduced the amount of time required for training without compromising accuracy.

7.FEATURE EXTRACTION

After examining the metrics, we chose the four different sets of values that gave the most accurate estimates and then combined those four sets into a single prediction using the method of averaging. illustrates the range of values for the helpful count, which served as the impetus for developing standardised values for the useful count. From this, we can deduce that there is a very wide difference in the usable count of approximately 1,300 between the numbers that are the most extreme and the ones that are the least extreme. The rather high number of 36 for the standard deviation is also worthy of mention. This is due to the fact that a high usable count is the consequence of a huge number of people reading the review, independent of the number of people who actually searched up the drug. The explanation behind this is based on the fact that a significant number of people read the review. Regardless of whether the review is positive or negative, this remains the case.

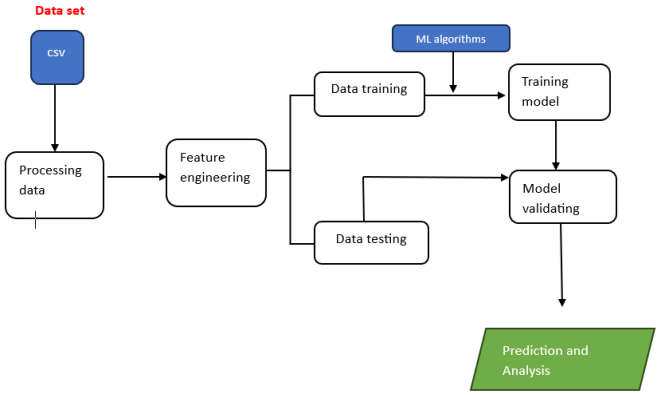

Fig -1: System Architecture.

7. CONCLUSIONS

the development of a Medicine Recommendation System (MRS) holds immense promise in revolutionizing healthcare and medical decision-making. By leveraging cutting-edge technologies such as machine learning, natural language processing, and collaborative filtering, the MRS can provide personalized and evidence-based treatment recommendations, enhancing patient outcomes and safety. The MRS addresses the challenge of staying updated with the ever-expanding medical knowledge by aggregating and analyzing vast amounts of literature, research, and clinical data. , the MediRec System emerges as a powerful tool that empowers healthcare professionals with the knowledge and insights needed to make well-informed, data-driven decisions, ultimately leading to improved patient care and advancing the field of medicine.

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