Drugs On Bugs

A report submitted for the course of

Application Development_Python Explore

II B. Tech II Semester

by

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CERTIFICATE

This is to certify that this bonafide record of the Application Development entitled **"Drugs On Bugs"** submitted by **Ms.Chaitra (2111CS020021), Mr.Kranthi (2111CS030048), Mr.Akhil (2111CS030050),Ms.Medha (2111CS030057)** of II year II sem to the Malla Reddy University, Hyderabad. This bonafide record of work carried out by us under the guidance of our supervision. The contents of this report, in full or in parts, have not been submitted to any other Organization for the award of any Degree.

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DECLARATION

We certify that

a. The work contained in this report is original and has been done by us under the guidance of our supervisor.
b. The work has not been submitted to any other Organization for any degree.
c. We have followed the guidelines provided by the Organization in preparing the report.
d. We have conformed to the norms and guidelines given in the Ethical Code of Conduct of the Organization.
e. Whenever we have used materials (data, theoretical analysis, figures, and text) from other sources, we have given due credit to them by citing them in the text of the report and givingtheir details in the references.

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ABSTRACT

In today's digital era healthcare is one among the major core areas of the medical domain. People trying to find suitable health-related information that they are concerned with. The Internet could be a great resource for this kind of data, however you need to take care to avoid getting harmful information. Nowadays, a colossal quantity of clinical information dispersed totally across different websites on the Internet prevents users from finding useful information for their well-being improvement. Errors in medication are one of the foremost severe medical faults that would be a threat to patients' lives. .During this paper, drug information systems are developed to help end users in distinctive correct medications for a particular wellness based on the reviews of other end-users provided on totally different medications for various specific diseases. The goal of this system is to give information on drugs based on the condition, ratings and reviews for each health condition of a patient.

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LIST OF ABBREVIATIONS

SMR	Structured Medicine Reviews
WHO	World Health Organization
DUR	Drug Utilization Review
NHS	National Health Service
DRD	Drug Review Dataset
NPL	Natural Language Processing

CHAPTER-1

INTRODUCTION

One of the most widely intensive topics on the internet is health-related information. Considering the present state of affairs everywhere the globe, people are more and more concerned about health and medical diagnosis issues. Some of the survey research like the Pew Internet survey says that 55% of the people having Internet, have used the Web to get health-related information . There is a study that focused to direct the actual commonness of searches related to health on the internet by analyzing search terms that people entered into common search engines. Also, to make some preliminary efforts in approximately describing and classifying these searches According to the write-up found in NCBI, it is reported that annually around 99,000 people die, because of mistakes done by medical professionals in hospitals in a ratio of 1:5 These problems raise the requirement to use drugs which are most informative in the field of healthcare to assist end-users make more efficient and accurate health-related decisions. Taking the correct drug is very essential in this fast-growing technological world, which can save lives. In the system, the drug is offered on a specific condition dependent on patient reviews and ratings using technologies like Machine Learning, Data mining, etc. It is based on Content and a Collaborative filtering approach. The basic objective of this Drug system is to design an effective and accurate system for drugs to treat patients. As an outsized range of datasets are available over internet sources, our system will analyze the data and aims to fulfil the objective with accuracy, scalability, and efficiency.

CHAPTER-2

REVIEW OF RELEVENT LITERATURE

Drug utilization review (DUR) is defined as an authorized, structured, ongoing review of prescribing, dispensing and use of medication. DUR encompasses a drug review against predetermined criteria that results in changes to drug therapy when these criteria are not met. It involves a comprehensive review of patients' prescription and medication data before, during and after dispensing to ensure appropriate medication decision-making and positive patient outcomes. As a quality assurance measure, DUR programs provide corrective action, prescriber feedback and further evaluations.

DUR is an ongoing, systematic process designed to maintain the appropriate and effective use of medications.[1] It involves a comprehensive review of a patient's medication and health history before, during, and after dispensing in order to attempt to achieve appropriate therapeutic decision-making and positive patient outcomes. Pharmacists participating in DUR programs can directly improve the quality of care for patients, individually and as populations, by striving to prevent the use of unnecessary or inappropriate drug therapy, prevent adverse drug reactions and improve overall drug effectiveness.

DUR is an authorized and structured ongoing review of practitioner prescribing, pharmacist dispensing and patient use of medications. The purpose of DUR is to ensure drugs are used appropriately, safely and effectively to improve patient health status. Predetermined criteria for appropriate drug therapy are compared against a patient's or a population's records. Non-adherence to criteria results in drug therapy changes. In addition, continual improvement in the appropriate, safe and effective use of drugs has the potential to lower the overall cost of care.

Recent years have seen a formalization of medication review by pharmacists in all settings of care. This article describes the different types of medication review provided in primary care in the UK National Health Service (NHS), summarizes the evidence of effectiveness and considers how such reviews might develop in the future. Medication review is, at heart, a diagnostic intervention which aims to identify problems for action by the prescriber, the clinican conducting

the review, the patient or all three but can also be regarded as an educational intervention to support patient knowledge and adherence. There is good evidence that medication review improves process outcomes of prescribing including reduced polypharmacy, use of more appropriate medicines formulation and more appropriate choice of medicine.

Unique ID	Drug Name	Condition	Review	Rating	Date	Useful Count
230126	Diflucan	Vaginal Yeast Infection	So much better than the creams.	10	1-Mar-09	55
218736	Opana ER	Pain	This medicine did nothing at all for my pain. Glad it works for some, but it didn't for me!	2	1-Aug-09	12
147353	Alprazolam	Anxiety	Changed my life completely, I can actually function in social settings.	10	28-Oct-11	4
126666	Eletriptan	Migraine	The only migraine medicine that has ever worked on me. Now my insurance company will not cover it. Guess I will have to pay for it. It works that good!	10	12-Nov-13	8
90969	Norco	Pain	I also have knee pain, shoulder pain, elbow and hand and finger pain. Norco seems to work best on the knee pain.	10	21-May-12	19

CHAPTER-3

METHODOLOGY

AI-based Drug systems are rapidly becoming more important in the field of healthcare. With vast amounts of medical data and research available, it can be challenging for healthcare professionals to stay up-to-date with the latest treatments and medications.AI-powered drug systems can provide valuable assistance to healthcare professionals in making more informed decisions regarding the best course of treatment for their patients. The dataset used in this research is Drug Review Dataset (Drugs.com) taken from the UCI ML repository . This dataset contains six attributes, name of drug used (text), review (text) of a patient, condition (text) of a patient, useful count (numerical) which suggest the number of individuals who found the review helpful, date (date) of review entry, and a 10-star patient rating (numerical) determining overall patient contentment.

One of the key benefits of using drug review system AI is that it can help identify potential drug interactions and adverse reactions. Such systems analyze patient data, including medical history and current medications, in order to identify potential issues alternatives. Another benefit of AI-powered drug systems is that they can help reduce the risk of medication errors.

By automating the process of medication selection, dosing, and administration, these systems can ensure that patients receive the right medication in the right dose at the right time. This can result in better patient outcomes and a decrease in healthcare costs.

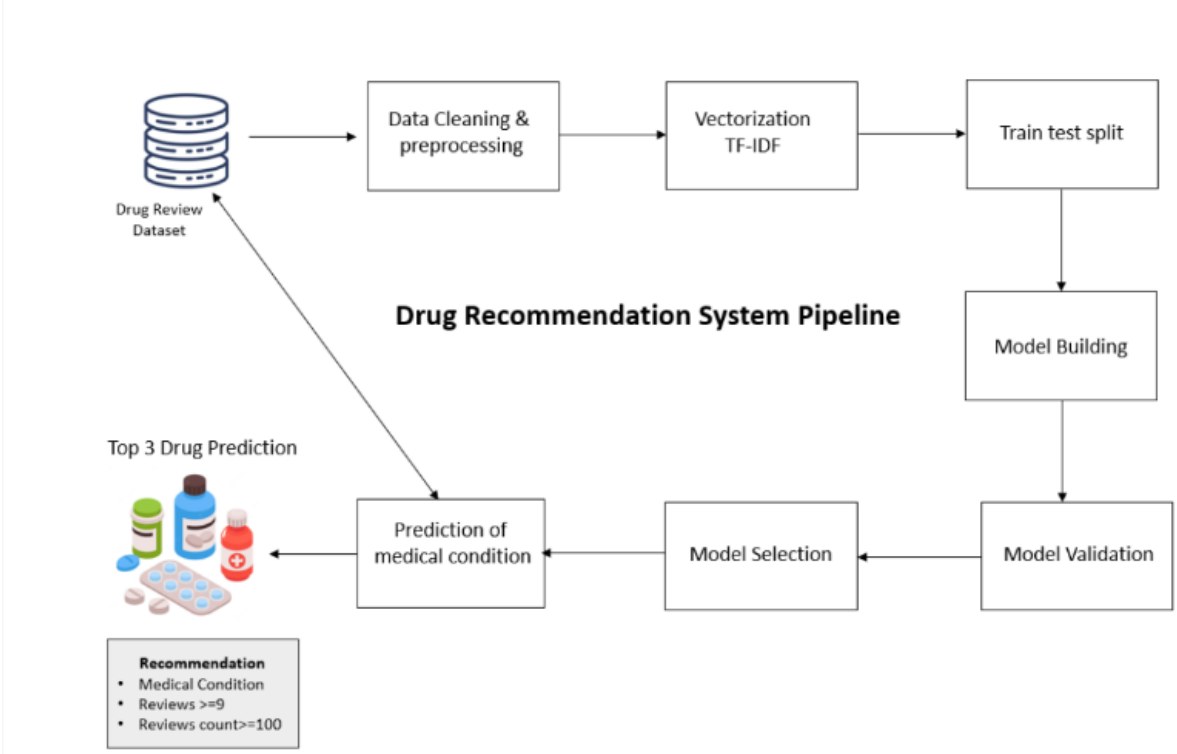


FIG 1.1 The overall flow of the drug system

3.1 PROBLEM DEFINITION

The problem is to provide an effective information on drug system that can analyze patient reviews, ratings and useful counts for specific health conditions. Online user reviews in this domain contain information related to multiple aspects such as the effectiveness of drugs and side effects, which make automatic analysis very interesting but also challenging. However, analyzing the sentiments of drug reviews can provide valuable insights. They might help pharmaceutical companies and doctors to quickly get into bad reviews and know patients' complaints. This sentiment analysis on drug reviews is basically modeled as a classification problem (i.e.,) classifying the sentiment of the user whether positive, negative or neutral based on their choice of words and their reviews. A lot of symptoms and drug sides were hidden under reviews, which will be great to be automatically extracted to improve the drug and help to give a better prescription.

3.2 OBJECTIVES

To provide information on drug based on the rating, review, and useful count, and that can be made based on the following criteria:

1. High rating: If a drug has an overall high rating compared to other drugs in the same category, it can be used as a safe and effective option.

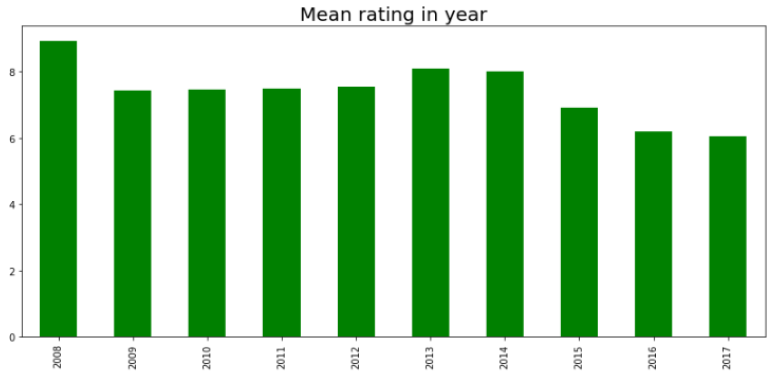


FIG:1.2

2. Positive review: If the majority of reviews for a drug are positive, it can be helpful as a drug which worked well for many patients.

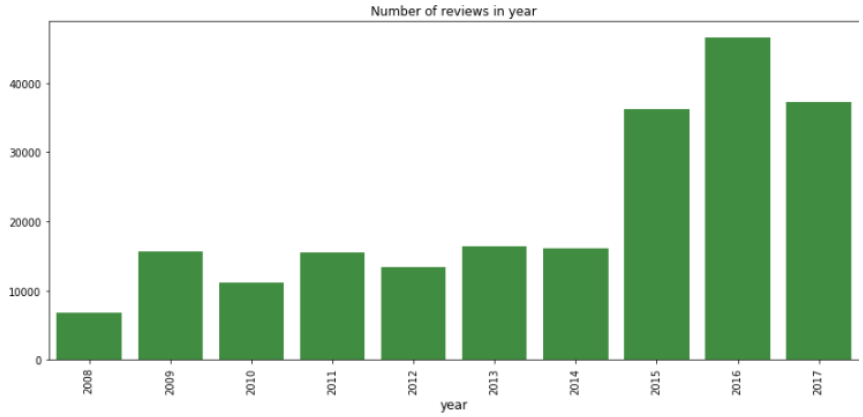


FIG:1.3

3. High useful count: If a review has a high useful count, it means that other patients have found the review helpful. This can indicate that the drug is commonly prescribed and has a positive impact on patients.

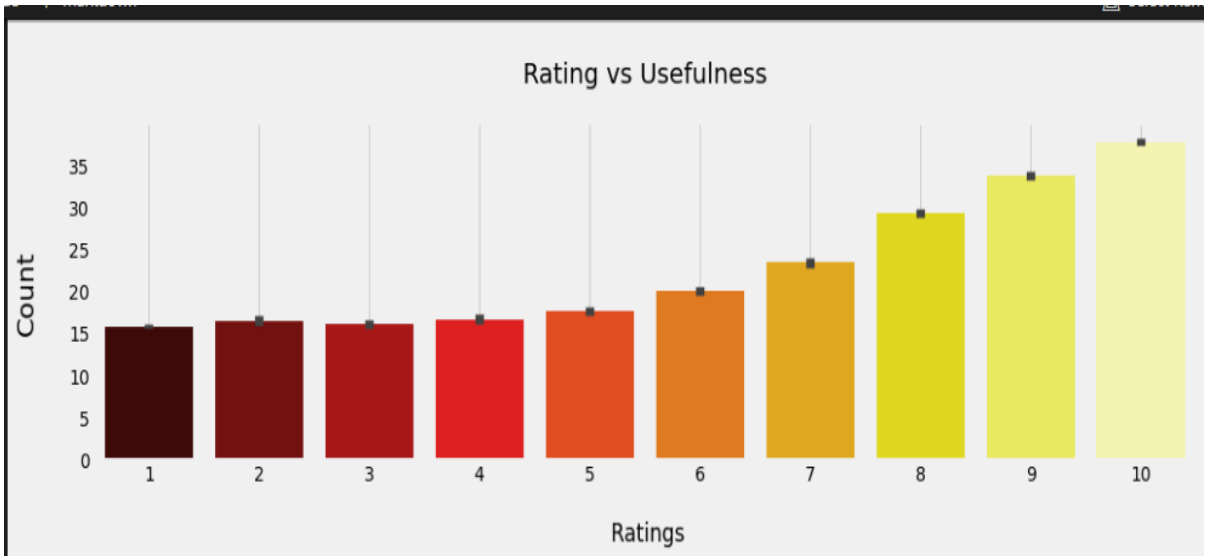


FIG:1.4

Overall, a combination of high rating, positive reviews, and high useful count can indicate that a drug is effective and safe for use. However, it is important to consult with a healthcare professional before taking any medication.

DATASET COLLECTION

In this project, we will be using the **DrugReviews** dataset .The dataset consists of **1,61,297** reviews of the users with **7** columns. the snapshot of the dataset is shared below.

1. `uniqueID` : An identifier for each post.
2. `drugName` : The name of the drug for which review is made.
3. `condition` : The name of the medical condition for which the medicine is used.
4. `review` : The review made by patients for a particular medicine.

5. `rating` : Ratings, given by the patients to each medicine on a scale of 10 where 10 represents the maximum efficacy.
6. `date` : Date of review entry.
7. `usefulCount` : The number of users who found the review useful.

	Unnamed: 0	drugName	condition	review	rating	date	usefulCount
0	206461	Valsartan	Left Ventricular Dysfunction	"It has no side effect, I take it in combinati...	9.0	May 20, 2012	27
1	95260	Guanfacine	ADHD	"My son is halfway through his fourth week of ...	8.0	April 27, 2010	192
2	92703	Lybrel	Birth Control	"I used to take another oral contraceptive, wh...	5.0	December 14, 2009	17
3	138000	Ortho Evra	Birth Control	"This is my first time using any form of birth...	8.0	November 3, 2015	10
4	35696	Buprenorphine / naloxone	Opiate Dependence	"Suboxone has completely turned my life around...	9.0	November 27, 2016	37

Table 1.2 Snapshot of drug review dataset

The dataset consists of drug names, medical conditions, textual reviews of the user, rating given by the user, date of the review, and a total number of useful count which means a total number of users who find the review useful.

It loads a dataset containing the disease and its corresponding medication from a file named *drug.csv*. The code then asks the user for the name of the condition and checks if it is available in the dataset. If it is available, it gets the corresponding condition for the entered drug name along with its rating, review and unique ID and displays them. If it is not available, it prints a message saying that the entered condition is not available in their database

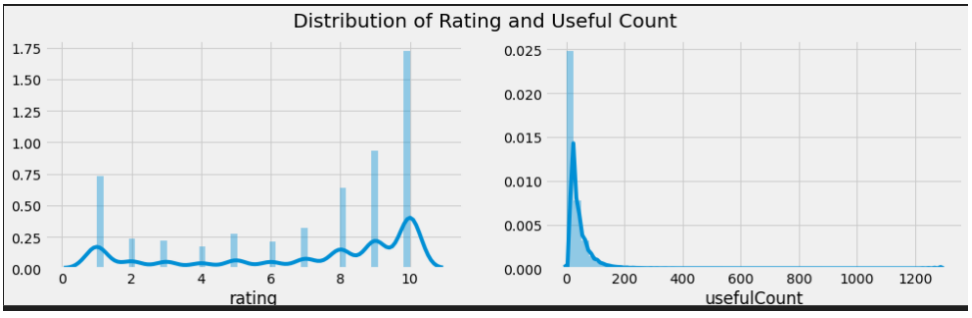


FIG:1.5

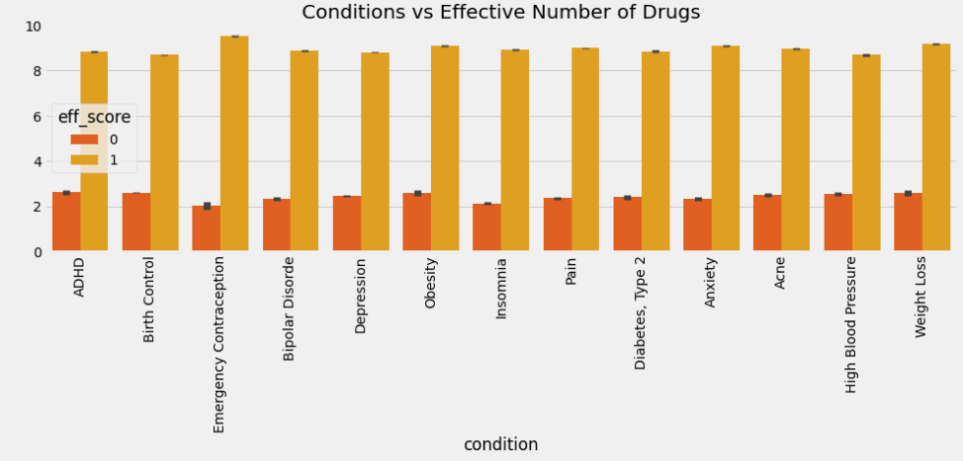


FIG:1.6

DATA PREPROCESSING

1. Data Cleaning:

a) Load your data in Pandas, a Python library that provides tools for data analysis. You can use the function to read your data from a CSV file into a Pandas data frame. Find out the number of missing values for all the attributes Missing Values in The figure shows attributes on X-axis and number of Missing values on Y-axis. It is shown that there area about 1200 missing values only for condition.

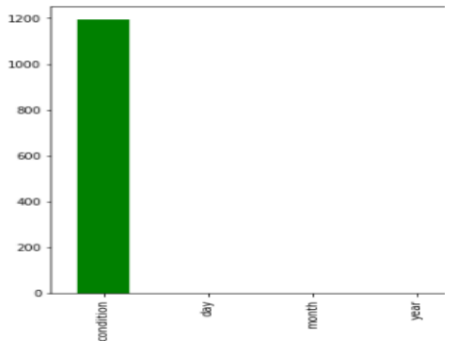


FIG:1.7

b) These missing values can be ignored ,removed or filled. so the rows with missing values can be removed since the dataset is very large.

c)Remove the duplicate rows from the dataset to normalize the data.

d)Delete the conditions with only one drug as only one drug may not be sufficient to represent as the best one.

e) Words like not, needn't, never etc are key parts of emotional analysis so remove them from stop words. Now clean the reviews by removing stop words.

f) Find out the correlation among attributes. It is found that reviews and useful count are highly correlated.

ALGORITHMS

There are several methods and algorithms that can be used to give the information on drugs based on rating, review, and condition. There are some of the methods which are used to give the information they are Rating Aggregation, Personalized Data Engine, Collaborative Filtering, Natural Language Processing(NPL) .

1.Rating Aggregation

Calculate the average rating based on user reviews for each drug. Develop a rating aggregation algorithm that takes into account factors such as the number of reviews, the usefulness count, and the credibility of reviewers. This can help in identifying the top-rated drugs or providing an overall rating for a specific drug.

2.Personalised Data Engine:

Implement to provide information on drugs based upon user preferences and feedback. Collaborative Filtering or Content-Based Filtering techniques can be used to identify similar drugs or to provide data on drugs having high ratings and positive reviews.

3.Collabarative Filtering:

Implement collaborative filtering algorithms to provide personalized drugs based on user ratings and reviews. This method analyzes the behavior of similar users and provide drugs that other users with similar preferences found useful.

4.Natural Language Processing(NPL):

Use NLP techniques like topic modeling or named entity recognition to extract meaningful information from drug reviews. This can help in identifying common topics, side effects, or benefits mentioned in the reviews.

Drug information:

This contains Python code that gives information of medicine. The code imports the necessary libraries such as pandas and numpy. It then loads the dataset containing the disease and its corresponding medication. The user is then asked to enter the name of the condition. The code checks if the entered disease is available in the dataset and if it is, it gets the corresponding medicine for the entered disease and displays it along with its rating, review andusefulcount.

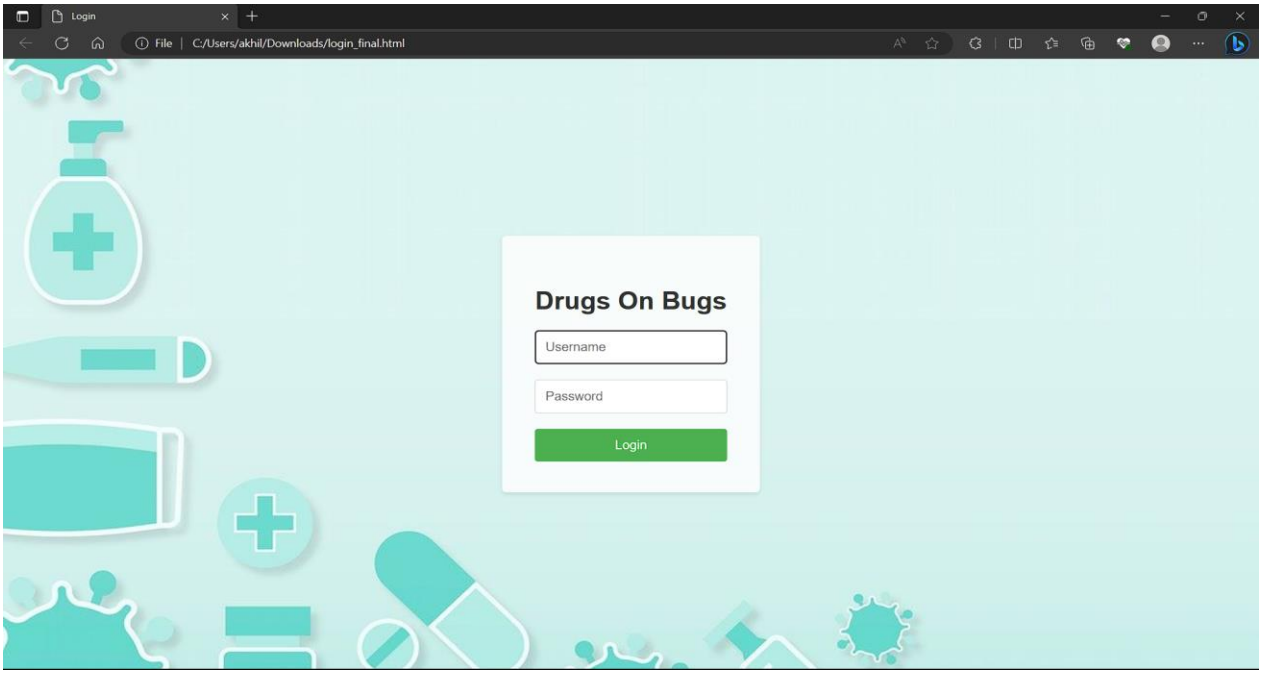
This code can be useful in prescribing medication for patients with specific diseases. However, it is important to note that this code is not intended to replace professional medical advice.

To run application: python app.py in command prompt

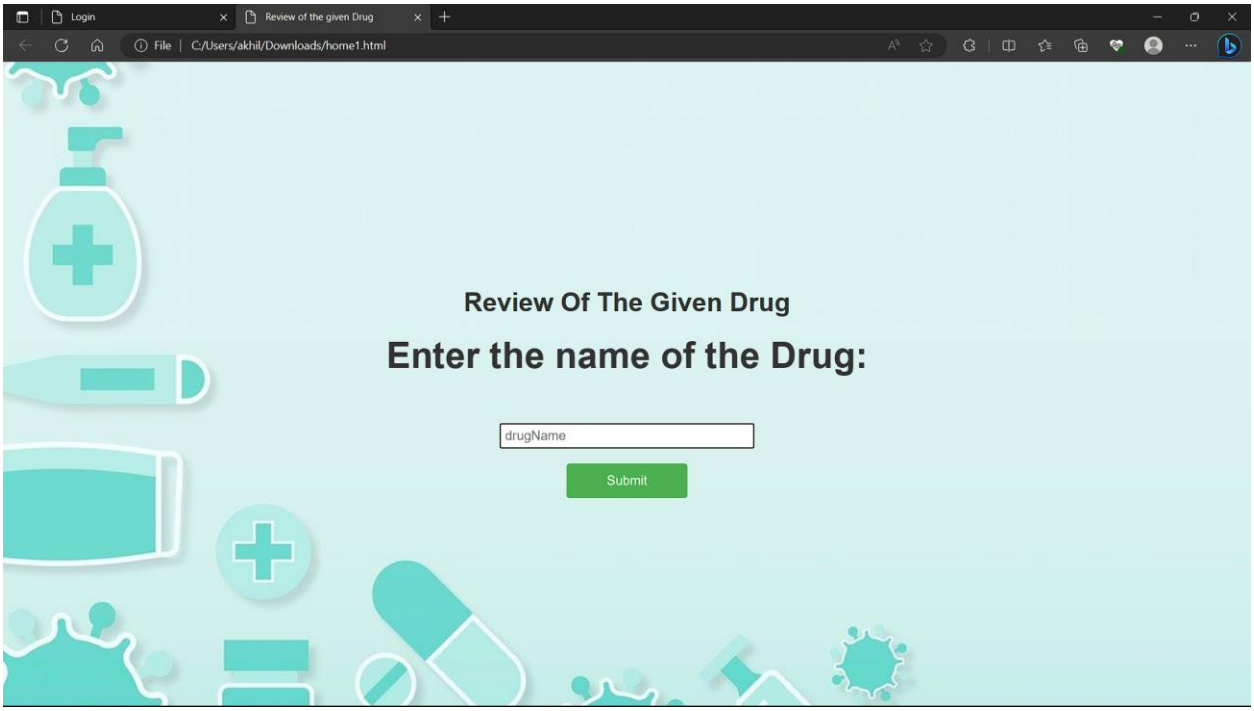
USER INTERFACE

When we see the web page it loads a login page. Upon login in it redirects to the home page.

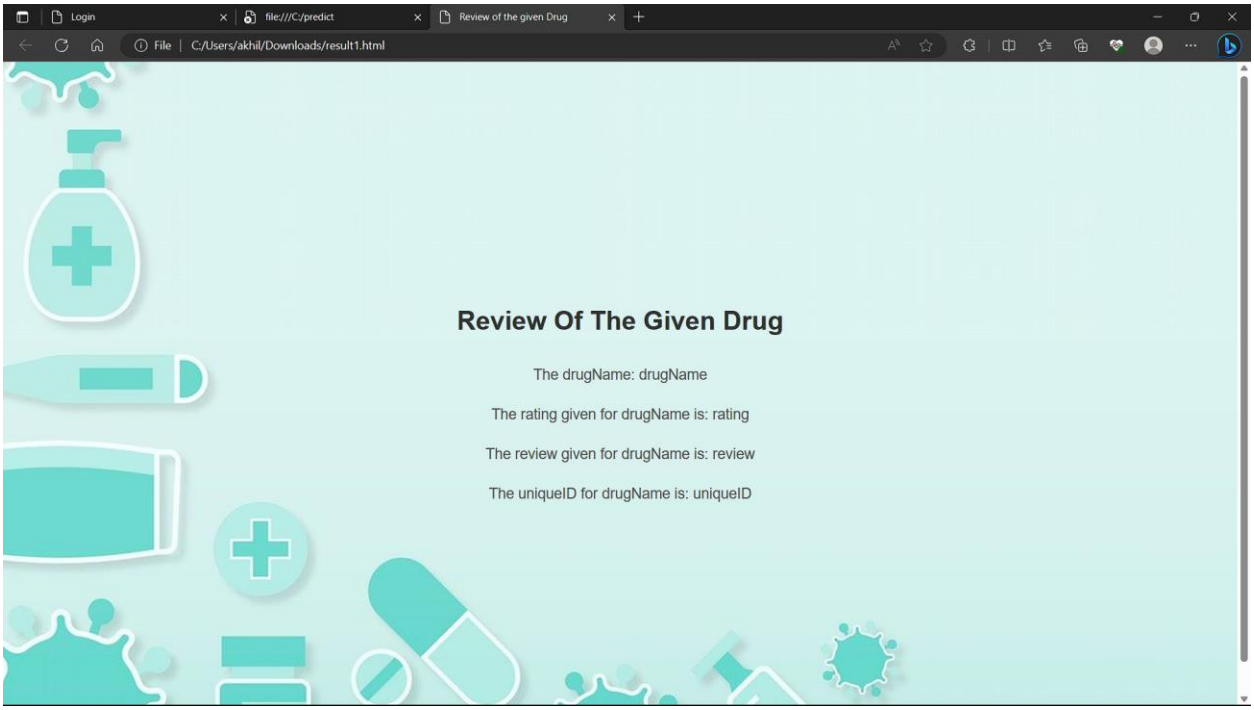
Login.html:



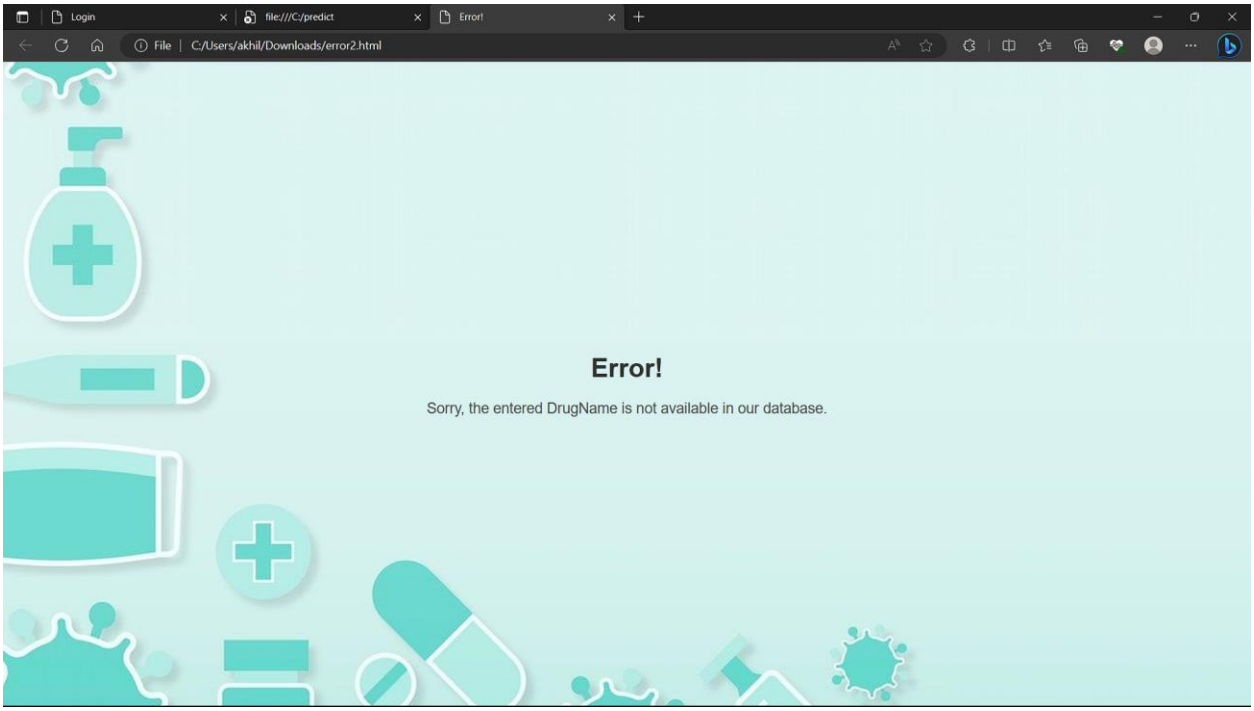
Home.html:



Result.html:



Error.html:


Login
file:///C:/predict
Error!
File | C:/Users/akhil/Downloads/error2.html
Error!
Sorry, the entered DrugName is not available in our database.

CHAPTER-4

RESULTS AND DISCUSSIONS

4.1 EXPERIMENT SETUP:

The system requires hardware, Python3.9, Scikit learn, Numpy, Visual Code , Pandas.

Hardware: The word hardware in computing refers to the physical, tangible parts of a computer system, electrical, electronic, electromechanical, and mechanical component Input devices are keyboard and mouse. The memory contains pieces of information in sections, like books in the library. The programs and data are stored there. It is also known as RAM. The processor works like the human brain, and also it examines and alters data, loads, and carries out program instructions. Also searches for memory programs to run.Cables, cabinets or boxes, peripherals of all kinds, and any other physical element involved, make up the Hardware or material support.

Python: Python was designed to be highly extensible via modules. This compact modularity has made it particularly popular as a means of adding programmable interfaces to existing applications. Van Rossum's vision of a small core language with a large standard library and easily extensible interpreter.

Numpy: NumPy is a Python library used for working with arrays. It also has functions for working in domain of linear algebra, fourier transform, and matrices. NumPy was created in 2005 by Travis Oliphant. It is an open source project and you can use it freely. NumPy stands for Numerical Python. In Python we have lists that serve the purpose of arrays, but they are slow to process. NumPy aims to provide an array object that is up to 50x faster than traditional Python lists. The array object in NumPy is called ndarray, it provides a lot of supporting functions that make working with ndarray very easy. Arrays are very frequently used in data science, where speed and resources are very important.

.

Visual Code: Visual Studio is the fastest IDE for productivity. Target any platform, any device. Build any type of application. Work together in real time. Diagnose and stop problems before they happen. It makes the stuff you do every day more fluid and responsive.

Pandas: Pandas is an open-source library that is made mainly for working with relational or labeled data both easily and intuitively. It provides various data structures and operations for manipulating numerical data and time series. This library is built on top of the NumPy library. Pandas is fast and it has high performance & productivity for users

4.2 DRUG INFORMATION SYSTEM:

After assessing the metrics, all four best-predicted results were picked and joined together to produce the combined prediction. The merged results were then multiplied with normalized useful count to generate an overall score of drug of a particular condition. The higher the score, the better is the drug. The motivation behind the standardization of the useful count was looking at the distribution of useful count

CHAPTER-5

CONCLUSION AND FUTURE SCOPE OF STUDY

In this work, each review was classified as positive or negative, depending on the user's star rating. Ratings above five are classified as positive, while negative ratings are from one to five-star ratings. Initially, the number of positive ratings and negative ratings in training data were approx:111583 and 47522, respectively

Giving information on medicines based on rating, review and useful count is a complex topic. While patient reviews can be helpful in providing feedback on the effectiveness of a medication, it is important to note that they are not always reliable sources of information. The World Health Organization (WHO) has published a guide to good prescribing that outlines ten principles of good prescribing. One of the principles is to "be clear about the reasons for prescribing" and another is to "establish an accurate diagnosis whenever possible" .

Structured Medicine Reviews (SMRs) are an evidence-based and comprehensive review of a patient's medication, taking into consideration all aspects of their health. In a structured medication review clinicians and patients work as equal partners to understand the balance between the benefits and risks of and alternatives of taking medicines.

A medicine recommendation system is similar system that gives data on the medicines for a particular disease based on patient reviews. This system is very essential in this fast growing technological world, which can save lives by helping doctors.

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APPENDIX

```
import pandas as pd

# Load the drug-review dataset
df = pd.read_csv("drug.csv")

def get_reviews(drug_name):
    # Filter the dataset for the given drug name
    filtered_df = df[df['drugName'].str.lower() == drug_name.lower()]

    # Get the required columns: condition, rating, review, and useful count
    conditions = filtered_df['condition']
    ratings = filtered_df['rating']
    reviews = filtered_df['review']
    useful_counts = filtered_df['usefulCount']

    return conditions, ratings, reviews, useful_counts

# Prompt the user to input a drug name
drug_name = input("Enter a drug name: ")

# Get the reviews for the specified drug name
conditions, ratings, reviews, useful_counts = get_reviews(drug_name)

if len(conditions) > 0:
    # Print the information for each review
    print(f"Reviews for '{drug_name}':")

    for condition, rating, review, useful_count in zip(conditions, ratings, reviews, useful_counts):
        if rating > 5:
            print(f"Condition: {condition}")
            print(f"Rating: {rating}")
            print(f"Rating: good")
            print(f"Review: {review}")
            print(f"Useful Count: {useful_count}")
            print("====================")
        elif rating == 5:
            print(f"Condition: {condition}")
            print(f"Rating: {rating}")
            print(f"Rating: Average")
            print(f"Review: {review}")
            print(f"Useful Count: {useful_count}")
            print("====================")
        elif rating <5:
```

```
        print(f"Condition: {condition}")
        print(f"Rating: {rating}")
        print(f"Rating: bad")
        print(f"Review: {review}")
        print(f"Useful Count: {useful_count}")
        print("====================")

else:
    print(f"No reviews found for '{drug_name}'.")
```

HTML CODE FOR USER INTERFACE:

LOGIN.html:

```
<!DOCTYPE html>
<html>
<head>
    <title>Login</title>
    <style>
        body {
            font-family: Arial, sans-serif;
            margin: 0;
            padding: 0;
            background-image: url("C:\Users\akhil\Downloads\homepage.jpg");
            background-size: cover;
            background-position: center;
            background-repeat: no-repeat;
            display: flex;
            justify-content: center;
            align-items: center;
            height: 100vh;
            background: url("homepage.jpg") no-repeat center center fixed;
            background-size: cover;
        }

        .container {
            background-color: rgba(255, 255, 255, 0.8);
            border-radius: 5px;
            padding: 40px;
            box-shadow: 0 2px 5px rgba(0, 0, 0, 0.1);
            text-align: center;
            max-width: 400px;
        }
```

```
        .login-title {
            color: #333;
            font-size: 32px;
            margin-bottom: 20px;
        }

        .input-field {
            width: 100%;
            padding: 12px;
            margin-bottom: 20px;
            font-size: 16px;
            border: 1px solid #ccc;
            border-radius: 4px;
            box-sizing: border-box;
        }

        .submit-btn {
            width: 100%;
            padding: 12px;
            background-color: #4CAF50;
            color: white;
            border: none;
            font-size: 16px;
            border-radius: 4px;
            cursor: pointer;
        }

        .submit-btn:hover {
            background-color: #45a049;
        }
    </style>
</head>
<body>
    <div class="container">
        <h2 class="login-title">Drugs On Bugs</h2>
        <form>
            <input type="text" id="username" name="username" placeholder="Username"
class="input-field"><br>
            <input type="password" id="password" name="password" placeholder="Password"
class="input-field"><br>

                                                                    <button
onclick="login()" target="_self" class="submit-btn">Login</button>

        </form>
```

```
   </div>
</body>
<script>
function login() {
  var username = document.getElementById("username").value;
  var password = document.getElementById("password").value;

  if (username == "a" && password == "1") {
    window.open("home1.html");
  } else {
    alert("Invalid username or password");
  }
}
</script>
</html>
```

HOME.html:

```
<!DOCTYPE html>
<html>
<head>
   <title>Review of the given Drug</title>
   <style>
      body {
         font-family: Arial, sans-serif;
         margin: 0;
         display: flex;
         justify-content: center;
         align-items: center;
         height: 100vh;
         background: url("homepage.jpg") no-repeat center center fixed;
         background-size: cover;
      }

      h1 {
         color: #333;
         text-align: center;
      }
      form {
         text-align: center;
      }

      label {
         display: block;
         margin-bottom: 10px;
         color: #333;
```

```
            font-size: 45px;
            text-align: center;
        }

        input[type="text"] {
            width: 300px;
            padding: 5px;
            font-size: 16px;
        }

        .submit-btn {
            width: 25%;
            padding: 12px;
            background-color: #4CAF50;
            color: white;
            border: none;
            font-size: 16px;
            border-radius: 4px;
            cursor: pointer;
        }

        .submit-btn:hover {
            background-color: #45a049;
        }
    </style>
</head>
<body>
    <div class="container">
        <h1>Review Of The Given Drug</h1>
        <form action="/predict" method="post">
            <h2> <label for="drugName">Enter the name of the Drug:</label><br></h3>
            <input type="text" id="drugName" name="drugName"
placeholder="drugName"><br><br>
<button onclick="search()" target="_self" class="submit-btn">Submit</button>
        </form>
    </div>
</body>
<script>
function search(){
  var drugName = document.getElementById("drugName").value;
  if (drugName=="drugname") {
    window.open("result1.html");
  } else {
    window.open("error2.html");
  }
}
```

```
</script>
</html>
```

RESULT.html:

```
<!DOCTYPE html>
<html>
<head>
   <title>Review of the given Drug</title>
   <style>
      body {
         font-family: Arial, sans-serif;
         background-color: #f5f5f5;
         margin: 0;
         padding: 20px;
         display: flex;
         flex-direction: column;
         justify-content: center;
         align-items: center;
         min-height: 100vh;
         background: url("homepage.jpg") no-repeat center center fixed;
         background-size: cover;
      }
      h1 {
         color: #333;
         text-align: center;
         margin-bottom: 20px;  }
      p {
         color: #555;
         font-size: 18px;
         text-align: center;
         margin-bottom: 10px;
      }
   </style>
</head>
<body>
   <h1>Review Of The Given Drug</h1>
   <p>The drugName: drugName </p>
   <p>The rating given for  drugName  is:  rating </p>
   <p>The review given for  drugName  is:  review </p>
   <p>The uniqueID for  drugName  is: uniqueID </p>
</body>
</html>
```

ERROR.html:

```
<!DOCTYPE html>
```

```
<html>
<head>
   <title>Error!</title>
   <style>
      body {
         font-family: Arial, sans-serif;
         background-color: #f5f5f5;
         margin: 0;
         display: flex;
         justify-content: center;
         align-items: center;
         height: 100vh;
         background: url("homepage.jpg") no-repeat center center fixed;
         background-size: cover;
      }

      h1 {
         color: #333;
         text-align: center;
      }

      p {
         color: #555;
         font-size: 18px;
         text-align: center;
      }
   </style>
</head>
<body>
   <div class="container">
      <h1>Error!</h1>
      <p>Sorry, the entered DrugName is not available in our database.</p>
   </div>
</body>
</html>
```