A

PROJECT REPORT

On

"Medicine Recommendation System
Using Machine Learning"

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IN

ELECTRONICS AND TELECOMMUNICATION

BY

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ABSTRACT

Most of the people tend to live a long and healthy life, but people are busy in their day-to-day life and it is not possible for everyone to visit doctors for minor symptoms of a disease. Many of people do not know about medicines and to visit a doctor and consult for minor symptoms for medicines it is time consuming process. As AI and machine learning like emerging technology can help us to create a recommend system that will prescribe medicine and this system can predict accurately a medicine to user. In this paper proposes the medicine recommend system which will predict disease and medicine according to symptoms entered by patients/user.

CHAPTER 1

INTROCUCTION

1.1 Overview

Nowadays, people are busy in their day-to-day life, and it is not feasible for everyone to visit doctor for minor symptoms of a disease. To visit a hospital is time consuming process and in recent Covid-19 pandemic time all hospitals were too busy, it was impossible to visit doctors for minor symptoms. Many of people had taken wrong medicines in that panic situation. There was no one to recommend. The precision medicine plays an important role to provide quality treatment and individually care for each patient.

Now as the era of Artificial intelligence (AI) came in existence the area of computer applications gets significantly boost up. The concept of artificial intelligence is nothing but the simulation of the human intelligence processed in computers. The development of artificial intelligent is based on the process of machine learning which includes getting information, evolving rules for extracting the information, illustrating approximate or definite inferences and verification. The successes of artificial intelligent are based on the accuracy of machine learning algorithms.

The accuracy of machine learning algorithm is mainly based on the availability of significant training dataset. Now days, we have enormous data for training a system. In this work, we are trying to analyze and explore the suitable medicine for a disease recommended by our system. Our research is to build a Machine Learning based system that can recommend the medicine based on the disease symptoms. We have seen that there are many diseases that share common medicines for treatment, if symptoms are common between the disease. So, the algorithm finds most common disease then suggest the medicine to user.

1.2 Background

Out of the pressure of Digital Transformation, the major industrial domains are using advanced and efficient digital technologies to implement processes that are applied on a daily basis. Unfortunately, this still does not happen in the same way in the medical domain. It could be revolutionizing the medical sectors, already doctors are very busy and recent COVID-19 pandemics all hospitals were too busy, it was impossible to visit hospitals for minor disease and symptoms. Using AI (Artificial Intelligence) we can create recommender system, that can reduce the work load of doctors and hospitals.

1.3 Aim

To design and implement a system that will predict the disease and prescribe the medicine of the disease using Machine Learning.

1.4 Problem Statement

Nowadays, people are busy in their day-to-day life, and it is not feasible for everyone to visit doctor for minor symptoms of a disease. It is also a time spending process to visit a doctor and consult him for minor disease. In modern time people want everything faster or less timing consuming.

1.5 Objective

- This system will predict disease according to the symptoms that are entered by user/patients.
- System prescribes medicine according to the disease.
- It will be highly accurate.
- Easy to use for every user

1.6 Advantages

- Suggest Quality Medicine.
- Time efficient
- Cost efficient
- Available to everyone and at any time.
- No middleman.
- Multiple patients can get medication at any time.

1.7 Summary

This chapter gives a brief overview of Medicine Recommend System Using Machine Learning. Application of Machine Learning and three algorithms are well explained in this chapter. It gives a brief look on problem definition and objective of overall system.

CHAPTER 2

LITERATURE SURVEY

Since coronavirus has shown up, inaccessibility of legitimate clinical resources is at its peak, like the shortage of specialists and healthcare workers, lack of proper equipment and medicines etc. The entire medical fraternity is in distress, which results in numerous individual's demise. Due to unavailability, individuals started taking medication independently without appropriate consultation, making the health condition worse than usual. As of late, machine learning has been valuable in numerous applications, and there is an increase in innovative work for automation. This paper intends to present a drug recommender system that can drastically reduce specialist's heap. In this research, we build a medicine recommendation system that uses patient reviews to predict the sentiment using various vectorization processes like Bow, TF-IDF, Word2Vec, and Manual Feature Analysis, which can help recommend the top drug for a given disease by different classification algorithms. The predicted sentiments were evaluated by precision, recall, f1score, accuracy, and AUC score. The results show that classifier Linear SVC using TF-IDF vectorization outperforms all other models with 93% accuracy [1].

Most of the people tend to live a long and healthy life, where they are more conscious about their health. But many studies show that almost many people die due to the medical errors caused in terms of taking wrong medicines and these errors are caused by doctors, who prescribe medicines based on their experiences which are quite limited. As machine learning, deep learning and data mining like technologies that are emerging day by day, these technologies can help us to explore the medical history and can reduce medical errors by being doctor friendly. In this paper proposes a medicine recommendation system, which takes the patient review data and performs sentiment analysis on it to find the best medicine for a disease by using N-Gram model. In order to increase the accuracy, a Light model is used to perform medication analysis. The paper also discusses the advantages, disadvantages and enhancements that can be incorporated to improve the accuracy [2].

Medicine recommender systems can assist the medical care providers with the selection of an appropriate medication for the patients. The advanced technologies available nowadays can help developing such recommendation systems which can lead to more concise decisions. Many existing medicine recommendation systems are developed based on different algorithms. Thus, it is crucial to understand the state-of-the-art developments of these systems, their advantages and disadvantages as well as areas which require more research. In this paper, we conduct a literature review on the existing solutions for medicine recommender systems, describe and compare them based on various features, and present future research directions [3].

In this paper, we review the existing medicine recommendation system solutions, and compare them based on various features. The goal is to demonstrate the existing solutions for the healthcare providers in order to improve the medicine selection process and select an appropriate medication for the patients [4].

Databases can contain information about the author(s) and his/their published scientific works or results of research/investigation, including bibliographic data, abstract or full text of the paper. The databases are collecting and processing the best scientific and professional papers, or reviews and case reports published in scientific and professional journals or other publications. The reliability and quality of information guarantees producers of databases. Most important databases are located in famous university/academic centres like Bethesda [National Library Medicine (NLM)], Philadelphia (ISI), Amsterdam (Elsevier), Ipswich (EBSCO), Geneva (WHO), Moscow (RAS), Shiraz [Islamic World Science Citation Centre (ISC)], Warsaw [Index Copernicus (IC)]. Author of this review article shortly described most important online databases of biomedical literature today which will be useful for scientists or other medical professionals [5].

Machine Learning (ML) has unfolded from the Artificial Intelligence, a field of computer science. Machine Learning (ML) is multidisciplinary field, a combination of statistics and computer science algorithms which is widely used in predictive analyses and classification. The second section of the paper focus to influence the basic machine learning methods and algorithms. This paper will go through the various machine learning tools needed to run the machine learning projects. The main concern of concerned paper is, the study the main approaches and case studies of using machine learning for forecasting in different areas such stock price forecasting, tourism demand forecasting, solar irradiation forecasting, supply chain demand and consideration of neural network in machine learning methods [6].

Recommender System (RS) is one of the most popular applications of Artificial Intelligence which attracted researchers all around the world. Many machine learning algorithms are used to develop RSs. Choosing the best machine learning algorithm to provide users with a product or service is the most challenging task in the area of RSs. Now we are witnessing a paradigm shift in the purchase habits of people from in-shop to online resulting in the availability of online information exponentially growing every day. The ever-increasing online information and the number of online users create new avenues in RS. In an online shopping scenario, these systems must be able to recommend relevant items to the users. The RSs have to deal with the huge amount of information by filtering the relevant information based on the analysis made on the inputs made by the users during their online sessions. These systems can recommend appropriate items to users based on their interest and previous preference which can lead to increased sales. The three major techniques used to build a RS are content-based, collaborative based and hybrid-based. This paper presents the various applications of RSs and makes a detailed comparative study of different machine learning approaches used. The methodologies used for identifying research articles for analysis, the merits and demerits of different techniques in RSs and domain-specific applications of these techniques are well explained here with scientific review analysis [7].

Recommender systems use algorithms to provide users with product or service recommendations. Recently, these systems have been using machine learning algorithms from the field of artificial intelligence. However, choosing a suitable machine learning algorithm for a recommender system is difficult because of the number of algorithms described in the literature. Researchers and practitioners developing recommender systems are left with little information about the current approaches in algorithm usage. Moreover, the development of a recommender system using a machine learning algorithm often has problems and open questions that must be evaluated, so software engineers know where to focus research efforts. This paper presents a systematic review of the literature that analyses the use of machine learning algorithms in recommender systems and identifies research opportunities for software engineering research. The study concludes that Bayesian and decision tree algorithms are widely used in recommender systems because of their relative simplicity, and that requirement and design phases of recommender system development appear to offer opportunities for further research [8].

More and more people are hearing about the health and medical diagnosis problems. However, according to the administration's report, more than 200 thousand people in China, even 100

thousand in USA, die each year due to medication errors. More than 42% medication errors are caused by doctors because experts write the prescription according to their experiences which are quite limited. Technologies as data mining and recommender technologies provide possibilities to explore potential knowledge from diagnosis history records and help doctors to prescribe medication correctly to decrease medication error effectively. In this paper, we design and implement a universal medicine recommender system framework that applies data mining technologies to the recommendation system. The medicine recommender system consists of database system module, data preparation module, recommendation model module, model evaluation, and data visualization module. We investigate the medicine recommendation algorithms of the SVM (Support Vector Machine), BP neural network algorithm and ID3 decision tree algorithm based on the diagnosis data. Experiments are done to tune the parameters for each algorithm to get better performance. Finally, in the given open dataset, SVM recommendation model is selected for the medicine recommendation module to obtain a good trade-off among model accuracy, model efficiency, and model scalability. We also propose a mistake-check mechanism to ensure the diagnosis accuracy and service quality. Experimental results show our system can give medication recommendation with an excellent efficiency, accuracy and scalability [9].

Nowadays people are progressively started caring about the health and medical diagnosis problems. However, according to the administration's report, more than 1 crore people every year die due to medication error done by novices (New doctor's). More than 42% medication errors are caused by doctors because they provide prescriptions according to their experience which are quite limited. And sometimes they have left many parts of the book they have read Technologies as data mining and recommender technologies provide possibilities to explore potential knowledge from diagnosis history and help the doctors to prescribe medication correctly to decrease the medication error. In this recommendation we will design and implement a universal medicine recommender system framework that applies data mining technologies to the recommendation system. The medicine recommender system consists of database system module, recommendation model module, model evaluation, and data visualization module. We investigated different medicine recommendation algorithms which are generally used in recommendation system SVM (Support Vector Machine), BP neural network algorithm and ID3 decision tree algorithm based on the diagnosis data. Each algorithm is checked to get better performance. Finally, in the given open data set, SVM recommendation model is selected for the medicine recommendation module to obtain a good trade-off among

model accuracy and model efficiency, Experimental results shows that our system will be able to give proper medication recommendation [10].

Identification of drug-drug and drug-diseases interactions can pose a difficult problem to cope with, as the increasingly large number of available drugs coupled with the ongoing research activities in the pharmaceutical domain, make the task of discovering relevant information difficult. Although international standards, such as the ICD-10 classification and the UNII registration, have been developed in order to enable efficient knowledge sharing, medical staff needs to be constantly updated in order to effectively discover drug interactions before prescription. The use of Semantic Web technologies has been proposed in earlier works, in order to tackle this problem [11].

Recommendation system is a data filtering technique. They are used to provide suggestions to the users according to their interest and need. It is a very popular technique in recent years and used by many e-commercial websites and other platforms to recommend news, books, movies, shopping items, novels, music and much more that is why recommendation system has become a hot topic. Recommendation systems are the subset of data filtering systems. The different types of recommendation systems are used in different platforms and have become an important part of various applications. It is a decision-making process that will help the users to buy items in which they are interested. Recommendation systems are very useful and effective technique of filtering the data. This paper is a review of recommendation systems that will describe recommendation system, how it works and helps in different platforms, and the different types of it with their merits and limitations [12].

Nowadays, the recommendation system has made finding the things easy that we need. Movie recommendation systems aim at helping movie enthusiasts by suggesting what movie to watch without having to go through the long process of choosing from a large set of movies which go up to thousands and millions that is time consuming and confusing. In this article, our aim is to reduce the human effort by suggesting movies based on the user's interests. To handle such problems, we introduced a model combining both content-based and collaborative approach. It will give progressively explicit outcomes compared to different systems that are based on content-based approach. Content-based recommendation systems are constrained to people, these systems don't prescribe things out of the box, thus limiting your choice to explore more. Hence, we have focused on a system that resolves these issues [13].

Due to increase of data on internet, there is an increased dependency on internet by people Thus, recommendation systems help people by suggesting products where is overload of information on ecommerce websites. There are various methods for recommendation. This paper study about various techniques used in designing of recommendation system with machine learning algorithm [14].

Recommender systems use algorithms to provide users with product or service recommendations. Recently, these systems have been using machine learning algorithms from the field of artificial intelligence. However, choosing a suitable machine learning algorithm for a recommender system is difficult because of the number of algorithms described in the literature. Researchers and practitioners developing recommender systems are left with little information about the current approaches in algorithm usage. Moreover, the development of a recommender system using a machine learning algorithm often has problems and open questions that must be evaluated, so software engineers know where to focus research efforts. This paper presents a systematic review of the literature that analyses the use of machine learning algorithms in recommender systems and identifies research opportunities for software engineering research. The study concludes that Bayesian and decision tree algorithms are widely used in recommender systems because of their relative simplicity, and that requirement and design phases of recommender system development appear to offer opportunities for further research [15].

A database is a system used to manage data on a computer system. There are several database work systems that have their own laws and ways of working. Data are arranged in various levels. In computer data are classified in a hierarchy. A higher level consists of one or more data at a lower level. Example: a folder has several sub folders; some subfolders have several files. Management of database management requires a tool / tool to be able to manage it, so that database management can continue to be managed and continue to improve its performance. With the existence of an information system, an organization will strive to be more competitive and efficient, which in turn adds value to obtaining, changing, and distributing information with the aim of increasing decision making, increasing organizational performance in achieving its organizational goals. An effective Information System provides accurate, timely, and relevant information to users so that it can be used for decision making. In making decisions, both in daily operations, as well as in strategic planning into the future. The decision-making process

must be based on timely and appropriate data and information so that the decisions taken are on target. Information is obtained from data processing, and data processing is carried out by information systems with the support of information technology [16].

In this paper, we would like to discuss the methods and ideologies used to create a database to be used for Human Resource purposes. Because we want this database to be accessible anywhere at any time, it is safe to conclude that an internet-based (web-based) database would work best, therefore we chose MySQL as the database management system. Before diving deep into the making of the database itself, it is important to understand certain basics of database design and the phases of the database life cycle itself. This paper will conclude on a few of the basic things to understand before designing a database for Human Resource Management on MySQL [17].

Cutting edge improved techniques gave greater values to Artificial Intelligence (AI) and Machine Learning (ML) which are becoming a part of interest rapidly for numerous types of research presently. Clustering and Dimensionality Reduction Techniques are one of the trending methods utilized in Machine Learning these days. Fundamentally clustering techniques such as K-means and Hierarchical is utilized to predict the data and put it into the required group in a cluster format. Clustering can be utilized in recommendation frameworks, examination of clients related to social media platforms, patients related to diseases of specific age groups can be categorized, etc. While most aspects of the dimensionality lessening method such as Principal Component Analysis and Linear Discriminant Analysis are a bit like the clustering method, but it decreases the data size and plots the cluster. In this paper, a comparative and predictive analysis is done utilizing three different datasets namely IRIS, Wine, and Seed from the UCI benchmark in Machine learning on four distinctive techniques. The class prediction analysis of the dataset is done employing a flask-app. The main aim is to form a good clustering pattern for each dataset for given techniques. The experimental analysis calculates the accuracy of the shaped clusters used different machine learning classifiers namely Logistic Regression, K-nearest neighbors, Support Vector Machine, Gaussian Naïve Bayes, Decision Tree Classifier, and Random Forest Classifier. Cohen Kappa is another accuracy indicator used to compare the obtained classification result. It is observed that Kmeans and Hierarchical clustering analysis provide a good clustering pattern of the input dataset than the dimensionality reduction techniques. Clustering Design is well-formed in all the techniques. The KNN classifier provides an improved accuracy in all the techniques of the dataset [18].

CHAPTER 3

METHODOLOGY

3.1 Block Diagram
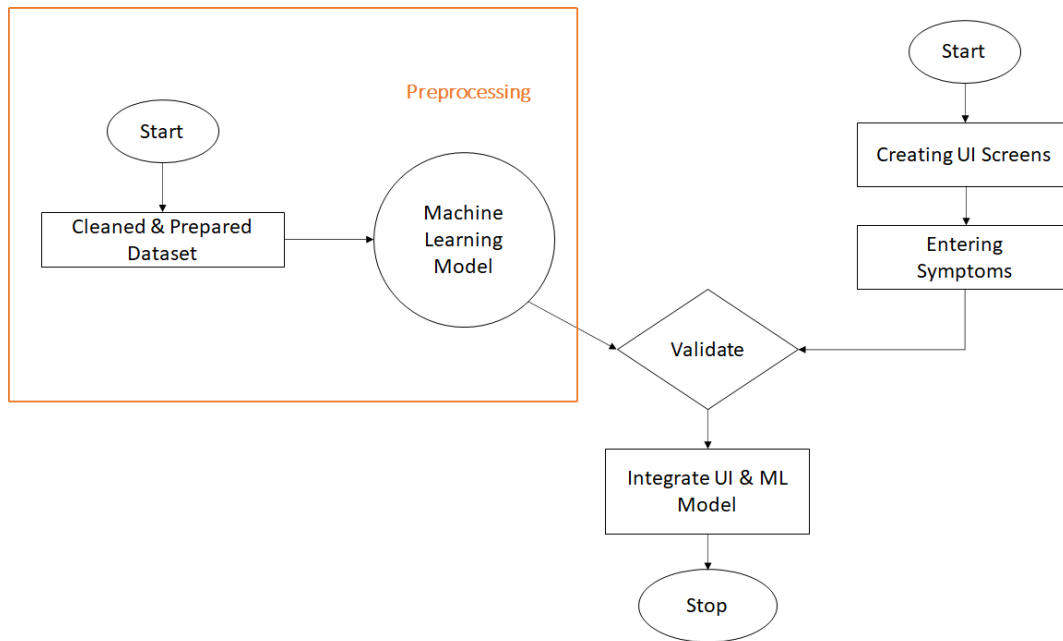
Figure 1: Block diagram of System

3.2 Machine Learning

Machine Learning is the field of study that gives computers the capability to learn without being explicitly programmed. ML is one of the most exciting technologies that one would have ever come across. As it is evident from the name, it gives the computer that makes it more similar to humans: ***The ability to learn***. Machine learning is actively being used today, perhaps in many more places than one would expect.

3.3 Libraries

Python's standard library is very extensive, offering a wide range of facilities. The library contains built-in modules (written in C) that provide access to system functionality such as file I/O that would otherwise be inaccessible to Python programmers, as well as modules written in Python that provide standardized solutions for many problems that occur in everyday programming. Some of these modules are explicitly designed to encourage and enhance the portability of Python programs by abstracting away platform-specifics into platform-neutral APIs.

3.3.1 NumPy

NumPy is the fundamental package for scientific computing in Python. It is a Python library that provides a multidimensional array object, various derived objects (such as masked arrays and matrices), and an assortment of routines for fast operations on arrays, including mathematical, logical, shape manipulation, sorting, selecting, I/O, discrete Fourier transforms, basic linear algebra, basic statistical operations, random simulation and much more.

3.3.2 Pandas

Pandas is mainly used for data analysis and associated manipulation of tabular data in Data frames. Pandas allows importing data from various file formats such as comma-separated values, JSON, Parquet, SQL database tables or queries, and MS Excel. Pandas allows various data manipulation operations such as merging, reshaping, selecting, as well as data cleaning, and data wrangling features.

3.3.3 Pickle File

Python pickle module is used for serializing and de-serializing a Python object structure. Any object in Python can be pickled so that it can be saved on disk. What pickle does is that it "serializes" the object first before writing it to file. Pickling is a way to convert a python object (list, dict, etc.) into a character stream.

3.4 UI Design

We have made easy to use UI for every time users. Using HTML5 and CSS3 created 5 pages Index page, about page, checking page, thank you page and Contact Page with connected with MySQL Workbench.

Figure 2: Entry Page of web-site

Figure 3: Symptoms Check Page of web-site
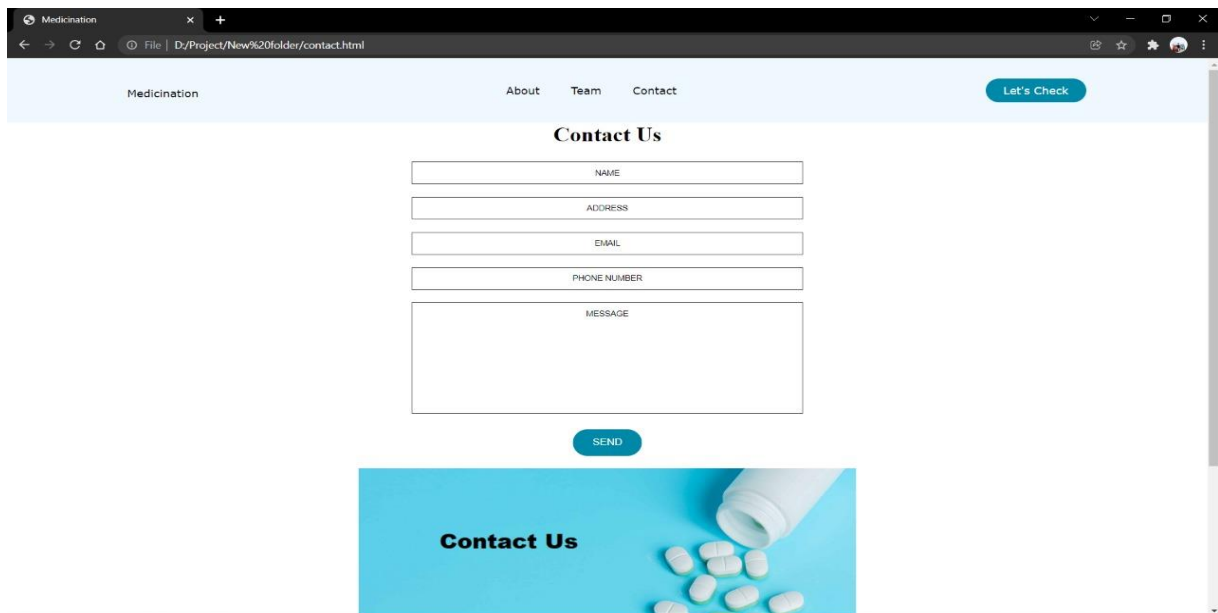
Figure 4: Contact Page of web-site

Figure 5: MySQL Workbench

3.4 Code

3.4.1 HTML5

Index Page

```html
<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <meta http-equiv="X-UA-Compatible" content="IE=edge">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Medicination</title>

    <link rel="icon" href="{{ url_for('static',filename='images/icon1.png') }}">

    <link rel="stylesheet" type="text/css" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/5.15.1/css/all.min.css">

    <link rel= "stylesheet" type= text/css" href= "{{ url_for('static',filename='styles/mainpage.css') }}">

</head>

<body>

    <header>

        <!-- <img class="logo" src="images/logo1.jpg" alt="logo">  ///jpg logo hide kelay -->

        <h1 class="logo" >

            <a href="{{ url_for('Landing_page') }}">Medicination</a>

        </h1>

        <nav>

            <ul class="nav__links">

                <li><a href="{{ url_for('about_page') }}">About</a></li>

                <li><a href="{{ url_for('team_page') }}">Team</a></li>

                <li><a href="{{ url_for('contact_page') }}">Contact</a></li>

            </ul>

        </nav>
```
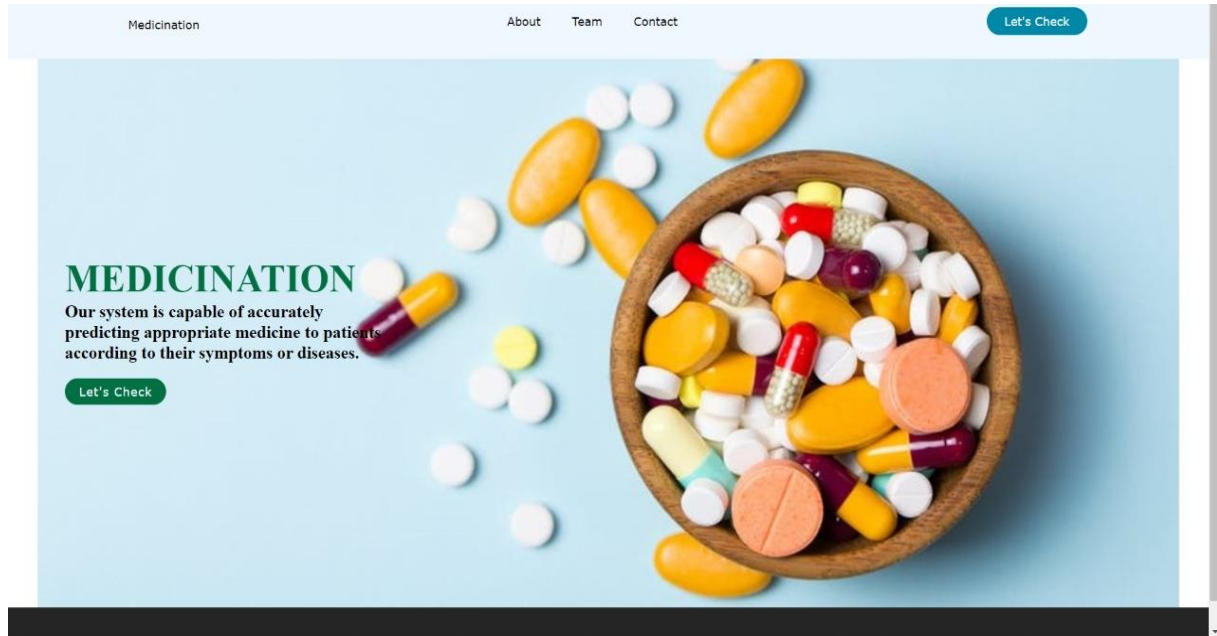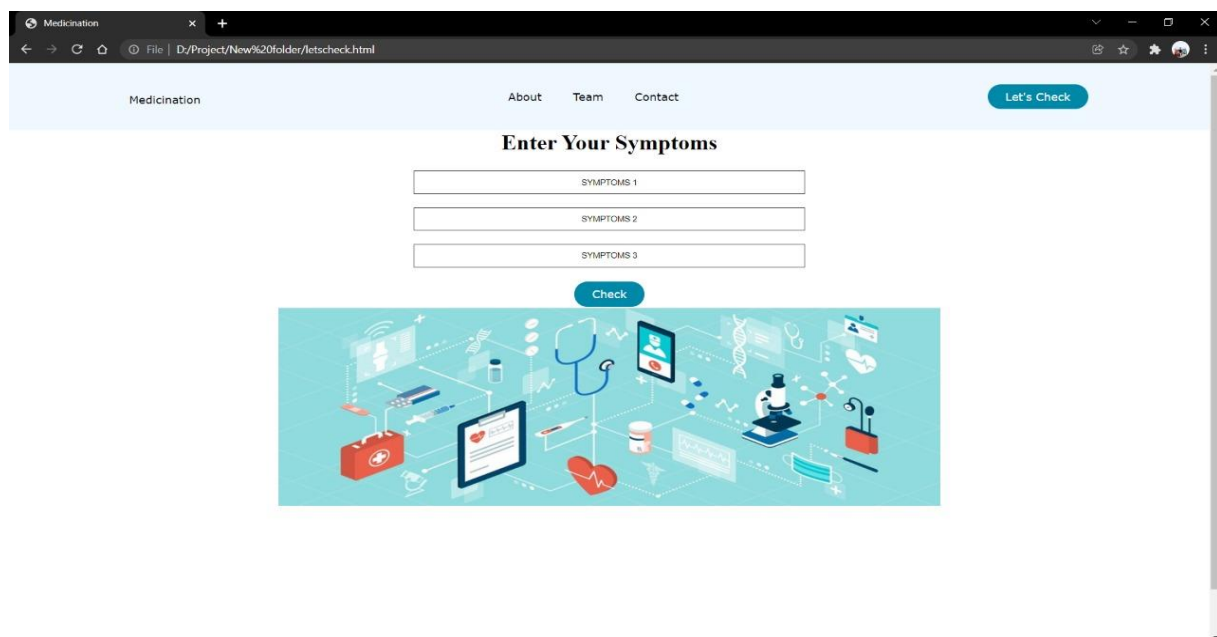
```html
        <a class="cta" href="{{ url_for('check_page') }}"><button>Let's Check</button></a>

    </header>

    <div class="frontimg">

        <img src="{{ url_for('static',filename='images/index3.jpg') }} "alt="">

        <div class="frontimg_text">

            <h2><span>MEDICINATION<br></span>Our system is capable of accurately

                <br>predicting appropriate medicine to patients<br>

                according to their symptoms or diseases.</h2>

                <a href="{{ url_for('check_page') }}">Let's Check</a>

        </div>

    </div>

    <footer class="footer">

        <div class="container_foot">

            <div class="row">

                <div class="footer-col">

                    <h4>company</h4>

                    <ul>

                        <li><a href="{{ url_for('about_page') }}">about us</a></li>

                        <li><a href="{{ url_for('team_page') }}">team</a></li>

                    </ul>

                </div>

                <div class="footer-col">

                    <h4>follow us</h4>

                    <div class="social-links">

                        <a href="https://www.facebook.com/"><i class="fab fa-facebook-f"></i></a>

                        <a href="https://twitter.com/adihargane_"><i class="fab fa-twitter"></i></a>

                        <a          href="https://instagram.com/the_pratzs_pb7?utm_medium=copy_link"><i          class="fab          fa-
instagram"></i></a>

                        <a href="https://www.linkedin.com/in/vamsi-avula-390431219/"><i class="fab fa-linkedin-in"></i></a>
```
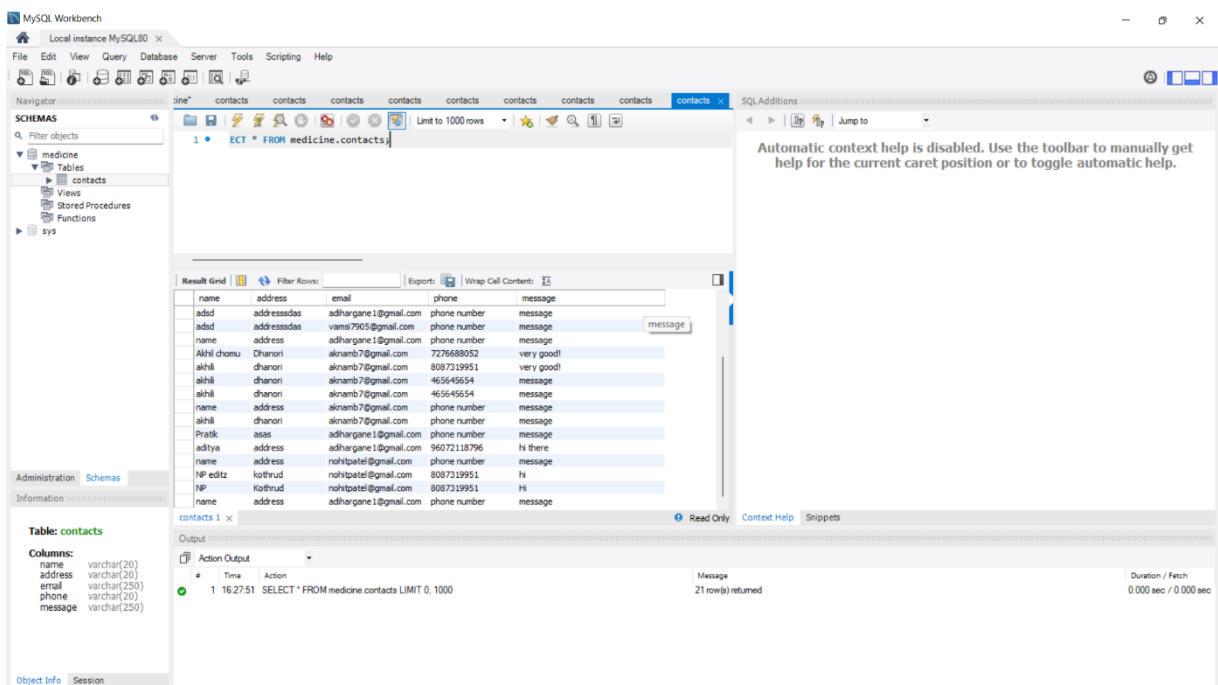
```
            </div>

          </div>

        </div>

      </div>

    </footer>

    <div id="footer"></div>

</body>

</html>
```

Contact Page

```
<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <meta http-equiv="X-UA-Compatible" content="IE=edge">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Medicination</title>

    <link rel="icon" href="{{ url_for('static',filename='images/icon1.png') }}">

    <link rel="stylesheet" type="text/css" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/5.15.1/css/all.min.css">

    <link rel= "stylesheet" type= "text/css" href= "{{ url_for('static',filename='styles/mainpage.css') }}">

</head>

<body>

    <header>

        <h1 class="logo" >

            <a href="{{ url_for('Landing_page') }}">Medicination</a>

        </h1>

        <nav>

            <ul class="nav__links">

                <li><a href="{{ url_for('about_page') }}">About</a></li>
```

```html
            <li><a href="{{ url_for('team_page') }}">Team</a></li>

            <li><a href="{{ url_for('contact_page') }}">Contact</a></li>

        </ul>

    </nav>

    <a class="cta" href="{{ url_for('check_page') }}"><button>Let's Check</button></a>

</header>

<div id="body">

    <h1>Contact Us</h1>

    <form method='POST'  action='/send' >

        <input type="text" name="name" id="name" value="name">

        <input type="text" name="address" id="address" value="address">

        <input type="text" name="email" id="email" value="email">

        <input type="text" name="phone" id="phone" value="phone number">

        <textarea name="message" id="message" value="message">message</textarea>

        <input type="submit" name="send" id="send" value="send">

    </form>

    <div class="contactimg">

        <img src="{{ url_for('static',filename='images/contact.png') }} " alt="">

    </div>

</div>

<footer class="footer">

    <div class="container_foot">

        <div class="row">

            <div class="footer-col">

                <h4>company</h4>

                <ul>

                    <li><a href="{{ url_for('about_page') }}">about us</a></li>

                    <li><a href="{{ url_for('team_page') }}">team</a></li>

                </ul>
```

```html
            </div>

            <div class="footer-col">

                <h4>follow us</h4>

                <div class="social-links">

                    <a href="https://www.facebook.com/"><i class="fab fa-facebook-f"></i></a>

                    <a href="https://twitter.com/adihargane_"><i class="fab fa-twitter"></i></a>

                    <a href="https://instagram.com/the_pratzs_pb7?utm_medium=copy_link"><i class="fab fa-instagram"></i></a>

                    <a href="https://www.linkedin.com/in/vamsi-avula-390431219/"><i class="fab fa-linkedin-in"></i></a>

                </div>

            </div>

        </div>

    </div>

  </footer>

  <div id="footer"></div>

</body>

</html>
```

Let's Check Page

```html
<!DOCTYPE html>

<html lang="en">

<head>

  <meta charset="UTF-8">

  <meta http-equiv="X-UA-Compatible" content="IE=edge">

  <meta name="viewport" content="width=device-width, initial-scale=1.0">

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  <link rel="icon" href="{{ url_for('static',filename='images/icon1.png') }}">

  <link rel="stylesheet" type="text/css" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/5.15.1/css/all.min.css">

  <link rel= "stylesheet" type= "text/css" href= "{{ url_for('static',filename='styles/mainpage.css') }}">
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<body>

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    </h1>

    <nav>

      <ul class="nav__links">

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        <li><a href="{{ url_for('team_page') }}">Team</a></li>

        <li><a href="{{ url_for('contact_page') }}">Contact</a></li>

      </ul>

    </nav>

    <a class="cta" href="{{ url_for('check_page') }}"><button>Let's Check</button></a>

  </header>

  <div id="body">

    <h1>Enter Your Symptoms</h1>

    <div>

      <form action='/predict' method="post" class="col s12">

        <div class="row">

          <div class="input-field col s4">

            <label for="s1"><b><h3>Symptom-1</h3></b></label>

           <input id="s1" name="Symptom1" placeholder=""  type="text" class="validate" list="datalist1">

          </div>

          <div class="input-field col s4">

           <label for="s2"> <b><h3>Symptom-2</h3></b></label>

           <input id="s2" name="Symptom2" placeholder=""  type="text" class="validate" list="datalist2">

          </div>
```

```html
        <div class="input-field col s4">

          <label for="s3"><b><h3>Symptom-3</h3></b></label>

          <input id="s3" name="Symptom3" placeholder="" type="text" class="validate" list="datalist3">

        </div>

      </div>

      <div class="center">

        <button type="submit" type="submit" name="send" id="send" value="Check">Predict</button>

      </div>

    </form>

    </div>

    <br>

    <br>

    <br>

    {{pred}}

      <br>

    </div>

   </div>

 </div>

</div>

<footer class="footer">

  <div class="container_foot">

    <div class="row">

      <div class="footer-col">

        <h4>company</h4>

        <ul>

          <li><a href="{{ url_for('about_page') }}">about us</a></li>

          <li><a href="{{ url_for('team_page') }}">team</a></li>

        </ul>

      </div>
```

```html
            <div class="footer-col">

                <h4>follow us</h4>

                <div class="social-links">

                    <a href="https://www.facebook.com/"><i class="fab fa-facebook-f"></i></a>

                    <a href="https://twitter.com/adihargane_"><i class="fab fa-twitter"></i></a>

                    <a href="https://instagram.com/the_pratzs_pb7?utm_medium=copy_link"><i class="fab fa-instagram"></i></a>

                    <a href="https://www.linkedin.com/in/vamsi-avula-390431219/"><i class="fab fa-linkedin-in"></i></a>

                </div>

            </div>

        </div>

    </div>

  </footer>

  <div id="footer">

  </div>

</body>

</html>
```

CHAPTER 4

Conclusion

In this work we have created database for training machine learning model which include 132 symptoms and 42 diseases. Also, we have created easy user interface using HTML5 and CSS3, on which users/patients can search symptoms very easily. Now we have to train the model by different machine learning algorithm. And search medicines for each diseases.

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