



# “SANJEEVINI” THE MACHINE LEARNING BASED AYURVEDIC MEDICATION SYSTEM

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**Abstract:** *Sanjeevini System represents a pioneering approach to drug operation, exercising machine literacy to streamline processes and ameliorate patient issues. By integrating advanced algorithms similar as natural language processing, pattern recognition, and prophetic modelling, Vaidyah assists healthcare professionals, cases, and watch givers in making informed opinions regarding drug operation. This innovative system aims to enhance patient safety, drug adherence, and healthcare provider effectiveness. Sanjeevini application of machine literacy ways enables it to effectively manage drug- related tasks, including decision-timber, dataset analysis, and vaticination systems. By using these capabilities, Sanjeevini demonstrates its implicit to revise drug operation in healthcare settings. One of the crucial features of Sanjeevini is its flawless integration into being healthcare systems, furnishing a stoner-friendly interface for healthcare professionals to pierce patient biographies and applicable medical information. This integration ensures that can fluently acclimatize to different healthcare surroundings, easing its wide relinquishment. also, Sanjeevini’s capability to incorporate traditional Ayurveda drugs underscores its comprehensive approach to drug operation. By encompassing both conventional and indispensable curatives, Sanjeevini aims to feed to a different range of case requirements, further enhancing its effectiveness and applicability in clinical practice. In summary, Sanjeevini represents a scalable and adaptable result that has the implicit to transfigure healthcare delivery worldwide. By employing the power of machine literacy, Sanjeevini enhances patient safety, improves drug adherence, and empowers healthcare professionals to deliver high- quality care. As the field of machine literacy continues to evolve, Vaidyah paves the way for the future of drug systems, offering a promising path towards more effective and individualized healthcare results.*

**Index Terms** - Sanjeevini System, Machine Learning, Drug Management, Patient Safety, Healthcare Integration Predictive Modelling, Natural Language Processing, Pattern Recognition, Drug Adherence, Traditional Ayurveda.

## I. INTRODUCTION

In healthcare, effective drug operation is pivotal for icing patient safety, optimizing treatment issues, and enhancing overall healthcare quality. Unfortunately, drug crimes and non-adherence persist as significant challenges, contributing to adverse events, increased healthcare costs, and compromised patient well- being. To combat these issues, integrating machine literacy ways into drug systems has surfaced as a transformative result. Enter the Sanjeevini system an innovative drug operation platform that harnesses the power of machine literacy to revise the administration, monitoring, and optimization of specifics.

By staking on advanced algorithms and data analysis, Sanjeevini strives to elevate patient safety, bolster drug adherence, and equip healthcare professionals with practicable perceptivity for informed decision-making. Traditional drug operation protocols frequently calculate on homemade data entry, private decision- making processes, and limited access to comprehensive patient information. These limitations can lead to drug

crimes, adverse medicine relations, and sour treatment plans. Sanjeevini directly addresses these challenges by using machine literacy algorithms able of recycling expansive datasets, feting patterns, and generating intelligent recommendations. In substance, the Sanjeevini system represents a significant vault forward in drug operation, promising to alleviate crimes, ameliorate adherence, and eventually enhance the quality of care handed to cases. Through its innovative approach and advanced technology, Sanjeevini aims to review drug operation practices and usher in a new period of healthcare delivery characterized by safety, effectiveness, and case- centricity.

## II. PROJECT AIMS AND OBJECTIVES:

The end of the ML- grounded Medication System is to transfigure drug operation through the application of machine literacy algorithms and sophisticated data analysis ways. The primary objects of the system encompass

1. Enhancing patient safety by using machine literacy, the system aims to minimize drug crimes and adverse medicine relations, eventually perfecting patient safety throughout the treatment process.
2. Enabling intelligent decision- making Through the analysis of vast datasets, the system empowers healthcare professionals to make informed opinions regarding drug administration, lozenge adaptations, and treatment plans, leading to further effective case care.
3. Easing comprehensive drug operation, the system provides a holistic approach to drug operation, encompassing tasks similar as tradition shadowing, drug adherence monitoring, and drug conciliation, thereby optimizing the entire drug process.
4. Enforcing a patient login runner, the addition of a patient login runner enables cases to pierce their drug biographies, track their treatment progress, and communicate with healthcare providers, fostering patient engagement and commission in their own healthcare trip.
5. Predicting conditions grounded on patient symptoms by analysing symptoms inputted by cases, the system utilizes machine literacy algorithms to prognosticate implicit conditions or health conditions, easing early opinion and intervention.
6. Suggesting Ayurvedic drug grounded on prognosticated conditions using the prognostications made by the system, Ayurvedic drug recommendations are handed, acclimatized to the specific conditions or health conditions linked, therefore offering individualized treatment options aligned with traditional drug practices.

Overall, the ML- grounded Medication System aims to revise drug operation by employing the power of machine literacy to enhance patient safety, enable intelligent decision- timber, and give comprehensive care results acclimatized to individual case requirements.

## III. LITERATURE SURVEY

Check In the literature check, several noteworthy studies in the sphere of complaint vaticination and drug recommendation systems are stressed:

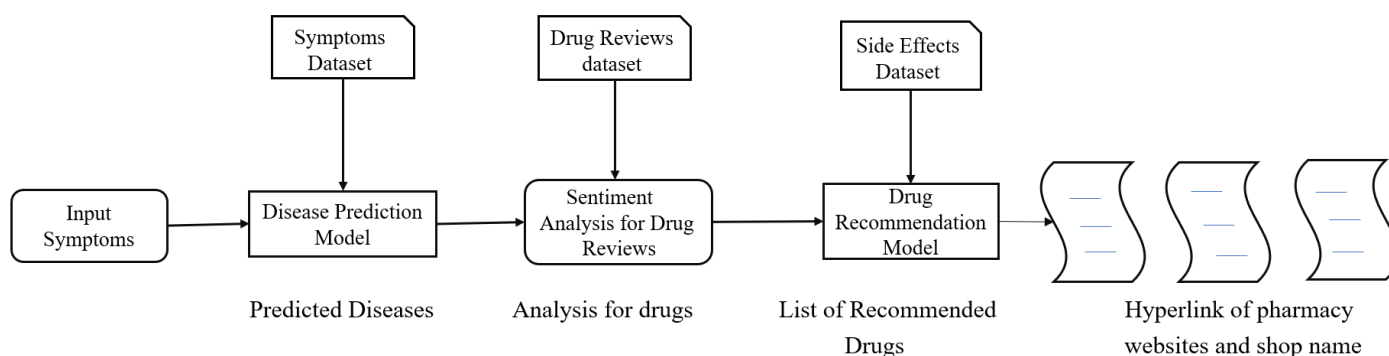
1. Satvik Garg conducted a review involving the development of a complaint vaticination and drug recommendation system using colourful machine learning algorithms. The system was trained to collude symptoms to conditions, and the complaint vaticination delicacy was analysed using different classifiers.
2. To address the complexity of recommending traditional herbal drugs grounded on individual health conditions, a individualized recommendation system was proposed. This system employed ontology- grounded technology and an conclusion machine to give customized recommendations, considering factors similar as instructions for use and contraindications.

3. Benjamin Stark and Constanze Knahl presented a methodical literature review fastening on drug recommendation machines. They distributed studies into machine literacy and data mining- grounded approaches, as well as ontology and rule- grounded approaches. The review estimated studies grounded on colourful parameters similar as conditions, data storehouse, and platform technology.
4. Varun A. Goyal and Dilip J. Parmar cooked a universal drug recommender system frame that applies data mining technologies to medical opinion. Their frame comported of modules for database operation, data medication, recommendation modelling, model evaluation, and data visualization. Through trials, support vector machines (SVM) were named as the recommended model for its delicacy, effectiveness, and scalability.
5. Qian Zhang and Guangquan Zhang proposed a mongrel recommender system to support individualized clinical tradition by integrating artificial neural networks (ANN) and case- grounded logic (CBR). This model expanded the patient point space by booby-trapping information from textbook data, allowing for more precise medicine recommendations grounded on remedy functions and symptoms.

In conclusion, these studies punctuate the different approaches and methodologies employed in complaint vaticination and drug recommendation systems. From machine literacy algorithms to ontology- grounded technologies, these studies contribute to the advancement of substantiated healthcare results aimed at perfecting patient issues and treatment efficacy.

### III. METHODOLOGY

#### The block diagram:



**Fig. 1 The high level design architecture of the Sanjeevini - A ML Based Medication System.**

The image you transferred depicts abstract illustration for an ML- grounded drug system. Then's a breakdown of the process

1. **Data Input The system takes three sets of data as input:**
  - **Symptoms Dataset** This includes information about a case's symptoms.
  - **medicine Reviews Dataset** This includes reviews of colourful specifics, presumably written by cases who have used them.
  - **Side goods Dataset** This includes information on the side goods of colourful specifics.
2. **Disease Prediction Model:**

This model analyses the case's symptoms data (from the Symptoms Dataset) to prognosticate what complaints the case might have.

### 3. Sentiment Analysis for medicine Reviews:

This model analyses the reviews of colourful specifics (from the medicine Reviews Dataset) to determine whether the reviews are positive, negative, or neutral.

### 4. Medicine Recommendation Model:

This model uses the following information to recommend specifics to the case

- The prognosticated complaints from the Disease Prediction Model.
- The sentiment analysis of specifics from the Sentiment Analysis for medicine Reviews model.
- The side goods information from the Side goods Dataset.

### 5. Affair:

The system labour's a list of recommended specifics for the case, potentially including hyperlinks to drugstore websites where the specifics can be bought.

### Datasets:

We have structured a dataset comprising tables, each devoted to a different complaint. For each complaint, the program labour's either 1 if present or 0 if absent. Using the values handed by the stoner, the program employs an algorithm to determine the most probable complaint from the dataset. While the dataset includes only a limited number of cases for each complaint, it encompasses further variations.

The ID3 classifier makes opinions grounded on the entropy of the given conditions. Meanwhile, SVM classifies the nearest point with applicable drug for the prognosticated complaint. also, sentiment analysis is conducted on medicine reviews sourced from the UCI depository dataset. Each medicine review undergoes bracket into positive and negative sentiments. Only specifics with a advanced positivity rate in their reviews are named from the available options.

pain	Acidity	Ulcers	Fatigue	Sweatiness	Prognosis
1	0	0	0	0	Arthritis
1	1	1	0	0	Gastritis
1	0	0	1	1	Diarrhea
1	0	0	1	1	Migraine

**Fig 2. Datasets with symptoms.**

### Workflow:

Creating a seamless workflow for our system involves designing an intuitive user interface (UI) tailored to the distinct needs of healthcare professionals, patients, and caregivers. Each interface should be visually appealing, easy to navigate, and equipped with features such as medication identification, patient profiles, and personalized recommendations. Additionally, incorporating interactive visualization tools will enhance data-driven insights and reporting.

Our disease prediction model, a classification model, utilizes symptoms to predict diseases. Similarly, sentiment analysis on drug reviews, mapped to predicted diseases, aids in recommending drugs based on sentiment and ranking, while considering possible side effects.

After predicting a disease, our system recommends suitable drugs. Leveraging the UCI Machine Learning Repository for Drug Review dataset, which contains diseases, multiple drugs, reviews, ratings, and useful counts, we merge it with the Disease-Symptom Knowledge Database. The process begins with inputting the disease.

Initially, our UI design in Python captures symptoms and user information, including name, age, gender, and disease history. This data collection ensures comprehensive records for authentication and further personalization. The system gathers and stores relevant patient information like medical history and current medications for generating personalized drug recommendations.

Upon symptom input, users select symptoms from a predefined list or input them. Employing techniques like natural language processing (NLP) enhances symptom interpretation accuracy. The system compiles relevant patient data, including medical history, demographics, lifestyle, genetic information, and reported symptoms or risk factors.

The collected data undergoes preprocessing, including normalization, handling missing values, categorical variable encoding, and feature extraction. This prepares the data for the machine learning model.

Using suitable algorithms such as logistic regression, decision trees, random forests, or neural networks, the ML-based system trains a disease prediction model. Rigorous evaluation via techniques like cross-validation ensures model generalization and effectiveness on unseen data.

In our disease prediction and drug recommendation system, we utilize the ID3 algorithm, which employs a top-down greedy approach to construct decision trees based on gain and entropy values. This decision tree helps predict diseases based on input data. Once a disease is predicted, our system recommends a suitable drug.

For drug recommendation, we leverage the UCI Machine Learning Repository's Drug Review dataset. This dataset contains information about diseases, multiple drugs, their reviews, ratings, and useful counts. After preprocessing, we merge this dataset with the Disease-Symptom Knowledge Database, aligning them based on common diseases.

In the Drug Review dataset, diseases are linked with multiple available drugs, shown visually with red and yellow colors representing drug availability. We conceptually envision a separation plane parallel to these groups, dividing them into positive and negative regions. Points near this separation hyperplane are collected, representing potential medications.

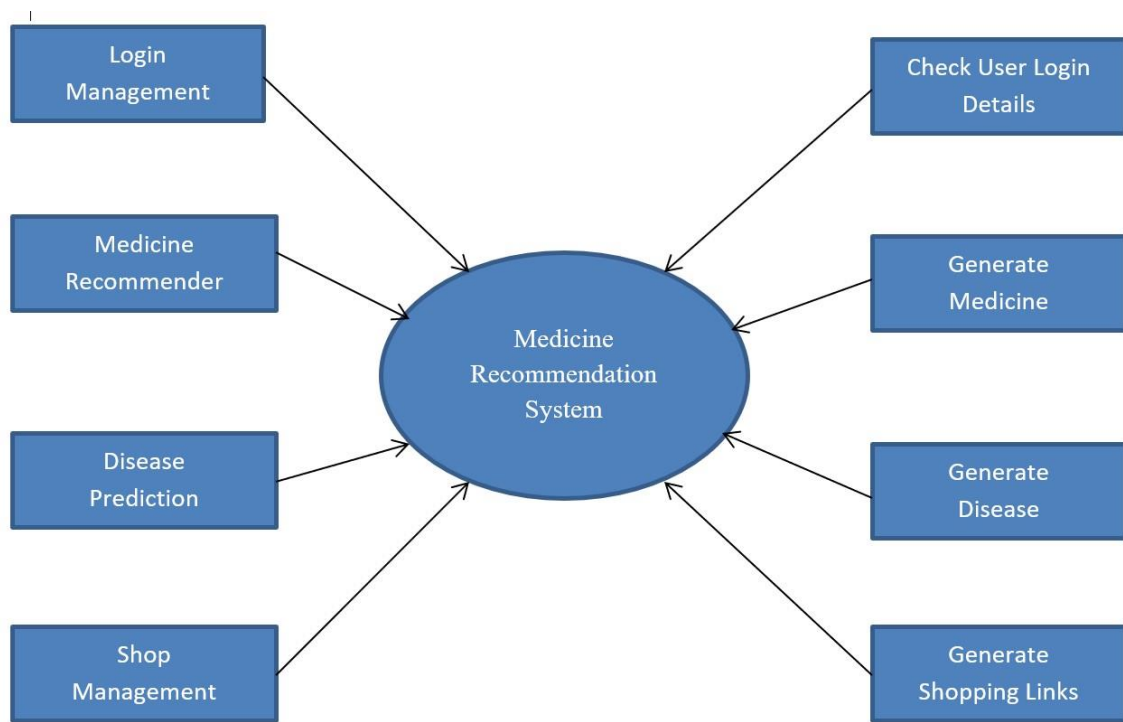
The ID3 algorithm selects the root node attribute, followed by placing parent and child nodes based on attribute values in binary format. With user symptoms provided, classification occurs. Each symptom slot corresponds to a separate branch in the decision tree.

Additionally, our system factors in age for medication separation. For instance, if the age exceeds 5 years, a different medication may be recommended. This approach ensures personalized and effective drug recommendations based on disease prediction and patient characteristics.

The system predicts diseases based on input features, presenting results in an understandable format. Recommendations for medications consider factors like medical condition, guidelines, effectiveness, side effects, interactions, and patient preferences.

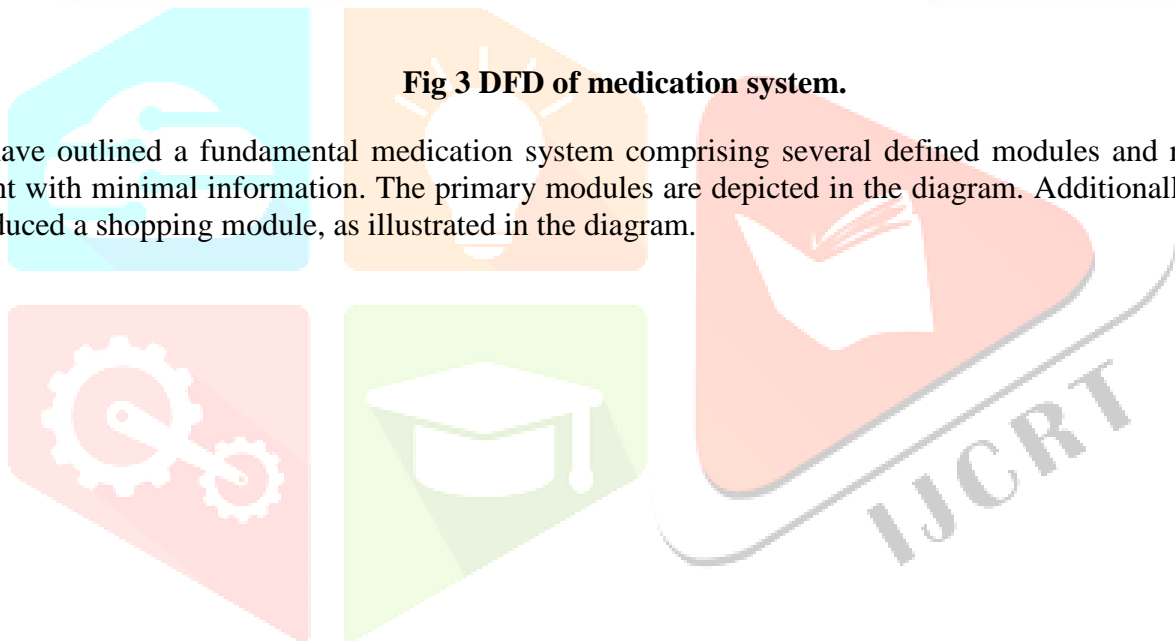
In essence, our workflow seamlessly integrates user-friendly interfaces, robust machine learning models, and comprehensive data processing to deliver accurate disease predictions and personalized drug recommendations. Our system offers a filter to select the patient's age and presents medicine predictions in a user-friendly format, including the recommended medicine.

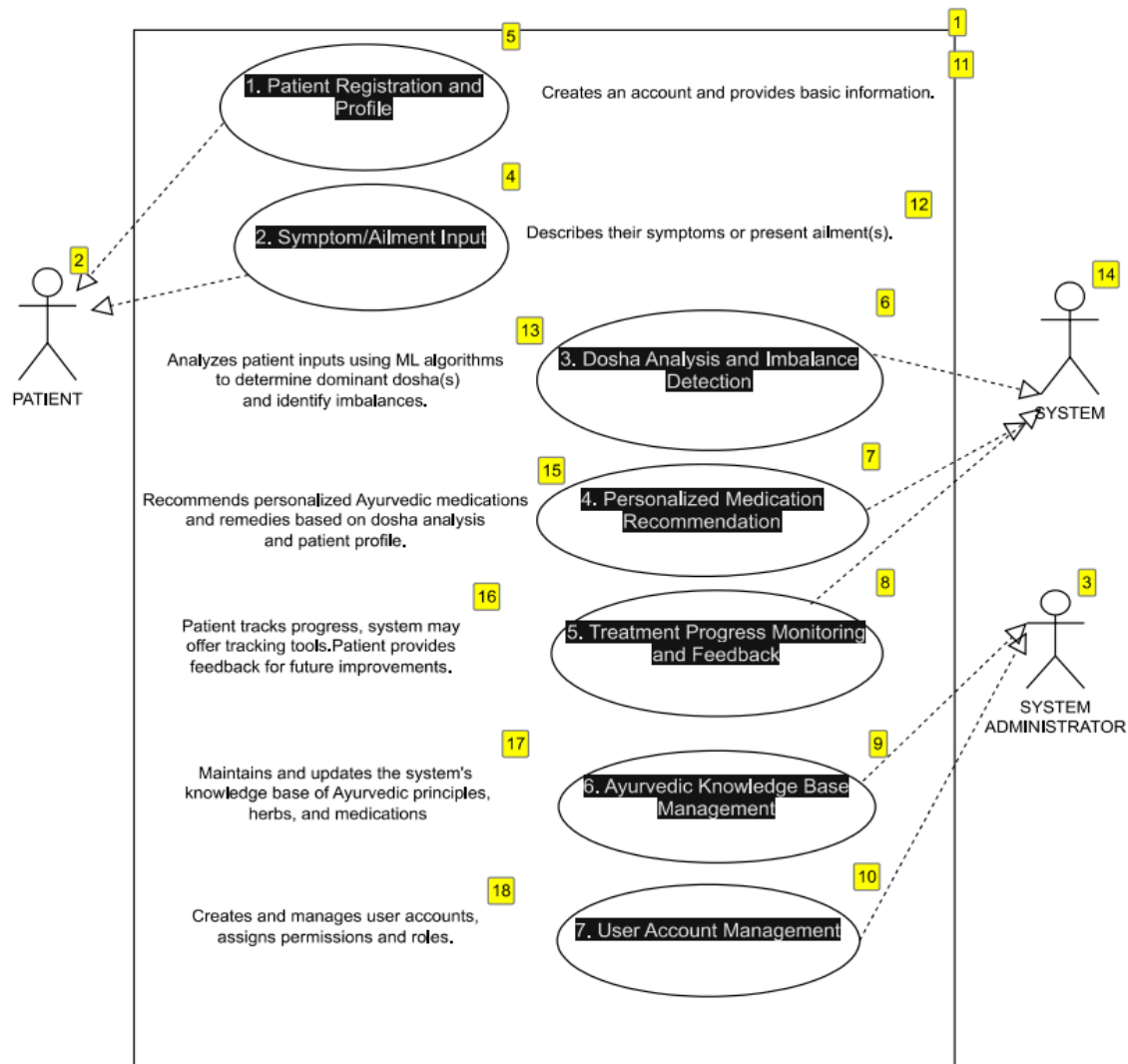
**Data flow diagram:**



**Fig 3 DFD of medication system.**

We have outlined a fundamental medication system comprising several defined modules and roles of the patient with minimal information. The primary modules are depicted in the diagram. Additionally, we have introduced a shopping module, as illustrated in the diagram.



**Use Case diagram:**

**Fig 4. Use Case diagram for Ayurvedic medication system.**

- 1. Patient Registration and Profile:** In the first step, the patient creates an account and enters their basic information into the system.
- 2. Symptom/Ailment Input:** Here, the patient describes their current health concerns or symptoms.
- 3. Dosha Analysis and Imbalance Detection:** An automated system analyses the information entered by the patient using machine learning algorithms to identify their dominant dosha (or doshas) and any imbalances that may be present. *Doshas are the three biological energies or principles that, according to Ayurveda, govern our mind and body. In a healthy state, all three doshas are said to be in a state of balance.*
- 4. Personalized Medication Recommendation:** Based on the dosha analysis and the patient's profile, the system recommends personalized Ayurvedic medications and remedies.
- 5. Treatment Progress Monitoring and Feedback:** The patient tracks their progress throughout the treatment. The system may offer tools to help them with this. The patient also provides feedback about their experience, which may be used to improve the system in the future.

6. **System Administrator:** An Ayurveda system administrator maintains and updates the knowledge base of the system. This knowledge base includes information on Ayurvedic principles, herbs, and medications.
7. **User Account Management:** The system administrator also creates and manages user accounts, and assigns permissions and roles.

## **Implementation:**

### **Patient Profile and Input Data:**

The system will gather and store pertinent patient details, including medical history, current medications, and treatment preferences. This information forms the foundation for generating personalized drug recommendations. Data may encompass first and last names, age, gender, email, address, password, and past medical conditions.

### **Symptom Recognition:**

Users will be prompted to input or select their symptoms from a predefined list. Alternatively, they may have the option to provide free-form input. Natural language processing (NLP) techniques may be employed to accurately understand and interpret the symptoms.

### **Data Collection:**

The system will collect relevant patient data, ranging from medical history to demographics, lifestyle factors, genetic information, and reported symptoms or risk factors. This data serves as input for the disease prediction model.

### **Feature Engineering:**

Collected data will undergo preprocessing and transformation into suitable input features for the machine learning model. Techniques such as data normalization, handling missing values, categorical variable encoding, and feature extraction will be employed.

### **Model Training:**

A machine learning-based disease prediction model will be trained using appropriate algorithms such as logistic regression, decision trees, random forests, or deep learning models like neural networks. The model will learn patterns and relationships between input features and the likelihood of specific diseases.

### **Model Validation and Evaluation:**

The trained disease prediction model will undergo thorough evaluation using validation techniques such as cross-validation or holdout validation. This ensures effective performance on unseen data and generalizability to new cases. Performance metrics like accuracy, precision, recall, and F1 score will be used for assessment.

### **Disease Prediction:**

Upon receiving user data and symptoms, the system will utilize the trained model to predict the likelihood or probability of specific diseases. By analyzing input features, the model generates predictions based on learned patterns and associations.

### **Recommendation Generation of Drugs:**

Considering the patient's profile and input data, the drug recommendation model will produce a list of recommended medications. Factors such as medical condition, treatment guidelines, drug effectiveness, side effects, drug interactions, and patient preferences will be taken into account.



## Medicine Delivery Services:

The system ensures the predicted medication reaches the patient's doorstep by partnering with online shopping sites like Apollo and Sandhu Store. These medication delivery services aim to simplify the process, especially for individuals with limited mobility or living in remote areas. It's crucial to choose reputable and licensed services, considering factors such as reviews, certifications, and legal compliance within the jurisdiction.

## V. RESULT ANALYSIS:

Our system is capable of generating personalized medication recommendations based on individual patient profiles, medical history, symptoms, and treatment objectives. These recommendations serve as valuable tools for healthcare professionals in making well-informed decisions regarding suitable medications for their patients.

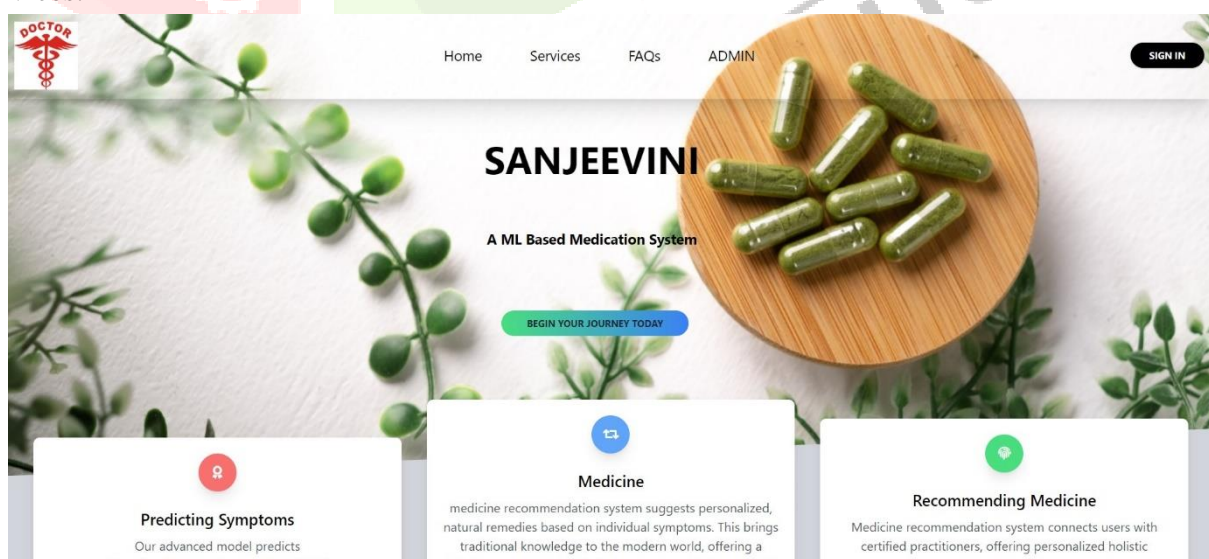
Furthermore, the medication system offers patients access to educational resources, medication information leaflets, and reliable drug databases. This empowers patients to actively participate in their healthcare journey, enabling them to make informed decisions and enhancing their understanding of prescribed medications.

The registration page, depicted in Fig.10, includes fields for user name, age, email, and mobile number, where comprehensive patient information is collected. The sign-in page comprises fields for username and password. Additionally, a password retrieval mechanism is provided through a hyperlink, facilitating password recovery via email verification.

This design interface for patient details serves as a crucial component, allowing patients to verify their information once again. This ensures accuracy and completeness of patient data, aligning with best practices identified through literature review and prior research.

The disease prediction page, as outlined in the design phase, features four symptom tabs based on survey findings. Upon inputting symptoms, the system predicts the disease and recommends medication. Additionally, the medication name is provided with hyperlinks to pharmacy websites for easy access to purchase medication. These websites, such as Apollo Pharmacy and Sandu Medicines, offer convenient avenues for patients to procure prescribed medications.

Overall, our system not only facilitates accurate disease prediction and personalized medication recommendations but also enhances patient engagement and accessibility to essential healthcare information and services.



**Fig 5. Home Page – Sanjeevini – A ML based medication system.**

### Register

First Name  Last Name

Age

Gender **Male** ▾


Email

City

Password

Past Medical Conditions

Already have an account? [Login](#)



### AYUCARE


Email

Password

Don't have an account? [Register](#)

Figure 6: Register page.

Figure 7: Sign in page.



**Patient 4**  
Name : SHARAD  
Age : 22  
Gender : Male

### Detect your disease

Please select the four symptoms that apply to you from the drop-down menus below.

1st Symptom  2nd Symptom  3rd Symptom  4th Symptom

Fig 8. Disease Detection page.

**Patient 4**  
Name : SHARAD  
Age : 22  
Gender : Male

### Detect your disease

Please select the four symptoms that apply to you from the drop-down menus below.

1st Symptom  2nd Symptom  3rd Symptom  4th Symptom

**Result**  
Your detected disease is: **Diarrhea**

Fig 9. Disease detected.

**Medicine Recommendation**

Please select the necessary fields to get medicine recommendation. Thank you!

Gender:  Age:  Severity:  Disease:

[Submit](#)

**Result**

Your prescribed medicine is: **Jahar mohra pishti**

Click Here for online order: **Appolo Formacy**

Click Here for online order: **Sandu shop**

**Fig 10. Medicine Recommendation and shops hyperlinks.**

## VI. CONCLUSION:

In summary, a medication system driven by machine learning presents a promising avenue for revolutionizing medication management, augmenting patient welfare, and aiding healthcare professionals in their decision-making processes. Through the utilization of sophisticated algorithms and data analysis methodologies, such a system can deliver tailored medication suggestions and predictive insights.

By integrating machine learning models and decision support tools, healthcare providers stand to benefit from timely and precise guidance to inform their prescribing practices. The system's capabilities extend to identifying potential drug interactions, fine-tuning dosages based on individual patient characteristics, and monitoring treatment responses. These functionalities collectively contribute to bolstering patient safety, mitigating medication errors, and amplifying treatment efficacy.

For patients, the medication system serves as a valuable resource, furnishing access to educational materials and comprehensive medication information. By fostering medication adherence and furnishing personalized recommendations, patients are empowered to navigate their medication regimens effectively, thereby enhancing their overall health outcomes.

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