



Ayurhealth Drug Recommendation System

Mrs. Shri Lakshmi Prasad¹, Ananth Kumar V², Ashish B³, Athreyjith J⁴, Haroon Sheikh⁵

Assistant Professor¹, student², student³, student⁴, student⁵,

Department of Computer Science & Engineering, ATME College of Engineering, Mysore, India

Abstract: The process of Ayurveda drug discovery has received a big boost from the use of high-end computers and machine learning algorithms. There are many new drugs introduced into the market each year, making it difficult for Ayurveda doctors to keep up with the latest advancements. In this proposed work we introduce an end-to-end system that is able to go through the literature of newly discovered drugs and store the features in a database. Then, it is able to accept the symptoms of a patient from a physician/Ayurveda doctor and recommend appropriate Ayurveda drugs, which may be prescribed to the patient, subject to the discretion of the physician/ Ayurveda doctor. We'll use a variety of supervised machine learning methods before deciding which one is best for the model. Datasets collected from www.kaggle.com and www.github.com and supervised learning algorithms applied to process the datasets and drug recommendation is done. There are many research works on this topic where they have built models and shown results, around 80 to 85% accuracy generated using R language, Python language and data science tools. But all these works are just models, cannot be used as application useful in real time. In our project work we build an application with model that can recommend the suitable Ayurveda drug based on the parameters like symptoms, disease, drug rating etc. It focuses on various feature selection techniques and prediction models to enhance disease diagnosis, improve patient survival rates, and recommend the best lifestyle practices to follow. Proposed system is a real time medical system useful for hospitals and doctors and built using Microsoft tools such as Visual Studio tool and SQL Server tool.

Index Terms: Data science, Drug, Naïve Bayes, Random Forest, GUI, Machine learning, AI, Ayurveda, Supervised Learning.

I. INTRODUCTION

Ayurveda, a time-tested medical system, has long provided personalized healthcare. While AI-driven medicine recommendations have grown recently, the exploration of Ayurvedic medicine in this field remains limited. With our proposed work we plan to implement and explore Ayurvedic medicine recommendation and how machine learning can enhance this approach by recommending individualized Ayurvedic treatments based on patient data. We propose a system that uses machine learning methods such as supervised learning and naïve bayes algorithm to first diagnose and then recommend the natural medicines. Our primary objective is to explore the potential of machine learning principles for medicine recommendation. By integrating machine learning techniques, this work seeks bridge the gap between traditional Ayurvedic wisdom and modern machine learning. Ayurveda, an ancient medical system from the Indian subcontinent, is renowned for its holistic and personalized approach to healthcare. Grounded in traditional wisdom, Ayurvedic medicines provide a natural and comprehensive path to well-being. In this era of personalized medicine, the potential of Ayurveda medicine recommendation using machine learning techniques is immense. By analyzing patient data and considering individual health profiles, these systems aim to bridge the gap between traditional medicinal wisdom, like Ayurveda, and modern healthcare standards Medicine recommendation involves the use of

advanced technologies and algorithms to suggest appropriate medications based on individual health conditions and medical history. This process often employs machine learning techniques to analyse large datasets, identifying patterns and correlations that contribute to personalized treatment plans. By considering factors such as medical history, symptoms, and potential side effects, these systems aim to enhance the precision and efficacy of medication recommendations. The goal is to offer patients tailored and optimized drug prescriptions, enhancing healthcare outcomes. Our proposed system involves developing an application software for Ayurvedic medicine recommendations. We build a browser-based application where patients can get register and can access the application and inputs the medical factors and system will predict the suitable ayurvedic medicine.

II. LITERATURE SURVEYS

2.1 IEEE PAPER TITLE: “Exploring Ayurvedic Medicine Recommendation Using Machine Learning Techniques”

YEAR OF PUBLICATION: 2024

AUTHORS: Ligandro Singh Yumnam, Aditya Jain, Dr. Usha G, Dr. Pretty Diana Cyril C

DESCRIPTION: Ayurveda, a time-tested medical system, traditionally offers personalized healthcare. Recently, AI-driven medicine recommendation systems have gained traction, but Ayurvedic medicine remains largely unexplored in this domain. In this paper, we aim to implement and investigate Ayurvedic medicine recommendation, leveraging machine learning to provide personalized treatments based on patient data. Our proposed system employs machine learning techniques such as decision trees and neural networks to first diagnose conditions and then recommend natural medicines. Furthermore, our primary objective is to explore the potential of machine learning in enhancing medicine recommendation. METHODOLOGY: Decision Trees, Neural Networks methods used.

LIMITATIONS:

- ❖ Not suitable for real time.
- ❖ Takes more time for processing data.
- ❖ Not better results obtained.

2.2 IEEE PAPER TITLE: INTELLIGENT AYURVEDIC FORMULATION RECOMMENDATION SYSTEM.

YEAR OF PUBLICATION: 2024

AUTHORS: Prathamesh Shinde, Khushi Songire, Sakshi Thakur, Shantanu Suryawanshi, Prof. S.P. Shinde

DESCRIPTION: Ayurveda, one of the oldest systems of medicine, emphasizes holistic healing through personalized treatments. However, its reliance on practitioner expertise often limits accessibility and scalability. The Intelligent Ayurvedic Formulation Medicine Recommendation System tackles these challenges by providing a solution that predicts diseases and suggests Ayurvedic remedies based on user-input symptoms. By leveraging a structured database of symptoms, diseases, and formulations, the system ensures accurate and reliable recommendations while adhering to Ayurvedic principles. Extensive testing on a dataset of over 200 symptoms and 50 formulations has demonstrated high accuracy, making the system a valuable tool for personalized healthcare.

METHODOLOGY: logistic regression, random forest, and support vector machine used.

LIMITATIONS:

- ❖ Model builds for static datasets.
- ❖ No real time implementations done.
- ❖ Less datasets used.
- ❖ Huge datasets required.

2.3 IEEE PAPER TITLE: Identification of Medicinal Leaves and Recommendation of Home Remedies using Machine learning

YEAR OF PUBLICATION: 2024

AUTHORS: Dr. Swati G. Kale, Dr. Sachin Jain, Dr. Sudhir Rangari, Dr. R. C. Dharmik, Dr. Manish Gardi, Vipul S. Lande.

DESCRIPTION: In today's era there is a growing need for programmed medical assistance systems. While many medical assistance systems exist for recommending allopathic medicines, the identification and assistance system for Ayurvedic medicines remains largely unexplored. However, with the growing urbanization and diminishing knowledge of traditional practices, the accurate identification of ayurvedic leaves and the appropriate recommendation of home remedies and medicines have become challenging. To address this issue, the proposed system employs state-of-the-art deep learning algorithms to identify Ayurvedic leaves based on images. Additionally, the system recommends Ayurvedic medicines based on patient symptoms and provides suggested home remedies.

METHODOLOGY: Convolutional Neural Networks (CNN), VGG16, MobileNet, and Inception are used.

LIMITATIONS:

- ❖ Graphical outputs generated.
- ❖ Less datasets used.
- ❖ Not suitable in real time.
- ❖ No real time implementations done.

III. PROPOSED SYSTEM

System builds as real-world application with machine learning model which works for dynamic medical datasets. System major goal is to recommend suitable Ayurveda medicine for patients using some efficient machine learning algorithms. System is GUI based Software meant for Ayurveda hospitals where doctors and patients can access using browsers. System uses medical factors such as patient age, gender, disease type, severity etc... System makes use of datasets from kaggle.com. System is an automated medical system for priority-based patient treatments. System developed as browser application using Microsoft technologies such as Visual Studio, SQL Server, C# which similar to C or C++, HTML, CSS, JS, jQuery.

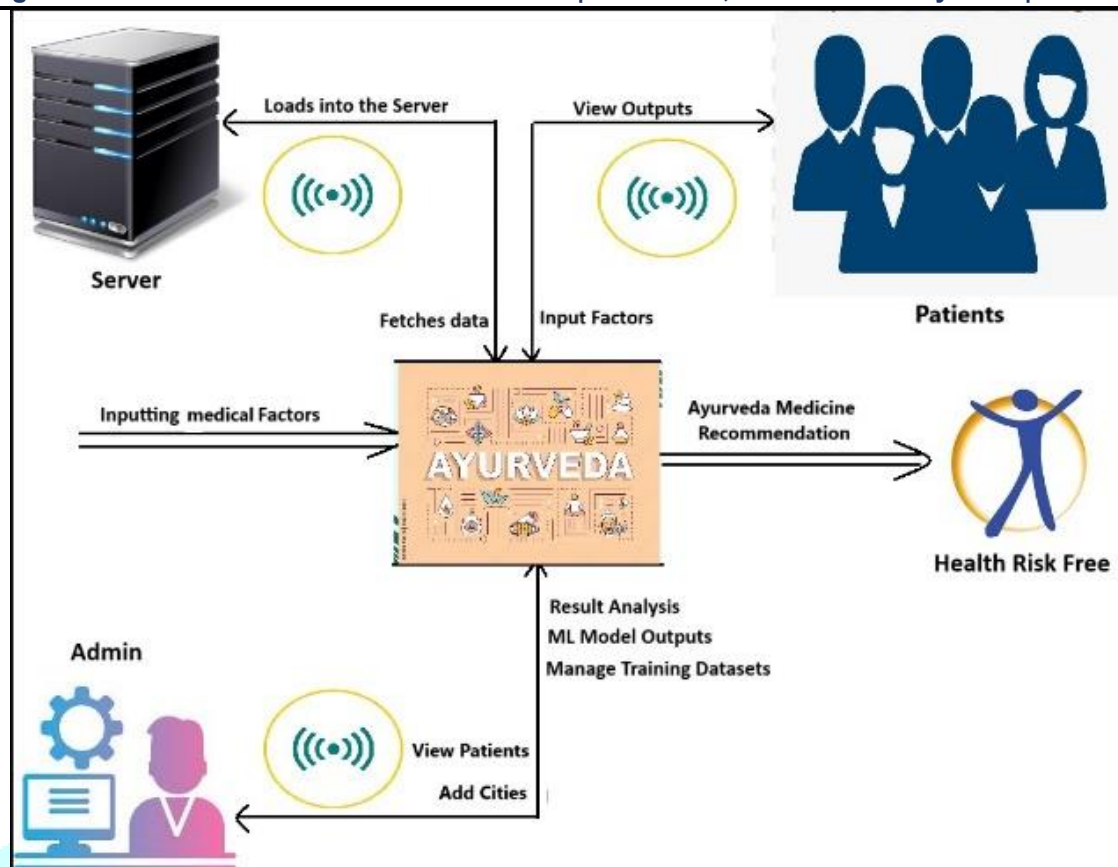


Figure 3.1: Proposed architecture

IV. METHODOLOGY

4.1 Supervised Learning Technique

It's a predictive model used for the tasks where it involves prediction of one value using other values in the data-set. Supervised learning will have predefined labels. It categorizes an object into one of the predefined labels based on specific parameters. In supervised learning, various algorithms can be used to build models, including KNN, Naïve Bayes, Decision Tree, ID3, Random Forest, SVM, and Regression techniques. The choice of algorithm depends on the requirements, labels, parameters, and dataset. These algorithms are used to develop models that make predictions based on available evidence, even in the presence of uncertainty.

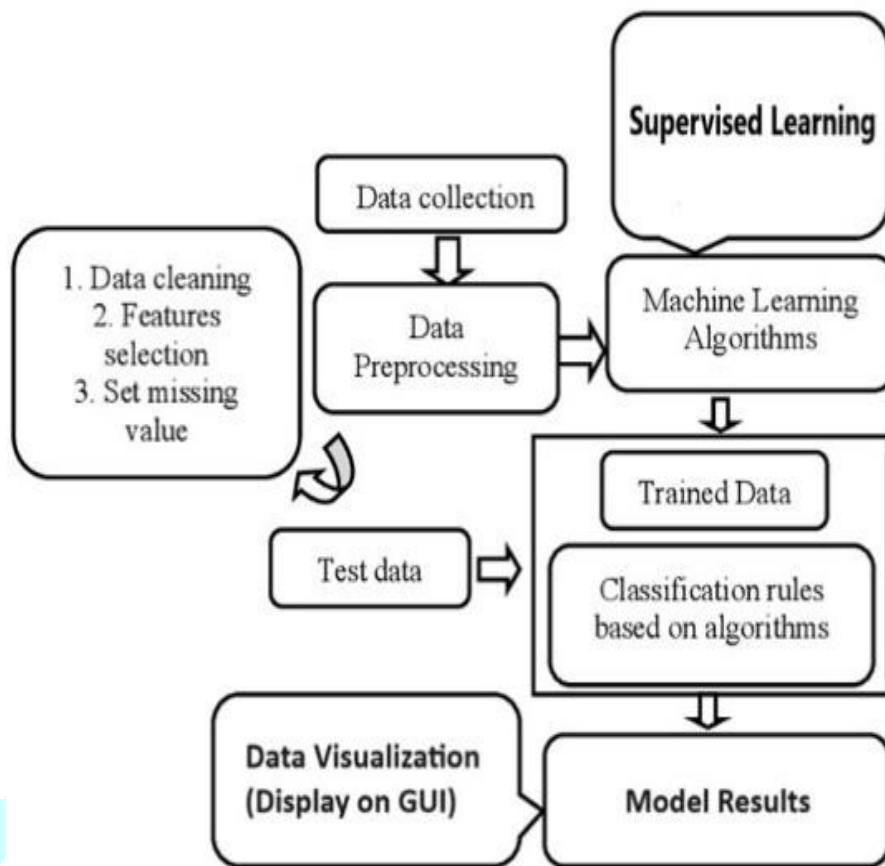


Figure 1. The working mechanism of proposed approaches

Step 1: Raw data Collected

This is the first step in the prediction process where we collect medical data.

Step 2: Extract and Segment Data (Data Preprocessing)

Medical data is analysed, and only relevant information is extracted. The necessary data is then processed and segmented based on specific requirements.

Step 3: Train Data

Once required data extracted and segmented, we need to train the data, train means converting the data into the required format such as numerical values or binary or string etc.

Step 4: ML Technique for Prediction

In this project for prediction, we make use to “Bayesian algorithm” which is an efficient and works fine for all different sets of parameters. It also generates accurate results.

Step 5: Model Built

Model developed using efficient machine learning algorithms and test for all different ratios and best model is used.

Step 6: Results

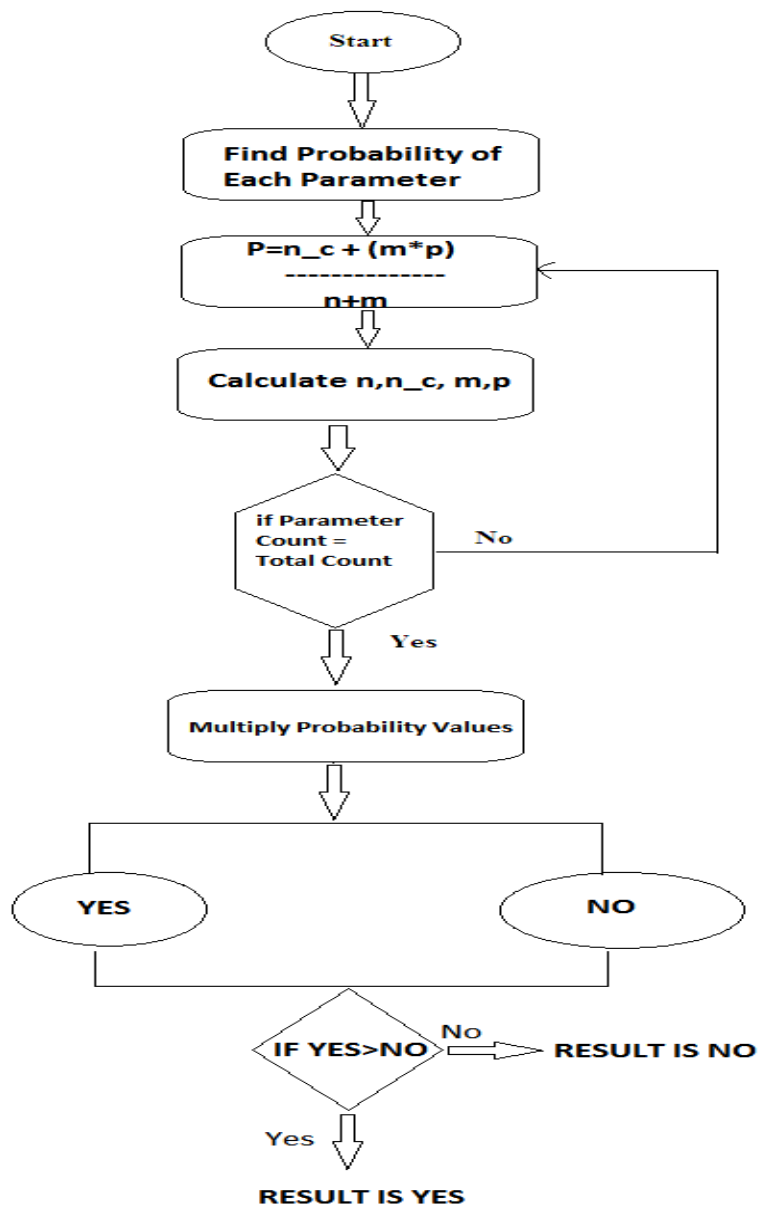
Results generated by the algorithm is checked with the accuracy using confusion matrix method. Here we validate the results generated by the algorithm “Bayesian classifier”.

Step 7: Visual Representation

Final outputs represented on GUI. When user’s gets login to the application system predicts the outputs and displays on a GUI.

4.2 Naïve Bayes Algorithm

Naïve Bayes is a probabilistic classification algorithm based on Bayes' Theorem. It is called "naïve" because it assumes that all features are independent of each other, which is often not true in real-world scenarios but simplifies computations.



FLOW OF NAIVE BAYES ALGORITHM

Input:

Training dataset T,

$F = (f_1, f_2, f_3, \dots, f_n)$ // value of the predictor variable in testing dataset.

Output:

A class of testing dataset.

Step:

1. Read the training dataset T;
2. Calculate the mean and standard deviation of the predictor variables in each class;
3. Repeat

Calculate the probability of f_i using the gauss density equation in each class;

Until the probability of all predictor variables ($f_1, f_2, f_3, \dots, f_n$) has been calculated.

4. Calculate the likelihood for each class;
5. Get the greatest likelihood;

Naive Bayes Algorithm Steps:

Step 1: Scan the dataset (storage servers)

Retrieving the required data for mining from sources such as databases, cloud storage, and Excel sheets.

Step 2: Calculate the probability of each attribute value. $[n, n_c, m, p]$

For each attribute, we calculate the probability of occurrence using the given formula (detailed in the next step). The formula should be applied to each class (disease) accordingly.

Step 3: Apply the formulae

$$P(\text{attributevalue}(a_i)/\text{subjectvalue}(v_j)) = (n_c + mp)/(n+m)$$

Where:

I. n = the number of training examples for which $v = v_j$

II. n_c = number of examples for which $v = v_j$ and $a = a_i$

III. p = a priori estimate for $P(a_{ij}v_j)$

IV. m = the equivalent sample size

Step 4: Multiply the probabilities by p

For each class, the results of each attribute are multiplied by PPP, and the final results are used for classification.

Step 5: Output

Compare the values and assign the attribute to one of the predefined classes.

V. EXPERIMENT RESULTS

5.1 NB Algorithm Results

Here we build a real time application useful for the medical department. This project build using Microsoft technologies. Medical Training datasets trained using NB algorithm and we got very good results. NB algorithm is programmed in such a way that, it works for dynamic datasets. NB algorithm logic is written and it's our own library. We are getting around 88.7% of accurate results and it takes around 10000 milli seconds for prediction.

Constraint	NB Algorithm
Accuracy	88.7 %
Time (milli secs)	12006
Correctly Classified (precision)	88.7 %
Incorrectly Classified (Recall)	11.3 %

5. CONCLUSION:

The Intelligent Ayurvedic Medicine Recommendation System integrates traditional Ayurvedic medicine with modern technology, offering personalized healthcare solutions. Using naïve bayes algorithm, it processes user symptoms and provides accurate, user-friendly recommendations. Proposed system is a real time medical system useful for hospitals and doctors and built using Microsoft tools such as Visual Studio tool and SQL Server tool.

VI. CONCLUSION

The Intelligent Ayurvedic Medicine Recommendation System integrates traditional Ayurvedic medicine with modern technology, offering personalized healthcare solutions. Using naïve bayes algorithm, it processes user symptoms and provides accurate, user-friendly recommendations. Proposed system is a real time medical system useful for hospitals and doctors and built using Microsoft tools such as Visual Studio tool and SQL Server tool.

6.1 Future Enhancements

- We can use more algorithms for prediction.
- We can add more factors for prediction.
- We can increase the size of the datasets.

VII. REFERENCES

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