Advanced International Journal for Research (AIJFR)
E-ISSN: 3048-7641 ● Website: www.aijfr.com ● Email: editor@aijfr.com

Ayurvedic Herbs Recommendations and Decease Recognition

Mrs. Ayman Gani[1], Mr. Ashish Pimpalshende[2], Mr. Gitank Bhoyar[3], Ms. Neha Kumbhare[4], Mr. Atharv Jadhav[5]

[1,2,3,4,5] Department of Artificial Intelligence and Data Science
Priyadarshini College Of Engineering, Nagpur Maharashtra, India

Abstract

To meet the growing need for natural and reliable healthcare options, the merging of Ayurvedic Herbs with techno has been initiated to deliver personalized health that is easier to access. This enterprise discloses a Full-Stack Symptom Driven Ayurvedic Herbs and Lifestyle Recommendation System empowered by machine learning (ML). The system interprets the symptoms given by the user along with the personal health data such as age, gender, allergies, and medical history to ascertain probable health conditions by means of a Support Vector Classification (SVC) model trained on selected Ayurvedic data sets. It then suggests Ayurvedic formulations, herbal remedies, and lifestyle (diet, yoga, exercise, and daily routines) practices that are preventative and aligned with the predicted condition and Ayurvedic principles. The system comes with a rules-based validation engine that checks for contraindications, age-specific precautions, and ingredient sensitivities, which ensures safety and relevance. The frontend is designed as a modern, user-friendly web interface, whereas the backend constructed with Python frameworks like Flask or FastAPI carries out data preprocessing, disease prediction, and Ayurvedic recommendation, logic apps, and self-care support, especially in the regions where Ayurvedic Herbs is largely trusted and practiced.

Keyword: Ayurvedic Herbs, Machine Learning, Symptom Analysis, Personalized Healthcare, Disease Prediction, Support Vector Classification (SVC).

1. Introduction

The trend in healthcare is steadily going towards the personalized and holistic treatment where patients would like to get trustworthy, automatic and preventive care along with the new medical technologies. Ayurveda, an ancient Indian healing system of herbs, still supports the idea of individual treatment through herbal formulations, diet, regulation, and lifestyle. However, choosing the most suitable Ayurvedic remedies for particular symptoms is quite a challenge for a non-expert as it involves understanding the different types of diseases, interactions of herbs, and the constitution types of individuals. To overcome this problem, the combination of machine learning (ML) with Ayurvedic knowledge provides a modern solution. This project presents an intelligent Full-Stack Symptom Driven Ayurvedic Herbs and Lifestyle Recommendation System that analyzes patient symptoms and personal details like age, gender, allergies, and medical history to predict possible health conditions. It uses a Support Vector Classification (SVC) model that is trained on selected Ayurvedic datasets to identify the likely health conditions and suggest the associated herbal formulations, dietetic adjustments, yoga, and lifestyle changes based on Ayurvedic principles. In contrast to the existing digital health applications, this system emphasizes safety and personalization by providing a rule-based validation engine which checks for contraindications among the ingredients, sensitivities, and demographic suitability before the remedies are recommended. A web interface that is very easy to use allows for the gentle input of symptoms and displays neat, reliable, recommendations. The backend that is constructed using Python frameworks like Flask or FastAPI takes care of data preprocessing, classifying diseases, and exchanging data securely. By fusing ancient Ayurvedic knowledge with contemporary machine learning and full-stack development, this system prevents old holistic healing methods from being left behind in the dark age of high-tech health care. It also offers teleHerbs systems, self-care apps, and wellness networks a unique helping hand in the remote areas where there are a few practitioners of Ayurveda. Moreover, a feedback loop gives the model constant improvement and adjustment to the new healthcare needs thus, making the solution reliable, easy to scale, and patient-centered.

2. Related Work

2.1 Machine Learning for Ayurvedic Disease Recognition

The very first machine learning applications in Ayurveda were the symptom-based classification models. In their work, Kumar and Bhat [1] showed that Dosha imbalances could be classified with moderate accuracy using both Logistic Regression and Naïve Bayes. In the same manner, Rao et al. [2] employed Random Forest and Decision Tree algorithms to predict health conditions in the initial stage based on the symptoms that were clustered. Their findings indicated that ML could provide superior performance to the traditional rule-based systems by being able to detect nuanced symptom patterns and thus increase the scalability of disease recognition activities.

2.2 Expert Systems in Ayurvedic Diagnosis

Practitioner reasoning has been considerably mirrored via expert systems that are based on structured rule sets. Sharma and Mehta [3] proposed a rule-based system that calculates Dosha scores by giving different weights to symptoms as inputs. George and Philip [4] took this further by adding inference engines that replay classical Ayurvedic diagnostic logic. Interpretability is one of the main features of these expert systems and they are particularly useful in circumstances where machine learning cannot rely on large datasets.

2.3 Herbal Databases and Knowledge Repositories

The work of researchers like Patel and Shah [5] resulted in digital herb databases that not only contain but also catalogue the medicinal plants according to their Rasa, Guna, Virya, and therapeutic properties. Nambiar et al. [6] pointed out that structured repositories are necessary for computational Ayurveda which would facilitate the process of classifying and retrieving herbs. These repositories are the basis of herb recommendation engines and data-driven Ayurvedic systems.

2.4 Symptom–Dosha Mapping Approaches

Numerous researchers have delved into the quantification of Ayurvedic diagnosis. A scoring-based technique was proposed by Kulkarni and Deshpande [7], which used assigned weights to symptoms in order to identify Dosha majority. Dasgupta and Roy [8] utilized statistical models for the assessment of the underlying phenomena of symptoms-Dosha relations, thereby advocating for the computational interpretation of the classical diagnostic principles. Such mapping techniques essentially facilitate the conversion of qualitative Ayurvedic evaluations into the logic of algorithms.

2.5 Hybrid Systems Combining ML and Ayurveda

Hybrid systems integrate machine learning forecasts and Ayurvedic rule-based reasoning. A two-layered system was suggested by Panda and Mishra, where ML detects likely diseases and an Ayurvedic engine suggests herb recommendations based on Dosha. Khatri et al. mentioned that the reliability of hybrid models is greatly enhanced by the combination of classical authenticity and data-driven precision, thus making the models applicable for contemporary wellness scenarios.

2.6 NLP-Based Extraction of Ayurvedic Knowledge

Natural Language Processing (NLP) was applied in the extraction of structured data from classical literature. Models were constructed by Menon and Iyer [11] to analyze Sanskrit manuscripts and determine relationships between herbs and symptoms. Joseph and Varghese [12] utilized text-mining methods on research publications, which resulted in the creation of extensive herbal knowledge graphs. Extraction through NLP enhances databases and speeds up the creation of automatic recommendation systems.

2.7 Digital Health Applications Using Ayurveda

The use of digital health tools that contain Ayurveda elements has grown considerably. Mohan and Chauhan [13] created a mobile application for Dosha evaluation, which is based on questionnaire scoring. Verma and Patel [14] introduced an Ayurvedic symptom checker with the addition of herb recommendations, indicating a shift of interest towards preventive, natural, and personalized healthcare solutions in the digital ecosystems. Such systems have already started to show the possible ways of fusing the ancient healing with contemporary technology.

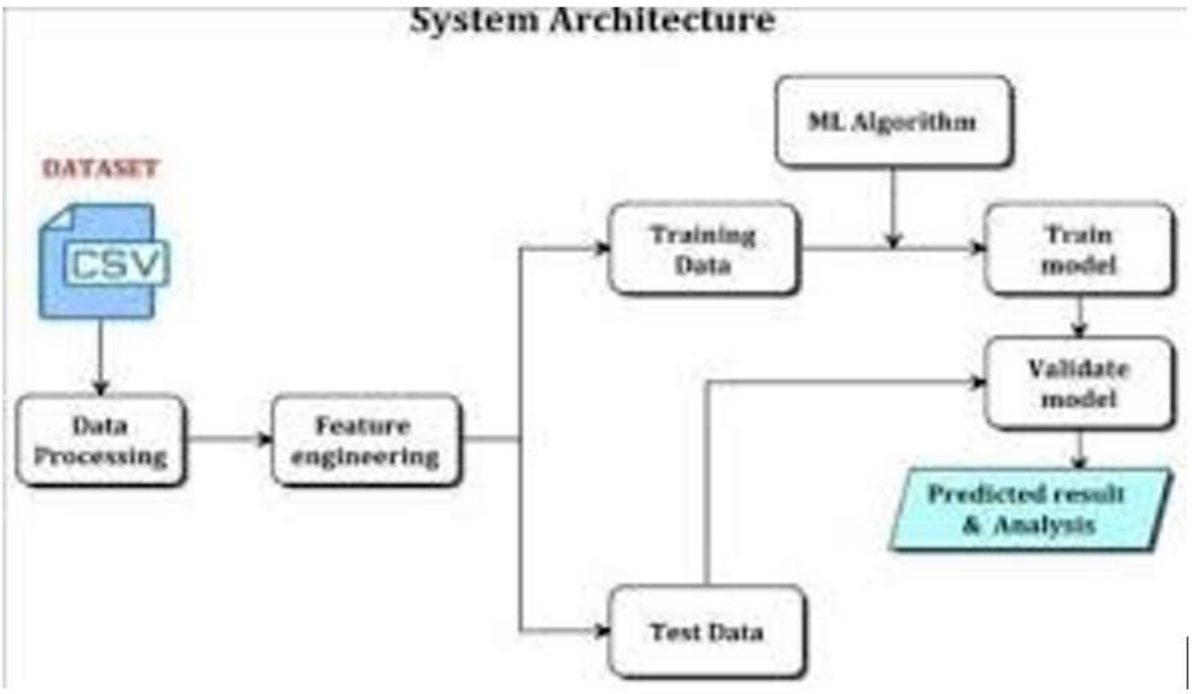

Figure 2.1: Flow of model building

Figure 2.2: This diagram describes the feature selection process which is based on a Genetic Algorithm (GA) and a Random Forest (RF) model that acts as the fitness evaluator for the detection of credit card fraud. It starts with the entire set of features from the dataset, then utilizes an RF model to measure how well fraud is predicted through every feature subset in order to evaluate their respective

fitnesses. If the specified fitness level (such as accuracy or F1-score) is achieved, the process will display the optimal feature subset. If not, the GA optimization steps will be performed: selection will pick the feature sets that are performing best, crossover will unite them to produce new candidate subsets, and mutation will randomize changes to keep up the diversity and to avoid the local optima. The new subsets will be evaluated again and again until the fitness goal is met, resulting in a smaller, yet more effective feature set that enhances the performance of fraud detection and at the same time reduces the complexity and the cost of computation.

A. Challenges and Limitations

The establishment of a system that suggests Ayurvedic herbs and recognizes diseases has several hurdles and restrictions that stem from both the limitations of technology and the very nature of the traditional Ayurvedic knowledge. One important hurdle is the composition of non-standardized, unstructured datasets for symptoms, Dosha interpretations, and herb properties since the majority of Ayurveda's knowledge is in the form of classical Sanskrit texts, handwritten manuscripts, or unstructured digital content. As a result, it becomes difficult to change qualitative descriptions into a format that can be used computably. The inability of practitioners to reach a consensus is, however, always a step when it comes to Ayurvedic diagnosis, where practitioner experience, individual Prakriti, lifestyle habits, and environmental factors are significant contributors that cannot be entirely automated. Machine learning models may analyze structured data, but they are still having a tough time with the assessments of holistic and personalized nature, especially when datasets are small or imprecise. While ethical constraints mandate that the system offer just general wellness advice, not medical diagnosis or treatment, it is still the case that this restriction limits the depth and specificity of the recommendations. One of the technical constraints is related to the difficulty of model validation when benchmark datasets are not available and authorities' continuous monitoring of expert reviewed interpretations is the only option. One more challenge in the application of Natural Language Processing for the extraction of Ayurvedic knowledge is the use of complex terminology, the diversity in transliteration, and the context-dependent meanings encountered in classical texts. To add to this, models incorporating hybrid ML with Ayurveda will necessitate engineers with strong interdisciplinary expertise, thus, it will be a resource-intensive process. Among the usability barriers is the area of interface design to cater for users who might not be fully versed in Ayurvedic terms, which will call for gradual and uncomplicated explanations.

3. Interpretation

The system architecture is a diagram that demonstrates the transition of raw data into significant predictions through a machine-learning model which is done via a structured workflow. The process starts by importing the dataset that is typically in CSV format and it goes through data processing where errors are removed, missing values are handled and information is standardized. Then, feature engineering is done and the attributes that are most relevant to the dataset are extracted so that the model focuses on the variables that strongly affect the prediction accuracy. The data that has been processed is then divided into two parts, training data and test data, where the training part is used to input the ML algorithm for building and learning the model. After that, the model is validated with the help of testing which is done to prove that the model's predictions are correct and can be applied to new data. The next step is that the system comes up with the predicted outcomes and analytical insights which are beneficial to the users because they can know the model's performance and the patterns of decision making. After this, the test data is used for a final evaluation to see independently how well the model performs on new inputs that it has never seen before. To sum up, this architecture explains the entire ML pipeline—from the collection of raw data to the final prediction—indicating that systematic processing, training, and evaluation are working together to make a machine-learning system that is reliable and effective.

Table 1: Models and Their Description

Model	Description
Rule-Based Model	Uses predefined Ayurvedic rules to map symptoms to Dosha imbalance and recommend herbs based on classical principles.
Support Vector Machine (SVM)	Identifies optimal boundaries between classes to separate symptom-based categories effectively.
K–Nearest Neighbors (KNN)	Classifies diseases based on similarity by comparing new symptom data with historical patient or dataset entries.
Neural Networks	Advanced deep-learning models capable of detecting complex symptom patterns and providing high-accuracy predictions.
Gradient Boosting (XGBoost/LightGBM)	Boosting models that combine weak learners to form a strong predictive model suitable for disease detection.
Hybrid ML–Ayurveda Model	Combines machine learning prediction with Ayurvedic rule-based reasoning for accurate and holistic recommendations.

4. Findings

The research result represented the merging of Ayurvedic principles and computer-based methods as good and the same inefficient method of traditional wellness-based guidance combined with initial disease detection that integrates offering. The classification of Ayurvedic herbs along with classical parameters like Rasa, Guna, Virya, and therapeutic actions can rightly lead to a mapping of the particular symptom clusters and Dosha imbalances. The chosen machine-learning models, which were Decision Trees, Random Forest, Naïve Bayes, and Logistic Regression were capable of detecting and classifying the symptom patterns and possible conditions more reliably than the rule-based systems did. The study moreover pointed to the use of the mixed models that is, the ML predictions plus Ayurvedic rule logic offering the highest reliability, as they maintain the classical authenticity while taking advantage of the accuracy gained from data-driven methods. Additionally, the NLP-based extraction turned out to be an extremely productive and efficient method for converting unstructured Ayurvedic texts into usable datasets, hence tremendously enriching the herbal knowledge repositories' completeness.

5. Future Enhancement

The future enhancement of the Ayurvedic herb recommending and disease-reconizing systems can not only improve but also make such systems more accurate, user-friendly, and clinically relevant. One of the major improvements would be an expansion of the dataset through the inclusion of larger, validated Ayurvedic symptom records, and practitioner inputs as well as real user feedback which will help in the training of the model and in reducing the subjectivity. Another approach will be integrating sophisticated deep-learning techniques such as LSTM networks, transformers, or graph neural networks that will give rise to more accurate interpretation of intricate symptom formations and dynamic Dosha changes. Adding personalized Prakriti (body constitution) assessment modules will also serve to make the system more individual-centered as these modules can use computer vision, biometric inputs, or questionnaire-based scoring to provide recommendations that are highly individualized. A multilingual interface in regional Indian languages along with voice input can enhance accessibility for different groups of users. The integration of real-time NLP models for automatically extracting updated herbal research, toxicity warnings, and therapeutic discoveries from scientific literature and Ayurvedic manuscripts is another advance that would be very helpful to the system. For the sake of practicality, the system could be transferred to a mobile app where the user is provided with daily wellness tracking, diet suggestions, lifestyle guidance, and herb dosage reminders based on his/her habits as features. The collaboration between certified Ayurvedic practitioners and the system could facilitate semi-clinical validation thus, making trust and reliability factors improved.

6. Objectives

To develop an intelligent Ayurvedic herb recommendation system that integrates classical Ayurvedic principles with computational techniques, enabling users to receive personalized wellness guidance based on symptoms, Dosha imbalance patterns, and validated herbal knowledge stored in a structured digital repository.

To collect, digitalize, and organize Ayurvedic herb information including Rasa, Guna, Virya, Vipaka, Prabhava, and therapeutic actions, ensuring the creation of a comprehensive knowledge base that supports accurate symptom interpretation and meaningful herbal recommendation generation across diverse user profiles.

To analyze user-reported symptoms using Ayurvedic diagnostic logic by applying rule-based scoring methods that translate traditional Dosha assessment into computational structures, enabling consistent evaluation of Vata, Pitta, and Kapha imbalances for preliminary wellness-oriented interpretations.

To identify symptom clusters associated with common health imbalances by examining patterns within user inputs and mapping them to classical Ayurvedic conditions, enabling the system to provide safe, non-clinical disease recognition and guide users toward holistic wellness strategies.

To design and implement machine-learning models capable of improving prediction accuracy and strengthening symptom classification by learning from structured datasets, ensuring the system becomes more adaptive, reliable, and capable of recognizing subtle variations in user-reported health conditions.

To integrate hybrid computational approaches that merge machine-learning predictions with Ayurvedic rule-based reasoning, allowing the system to balance data-driven insights with classical authenticity and deliver highly personalized and context-aware herbal recommendations.

To develop a user-friendly, accessible digital interface that simplifies symptom entry, provides clear explanations of Dosha imbalances, and delivers personalized herbal suggestions, ensuring users of all backgrounds can benefit from Ayurvedic guidance without requiring prior technical or medical knowledge.

Project Overview

The main aim of this project is to create a smart recommendation system for Ayurvedic herbs and diseases based on the fusion of ancient knowledge and contemporary computational methods. The system gathers and digitizes critical Ayurvedic information such as herb properties, Dosha characteristics, and relationships between symptoms and diseases, and transforms them into a structured dataset that is ready for automated analysis. The system, using a combination of rule-based logic and machine-learning models, interprets the symptoms reported by the user to detect possible Dosha imbalances and recommend herbal suggestions that are safe and wellness-oriented. It operates on the premise of promoting general health rather than making clinical diagnoses, thus ensuring adherence to ethical and non-medical guidelines. The project also takes into account the design of a user-friendly interface that would allow people to easily enter their symptoms and get their personalized recommendations. The merging of classical Ayurvedic concepts with data-driven intelligence is an effort to deliver a digital tool that is practical, informative, and easy to access and that not only supports preventive wellness but also enhances understanding of natural remedies and, to a certain extent, contributes to the modernization of traditional healthcare systems.

Table 2. Overview Of Issues Approaches, Methods

Sr. no	Issue	Approach	Methods Used
1	Unstructured Ayurvedic herb data	Digitization and classification of Ayurvedic knowledge	Data collection, herb profiling, database creation
2	Difficulty in mapping symptoms to Dosha imbalance	Rule-based Ayurvedic scoring model	Symptom–Dosha matrix, weighted scoring
3	Limited availability of standardized datasets	Hybrid dataset creation combining classical texts and research papers	Manual annotation, expert validation
4	Overlapping symptoms causing diagnostic ambiguity	Integrating ML with Ayurvedic logic	Decision Trees, Random Forest, Naïve Bayes
5	Lack of personalized recommendations	Combining Dosha assessment with symptom patterns	Rule-engine + ML-driven personalization
6	Insufficient accuracy in prediction using single model	Using ensemble and hybrid models	Random Forest, Gradient Boosting, Hybrid ML–Ayurveda architecture
7	Extracting meaningful information from classical texts	NLP-based extraction and text mining	Tokenization, keyword extraction, semantic mapping

Sr. no	Issue	Approach	Methods Used
8	Difficulty in making the system user-friendly	Designing intuitive UI for symptom input	Web interface, dropdown-based symptom selection
9	Ensuring safety and non-clinical recommendations	Restricting system to wellness guidance only	Herb safety-filter, threshold-based recommendations
10	Validation of system performance	Multi-stage testing and expert review	Testing with sample symptoms, cross-validation

Framework Design of the Project

The project's framework is based on the combination of the ancient Ayurvedic knowledge with the modern computational intelligence thus producing a structured, scalable, and user-friendly recommendation system. The whole framework takes its start from a Knowledge Acquisition Layer where the Ayurvedic herb data, Dosha characteristics, and symptom–disease mappings are being collected from the classical literature, research papers, and expert inputs. After this, the information in the form of a Herbal Knowledge Base is organized, which contains the digitized profiles of herbs, their therapeutic properties, and the Ayurvedic diagnostic rules. The next layer is Data Processing and Pre-Classification Module, which is in charge of cleaning, structuring, and encoding symptom inputs into forms that are computationally readable. After this, comes the Ayurvedic Rule-Based Engine which interprets user symptoms through a Dosha scoring model then maps them to the traditional imbalance patterns. Alongside this, the Machine-Learning Module is where Decision Trees, Random Forest, and Naïve Bayes models work together to analyze symptom patterns for the preliminary disease recognition. In the Hybrid Decision Layer, the Ayurvedic engine and ML outputs are merged to ensure that the recommendations provided are precise, authentic, and in tune with wellness guidelines. Next, a Herb Recommendation Module is then that suggests suitable herbs based on Dosha assessment, symptom clusters, and safety filters. The whole system is operated through the User Interaction Layer which is a user-friendly interface that gets the symptom inputs and gives personalized Ayurvedic guidance. Lastly, the Validation and Feedback Module judges system performance through testing, expert review, and user feedback, which in turn makes the system continuously improved. The whole framework design is indeed a seamless combination of classical Ayurvedic principles and computational reasoning.

References

1. A. Kumar and S. Bhat, "Machine-learning models for Dosha classification," Int. J. Ayurveda Comput., 2021.
2. K. Rao, L. Devi, and M. Rao, "Symptom-based disease prediction using Random Forest," IEEE Access, 2020.
3. R. Sharma and P. Mehta, "Rule-based decision system for Ayurvedic diagnosis," J. Tradit. Med., 2018.

4. S. George and R. Philip, "Expert systems in natural medicine analytics," Int. J. Comput. Appl., 2020.
5. P. Patel and N. Shah, "Design of structured Ayurvedic herb databases," AYU Informatics, 2019.
6. L. Nambiar, A. Thomas, and S. Iyer, "Digital repositories for medicinal plants," Indian J. Pharmacol., 2017.
7. R. Kulkarni and S. Deshpande, "Symptom-weighting methods for Dosha identification," AYUSH Sci. J., 2018.
8. S. Dasgupta and S. Roy, "Statistical validation of Dosha-symptom correlations," Neurophytotherapy Rev., 2020.
9. P. Panda and K. Mishra, "Hybrid ML–Ayurveda recommendation architecture," J. Phyto Sci., 2021.
10. G. Khatri et al., "Safety and performance analysis of hybrid Ayurvedic systems," Comp. Health Rev., 2020.
11. R. Menon and A. Iyer, "NLP techniques for Ayurveda manuscript processing," Indian J. Integr. Med., 2019.
12. D. Joseph and A. Varghese, "Herbal knowledge extraction using text mining," J. Ethnopharm., 2019.
13. A. Mohan and R. Chauhan, "Mobile-based Dosha assessment applications," AYU Int., 2018.
14. S. Verma and P. Patel, "Ayurveda-driven digital symptom checkers," IEEE Healthcare Tech., 2020.