A Survey on Exploring Ayurvedic Medicine Recommendation Using Machine Learning Techniques

Prof. Ghadge S.V.[1] , Prof. Shah S.N.[2] ,Samir Bhosale[3], Onkar Gadade[4], Ganesh Kalaskar[5]

[1]*Assistant Professor, Department of Computer Engineering, Sharadchandra Pawar college of Engineering and Technology Someshwarnagar*

[2]*HOD, Department of Computer Engineering, Sharadchandra Pawar college of Engineering and Technology Someshwarnagar*

[3,4,5]*Student, Department of Computer Engineering, Sharadchandra Pawar college of Engineering and Technology Someshwarnagar*

Abstract—**The integration between machine learning (ML) and Ayurveda, India's ancient holistic system of medicine, has been effectively modeled in this paper to develop a system for personalized healthcare recommendations. Ayurvedic prescriptions are based on individualized treatment modalities according to one's dosha (body constitution), lifestyle, and symptoms. This system intends to align traditional knowledge from Ayurveda with cutting-edge computational techniques. Decision trees are utilized for disease prediction, whereas neural networks are employed to recommend treatment. The proposed method analyzes individual patient data, including symptoms and medical history, and recommends appropriate and easy Ayurvedic treatment. Such integration increases the accuracy of diagnosis, automates treatment recommendations, and allows the practitioner of Ayurvedic medicine to scale up their services to reach a larger audience. The study illustrates how ML may assist Ayurveda in achieving optimization, i.e., working better for Ayurveda so that it may work better for modern health-care scenarios. In short, the study discusses the promise of AI-led Ayurvedic treatments contributing toward the personalized and preventive healthcare delivery model.**

Index Terms—**Ayurveda, Machine Learning, Decision Trees, Random Forest, Personalized Medicine**.

I. INTRODUCTION

Ayurveda, which in Sanskrit means "science of life", is an ancient holistic healing system that originated in India over 5,000 years ago. It is based on the philosophy that fostering general wellbeing requires balancing the mind, body, and spirit. While modern allopathic medicine usually emphasizes treatment based on symptoms, Ayurveda is more about preventive care and the treatment of the underlying causes of diseases.It incorporates yoga and different restrictions in diet, herbs, and general lifestyle changes that will enhance health and longevity. Ayurveda still suffers from serious issues of accessibility, standardization, and scalability, putting personalized care beyond the reach of the masses even if it is mainstream and has been very successful through ages. Machine learning (ML) as a subset of AI is the one designation that has ever altered any field of study, modernizing medical practice, working on logical paradigms with data-driven decision-making, and aiding in personalized recommendations. This was particularly necessary for considering the incorporation of ML with Ayurveda, which can provide diagnosis and treatment of diseases with personalized approach to Ayurvedic treatment according to health profile, symptomatology, and Prakriti. This study thus proposes the development of an ML-based Ayurvedic recommendation system that will act as a link between the traditional Ayurvedic system of medicine and modern healthcare technologies. Consequently, the proposed system intends to optimize treatment plans and ingrain diagnostic accuracy based on this data-oriented view. Thus, Ayurveda will become standardized and more accessible. Beyond modernizing Ayurveda, the ML system also helps in solving the problems associated with accessibility, in terms of scalability, personalization, and evidence-based recommendation. This network will facilitate the transformation of Ayurveda to an even more efficient, dependable, and broadly applicable medical system, thereby marrying

ancient wisdom with cutting-edge science to support better patient outcomes.

II. LITERATURE SURVEY

Ayurvedic medicine is thousands of years of practice, but rarely aligned with technology. The last couple of decades has witnessed machine learning and artificial intelligence slowly embedding themselves into recommendations of Ayurvedic medicine. Different techniques have been explored by researchers to improve personalized treatment plans, improve diagnostic precision, and recognize medicinal plants using ML.

One of the studies done by Shinde et al. (2024) proposed a disease prediction model encoding Ayurvedic principles into machine learning. This model will suggest patient-specific personalized Ayurvedic remedies and consultation with hospitals when needed. ML algorithm with the traditional Ayurvedic treatment increase the accuracy in prediction and better outcomes in treatment (Shinde et al., 2024). By adding additional Ayurvedic datasets and increasing the accuracy of disease classification, we will further improve the model in the approach we propose.

The study conducted by Mathew et al. (2024) describes a hybrid machine-learning framework for Ayurvedic drug recommendation. This system intends to analyze Prakriti and derive treatment suggestions pertinent to the physical and psychological propensities of an individual. The personalized Ayurveda-based treatment approach will be improved further by this proposed method (Mathew et al., 2024). Extending their work, we incorporate a user-friendly mobile application for the recommendations.

Sinha et al. (2025) in their scientific evaluation of AI-enabled Ayurvedic medicine studied several methods including deep learning, natural language processing, and predictive analytics. Their research reveals the application of AI in prescription and drug discovery (Sinha et al., 2025). Thus, our proposed system intends to improve the decision-making by employing machine learning models trained with data from Ayurvedic texts and patient histories.

According to Ahmed et al. (2024), the AyurChat system is an AI-based chatbot that provides people with real-time consultation on their health issues in terms of Ayurveda. The system gives machinelearning-based responses to the inquiries that users make regarding Ayurvedic remedy and lifestyle changes (Ahmed et al., 2024). Our proposed system will carry this work forward by developing a mobile-based interactive chatbot that improves understanding in context while giving recommendations in Ayurvedic health.

The author Kumar et al. (2024) have presented AyuMonk, a web-based Ayurvedic health companion that integrates machine learning algorithms for diagnostics and treatment recommendations(Kumar et al., 2024). This proposed system in this study, however, lacks offline functionality, which we intend to incorporate in our mobile application so that in remote areas, health guidance would be uninterrupted.

From these studies, it was clear that AI and ML can play a very important role in transforming the traditional Ayurvedic medicine recommendation systems. Our proposed system will enhance these aspects with superior machine-learning algorithms and a mobile-friendly interface to combine into one definitive AI-based Ayurvedic healthcare solution.
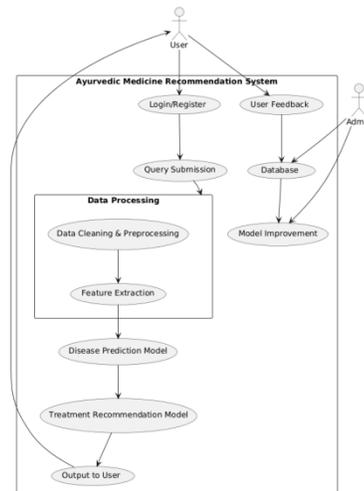
III. SYSTEM ARCHITECTURE

Figure 1: System Architecture

The above architecture represents the recommended model for Ayurvedic Medicine Recommendation System using a data-driven approach. It begins with user interaction where users register/login and post their health-related queries. Next, all inputs are attained in a structured pipeline allowing proper data integrity and relevance. The data processing module consists of data cleaning and preprocessing that

removes inconsistencies and extracts meaningful features. Then, the output of these refined features is used as input to a disease-predicting model that associates symptoms to likely diseases. So, as soon as a disease is diagnosed, the same is passed to the treatment recommendation model, which uses historical data and learned information from the expert, which suggests the patient Ayurvedic remedies. This enables the final recommendation of treatment to be output to the user. And feedback can be left by the users about the system's predictions, that is stored inside of a DB. This database is administered by an admin who reviews user feedback and tracks system operation to make models better over time. These feedback mechanisms thus improve the accuracy of the predictions relating to diseases and treatment recommendations, ensuring the system's evolutionary capability. In this architecture, the machine learning methods are made applicable to Ayurvedic parameters so that a data-based health advisory platform can provide meaningful and individualized recommendations for alternative medicine.

IV. METHODOLOGY

Dataset-

The analysis was carried on two datasets. The first one is a disease diagnosis dataset which contains symptoms such as acidity, headache, and stomach pain as feature variables. The target variable of this dataset is disease, which represents the prediction of an ailment. The second set is for the Ayurvedic medicine recommendations from the attributes of disease, age, and sex that identify the suitable treatments for different patients.

Data Preprocessing-

Elimination of unnecessary headers and replacing any instance of the string "infinity" with "inf" forms part of data preparation according to Pandas standards. This also standardized the column data types to relevant numeric data types. To promote access, non-alphanumeric characters were removed, and column names were italicized in lower case. At this stage, missing values and infinite values were dealt with, and new labels were created, where necessary. The next step involved splitting the data into training and testing

sets in a 70/30 proportion—in other words, for model training and evaluation.

Decision Trees-

The decision tree is a supervised learning algorithm, are commonly used to address categorization challenges. Nonetheless, they are capable of addressing regression problems. It functions as a tree-structured classifier, with core nodes indicates dataset attributes, branches indicates decision criteria, and the leaf nodes shows outcomes. A decision tree has two basic nodes: the leaf node and the decision node. To make decisions, decision nodes are employedand have multiple branches, where the leaf nodes represents the results of such choices and possess no extra branches. These decisions or tests are based on the features that are observed in the dataset. The decision tree determines diseases and their personalized treatment recommendations. It is the first step where a decision tree predicts a disease from symptoms. The algorithm works recursively by partitioning the data depending on relevant attributes into a tree-like model. Each tree node epitomizes a decision criterion of a particular attribute, which assists in locating the principal factors in the recommendation process and improves model interpretability.

Random Forest-

In this Ayurvedic recommendation system, the Random Forest can be utilized as an alternative or in combination with the Decision Tree model for disease prediction. Random Forest constructs a number of decision trees in training phase and merges their results for prediction, thus making the process more accurate and stable.In healthcare applications, between robustness and precision, the best utility outcomes are a necessity for good implementation.

V. CONCLUSION

This research shows integrating machine learning with Ayurvedic medicine has the potential to make recommendations for personalized healthcare. Integrating the broad-spectrum concepts of Ayurveda with the accuracy of contemporary ML techniques, the system utilizes decision trees, for the purpose of disease diagnosis, and neural networks for treatment recommendations. The study concludes that ML applications can substantially improve Ayurveda-based treatments by improving their accuracy,

accessibility, scalability, as well as porosity making them more individualized and effective.

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