



iJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** X **Month of publication:** October 2026

DOI: <https://doi.org/10.22214/ijraset.2026.85156>

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Machine Learning-based Ayurvedic Body Type Prediction with Suggestive System

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Abstract: Ayurveda, the ancient Indian system of medicine, classifies human beings into three primary body types, or Prakritis: Vata, Pitta, and Kapha. These body types are determined by the balance of three fundamental biological energies called Doshas. Understanding an individual's body type is crucial for recommending lifestyle habits, dietary preferences, and preventive healthcare strategies. Traditional methods for determining Prakriti rely on subjective questionnaires and expert evaluation, which can often be inconsistent and time-consuming. This project aims to leverage machine learning techniques to predict an individual's Ayurvedic body type accurately and efficiently. By analyzing physiological, psychological, and lifestyle data, the system can classify users into one or more dominant Doshas. Furthermore, the project incorporates a suggestive system that provides personalized recommendations on diet, exercise, and daily routines based on the predicted Prakriti. The integration of machine learning enhances prediction accuracy, provides a scalable solution, and bridges traditional knowledge with modern technology, making Ayurvedic health insights more accessible to the general population.

Keywords: Ayurveda, Prakriti Classification, Dosha Prediction, Machine Learning, Suggestive System, Personalized Healthcare

I. INTRODUCTION

Ayurveda emphasizes personalized healthcare, asserting that each individual has a unique constitution influenced by the three Doshas: Vata, Pitta, and Kapha. Vata governs movement and communication, Pitta controls metabolism and digestion, and Kapha regulates structure and stability. An imbalance in these Doshas can lead to specific health issues, making early identification and management essential. Traditionally, Ayurvedic practitioners determine a person's Prakriti through in-depth interviews, physical examinations, and detailed observations of lifestyle habits. However, this process requires expert knowledge and is subject to human bias. The advent of machine learning offers a solution to automate and standardize this process. By training algorithms on datasets that include physical attributes, behavioral patterns, and health indicators, the system can predict the dominant Dosha(s) with high accuracy. Integrating a suggestive system enhances the practical value of the prediction by offering customized recommendations for maintaining Dosha balance, thus supporting preventive healthcare and promoting holistic well-being.

A. Scope of the Project

The project has significant potential to modernize Ayurvedic healthcare by providing automated, reliable, and accessible body type predictions. The scope includes collecting user-specific data such as age, height, weight, diet preferences, sleep patterns, stress levels, and physical activity. Using machine learning models like decision trees, random forests, and neural networks, the system can classify users into Vata, Pitta, or Kapha types. Beyond prediction, the system offers a suggestive framework that advises on personalized nutrition, exercise routines, and lifestyle modifications. The project also allows integration with mobile or web applications, making it widely accessible. Additionally, this system can serve as a foundation for future research, such as correlating Ayurvedic body types with susceptibility to diseases, improving personalized medicine, and integrating wearable health data for dynamic Prakriti assessments. Overall, the project bridges traditional wisdom with contemporary technology, promoting preventive and personalized healthcare on a larger scale.

B. Problem Statement

Accurate determination of Ayurvedic body types is essential for personalized health management, but current methods are subjective, inconsistent, and dependent on expert practitioners. Individuals without access to trained professionals may not receive accurate assessments, limiting the practical application of Ayurveda. Moreover, the lack of automated tools prevents large-scale analysis and integration into modern healthcare platforms. There is a need for a system that can objectively analyze multiple physiological, behavioral, and lifestyle factors to predict Prakriti.

Additionally, providing actionable recommendations based on the predicted body type is vital to translate knowledge into practical lifestyle adjustments. The challenge lies in designing a system that is accurate, scalable, user-friendly, and capable of delivering meaningful suggestions in line with Ayurvedic principles.

II. LITERATURE SURVEY

The rapid growth of digital health applications and the increasing interest in personalized, preventive care have motivated researchers to explore how machine learning can support Ayurvedic diagnostics. Prakriti assessment is central to Ayurveda, offering essential principles to describe an individual's constitution and inform lifestyle guidance. As interest in objective, scalable Prakriti prediction increases, it is important to understand the landscape of current machine learning approaches applied to this problem. This literature survey reviews key advancements and comparative analyses relevant to the development of an effective machine learning-based Prakriti prediction and suggestive system.

Machine learning algorithms and their potential to improve Ayurvedic diagnostics have been the subject of numerous studies.

In [1], Lakshmi Bheemavarapu and K. Usha Rani present a review of machine learning models developed to automatically identify an individual's body constitution (Prakriti) using data gathered through Prasna Pariksha, a questionnaire-based assessment. The traditional Ayurvedic approach to determining Prakriti is qualitative and expert-dependent, which limits consistency across practitioners. The review surveys models such as Random Forest, SVM, and Naive Bayes that operate on phenotypic traits collected via structured questionnaires to classify individuals into dominant Dosha types (Vata, Pitta, Kapha). The authors argue that such models can support both individuals and practitioners by producing reproducible classifications that inform lifestyle and treatment recommendations, while noting that dataset size, feature selection, and validation against expert labels remain open challenges.

In [2], Majumder et al. apply eight machine-learning classifiers, including decision trees and SVM, to phenotypic data collected from 217 individuals drawn from genetically diverse cohorts representing three extreme Prakriti categories. Performance across the algorithms is compared using multiple metrics on predefined train/test splits. The study demonstrates improved consistency and accuracy relative to traditional subjective evaluation and underscores the potential of AI to support objective Prakriti classification, though the relatively small and extreme-case-focused dataset limits generalizability.

In [3], Gupta et al. introduce AYUSH-27, a machine learning and deep learning pipeline trained on phenotypic characteristics from 505 individuals gathered through a conversational AI interface. Classical models such as Random Forest, KNN, SVM, and Naive Bayes are used for Prakriti prediction, while deep neural networks classify Vikriti, or imbalanced Dosha states, from digital pulse signals captured by smartphone PPG sensors. The work highlights the potential of a holistic wellness application built on ML, though the reported Vikriti classification accuracy of around 58% points to the need for further model improvement.

In [4], Parshionikar and Lopes propose a Random Forest-based model to automate Prakriti classification directly from survey data, addressing the subjectivity inherent in traditional diagnostic approaches. The paper emphasizes the benefits of automated assessment for scalable, personalized healthcare, although detailed performance metrics and dataset characteristics are not disclosed in the available abstract.

In [5], Kottawar et al. present a multimodal AI framework that combines machine learning, natural language processing, and data fusion to standardize Prakriti assessment beyond conventional questionnaires, incorporating both phenotypic and genetic data. The reported results show more than 85% agreement with expert assessments, suggesting that AI-enhanced diagnostic tools are feasible in practice. The authors also discuss ethical considerations such as data privacy and algorithmic transparency, while acknowledging that the results remain preliminary and that integration complexity may constrain near-term clinical adoption.

In [6], Bheemavarapu and Usha Rani address the multiclass classification problem underlying Prakriti prediction, applying techniques such as SMOTEN to correct class imbalance and PCA/MCA for dimensionality reduction. Multiple models and hybrid ensembles are evaluated in pursuit of improved prediction performance on balanced datasets. The study offers a detailed comparative evaluation with advanced preprocessing, though its outcomes depend heavily on the availability of large, well-labeled datasets.

In [7], Tripathi et al. integrate psychometric measures, including emotional intelligence, IQ, and personality traits, with machine learning to enable cross-cultural Prakriti classification. Several models, including ensemble methods, are tested to improve reproducibility across different populations. By moving beyond purely physical traits, the study broadens the feature space available for Prakriti prediction, though it notes the need for careful validation across cultural contexts and attention to related ethical considerations.

In [8], Shivmurthy et al. describe HerbiSense, a hybrid system that combines Random Forest, clustering, NLP, XGBoost, and a rule-based Ayurvedic engine to deliver automated Prakriti classification alongside personalized treatment suggestions through a chatbot interface. The system improves scalability and decision consistency relative to manual assessment and produces interpretable, real-time outputs, though its performance depends on the integration quality of its many constituent components and on the underlying dataset.

In [9], Singh and Singh contribute Prakriti200, a structured dataset of 200 standardized assessments mapping physical and behavioral traits to Dosha scores. The dataset establishes a benchmark resource intended to support future computational studies of Prakriti prediction, though its moderate size means that expanding coverage to larger and more diverse populations would further improve the generalizability of models trained on it.

In [10], Mallajosyula offers a 2025 perspective on how AI and machine learning are being applied to the digitization of Ayurvedic knowledge, including Prakriti assessment, and discusses the broader challenges and opportunities in integrating Ayurveda with modern data science. As a conceptual overview rather than an empirical study, the paper is valuable for situating technical work within the wider landscape of AI-driven Ayurveda research.

In [11], Piplani and Mehra apply an unsupervised learning approach, using K-means clustering to detect natural groupings of Prakriti types within feature data. The work illustrates how clustering can reveal constitutional patterns without relying on labeled data, offering a complementary perspective to supervised classification, although clusters formed this way may not fully align with expert-defined Prakriti categories in the absence of ground-truth labels.

In [12], Salvi and Kadam investigate the use of AI to automate Prakriti classification with improved consistency, advocating for machine-learning approaches that make Ayurvedic diagnostics more scalable and objective. The paper focuses on bridging traditional and modern diagnostic methods, though it does not provide detailed algorithm-level comparisons or quantitative results.

In [13], Bidve et al. explore Multinomial Naive Bayes together with K-modes clustering across seven Prakriti clusters, including mixed types, reporting strong performance with accuracy around 0.90 along with solid precision and recall. The study demonstrates the value of clustering approaches for capturing overlapping body-type classes, though as a preprint it still requires peer-review validation.

In [14], S. Shaumya conducts a systematic literature review of AI and ML applications in Ayurveda between 2020 and 2025, cataloging classical models, boosting techniques, and ensemble-learning studies relevant to Prakriti classification and personalization. The review highlights recurring gaps, such as limited evaluation of disease states and persistent data scarcity, and, as a secondary source, synthesizes trends rather than presenting new empirical findings.

In [15], Pandey et al. describe AyurInsights, an AI-enhanced chatbot designed to conduct automated Prakriti assessment through conversational interaction, aiming to streamline the assessment process for users while delivering personalized health insight. The project demonstrates a practical, user-facing AI interface for Prakriti assessment, though as an unpublished project report it has not undergone peer review.

A. Summary of Literature Survey

The reviewed literature reflects a clear progression from purely qualitative, expert-dependent Prakriti assessment toward increasingly automated and data-driven approaches. Early and foundational studies establish that classical supervised models such as Random Forest, SVM, and Naive Bayes can reproduce Prakriti classifications with reasonable consistency when trained on questionnaire-derived phenotypic data, though most of these studies are constrained by small or narrowly scoped datasets. Later work extends this foundation by incorporating deep learning on physiological signals, multimodal data fusion combining phenotypic and genetic information, and psychometric features such as personality and emotional intelligence, broadening the feature space available for prediction.

More recent studies increasingly focus on practical deployment and usability, including chatbot-based assessment interfaces, hybrid rule-and-ML recommendation engines, and dedicated benchmark datasets intended to support reproducible research. Across the survey, recurring limitations include small or imbalanced datasets, limited validation against expert-labeled ground truth, and a shortage of peer-reviewed, large-scale studies — gaps that motivate the machine learning-based prediction and suggestive framework proposed in this work.

B. Table of Summary

Table I
Table of Literature Survey

Paper No.	Title	Authors	Techniques Used	Focus Area	Remarks
[1]	Machine Learning Models Used for Prakriti Identification Using Prasna Pariksha in Ayurveda	Lakshmi Bheemavarapu, K. Usha Rani (2023)	Random Forest, SVM, Naive Bayes	Review of ML for Prakriti identification	Comprehensive survey practical ML application assessment
[2]	On Intelligent Prakriti Assessment in Ayurveda: A Comparative Study	Majumder et al. (2023)	Decision Trees, SVM, and 6 other classifiers	Comparative study on 217 individuals	Comparative analysis multiple ML models;
[3]	AYUSH-27: Machine Learning Driven Accurate Assessment of Ayurveda Prakriti and Vikriti	Gupta et al. (2022)	Random Forest, KNN, SVM, Naive Bayes, Deep Neural Networks	ML/DL pipeline on 505 individuals via conversational AI	Combines classic ML learning; larger dataset
[4]	An AI-Driven Approach for Predicting Prakriti in Ayurvedic Healthcare	Parshionikar, Lopes (2025)	Random Forest	Automated Prakriti classification from survey data	Direct application of automate traditional a
Paper No.	Title	Authors	Techniques Used	Focus Area	Remarks
[5]	Artificial Intelligence for Objective Prakriti Assessment in Ayurveda	Kottawar et al. (2025)	ML, NLP, multimodal data fusion	Standardizing assessment beyond questionnaires	Multimodal approach agreement with expert ethics
[6]	Comparative Analysis of Multiclass Classification Algorithms for Prasna Pariksha-Based Prakriti Identification	Bheemavarapu, Usha Rani (2025)	Multiple ML models, SMOTEN, PCA/MCA	Multiclass classification with class-imbalance handling	Detailed comparative advanced preprocessing
[7]	Integrating Psychometric Assessment and Machine Learning for Prakriti Prediction	Tripathi et al. (2025)	Ensemble methods with psychometric features (EQ, IQ, personality)	Cross-cultural Prakriti classification	Explores non-traditional psychometric features
[8]	AI-Driven Prakriti Assessment and Ayurvedic Drug Recommendation System (HerbiSense)	Shivmurthy et al. (2026)	Random Forest, clustering, NLP, XGBoost, rule engine	Prakriti classification and chatbot-based drug recommendation	End-to-end practical clinical interpretability
[9]	Prakriti200: A Questionnaire-Based Dataset of Ayurvedic Prakriti Assessments	Singh, Singh (2025)	Dataset / benchmark construction	Structured dataset of 200 assessments	Valuable structured dataset research
[10]	AI and Machine Learning in Ayurveda: A 2025 Perspective	Mallajosyula (2025)	Review / perspective	AI/ML digitization of Ayurvedic knowledge	Broad overview of AI Ayurveda research
[11]	An Unsupervised Learning Model for Ayurvedic Prakriti	Piplani, Mehra	K-means clustering	Unsupervised grouping of Prakriti types	Highlights unsupervised discovers latent patterns
[12]	Prakriti Analysis Using AI: A Convergence of Ayurveda and Modern Technology	Salvi, Kadam (2025)	AI-based classification (general)	Bridging traditional and modern diagnostic methods	Focuses on bridging traditional modern methods
[13]	Enhancing Ayurvedic Diagnosis Using Naive Bayes & K-modes Clustering	Bidve et al. (2023)	Multinomial Naive Bayes, K-modes clustering	Seven Prakriti clusters including mixed types	Addresses mixed/overlapping types; ~0.90 accuracy
[14]	Systematic Literature Review on AI/ML in Ayurveda (2020-2025)	S. Shaumya (2025)	Review of classical, boosting and ensemble models	Catalog of ML applications for Prakriti classification	Synthesizes broad trends common techniques
[15]	Intelligent Chatbot for Ayurvedic Prakriti Assessment (AyurInsights)	Pandey et al. (2025)	Conversational AI / chatbot	Chatbot-based automated Prakriti assessment	Practical AI interface

III. OBJECTIVES

- 1) To develop an automated system for accurate prediction of Ayurvedic body types (Vata, Pitta, Kapha, or mixed).
- 2) To integrate machine learning techniques for analyzing physical, psychological, and lifestyle data.
- 3) To reduce subjectivity and inconsistency associated with traditional Prakriti assessment methods.
- 4) To provide personalized lifestyle, dietary, and exercise recommendations based on predicted body type.
- 5) To create a user-friendly platform (web or mobile) for easy access and interaction.
- 6) To build a scalable framework capable of continuous improvement through user feedback and updated datasets.
- 7) To bridge traditional Ayurvedic knowledge with modern computational techniques for preventive healthcare.

IV. CONCLUSIONS

The integration of machine learning with Ayurvedic principles provides a novel and effective approach for predicting individual body types (Prakriti) and offering personalized wellness recommendations. This project demonstrates how traditional knowledge, often subjective and reliant on expert evaluation, can be transformed into a systematic, data-driven framework that ensures consistency, accuracy, and accessibility.

By collecting and analyzing physiological, psychological, and lifestyle data, the system can accurately classify users into Vata, Pitta, Kapha, or mixed body types.

The use of multiple machine learning models, including Random Forests, Support Vector Machines, and Neural Networks, allows the system to capture complex patterns and relationships between features that may not be obvious in traditional assessment methods. Additionally, the incorporation of a suggestive system ensures that the prediction is actionable, guiding users toward lifestyle adjustments, dietary habits, and exercise routines tailored to their Dosha constitution. Overall, the project bridges the gap between ancient Ayurvedic wisdom and modern computational intelligence, providing a tool that is not only scientifically robust but also practical for everyday use. The system enhances personalized healthcare by promoting preventive measures, improving individual well-being, and supporting a holistic approach to health that is rooted in centuries-old tradition yet powered by modern technology.

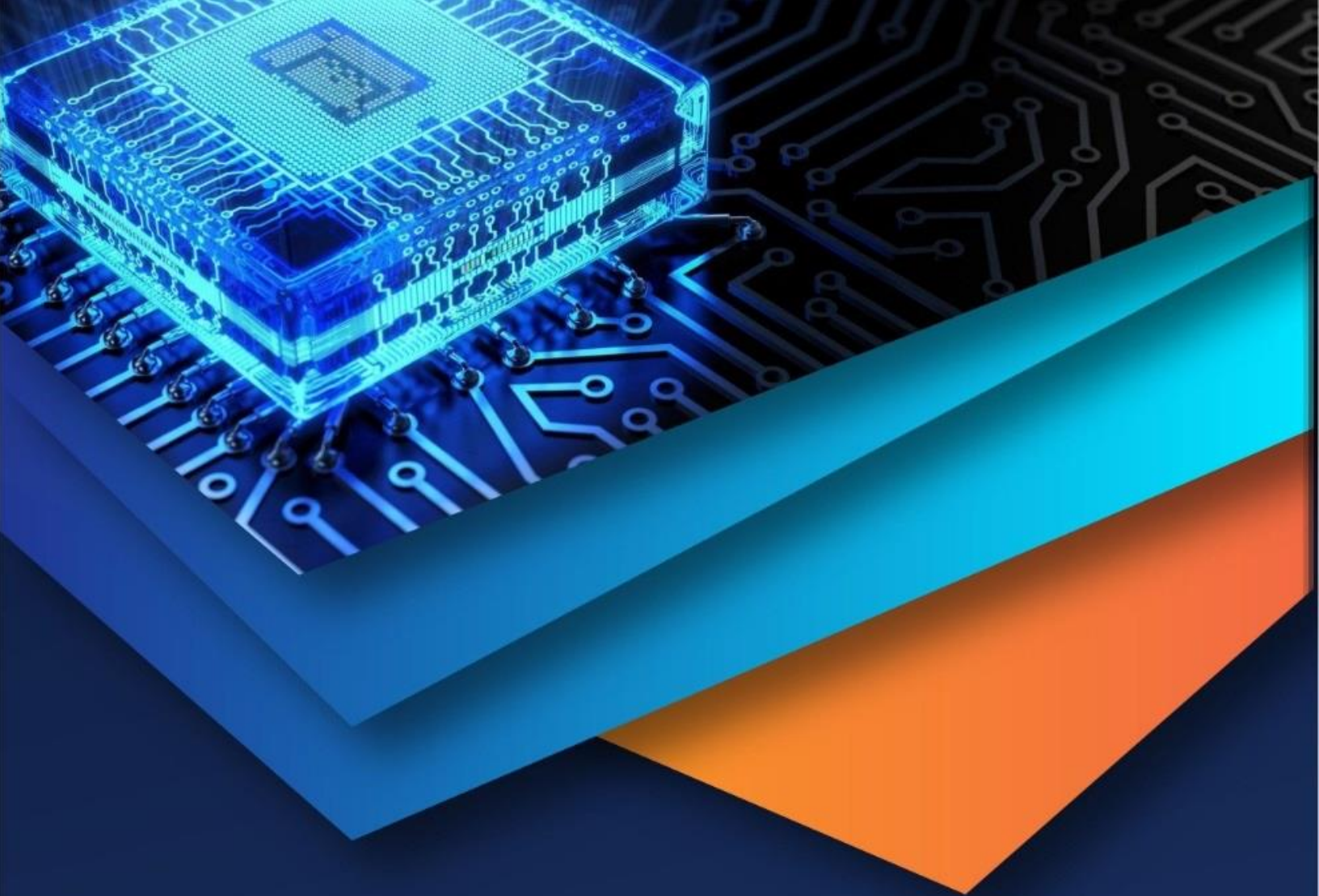
V. FUTURE SCOPE

The future scope of this project is vast and multidimensional. One potential extension is the integration of real-time physiological data from wearable devices such as smartwatches or fitness trackers, which would allow dynamic assessment of an individual's Prakriti and Vikriti (imbalanced Dosha states) over time. This would enable a more personalized and adaptive recommendation system, responsive to changes in lifestyle, diet, or health conditions. Additionally, the system can be enhanced by incorporating genetic and epigenetic data, providing a deeper understanding of how constitutional types interact with biological and environmental factors.

Another direction is the development of multi-language and culturally adaptive interfaces, making Ayurvedic guidance accessible to a broader global population. Moreover, expanding the dataset to include larger, diverse populations would improve model generalizability and accuracy, particularly for mixed or borderline Dosha types. There is also potential to integrate the system with telemedicine platforms, allowing healthcare practitioners to offer AI-assisted assessments and consultations remotely. Finally, the system can be extended to include predictive analytics for disease susceptibility, preventive healthcare planning, and long-term wellness monitoring, transforming it into a comprehensive digital Ayurveda platform that combines diagnosis, personalized guidance, and health tracking.

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