Ayurveda Hub: Automated Prakruti Detection and Comprehensive Ayurvedic Reference Integration

*Prof.S.S. Katkar [*1], Viraj Gund [*2], Vinesh Vawadra [*3], Mohd Raiyaan J. Shaikh[*4], Laxman Masale[*5]*
[1]Lecturer,IT, JSCOE,Pune,Maharashtra,India.
,[2345]Student, IT, JSCOE,Pune,Maharashtra,India

Abstract:
Ayurveda Hub: Automated Prakruti Detection and Comprehensive Ayurvedic Reference Integration as a unifying tool enhancing the quality of various aspects of Ayurvedic practices Eastern India describes AI Indian medical practitioners by utilizing distinct modern technologies in collaboration with agriculture. It also includes more than sixty ayurvedic texts within a consolidated, indexed digital library which allows practitioners to quickly access relevant information from multiple types of sources. The system, using machine learning algorithms, automatically identifies Prakruti and even manages to determine Prakruti based on input assessments in administrative fashions Ayurveda uses modern AI technologies for speech recognition.The solution facilitates easy access to information that is detailed enough to help in the improvement of research education and decision making in Ayurveda. With the help of smooth and user friendly interfaces, which integrate hardware with software modules, Achievements of the project were made possible by the combined clinical and educational settings where quick retrieval of information was needed. It is in the form of a platform developed on the MERN stack. The result is a tool that is dependable and scalable whose core intent is constant research and clinical improvements while modernizing traditional ayurvedic practices.

Keywords: Digital Ayurveda, Prakruti Detection, Ayurvedic Text Integration, Machine Learning, Ayurvedic Hub, Learning Technology, User-Centric Interface and Real-Time InteractionI.

1.INTRODUCTION:

In the current changing healthcare landscape, bringing modern technology into play with traditional practices can significantly augment accessibility as well as the efficacy of health care delivery. The Ayurveda Hub: Automated Prakruti Detection and Comprehensive Ayurvedic Reference Integration bridges this gap by working towards an advanced AI-powered platform designed specifically for the Ayurvedic practitioner.The system uses machine learning algorithms for auto-detecting Prakruti, thus providing practitioners with rapid and accurate determination of a patient's Prakruti from input assessments. It also holds a huge database of

Ayurvedic texts; hence, it enables practitioners to access relevant information from multiple sources efficiently.In traditional Ayurvedic practices, much manual effort is required for Prakruti assessment and text reference, which this project aims to make easier. The system is connected with both hardware and software components, which ensure a user-friendly interface of the system to improve decisionmaking, education, and research. Ayurveda Hub can be applied in clinical and educational settings and ensures an efficient, real-time solution for the modernization and support of Ayurveda practices within a digital perspective

2. LITERATURE SURVEY

1) Paper Name : Automated Prakruti Assessment Year : 2024 Description : This paper explores the application of machine learning algorithms to automate the process of Prakruti determination, a core aspect of Ayurveda that categorizes individuals based on their physical, mental, and emotional constitution (Vata, Pitta, Kapha). By analyzing diverse user data, including lifestyle factors and physiological traits,the system ensures a standardized and accurate assessment, minimizing the subjectivity involved in manual evaluations. The paper highlights how the integration of ML techniques addresses challenges like inconsistencies and errors, offering a reliable framework for large-scale implementations. Additionally, the research explores how adaptive learning models can improve over time by incorporating user feedback and regional data, thereby enhancing the system's accuracy and cultural relevance. Despite its promise, the study identifies challenges, such as the lack of comprehensive datasets for underrepresented

populations and the complexities of aligning diverse cultural practices into a universal framework.

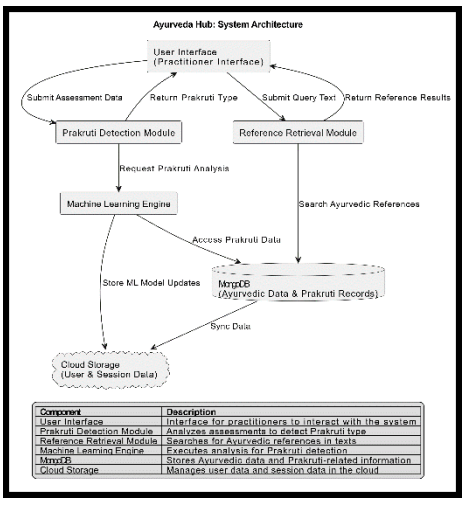
2) Paper Name : Personalized Therapy Recommendation System Year : 2024 Description : This paper investigates the development of an intelligent system capable of delivering personalized therapy recommendations tailored to individual Prakruti types and health conditions. By leveraging AI and machine learning algorithms, the system processes user inputs, including symptoms, medical history, and lifestyle choices, to recommend Ayurvedic therapies, dietary plans, and lifestyle adjustments. The study emphasizes the role of data-driven insights in enhancing the relevance and effectiveness of Ayurvedic treatments. Additionally, the integration of continuous learning mechanisms allows the system to adapt to evolving user needs and preferences over time. The paper discusses how this approach addresses limitations of generic treatment recommendations and contributes to a more personalized healthcare experience. However, the system faces challenges in handling complex cases, such as multicondition diagnoses, and requires further refinement in rare or atypical scenarios to ensure comprehensive coverage.

3) Paper Name : Ayurvedic Text Search Engine Year : 2024 Description : This paper presents an advanced search engine powered by natural language processing (NLP) and text mining techniques, specifically designed to facilitate quick and accurate access to Ayurvedic texts. By employing semantic search capabilities, the system allows users to query complex Ayurvedic concepts in natural language, offering results that are both precise and contextually relevant. The paper emphasizes the importance of cross-referencing, where the system connects related concepts and formulations across different texts, providing a holistic understanding for users. The integration of text mining techniques helps address the variability in language used in ancient Ayurvedic scriptures, making the system robust against linguistic inconsistencies. These advancements are particularly significant for researchers, practitioners, and students who require streamlined access to traditional knowledge. However, the study acknowledges challenges such as potential gaps in digitized texts and difficulties in standardizing interpretations of ancient terminologies.

4) Paper Name : Integration of Traditional and Modern Insights Year : 2024 Description : This paper explores the integration of traditional Ayurvedic knowledge with modern medical insights through the use of AI-driven data systems. The system leverages advanced techniques like knowledge graphs, data mapping, and machine learning to align the qualitative principles of Ayurveda with the quantitative data-driven models of modern medicine. This integration enables a comprehensive decision-making framework for practitioners, where historical wisdom and contemporary evidence work in synergy to provide holistic care. The paper also discusses the role of natural language processing in decoding traditional terminologies and translating them into concepts that can be understood within the context of modern healthcare. By bridging these domains, the system aims to enhance the precision, adaptability, and global relevance of Ayurvedic practicesHowever, challenges persist in reconciling the philosophical foundations of Ayurveda with the clinical metrics of modern science, as well as in maintaining the authenticity of traditional practices while adapting them for contemporary use.

3)METHODOLOGY

The Ayurveda Hub project goal is to create historical evidence of Ayurveda practitioners by implementing contemporary methods of automation in Book Printing Text Recognition System. This system contains Prakruti Detection which is based on machine learning models, as well as Book Citation Integration which extracts pieces of text from Ayurvedic books using highly developed search algorithms. The system is intuitive and easy to use while making decision-making easier and broadening the scope of education in practitioners. The modular structure makes it possible to process multiple streams of data—assessment data, text input data, and result output data and display all of them simultaneously and with low latency.



The Ayurveda Hub platform is a robust system designed to handle natural identification and book reference aggregation functionality seamlessly. Makes it easy to use and user friendly. A detailed description of the components is below. start: The system starts with a secure user login/authentication process. Users are authenticated with a password, email, or other secure access mechanism. This is to ensure the confidentiality of information. After successful authentication User-specific settings and previously accessed data (if any) will be loaded. Enabling the dashboard: The dashboard acts as a central control center. It offers two main options. Natural Detection: Directs the user to a module designed for light analysis based on the user's evaluation. Book Reference Integration: Redirects users to a module that enables keywordbased text search in a library of Ayurvedic texts. Additional dashboard features include: Access user manual/tutorial Shortcuts to frequently used functions Quickly access user comments and session history. Activating the module: The relevant modules are used depending on the user's selection: Basic knowledge about nature: The user completes a questionnaire developed to measure the user's physical and mental characteristics. Inputs are evaluated through machine learning algorithms to infer the user's natural type. It will display detailed information. Including user-generated lifestyle changes. and an explanation of the nature of things known Integrated book references: Users enter key words or phrases related to their search terms. Advanced search algorithms pull relevant terms from a vast database of Ayurvedic texts to analyze search terms. The system sorts and returns results with searchable sources.

Mathematical Model

Prakruti Detection Model

The Prakruti detection process relies on user-provided assessment data to classify their constitution (Prakruti) into categories based on Ayurvedic principles.

1. Feature Representation: o User responses to the assessment questions are encoded as numerical feature vectors: x=[x1,x2,...,xn]x = [x_1, x_2, ..., x_n]x=[x1,x2,...,xn] o Here, xix_ixi represents the response to the iii-th question in the assessment. o These responses are normalized and scaled to ensure uniformity across different types of inputs (e.g., numerical, categorical, or ordinal). o The feature vector xxx forms the basis for predictive analysis by the classifier.

2. Classifier: o A machine learning classifier f(x)f(x)f(x) is used to predict the Prakruti type. The classifier maps the feature vector xxx to one of the predefined categories: f(x)=Prakruti Type (Vata, Pitta, Kapha, or combinations)f(x) = \text{Prakruti Type (Vata, Pitta, Kapha, or combinations)}f(x)=Prakruti Type (Vata, Pitta, Kapha, or combinations) o The classifier is trained on a labeled dataset containing known Prakruti types, using algorithms such as decision trees, support vector machines (SVM), or neural networks. o The output includes the predicted Prakruti type, confidence scores, and an explanation of the contributing factors.

3. Output Representation: o The predicted Prakruti type is presented to the user along with actionable insights, such as dietary recommendations, lifestyle changes, and wellness tips, tailored to their Ayurvedic constitution. o Confidence levels associated with the prediction help in interpreting the reliability of the results.

Book Reference Integration Model

The book reference integration feature employs advanced information retrieval techniques to search and rank results from a vast repository of Ayurvedic texts.

1. Query Tokenization: o A user's search query qqq is broken down into a set of meaningful keywords: q={k1,k2,...,km}q = \{k_1, k_2, ..., k_m\}q={k1,k2,...,km} o Here, kik_iki represents the iii-th keyword derived from the query. o Natural language processing (NLP) techniques, such as stop-word removal, stemming, and lemmatization, are applied to refine the tokens.

2. Document Representation: o Each document ddd in the repository is represented as a high-dimensional vector using term frequency-inverse document frequency (TF-IDF) or word embeddings like Word2Vec or BERT. o The similarity between the query vector qqq and document vector ddd is computed using cosine similarity: Relevance(q,d)=q⋅d∥q∥∥d∥\text{Relevance}(q, d) = \frac{q \cdot d}{\|q\| \|d\|}Relevance(q,d)=∥q∥∥d∥q⋅d

Algorithms

1. User Interaction and Input Control: This module guarantees smooth interaction between the user and the system. It records user actions such as clicking buttons and entering text. or command by gesture It interprets input to move between modules, such as nature detection and book search. This ensures a user-friendly experience.

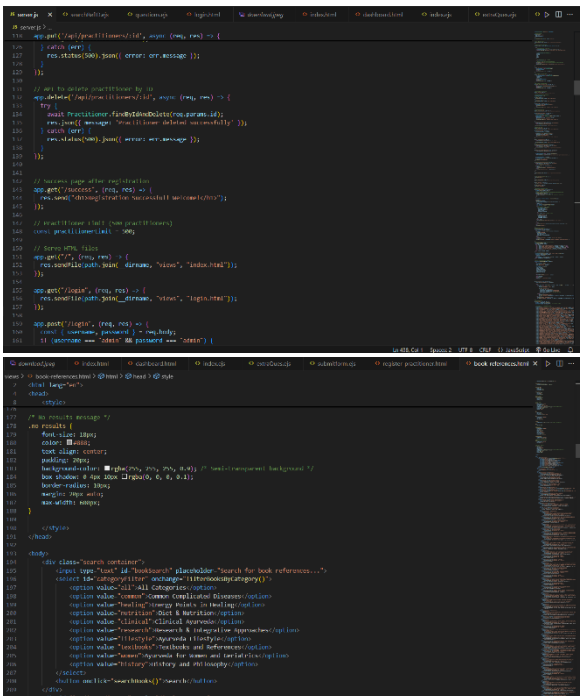
2. Inquire about pre-processing for book search: Pre-processing algorithms optimize user-entered search terms for accurate and efficient retrieval. which involves cleaning Token creation and generalizing the text to

match references to relevant Ayurvedic books. The system ensures that search takes into account variations in vocabulary by matching synonyms and using linguistic processing techniques.

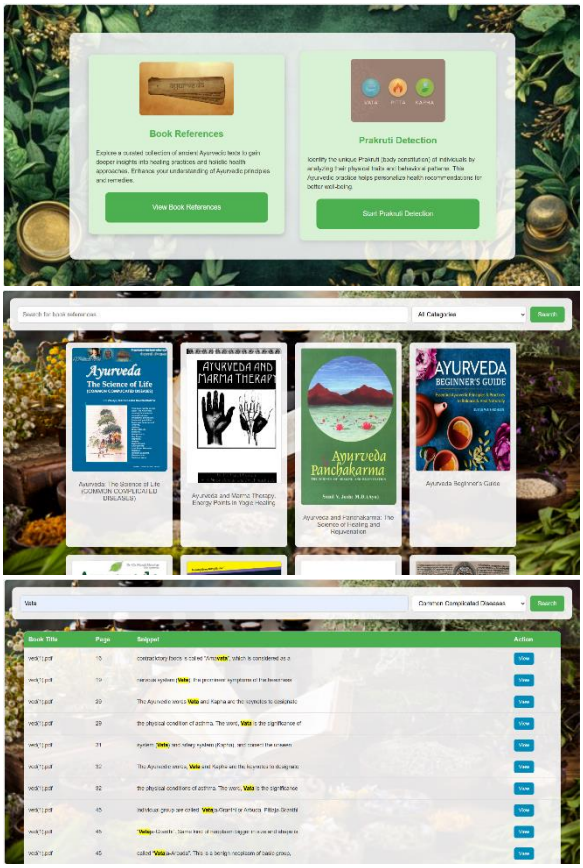
3. Nature identification through response analysis: This algorithm analyzes user evaluation responses to predict natural categories (vata, pitta, kapha, or combinations), leveraging machine learning to interpret the coded responses. Create a comprehensive result that includes natural types. As well as supporting explanations for operators...

4. Search, sort and display: This module ranks passages from Ayurvedic books according to their relevance to the user's question. Using cosine similarity and keyword frequency The algorithm ensures that the most accurate and contextually valuable citations appear at the top of the results. This improves the efficiency of data retrieval.

5. Improving suggestions for continuous improvement. This algorithm collects and processes user feedback to improve system accuracy and user experience. Response data is analyzed to improve natural predictions. Optimize search algorithms and improve the functionality of the module.



RESULTS AND DISCUSSION



The Ayurveda Hub project provides a powerful platform for Ayurvedic practitioners. It successfully integrates nature recognition and book citations using machine learning and natural language processing. The Prakriti Identification Module accurately predicts the type of

Prakriti (vata, pitta, kapha or combinations thereof). According to user ratings With a detailed explanation of each prediction. The usability of the system is highly praised. It provides smooth navigation between modules. Real-time nature recognition and effective book references

Disscussion

The Ayurvedic Center demonstrates its ability to combine traditional Ayurvedic practices with modern technology that enhances the practitioner's decision-making process. Nature recognition with machine learning gives accurate results. This saves time and guarantees a reliable body anatomy assessment. The book reference integration feature enhances the consultation by providing easy access to relevant Ayurvedic knowledge. But the system has limitations, such as the complexity of interpreting mixed results. and speed of retrieving book reference information especially large documents Future improvements may focus on increasing search speed and accuracy. Added more descriptive visual aids. and expanding the Ayurvedic knowledge database The project shows important revolutionary promise

3. CONCLUSIONS

In conclusion, the project Ayurveda Hub: Automation of Prakruti Detection and Ross Comprehensive Integration of Ayurvedic Reference has managed to reduce certain scribals of Ayurvedic practice. Once more, as the process of Prakruti detection is automated and information from more than sixty Ayurvedic resources is at hand, practitioners are able to arrive at decisions easily. The user interface facilitates easy use of the system and also easy navigation through the various tasks allowing both clinical and educational use of the application. For the future, we outline a new broader range of texts and an increase in the system’s efficacy. The progress in this direction confirms the desire to modernise the practices of Ayurveda, providing advanced resource coverage and supporting the development of the discipline for the future.

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