Grenze International Journal of Engineering and Technology, January Issue

Ayurveda Insights: Ensemble Learning for Personalized Wellness

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***Abstract*— These theories inspired an enormous type of cure methods. The conventional medicines are based on three doshas, the concept that human beings are sinners. A questionnaire is adopted for gathering information about the lifestyle, behavior, and experience of a person. The queries are then employed to help develop customized guidelines for the specific treatment. The tool is supposed to provide self-care tips once a consumer becomes ill, looking at the consumer's particular fitness concerns. The observe strategy consists of a questionnaire with 10 questions built to collect information regarding a user's life and practices. Ayurveda utilizes a class work expert machine for observing a number of rules in order to discover man or woman doshas successfully consistent with the concept of 'Tridoshas'. This guarantee allows modern Ayurvedic knowledge in the creation of nonsectarian medical care through the application of the method of to mesh with the contemporary. Workplace devices of techniques, providing efficient airplanes managing and designed for consumers. The guide consists of home remedies, Ayurvedic herbs and must-haves products in side the marketplace, giving users a full review of their particular fitness issue.**

***Index Terms*— Ayurveda, Natural Health Insights, Natural Cures, Wellness Challenges, ensemble learning, dosha.**

I. INTRODUCTION

Indian literature is the depository of Ayurveda, an ancient medical science researched for Five centuries ago. The Sanskrit words "Ayus" (life) and "Veda" (knowledge or science) form the foundation of the name "Ayurveda". Therefore, one could term Ayurveda as the "life of science" or the "science of life". Having Ayurveda gives you basic knowledge on how to maintain your health if it is passed down through the ages. The five elements that make up Ayurveda are air, ether, earth, and water. According to Ayurveda, the nature of fire connects these elements, or it has defined the constitution. The combined effect of these five subjects is called Ayurveda is the "three evils" or Vata, Pitta, and Kapha. As it is often known that the elements, which consist of air along with ether form Vata, fire and water was Pitta, and water and earth become Kapha In the contemporary world, people highly depend on allopathic medicines. These medicines are prescribed by many doctors these days. These medicines become popular due to the fast recovery policy. But while prescribing them, doctors always forget the power of the medicines. This power always creates many bad effects on the body of the patients. Many patients don't have any idea about the content of these medicines they are consuming. Sometimes, minor ailments may be treated with overly potent medicines, leading to an imbalance in treatment.

Grenze ID: 01.GIJET.11.1.322_4

Additionally, using strong medicines for minor issues can drive up healthcare costs, making treatment less affordable or sustainable for patients. These drugs are always provided at a very high cost. Sometimes, their cost is not affordable by any patient. consumption of such like drugs causes the loss of both wealth as well as health like damage of body parts, and that also due to the excessive dosage of these drugs. These are named evils because they change, sometimes. Basically, you call health the balance of these three doshas; and any imbalance of the these doshas leads to the diseases. We use Prolog to solve problems inasmuch as Prolog provides a powerful system: it is convenient for the solving of expressive problems quite naturally and concisely; and having done so, it is particularly apt
certain types of symbolic concepts and rule-based systems Imbalance Vata disturbs body circulation and causes all the abnormalities of the body, A good imbalance causes excessive heat in the body and is the root cause of inflammatory disorders and when phlegm is out of balance cough, sinus, sneeze and many more. Prolog by using this we can diagnose the person by asking some questions related to their health issues and find out the health issues we prescribe the drug to the person. This paper uses AI and ML techniques to classify models for dosha detection and Ayurvedic medicine recommendation. We explored existing models of literature to understand methodologies and algorithms used in syst.

II. Related Work

The existing system uses Ontology Modeling with Web Ontology Language (OWL) to organize and interpret patient health data, applying Rule-Based Inference to suggest personalized herbal treatments. It incorporates ICD-10-TM and Thai traditional medicine classifications for accurate recommendations and references the National Drug System Database to ensure treatments meet approved standards [1]. The system uses Latent Dirichlet Allocation (LDA) Topic Modeling to identify herb-syndrome patterns, treating herbs as "documents" and syndromes as "terms" to analyse functions. The herb-syndrome frequency matrix preprocesses data, creating herb vectors to measure similarities with KL divergence. The Double-End Fusion Recommendation Framework further refines recommendations by categorizing herbs based on medicinal similarity, using Weight Proportion and Similarity Remapping to enhance accuracy and identify complementary and similar herb combinations [3]. The COMER architecture consists of three main components: a Drug Database for gathering and organizing drug information, a Modeling Server that builds and updates an offline recommendation model using customer ratings, and a Recommendation Server that suggests top-N drugs based on user input. It employs K-means clustering to group drugs by efficacy and collaborative filtering to calculate user similarity for personalized recommendations. Additionally, a tensor decomposition model addresses cold start and data sparsity challenges by modeling user-drug-tag relationships for improved accuracy [4].
System uses Symptom-Prescription Retrieval (SPR) Module: Utilizes a Transformer model with multi-head self-attention and feedforward networks, Herb-Herb Retrieval (HHR) Module: Uses a Transformer model to embed herb pairs and calculate their compatibility, Prescription Decoder (PreD): Employs hierarchical LSTM decoders to transform previous herb states into new outputs while integrating various inputs. These modules work together to enhance the prescription generation process in TCM by leveraging advanced machine learning techniques [6]. system provides personalized drug recommendations to assist inexperienced doctors and patients, utilizing advanced data mining techniques. It consists of five modules: a database system for managing diagnostic and drug information; a data preparation module for cleaning raw data; a recommendation model using algorithms like SVM and neural networks; a model evaluation module to assess performance; and a data visualization module for insights. The system prioritizes accuracy and safety, incorporating a mistaken-check mechanism and thorough data analysis to enhance medication recommendations [7]. The research investigates the formulation of Ayurvedic churna, a powder made from herbs and minerals that requires no processing. A total of 86 ingredients were selected based on input from Ayurvedic physicians, resulting in 36 standardized churna recipes guided by regional pharmacological texts. The study employed Pointwise Mutual Information (PMI) to analyze ingredient associations and the Louvain method for community detection, which groups ingredients based on their interactions, offering insights into their complementary or disfavoring relationships [8].

III. Proposed Model

The operational framework of Ayurveda is designed to provide a user-friendly and effective system for managing personal health. It combines traditional Ayurvedic principles with modern data insights, allowing individuals to address their health concerns holistically. This framework facilitates personalized health management, considering unique body types (doshas) and health patterns, while offering tailored lifestyle and

treatment recommendations. It integrates advanced tools, like data-driven analysis, to streamline decision-making, helping users maintain and enhance well-being through customized, actionable health solutions.

The Ayurveda health management system starts with a Sign-Up process, enabling new users to create accounts. Once logged in, users are directed to a personalized Dashboard featuring access to the Home page, an AI Chatbot, Dosha prediction, and Profile management. The AI Chatbot assists with queries and provides information, while users can update their personal settings in the Profile section, with an option to log out at the end of their session.

Admins have access to a specialized dashboard to view User Registration details and perform necessary administrative functions. Through the Dosha feature, users answer questions to predict their unique dosha type. Users can then share symptoms with the chatbot, which responds with a potential diagnosis and detailed information about the illness. Finally, it recommends suitable Ayurvedic medicines. Afterward, users are prompted to provide feedback before logging out.

A. Features of System

- User Registration and Profile Setup: To embark on their medication journey with, users start by registering on the platform and creating their personal profiles.
- Tailored dosha detection: After registration, users can proceed with dosha detection, which identifies their unique body type as Vata, Pitta, or Kapha—collectively known as the tri-doshas. This detection provides essential insights into each user's primary bodily constitution, offering a foundation for personalized health guidance.
- Real-time Expense Tracking: Users can manually input their symptoms to receive tailored Ayurvedic medicine recommendations. The platform actively monitors each user's body type, ensuring they receive timely updates on recommended treatments, supporting continuous and personalized healthcare guidance.
- Intelligent Recommendations: The platform utilizes insights from users' eating habits, body weight, and sleep goals to deliver personalized recommendations. These suggestions offer strategies for cost efficiency, uncover potential health improvements, and optimize Ayurvedic medicine recommendations, tailoring outcomes for each user's wellness journey.
- Virtual Health Guidance: Serving as a virtual health advisor, the platform offers personalized guidance and insights, empowering users to make informed health decisions.
- Robust Data Security: User data security and confidentiality are prioritized on the platform, which employs strong encryption and protective measures to safeguard personal health information effectively.
- Medicine recommendation: Preferences given like home-made medicine preparation, sources available in market, Herbs are given ensuring that they will provide valuable benefits to user.

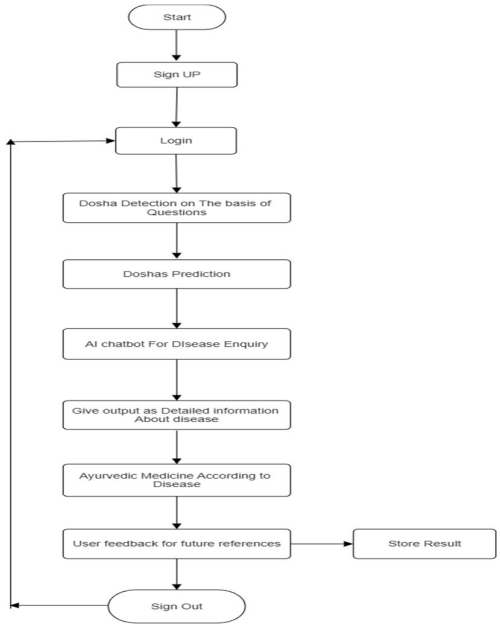

Fig. 1. Flow of Website

IV. PERFORMANCE EVALUATION

This section details the implementation of the proposed system and provides a performance analysis of each component.

A. SETUP

Artificial Neural Network (ANN)

Artificial neural networks are a computational model derived from the neural structure of the human brain. They consist of layers of interconnected neurons: an outer layer, one or more hidden layers, and an output layer. Each neuron processes input, uses weights, and activation to produce output, learning complex patterns in data through training.

Due to its ability to model nonlinear relationships ANNs are widely used in tasks such as image recognition, word processing, and predictive analysis.

LSTM

Long Short-Term Memory is a kind of recurrent neural network (RNN) that addresses the issue of vanishing gradients that regular RNNs frequently have by handling data sequences and retaining information over time. A cell state and three different kinds of gates—input, forget, and output—that control information flow and determine what should be kept or discarded are how LSTMs accomplish this. Because of this structure, LSTMs are especially useful for sequential data problems where long-term dependencies are essential, like speech recognition, language modeling, and time-series prediction.

Chatbot

A chatbot is an AI-driven application that interacts with users in natural language to provide assistance, answer questions, or perform specific tasks. It leverages machine learning, natural language processing (NLP), and sometimes rule-based logic to understand user input and respond appropriately. Chatbots can be integrated into messaging apps, websites, or virtual assistants, and are often used in customer service, health advisories, e-commerce, and information retrieval. They range from simple rule-based bots, which follow set scripts, to advanced models that can carry out complex conversations and adapt based on user feedback and context.

Doshas Classification

Dosha Classification helps identify which dosha is most prominent in an individual. By asking specific questions about lifestyle, physical traits, and habits, a system can predict a user's dominant dosha. This insight informs personalized recommendations in Ayurveda, guiding users toward lifestyle adjustments, dietary plans, and treatments that help balance their unique dosha combination for optimal health and well-being.

B. Performance analysis

LSTM

Input Layer and Time Step Representation:

- Each user's input sequence could consist of daily or weekly records of health symptoms, emotional states, lifestyle habits, or seasonal influences that Ayurveda considers important. These inputs are represented as sequences over time, such as $[x_1, x_2, x_3, \ldots\ldots x_t]$, where each x_t includes features related to dosha-relevant data.
- The LSTM processes each input in the sequence step-by-step, learning dependencies across time.

Forget Gate

$$f_t = \sigma\left(W_f \cdot \left[h_{t-1}, x_t\right] + b_f\right)$$

- The forget gate ft decides which information from the previous cell state Ct-1 should be kept or discarded. This is particularly important in Ayurvedic data, where some symptoms may be transient and should not have an excessive impact on predicting the dosha imbalance.

Input Gate

$$i_t = \sigma(W_i \cdot [h_{t-1}, x_t] + b_i)$$

$$\tilde{C}_t = \tanh(W_C \cdot [h_{t-1}, x_t] + b_C)$$

- The input gate It and the candidate cell state Ct decide what new information will be incorporated into the current cell state Ct. This mechanism is essential for capturing evolving health patterns or new symptoms that may affect the dosha levels.

Cell State Update

$$C_t = f_t * C_{t-1} + i_t * \tilde{C}_t$$

- The cell state Ct maintains an accumulated summary of information over time. This updated state is critical for reflecting the user's dominant dosha trends, as it combines both the previous state and new observations.

Output Gate and Hidden State

$$o_t = \sigma(W_o \cdot [h_{t-1}, x_t] + b_o)$$

$$h_t = o_t * \tanh(C_t)$$

- The output gate Ot and hidden state ht provide the final output for each time step, capturing the dosha representation based on cumulative inputs.

Final Layer (Classification)

$$\text{softmax}(z_i) = \frac{e^{z_i}}{\sum_j e^{z_j}}$$

- Once all time steps have been processed, the hidden state ht from the last time step is passed to a dense layer with a softmax activation function for classification:
- This function converts the LSTM's output into probabilities across the three dosha categories (Vata, Pitta, and Kapha), giving a classification based on the sequential patterns observed.

Loss Calculation and Backpropagation Through Time (BPTT)

- The network's predictions are compared to actual dosha labels using cross-entropy loss, and the weights are updated using Backpropagation Through Time (BPTT). This method adjusts weights based on their influence across all time steps, permitting long-term dependencies to be learned by the model dependencies critical for dosha prediction.

Prediction

- Once trained, the LSTM can predict a user's dosha based on their sequence of health data inputs. By considering information over time, the LSTM captures nuanced shifts that could indicate dosha imbalances or changes, providing a refined Ayurvedic diagnosis.

ANN

Input Layer

- The ANN receives user information as input, which could include data like body type, eating habits, sleep patterns, emotional tendencies, and physical symptoms.
- Each of these features is encoded as a numerical value, creating an input vector X for the ANN.

Weighted Sum Calculation (Linear Combination)

- The input vector X is fed into the first layer, where each neuron calculates a weighted sum:

$$z = W \cdot X + b$$

- Here, W represents the learned weights that adjust based on the patterns of each input feature's contribution to each dosha, and b is the bias term.

Activation Function

- After the weighted sum z, the activation function f(z) is applied to each neuron. Non-linear activation functions like ReLU or Sigmoid allow the model to learn more complex relationships between the inputs and dosha classifications.

For example,

$$a = \text{ReLU}(z) = \max(0, z)$$

- The activations a are then passed on to the next layer to progressively identify patterns unique to each dosha.

Output Layer

- In the final layer, neurons output the values y, which represent probabilities for each dosha category. Typically, a softmax function is used here to create probability from the raw scores that sum to 1:

$$\text{softmax}(z_i) = \frac{e^{z_i}}{\sum_j e^{z_j}}$$

- For three doshas, this would result with the greatest likelihood suggesting the anticipated dosha.

Loss Calculation

- A cross-entropy loss function is used during training to compare the model's predictions against the actual dosha classifications:

$$L = -\sum y \log(\hat{y})$$

- Here, y is the actual dosha class (one-hot encoded), and y^ is the predicted probability for each class.

Backpropagation and Weight Update

- The network updates its weights W and biases b by using the gradients of the loss function with respect to each weight and bias, employing the gradient descent algorithm for optimization.

$$W \leftarrow W - \alpha \frac{\partial L}{\partial W}$$

- Through backpropagation, the network learns to associate certain input patterns with specific doshas.

Prediction

- Once the model is trained, it can predict doshas by outputting the most probable dosha class based on the input features.

V. SUMMARY

Ayurveda, a time-honored and sophisticated system of knowledge, promotes a comprehensive approach to well-being by addressing the underlying causes of diseases rather than merely alleviating the symptoms. Its wisdom guides us toward joyful, healthy lives. This system leverages Ayurvedic knowledge to recommend personalized treatment plans, drawing on user feedback and targeted health inquiries. The implementation includes the use of Prolog to analyze user responses and recommend Ayurvedic medications, ensuring treatments are customized to individual needs and health profiles with the help of machine learning algorithms.

VI. CONCLUSION

The paper is thus concluding on providing an all-round overview of traditional medicine systems, be it Ayurveda or TCM, in a holistic way and with their historical perspective also, along with therapeutic appraisal and scientific relevance. For suggesting herbal recommendations based on present-day approaches like data mining, personalized recommendation systems, and data driven modeling, a critical section is kept aside to evaluate critically. This underscores the significance of indigenous healing systems, puts a spotlight on their potential in integrative healthcare, and advocates for innovative approaches that might help deepen understanding and potentially verify efficacy. Ancient wisdom married with advanced research and technology is an epitome of a holistic approach combining traditional practices with modern technologies to achieve a 95% system accuracy.

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