A Review Paper on Identification of Ayurvedic Prakriti Types

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Abstract – Human prakriti and tridosha are important for human health and fitness according to Ayurveda. A person's prakriti can be identified in Ayurveda in several ways. According to Ayurveda, every person born has five elements: earth, air, water, fire and space.We own distinctive balance of these five elements in assorted degrees. The balance of these elements is known as Tridosha. There are three basic doshas: Vata, Pitta and Kapha, and good health is considered a balance of these three doshas. Doctors evaluate these characteristics through examination and palpation to determine Prakriti in patients. The physician decides on diagnosis, primary prevention, and therapy based on the Prakriti of each individual. Prakriti assessment involves clinical examination including questions about physiological and behavioural traits. There is requirement to develop models correctly for predicting prakriti classes that have been used for foretell various diseases. Ayurvedic doctors examine the prakriti of a person either by accessing the physical features and or by inspecting the nature of their pulsation. Based on this investigation, they identify, prevent and cure disease in patients by prescribing medicine.This article looks at a comprehensive literature review based on three aspects: prakriti and tridosha, the physiological characteristics. Research gaps were also found based on the literature survey.

Keywords – Ayurveda, Prakriti, Tridosha, Physiological Features, Dominant, Vata, Pitta, Kapha.

I. INTRODUCATION

Enhancing mortal body immunity is essential for maintaining the stylish health in the present day owing to the rise of several contagions like Corona. Ayurveda spreads the benefits of nature in maintaining an active life. According to Ayurveda, three doshas, or Prakriti i.e. Vata, Pitta, and Cough, are used to assess a person's health. These doshas have a close connection to the body's vulnerable system. A person with a balanced Tridosha system will not get any illness. Balance of Tridosha is necessary for a mortal being to be healthy and vulnerable. The most common way to measure Tridosha is by heartbeat. Heartbeat reading is a characteristic technique of Ayurveda where the physicist places the index, middle and ring fingers on the wrist and independently measures the strengths of the vata, pitta and kapha doshas. This technique has been used in Ayurveda for a long time, but it lacks a quantitative measure of confidence and requires a master expert to obtain an accurate result.The other important skill is to classify the person in Tridosha is based on Physiological features like hair, eyes, nose, lips, skin color, etc. In this alternate technique, in order to classify prakriti or Tridosha, we need to extract some features from the parts of the human body. In this technique, if we train the computer based on some image processing techniques it automatically retrieves features from the images of human body parts in order to get the prakriti of the human being.

- **Vata Dosha: -** Vata is the energy of movement and is composed of air and space. The characteristics of Vata dosha are dry, light, mobile, rough, cold and quick. A person with this dosha has a tall, thin, small body and a long face. The skin is dry, rough and lacks shine. Vata people are more prone to diseases such as arthritis, Alzheimer's and diseases related to the nervous system.
- **Pitta Dosha:** - Pitta is the energy of metabolism and digestion. which consists of fire and water. The characteristics of pitta dosha are hot, sharp, liquid. A person with Pitta dosha is usually of medium build and medium height. The skin is very soft, reddish and shiny. They can't stand the heat.
- **Kapha Dosha: -** Kapha is a lubricating energy and the structure consists of earth and water. Properties of kapha have large body frame generally fat, having big beautiful eyes and tubby cheeks.

Digital Image Processing is the sub-group of digital signal processing that processes digital images using algorithms in order to get meaningful insights from them. Digital Image Processing plays a vital role in extracting features from the images of physiological parts of a human being. It involves several steps such as:

- Image segmentation due to dim background and poor lighting conditions
- Extraction of features using algorithms
- Identification or verification

Improvisation using algorithms to improve accuracy.

II. RELATED WORK

Arpit Trivedi et. al. (2021) studied a comprehensive literature review based on three aspects: Prakriti and tridosha, physiological characteristics, and the contribution of machine learning and image processing. They identified research gaps based on a literature survey. They proposed a model based on image processing to classify human prakriti based on the physiological characteristics of images [1].

Ammu Anna Mathew et.al. (2020) presented a study of pulse characteristics, traditional parameters and sensors used in the field for disease detection using pulse diagnosis. The nature of the healthy pulse and the changes accompanying the disease are very important in determining the cause of diseases. Nadi Pariksha helps to identify more than 80 different diseases based on the three pulses of the radial artery, analyzing the diseases in their initial stages in a non-invasive way and treating them at an early stage [2].

Purushotham (2021) provided a detailed comparison of the actual consumption of different food groups in the cohorts of these studies. We then use the nutritional principles of Ayurveda, a traditional Indian medicine, to show how these seemingly contradictory results can be explained. Traditional medical systems such as Ayurveda deeply understand the effects of food on physiology. Ayurveda considers not only the type of food but also many other factors such as taste, temperature and time of consumption. Traditional cuisines evolved hand in hand with such medical systems to optimize nutrition in the context of local climate and food availability. Using the expert wisdom of these traditional systems to create an integrated nutritional science would help combat the epidemic of chronic lifestyle diseases and improve health and well-being [3].

Sharma et al. to (2020) suggested that epigenetics is an important mechanism in Ayurveda. This correlation and understanding will lead to better communication and understanding with the current medical system and better integration of both sciences in the management of optimal health. In addition, the study of Ayurvedic methods affecting gene expression further increases the correlation and understanding between the current medical system and Ayurveda [4].

Joshi Manisha et al. to (2020) To design an intelligent human recognition system based on Prakrit language image analysis and machine learning algorithms. The images of the language were taken with a webcam and processed with a Raspberry Pi development board. Algorithms are developed using OpenCV python libraries. Thirteen geometry, two non-geometric features, and two texture attributes were extracted from each tongue image. These qualities were used to identify Prakrit Vata, Pitta and Kapha. The performance of three classifiers, i.e., KNN, neural network and decision tree, was tested to identify the class of the test image [5].

Wallace et al. to (2020) presented Ayurvedic concepts such as Prakriti with modern genetic research. It correlates the combination of the three doshas, Vata, Pitta and Kapha, with certain gene expression and physiological characteristics. It also helps interpret Ayurveda as the ancient science of epigenetics, which assesses the current state of the doshas and uses specific, personalized dietary and lifestyle measures to improve a patient's health. This revision includes an update of this new field [6].

Gaytri Gadre et al proposed a system that worked on dataset and works with computer vision and machine learning algorithm to find human pakrut. Identifying a person's prakriti by analyzing their facial features such as hair, eyes, nose, lips and skin color using facial recognition techniques in computer vision. This is the first study of its kind in this problem area that attempts to bring imaging into the scope of Ayurveda [11].

Vishu madaan et al proposed a system that worked to predict human body parts based on Ayurveda using different machine learning models and analyzing their performance on different parameters. K-Nearest Neighbor, Artificial Neural Networks, Support Vector Machine, Naive Bayes, Decision Tree, XG-Boost and Cat-Boost methods with and without hyperparameter tuning. In this paper, we present a performance comparison of these machine learning methods for predicting human body components with different performance parameters [12].

Shilpa et al. assess Tridoshas i.e. VATT, PITT, and KAPH from psychological perspective in human beings on a personality scale. As per authors these dosha's are com- posed of the Pancha-Mahabhutas. One or multiple dosha can dominate at any point of time. There is no case when one or the other Pancha-Mahabhutas and the Tridoshas are totally absent. They explain in their research work that developed scale shows the psychometric properties. The scale assesses the psychological manifestation of the Tridoshas, which is the basic achievement. The standardization procedure developed by them involves the development of the Mysore Psychological Tridosha Scale for prakriti determination. [13]

P. Kallurkar et.al *An*alyzed Variation in Tridosha during fever, before and after meal, epileptic jerks, and recovery phase of typhoid. An automated Instrumentation system is implemented to mimic the Nadi Vidwan's method. Author acquired the pulse signals using a suitable pressure sensor and processed in MATLAB. The imbalances of radial arterial signal in various abnormalities were observed. Graphical User Interface has been developed using MATLAB for displaying results [14]. Developed using MATLAB for displaying results [14].

M. Osman et.al state the idea to automate the process where author scan a body image using machine learning and deep learning algorithms and classify the different features into different doshas to finally conclude the dominant dosha as result [15].

Sanyam Jain, Taruna Chawala study the diagnose imbalance of doshas, there are several methods, out of which one is to observe visually the different features of the human body. Body type, skin type, hair type, eyes type, face type, etc possess different characteristics under the influence of various doshas. Hence the author's idea is to automate this process where author scan a body image using machine learning and deep learning algorithms and classify the different features into different doshas to finally conclude the dominant dosha as result [16].

Sharmila Begum et at Proposed a system - Diagnosing Diseases through pulse – "finding any disease using nadi" is an automated system to find the diseases and its related information about the human body. This project provides detailed information and reports on patients by obtaining their nadi as a time series. The *nadi* pulses are sensed by the fingertip, which actually measure the pressure exerted by the artery [17].

Muhamma et al. proposed a paper in which hair analysis in unconstrained setting, including hair detection, segmentation. The analysis is carried out, including hair detection, segmentation, and hairstyle classification. Hair detection in images is useful for many applications, such as face and gender recognition, video surveillance. The author builds a hair probability map by classifying overlapping patches described by features extracted from a CNN, using Random Forest [18].

Corina Dunlap et al. discussed that Ayurveda consists of determining the constitution and imbalances of an individual through various modular approaches. The authors worked on three different questionnaires and tested their reliability to know the human prakriti level. They analyze and display the reliability of the tests in numerical values. They conclude that a standardized questionnaire-based tool for the investigation of prakriti is needed [19].

Zuo et.al study presents an end-to-end network for human skin detection by integrating recurrent neural layers into FCNs. RNN layers are employed to model the semantic spatial dependencies between image pixels. Experimental results show that our proposed FCN and RNN algorithm outperforms standard methods on both the COMPAQ and ECU skin datasets. RNN layers effectively improve the stability of skin detection algorithm under complex backgrounds [20].

Mehta et al. proposed a mechanism using Ayurveda is an alternative medicine system with historical roots in India. Author stated that in Ayurveda, any disease is considered to be caused by the imbalance of various Doshas (Vata, Pitta & Kapha) in human body. Author proposed idea to automate the process where he scan a body image using machine learning and deep learning algorithms and classify the different features into different doshas to finally conclude the dominant dosha as result [21].

Manoj Kumar Singh et al, describe various image-processing techniques to retrieve information from an image after performing series of steps. Various image processing techniques such as Threshold based image segmentation, region-based image segmentation, Edge-based image segmentation, Fuzzy theory-based image segmentation, ANN-based image segmentation, and Partial Differential Equation (PDE) based image segmentation had been overviewed. After studying these techniques, it seems that one has to use a hybrid approach to uphold the accuracy and feature extraction from an image [22].

III. DISCUSSION BASED ON LITERATURE SURVEY

Based on a comprehensive literature review from three perspectives mentioned in, we led several insights from them. Literature survey clearly said that Tridosha, Prakrits play an important role in human health There is a strong connection between Prakrits in terms of human and physiological characteristics.

Table 1. Determine your Tridosha

SNo	Observation	Tridosha		
		Vata	**Pitta**	**Kapha**
1	Body size	Thin	Medium	Large
2	Body weight	Low	Medium	Overweight
3	Cheeks	Wrinkled/ Sunken	Smooth Flat	Rounded, Plump
4	Face shape/ Chin	Thin, Angular	Tapering/ Triangular	Rounded, Double Chin
5	Eyes	Black, Brown, Small	Bright Gray, Small Green Yellow Red	Big, Blue
6	Nose	Uneven	Long Pointed	Short Rounded,
7	Lips	Dry, Cracked, Black/Brown Tinge	Red, Inflamed, Yellowish	Smooth, Oily, Cool, White, Pale
8	Skin	Thin, Dry, Cold, Rough, Dark	Smooth, Oily, Warm, Rosy	Thick, Oily, Cool, White, Pale
9	Hair	Dry, Brown, Black	Gray, Red,	Wavey, Oily

Table 1 lists some of the 9 specific characteristics observed by Ayurvedic physicians when prescribing prakruti in humans. The dominant element is the one whose most characteristics correspond to the observed patient.
The dominant dosha of Prakruti analysis can be found by observing the physiological and psychological characteristics of a person.

IV. RESEARCH GAP

- Physiological characteristics of a person play a decisive role human Prakrit recognition. Human Prakrit is crucial for the immune system.
- Extensive literature survey not available with consultation Ayurvedic experts for identification Prakrit.
- There is no automatic system to detect Human prakriti is based on images of various physiological characteristics.

V. CONCLUSION

A systematic classification of personal Prakrit data is needed based on a literature review of Ayurvedic Prakrit types. Prakruti determination is critical to Ayurveda, which has led Ayurvedic physicians to develop methods such as questionnaires or pulse-based tools to capture psychological and physiological characteristics. Hence this study is an important step not only for Ayurvedic doctors but also for the common man to help him lead a healthy lifestyle by changing his lifestyle.

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