

Ayurvedic Medicine-based Automated Machine Learning Approach for Determining the Nature of the Human Body

T. Thanushree¹, K.G. Manjunath²

¹PG Student, Department of CSE, SIT, Tumkur, Karnataka, India. E-mail: thanushreesiet97@gmail.com

²Assistant Professor, Department of CSE, SIT, Tumkur, Karnataka, India. E-mail: kgmanjunath@sit.ac.in

Abstract

Tridosha suggests the three fundamental energies or decides that manage how the human body limits on a physical and significant level. The three energies are known as VATT, PITT, and KAPH. Despite the surprising amount of time that Ayurveda-dosha study has been utilised, a quantitative evaluation of these distinctive methodologies is now lacking. A thorough and definite assessment prompts a compelling treatment. The makers work out Cronbach alpha of VATT-Dosha, PITT-Dosha, and KAPH-Dosha as 0.94, 0.98, and 0.98, independently, to assess the dataset's constancy. The experts focused on 807 sound individuals developed 20 to 60 and observed that 62.1 percent were men and 37.9% were women. To set up the model for request examination, customary AI estimations like Artificial Neural Network (ANN), K-Nearest Neighbor (KNN), Support Vector Machine (SVM), Nave Bayes (NB), and Decision Tree are utilized (DT). The system uses a mix of AI estimations to see constitutions. As portrayal assessment measures, root mean square misstep (RMSE), precision, audit, F-score, and not entirely settled and reviewed.

Index Terms: Ayurveda, Machine Learning, Human Body Nature.

DOI: 10.47750/pnr.2022.13.S03.182

INTRODUCTION

Ayurveda, which started on the Indian subcontinent a long time back, is one of the world's most prepared clinical sciences. The maxim "Ayurveda" is contained two words: "Ayur: life" and "Veda: know," and it from a genuine perspective implies "life science." By fitting a singular's body, mind, and soul, Ayurveda stimulates a strong living. It is a trademark strategy for recovering and treatment, as well as a specialty of widening one's future. In the current state of the art world, every individual is spoiled with problem right off the bat, as such comprehension how to continue with a sound lifestyle is essential [1]. Ayurveda is one such way that shows ordinary harmony and helps disharmony removal. The usage of the resources and affliction are associated in Ayurveda. The maltreatment of the resources prompts a qualification among man and nature, as well as an adjustment of human impulse. The Ayurvedic thinking relies upon the decency of nature and oneself. Changing people's lives is one of Ayurveda's most extensive weapons [2]. Ayurvedic experts who notice the structure's rules and limits have a prevalent chance participating in a sound and disorder free life [3]. Every thing in the universe, according to Ayurveda, is contained the five 'panchmahabhutas,' or parts (space, fire, earth, and air) [4][5]. These parts are reflected in human bodies as three normal energies that control and deal with all life limits. The 'Doshas' or 'Tridoshas' are the three powers that consolidate VATT,

PITT, and KAPH. Physical (Shaaririka Prakriti) and insightful (Shaaririka Prakriti) human nature (prakriti) are the two orders (Manasa Prakriti). VATT, KAPH, and PITT are sharirika prakritis. Wind is addressed by the word 'VATT.' The breeze blows the cloud around and makes it shift[6]. With a singular blow, wind can move the whole climate. The VATT Dosha invigorates a man's will to live and moves him to encourage all through day to day existence. Energy is also expected for physiological and metabolic limits. The power 'PITT' improves thought and gives the human body a shining appearance. It is responsible for all metabolic errands, as well as inner intensity level and synthetic balance, in the human body. The part 'KAPH' addresses water, which is a fluid part in the human body that lubes up the joints.

CONTRIBUTIONS

- The goal of this study was to apply a variety of AI computations to predict Ayurvedic-based human body parts.
- In the current state of the art society, Every person is enslaved by chaos from an early age, thus understanding how to continue with a sound lifestyle is essential.
- Changing people's lives is one of Ayurveda's most non-umental weapons.
- This procedure may be used by anybody, sound

or cleared out, to learn about part sporadic attributes in their bodies without arriving at an Ayurvedic proficient.

RELATED WORK

Prajakta Kallurkar et al [7], Ayurveda is an old book that researches the nature, expansion, and significance of life. Beatfinding using signals got from the three explicit regions on the wrist at the extended vein, specifically vata, pitta, and kapha, expected a critical part in Traditional Chinese Medicine and Ayurveda. Using their knowledge and experience, the Nadi Vidwans recognize the sign on the patient's wrist. Any change of the sign's propensity can be utilized to recognize a Dosha imbalance. This assessment looked at how Tridosha changed during fever, while eating, epileptic jerks, and the typhoid recovery period. A robotized Instrumentation structure is made to duplicate Nadi Vidwan's philosophy. We accumulated the beat signals including a sensible pressure sensor and inspected them in MATLAB. Extended hall signal sporadic qualities have been tracked down in a combination of abnormalities. A graphical UI was certain MATLAB to show the results.

Xiaobo Liu et al [8], Two stand-out ways to deal with dealing with the issue of different scatterings in getting ready and test data are move learning and outfit learning. While planning data is pitiful, we propose a company move learning system in this work to additionally foster gathering accuracy. Tr Resampling, a weighted resampling strategy for move learning, is recommended first. Each accentuation resamples the data in the source region with high loads, and the TrAd-aBoost computation is used to change the source and target data loads. Second, in TrResampling, three commendable AI computations are used as base understudies: straightforward Bayes, decision tree, and SVM, with the best performing base understudy decided for move learning. TrResampling's show is shown using TrAdaBoost and decision trees on 15 UCI enlightening assortments, as well as TrAdaBoost, ARTL, and SVM on five message instructive assortments. Our proposed TrResampling beats state of the art learning computations on UCI educational records and text enlightening files, according to exploratory results.

Harshi Pogadadanda et al [9], Three Ungers are placed on the right hand under the wrist when the Ayurvedic proficient checks the client's pulse. As the heart develops and contracts, he can feel the blood spraying out in sprays. This affirmed "extended heartbeat" (Hasta Nadi) is reasonable for more many-sided heartbeat assessments. As shown by Ayurveda, there are three kinds of pulses. The Vata beat is significant under the pointer. The Pitta and Kapha pulses may be tracked down under the middle and ring fingers, independently. The Vata thump is separated by a thin, fast, and irregular heartbeat under the skin. The Pitta beat, on the other hand, is even more exceptional and voluminous, and it can beat in a standard or flighty model.

The Kapha heartbeat can be recognized further (neath oily tissue) and moved step by step and often. The Ayurvedic expert can similarly check the patient's pulse in various bits of the body to get a more complete picture of their prosperity [10][11]. Measuring a patient's pulse requires incredibly pre-arranged trained professionals and specialists. Unfortunately, the current ayurveda specialists and experts miss the mark on ability to scrutinize the beat precisely utilizing the recently referenced procedure, achieving misguided patient end. To deal with this difficulty and precisely treat patients, the recommended approach is used. The Ayurvedic tridosha — vata, pitta, and kapha — are regulatory structures that control input/result, turnover, and limit, separately, as demonstrated by a report; endeavors that systems examination see as major to each open system. This, as shown by Ayurveda, would outfit them with general characteristics shared by each living being. In this survey, let loose coherent verification backs the recommended dosha ID as well as the systems assessment on which it is based [12][13]. Coenzyme A, a basic piece of unsaturated fat processing, is unequivocally referred to. Its expansive presence in all cells shows that it is an extraordinary invariant, suggesting that the metabolic pathway through which it is found is imperative. Ayurvedic specialists see the significance of Nadi Pariksha, which they use to break down patients' Tridoshas and other physiological and mental conditions. The uncommon texts Sarangadhara Samhita, Yoga Ratnakara, Basavarajeeyam, and Bhavaprakasha cover the nuances of Nadi Pariksha in a short grouping of slokas. Regardless of the way that Ayurveda has centuries of contribution in Nadi Pariksha and an immense gathering of writing to back it up, it is personal in nature, and the prerequisite for a coherent technique to explore nadi is generally seen. The genuine nature of heartbeat wave assessment to Nadi Pariksha has not been explored [14]. Thump wave speed has actually attracted a lot of study thought since it is accepted to be a good sign of cardiovascular sickness; regardless, the tangibility of heartbeat wave assessment to Nadi Pariksha has not been explored.

Motivation: The primary job of this study is to collect information from a considerable number of people to find out their dosha type, which can be VATT, PITT, or KAPH. Following the collection of data from strong individuals, the data is supported and internal consistency is checked, and the data is then ready and surveyed using AI models like SVM, KNN, ANN, Nave Bayes, and Decision Tree.

A couple of characteristics and differentiations in the human body may be used to describe the kind of dosha. To get ready AI models and overview the show of each and every class, we may moreover accumulate data from wiped out individuals and animals.

METHODOLOGY

Choice of Data Collection Tool: For model readiness and rightness, definite and intentional data gathering is a drawn-out task. Dependent upon the sort of study, a couple of data variety methods are used. A record overview, a discernment, a gathering, an assessment, or a mix of technique might be used. Directly following perceiving the arrangement and attributes of the large number of different social occasions, we fabricate a survey to assemble information on these characteristics from different people [15] [16]. The makers arranged a survey to accumulate data, which was a monetarily insightful technique for getting information. It's easy to use and outfits a lot of consideration with little effort.

Determination of Target Respondent: Strong specialists of the two sexes between the ages of 20 and 60 are determined to ensure that the end results are not impacted by the part's illness. For this development, we picked students and educational association delegates to partake in the outline. This record has 837 events of all of the 28 attributes kept in Table 2. We learn 8 segments in the record that are missing information and kill them.

Information Validation: A survey is an exploratory instrument that contains a movement of requests and various salesto assemble data from respondents.

Pilot Testing: We do a pilot study to make sure that data combination is consistent. To begin, the study's importance is assessed using 50 heedlessly picked individuals from the whole assembling under review. Following achieving fitting precision from restricted scope use on this dataset, we continue gathering data using comparable methods. Considering the disclosures of the pilot audit, we will continue to get ready and test the whole model.

Information Pre-Processing: We simply welcome strong people to share, and we accumulate data using unbiased concentrating on methodologies. We use implerandom assessing to pick individuals for the data gathering. Direct sporadic inspecting is a system for picking a little assembling of individuals from a greater people. Each individual is picked with a comparative probability or plausibility. During our coordinated efforts with the individuals, we instruct and teach them on the value concerning Ayurveda in present day life [17]. The audit's inspiration is given to individuals who are judged roused and have given their consent. We saw that the individuals were intrigued about their Dosha kind. For data, we talk with a little assembling of 807 individuals developed 20 to 60 [18] [19].

MACHINE LEARNING MODELS

Support Vector Machine, or SVM, is a specific classifier with a segregating Hyperplane. A line called a hyperplane divides a plane into two half, one on either side of each class' two-layered space. It is done on described,

marked getting ready data in a really look at learning technique. The strategy makes an ideal hyperplane for orchestrating new snippets of data [20]. The assist vector with machining procedure is used search for a hyperplane in a N-layered space that orders information of interest in a stand-out way. Figure 1 shows howthe hyperplane perceives the two sorts of helpful snippets of data. The separator is depicted in the circumstance,

$$W^T X_i + b \geq 1 \text{ if } Y_i = 1$$

$$r = \frac{W^T X + b}{\|W\|}$$

$$\rho = \frac{2}{\|W\|}$$
(1)

Where X_i is a valuable snippet of data and Y_i is a class that the data point could have a spot with. SVM's useful executions and presentations have turned out to be significant for high- layered issues and minimal enlightening assortments, which is the explanation it is so commonly used.

KNN METHOD: The KNN procedure is an AI framework for characterizing and expecting data that is made due. This relies upon the likelihood that data parts in a comparable part space have a comparable class consigned to them. This procedure relies upon the Euclidean distance system, which licenses us to use a condition to process the distance between two regions toward a path structure.

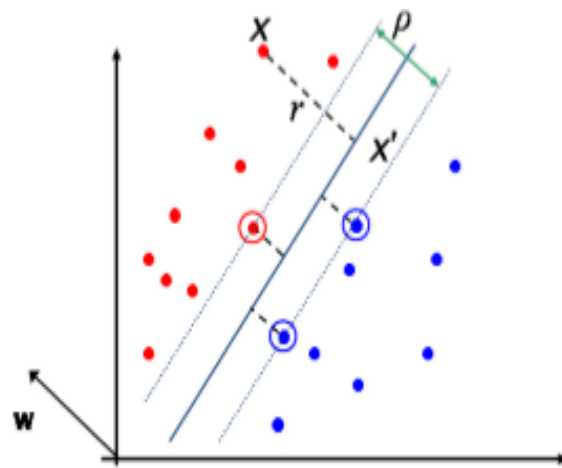


Fig. 1. SVM working with hyperplanes

$$ED = \sum_{i=1}^k (x_i - y_i)^2$$
(2)

ED represents Euclidean Distance. The distance in a two-layered space is basically between two focuses (x_i, y_i) in the xy plane space, where $I = (1, 2, \dots, k)$ are data of interest.

NB CLASSIFIER: naive bayes is a verifiable procedure or overseen learning classifier. The Bayes speculation based

technique expects that the presence of a part in a class is absolutely unessential to the presence of various components. Issue cases are treated as part vectors in the Naive Bayes technique, which are then gathered into express portrayals. These traits are not associated; consequently the value given to one has little effect on the value given to the others. The condition shows the back probability $P(T|A)$, $P(A)$ Predictor Prior Probability), $P(T)$ class prior probability), and probability $P(A|T)$.

$$P_A^T = \frac{P_T^A *}{P(T)P(A)} \tag{3}$$

Where A- Attributes, T-Goal.

ANN LEARNING: In each regard, the phony cerebrum network seems to be the human psyche structure. It includes a social event of fake neurons that have been arranged to deliver portrayal results. These neurons have loads associated with them to change the effect of the coming main impetuses. Immense data is passed into the association on through their outcome. The presence of a sensible association and the relationship between neurons across layers are depicted in Figure 2. Artificial neural networks use one of two activation function types:

- (1) Rectified Linear Unit (ReLU), and (2) Softmax

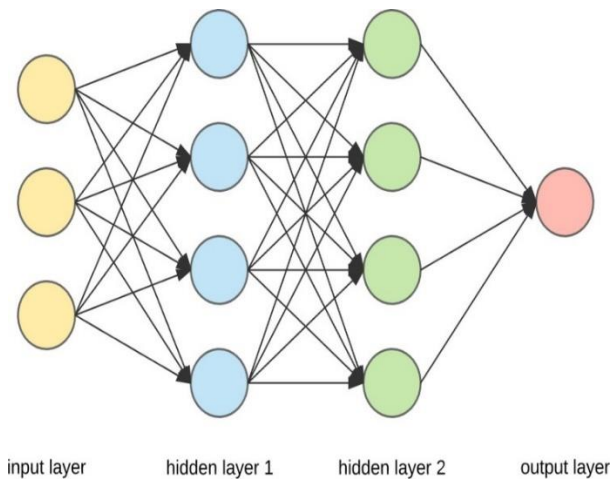


Fig. 2. Neural Network Learning

RESULTS AND DISCUSSION

In this Section, we show how machine learning models are applied to managed data. It is tempting to continuously watch the display of numerous Learning Methods because no single calculation in man-made knowledge proves to be effective for every problem. The size and development of your dataset are just two examples of the many factors that play a role. That's the explanation behind the execution of various assessments for our information, while evaluating execution and choosing the boss using a hold-out "test set" of data. Utilizing standard ML model, we may not finding any extremely perfect outcomes. We employ hyper limit tuning to enhance the outcomes even more. The outcomes of

the experiments are presented in this section. XGB Classifier, Support Vector Machine, and GaussianNB were used to build the models. The models were evaluated using metrics, precision, re-call, f1-score, and support. It is calculated how accurate these models are. The figures 3, 4 and 5 show the results obtained from Support Vector Machine, XGB Classifier and GaussianNB models respectively.

CONCLUSION

This study's main goal was to forecast Ayurveda-based human body parts utilising a system of AI models and assess their applicability using a number of different principles. To accomplish this, we chose the assistance of clinical professionals to create an outline and compile data from end users. The experts were then instructed to review and pre-process the data before K-nearest neighbour, fake mind associations, support vector machines, Naive Bayes, and decision trees were used. In this audit, we investigate how well different AI computations predict human body parts across a range of presentation estimates. We had the option of using CatBoost or redesigning the settings to get a 0.95 accuracy rate. Our poll stands out because it combines cutting-edge AI calculations to separate between key human components (AyurvedaDosha). This approach may work well in various human parts, according to ayurvedic clinical experts. Anyone, healthy or disabled, can apply this procedure without the assistance of an Ayurvedic professional to learn about some unpredictable characteristics in their body.

	precision	recall	f1-score	support
0	1.00	1.00	1.00	305
1	1.00	1.00	1.00	190
2	1.00	1.00	1.00	377
3	1.00	1.00	1.00	243
4	1.00	1.00	1.00	318
5	1.00	1.00	1.00	67
accuracy			1.00	1500
macro avg	1.00	1.00	1.00	1500
weighted avg	1.00	1.00	1.00	1500

Fig. 3. Results of XGBClassifier

	precision	recall	f1-score	support
0	1.00	1.00	1.00	305
1	1.00	1.00	1.00	190
2	1.00	1.00	1.00	377
3	1.00	1.00	1.00	243
4	1.00	1.00	1.00	318
5	1.00	1.00	1.00	67
accuracy			1.00	1500
macro avg	1.00	1.00	1.00	1500
weighted avg	1.00	1.00	1.00	1500

Fig. 4. Results of Support Vector Machine

	precision	recall	f1-score	support
0	1.00	1.00	1.00	305
1	0.79	1.00	0.88	190
2	0.88	0.85	0.86	377
3	0.81	1.00	0.89	243
4	1.00	0.69	0.82	318
5	1.00	1.00	1.00	67
accuracy			0.90	1500
macro avg	0.91	0.92	0.91	1500
weighted avg	0.91	0.90	0.89	1500

Fig. 5. Results of GaussianNB

REFERENCES

- B. Patwardhan, "Bridging Ayurveda with evidence-based scientific approaches in medicine," *EPMA J.*, vol. 5, no. 1, pp. 17, Dec. 2014.
- Ayurveda: A Brief Introduction and Guide. Accessed: Jun. 23, 2019. [Online]. Available: <https://www.ayurveda.com/resources/general-information>
- M. M. Mathpati, S. Albert, and J. D. H. Porter, "Ayurveda and medicalization today: The loss of important knowledge and practice in health?" *J. Ayurveda Integrative Med.*, vol. 11, no. 1, pp. 89-94, Jan. 2020, doi: 10.1016/j.jaim.2018.06.004.
- M. Luckner, B. Topolski, and M. Mazurek, Application of XG-Boost algorithm in fingerprinting localisation task, in *Proc. IFIP Int. Conf. Comput. Inf. Syst. Ind. Manage. Cham, Switzerland: Springer*, pp. 661-671, 2017.
- P. Schratz, J. Muenchow, E. Iturrutxa, J. Richter, and A. Brenning, Hyperparameter tuning and performance assessment of statistical and machine-learning algorithms using spatial data, *Ecol. Model.*, vol. 406, pp. 109-120, Aug. 2019.
- Y. Yoo, Hyperparameter optimization of deep neural network using univariate dynamic encoding algorithm for searches, *Knowl.-Based Syst.*, vol. 178, pp. 74-83, Aug. 2019.
- P. Kallurkar, K. Patil, G. Sharma, S. Sharma and N. Sharma, "Analysis of Tridosha in various physiological conditions," 2015 IEEE International Conference on Electronics, Computing and Communication Technologies (CONECCT), 2015, pp. 1-5, doi: 10.1109/CONECCT.2015.7383890.

- X. Liu, Z. Liu, G. Wang, Z. Cai and H. Zhang, "Ensemble Transfer Learning Algorithm," in *IEEE Access*, vol. 6, pp. 2389-2396, 2018, doi: 10.1109/ACCESS.2017.2782884.
- H. Pogadadanda, U. Shwetha Shankar and K. R. Jansi, "Disease Diagnosis Using Ayurvedic Pulse and Treatment Recommendation Engine," 2021 7th International Conference on Advanced Computing and Communication Systems (ICACCS), 2021, pp. 1254-1258, doi: 10.1109/ICACCS51430.2021.9441843.
- E. Karanja, J. Zaveri, and A. Ahmed, "How do MIS researchers handle missing data in survey-based research: A content analysis approach," *Int. J. Inf. Manage.*, vol. 33, no. 5, pp. 734-751, Oct. 2013.
- S. Keith Taber, "The use of Cronbach's alpha when developing and reporting research instruments in science education," *Res. Sci. Educ.*, vol. 48, no. 1, pp. 1273-1296, 2018.
- G. P. Herrera, M. Constantino, B. M. Tabak, H. Pistori, J.-J. Su, and A. Naranpanawa, "Data on forecasting energy prices using machine learning," *Data Brief*, vol. 25, Aug. 2019, Art. no. 104122.
- A. M. Ibrahim and B. Bennett, "The assessment of machine learning model performance for predicting alluvial deposits distribution," *Procedia Comput. Sci.*, vol. 36, no. 1, pp. 637-642, Nov. 2014.
- X. Jiang, Y. Pang, X. Li, J. Pan, and Y. Xie, "Deep neural networks with elastic rectified linear units for object recognition," *Neurocomputing*, vol. 275, pp. 1132-1139, Jan. 2018.
- U. R. Acharya, S. L. Oh, Y. Hagiwara, J. H. Tan, and H. Adeli, "Deep convolutional neural network for the automated detection and diagnosis of seizure using EEG signals," *Comput. Biol. Med.*, vol. 100, no. 1, pp. 270-278, Sep. 2018.
- S. Deepak and P. M. Ameer, "Brain tumor classification using deep CNN features via transfer learning," *Comput. Biol. Med.*, vol. 111, Aug. 2019, Art. no. 103345.
- E. M. Karabulut and T. Ibrkci, "Analysis of cardiocogram data for fetal distress determination by decision tree based adaptive boosting approach," *J. Comput. Commun.*, vol. 02, no. 09, pp. 32-37, 2014.
- V. A. Dev and M. R. Eden, "Formation lithology classification using scalable gradient boosted decision trees," *Comput. Chem. Eng.*, vol. 128, pp. 392-404, Sep. 2019.
- S. V. Murty and R. K. Kumar, "Accurate liver disease prediction with extreme gradient boosting," *Int. J. Eng. Adv. Technol.*, vol. 8, no. 6, pp. 2249-2258, Aug. 2019.
- S. Lim and S. Chi, "Xgboost application on bridge management systems for proactive damage estimation," *Adv. Eng. Informat.*, vol. 41, Aug. 2019, Art. no. 100922.