Study of Recommendation System for Yoga and Raga for Personalized Health based on Constitution (Prakriti)

Pooja Patil
Department of Computer Engineering
Pimpri Chinchwad College of Engineering
Pune-44

Sonal Gore
Department of Computer Engineering
Pimpri Chinchwad College of Engineering
Pune-44

ABSTRACT
Since nowadays globalization has increased beyond its growth, many challenges and stressful situations need to be faced by human. In Current scenario Ayurveda experts diagnose the diseases by interacting with patients and by examining the patient. They suggest medicine, yoga, raga, and diet according to their observations. Such process is very time consuming. Designing automatic recommendation systems which recommend the yoga and raga for specific prakriti.it will help experts to reduce certain amount of time, such system recommend accurate yoga and raga according to physical and mental characteristics of person (Prakriti).Neural Network Technology and decision tree will be used to design recommendation system for generating rules based on Constitution, Timing, Atmosphere, Mood, and Disorder.

Keywords
Neural Network, Decision Tree, Prakriti, Raga, Yoga.

1. INTRODUCTION
Music plays an important role in human life. There is direct relation between music and emotions. Indian classical music provides the raga. In the Indian musical tradition, ragas are associated with different times of the day, or with seasons. Different emotions are related to different raga.

Mind and body are two sides of one coin. Yoga gives the flexibility to mind and body. Yoga, at its physical level is aimed at cleansing practice which can be very effective in addressing various disorders. Raga and yoga make positive impact on human health. Task of suggesting raga and yoga will be automated by designing automatic recommendation system based on constitution (prakriti).This task will be achieved with the help of ANN and Decision tree.

In Ayurveda number of patients gets treated in traditional way by Ayurveda doctor. Interaction with patient to take his/her history and examination of patient ,these are two major steps that each and every Ayurveda doctor follows before suggesting any prescription to patient. By following such time consuming process they come to some analysis and suggest the people to follow certain ayurvedic medicine, diet, yoga, and music and such process will be automated by identifying people's prakriti and recommending them certain raga and yoga. This will help them to balance their doshas and will make positive impact on their health.

2. AYURVEDA RELARED CONCEPTS

2.1 Prakriti
It (Constitution) is useful in understanding the entire makeup of an individual, strength and weaknesses, how they respond to different foods or environments [1].The evaluation of an individual's prakriti is very useful in helping him to make correct choices with respect to food and lifestyle.

In Ayurveda literature, 3 main dosha prakriti is mentioned Kapha, Vata, and Pitta. These three doshas are responsible for our physical, mental and emotional make up, which gives unique identity to individual [2].

Vata: cold, dry, light and mobile by nature

Pitta: warm, oily and intense by nature

Kapha: damp and slow by nature

The large generalized study has made on different dosha and their combinations (one-dosha, two-dosha, three-dosha)[3].

2.2 Raga
It is musical term which is mostly used in Indian classical music. Ayurveda literature makes use of raga as disease troubleshooter. Different ragas are available for different dosha.

2.3 Yoga
Yoga practice helps develop the body and mind bringing a lot of health benefits yet is not a substitute for medicine. Yoga provides number of benefits like all-round fitness, stress relief, inner peace, improved immunity, living with greater awareness, increased energy, better flexibility & posture, better intuition [6].

By considering all those things regarding yoga and raga will design recommendation system based on 5 different parameters like Constitution, Timing, Atmosphere, Mood, and Disorder. This Task will be done with the help of decision tree and artificial neural network.

3. YOGA AND RAGA
Table 2 gives the different yoga asanas for different diseases.

Table 1: Yoga and Diseases.

Diseases Name	Type of pose	Relative Yogas
Diabetes	Supine Pose	Utthit Padmasana, Halasana,Skandha Katiasana, Chakrasana
	Prone Poses	Shalabhasana,Dhanurasana
	Sitting Poses	Ardhamatsyendrasana,Mandukasana,Paschimatanasana,Mayurasana
Indigestion	Supine Poses	Utthit Padmasana, Katichalana
	Sitting Poses	Vajrasana, Mandukasana
Heart Disease	Supine Poses	Uttan Tadasana, Shavasana, Uttan Padasana,
	Prone Poses	Shalabhasana, Bhujangasana

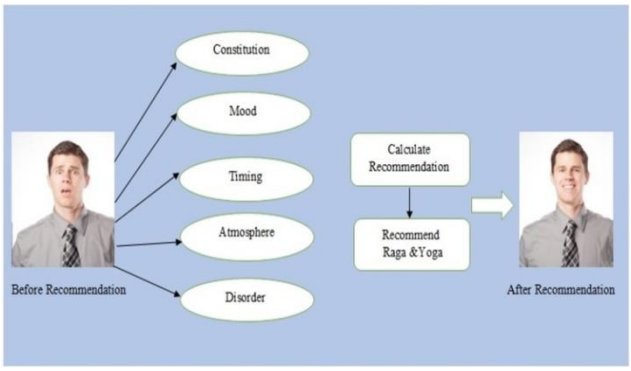

Fig 1. Recommendation System Based on Different Parameters and Its Effects

Table 2: Raga and Timings

Dosha	Raga Name	Instrument	Timing
Vata	Raga Madhuvanti	Bamboo flute	Late Afternoon
Pitta	Raga Ahiri & Raga Charukeshi	Sitar and Surbahar	Afternoon 10 A.M -2 P.M
Kapha	Raga Bairagi and Raga Basant	Sarod	Heavy Morning, Evening Hours

Table 1 gives the different ragas and their respective timings for listening[5].Timings have direct impact on raga effect.

Table 2 gives the different yoga asanas for different diseases.

Table 3 gives the literature survey table about technical algorithms and their outcomes.

4. DECISION TREE AND ARTIFICIALNEURAL NETWORK

4.1 Decision Tree

It is very easy to build because it does not require any domain knowledge or parameter setting,thats why it is most widely used for knowledge discovery. Decision tree can handle high dimensional data. The way data is represented in decision tree is easily handled and understood by human beings. Steps of decision tree are very easy and fast. These are mostly used in many applications such as medicine, manufacturing and production, financial analysis, astronomy and molecular biology [6].

- **Information gain**

It is one of attribute selection measure. Let node N represent or hold the tuples of partition D.The attribute with the highest information gain is chosen as the splitting attribute for node N.This attribute minimizes the information needed to classify the tuples in the resulting partitions and reflects the least randomness or "impurity" in these partitions[6].

$$E(S) = \sum_{i=1}^{c} - p_i \log_2 p_i$$

How much more information would we still need (after the partitioning) in order to arrive at an exact classification. This amount is measured by:

$$Info_A(D) = \sum_{j=1}^{v} \frac{D_j}{D} * Info(D_j)$$

Information gain is defined as the difference between the original in formation and requirement.

$$Gain(A) = Info(D) - Info_A(D)$$

4.2 Neural Network

A neural network is a set of connected input/output units in which each connection has a weight associated with it.During the learning phase, the network learns by adjusting the weights so as to be able to predict the correct class label of the input tuples. Neural network learning is also referred to as connectionist learning due to the connections between units. Advantages of neural networks, however, include their high tolerance of noisy data as well as their ability to classify patterns on which they have not been trained. They can be used when you may have little knowledge of the relationships between attributes and classes [6]

5. PROPOSED MODEL

5.1 Steps of Artificial Neural Network

1. Mapping the input parameter to input layer

2. Initialize all weights and biases in network

3. For each unit of input layer j

$$O_j = I_j$$

For each unit of Hidden or Output layer j

$$I_j = \sum_i W_{ij} O_i + \theta_j$$

4. Comparing target value and expected value

if error is more apply back propagation (Calculating MSE)

$$Err_j = O_j(1 - O_j)(T_j - O_j)$$

T_j=Expected Value

5. For Hidden Layer

$$Err_j = O_j(1 - O_j)\sum_k Err_k W_{j_k}$$

6. Calculate Weight

$$\Delta W_{ij} = (l) Err_j O_i$$

$$W_{ij} = W_{ij} + \Delta W_{ij}$$

7. Calculate Bias

$$\Delta\theta_j = (l)Err_j$$

$$\theta_j = \theta_j + \Delta\theta_j$$

5.2 Steps of Decision Tree

1. Entropy(Expected Information) using the frequency table of one attribute

$$E(S) = \sum_{i=1}^{c} - p_i \log_2 p_i$$

2. Now calculate Gain of each attribute
3. Highest information gain among the attribute, it is selected as splitting attribute.

5.3 HYBRID MODEL

1. Apply back-propagation algorithm
2. Feature selection model
3. Decision rules generated by C4.5 are validated by measuring its performance.

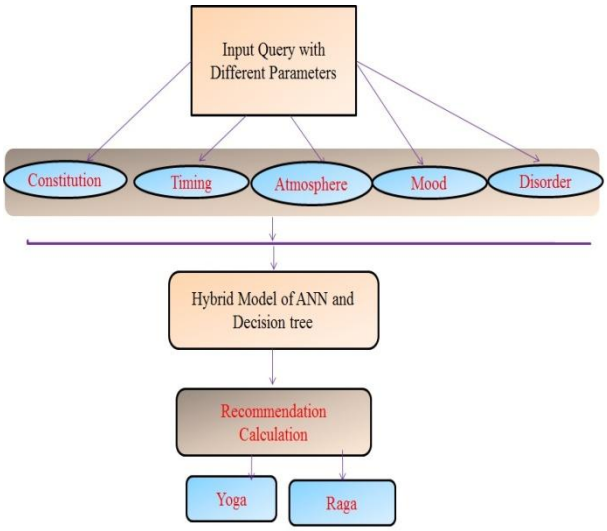

Fig 2.Flow of System

6. CONCLUSION

In this paper recommendation of yoga and raga is implemented with the help of decision tree and artificial neural network hybrid model. System which recommends raga and yoga on user's details to improve personalized health. System is automated with help of hybrid model decision tree and ANN. It is less time consuming with less intervention from Ayurveda experts.

7. REFERENCES

[1] Robert Svoboda, Prakriti Your Ayurvedic Constitution, 220 pages, pb publication 2011.

[2] Annet King," What Does Your Dosha Say About You",The International Dermal Institute,postgradute education in skin and body therapy.

[3] National Library of Ayurveda Medicine ,NLAM education

[4] J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68-73.

[5] http://www.ayurveda-music.com/Healing-Sounds-of-Ayurveda.html

[6] Amiya Nath Sanyal,Ragas and Raginis,Orient Longmans,first published 1959.

[7] http://www.artofliving.org/in-en

[8] Data mining concepts and techniques,Jiawei han,Michelin kamber,second edition.

[9] Chen Zhibo,Han Hui, Wang Jianxin. Data Warehouse and Data Mining. Qinghua University press. Beijing.2009. [

[10] Liao Kaiji, Liu Fengying, Hu Jianjun. Data Warehouse and Data Mining. Beijing University press. Beijing.2008.

[11] ZhaoHui Tang, Jamie MacLennan. Data Mining with SQL Server 2005. Qinghua University press. Beijing.2007.

[12] J.R.Quinlan,C4.5 Programs for Machine Learning[EB] 1993