

# Predictive Analysis of Diseases Using NADI by Artificial Intelligence Techniques

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## Abstract

In modern Ayurvedic medicine the treatment is based on automatic diagnosis of need in human body. The Nadi is classified three categories are described below. This Nadi predicts the disease when there is a deviation in bevel rate. The sensors are placed in Nadi region and analyzed to the disinfectant. Nadi Pariksha/Pulse Diagnosis is a non-invasive ancient technique of ayurvedic disease diagnosis through pulse.... The time tested and age-old natural way of healing, Ayurveda, has taught that any presence of disease in our system will be indicated as an imbalance in our 'Doshas' - Vata, Pitta and Kapha.

**Keywords:** Nadi Pariksha, Vata, Pitta and Kapha.

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## 1. Introduction

Nadi Pariksha/Pulse Diagnosis is a non-intrusive old method of ayurvedic illness analysis through heartbeat. It precisely analyze physical, mental and enthusiastic irregular characteristics also. It is additionally the logical instrument that empowers a individual to anchor their customized health routines, for example, helpful back rubs, customized diet, and detoxification.

The reliable and age-old common method for recuperating, Ayurveda, has instructed that any nearness of sickness in our framework will be shown as lopsidedness in our 'Doshas' - Vata, Pitta and Kapha. The standards of Ayurveda pursue the normal approach to analyze sicknesses and bring back equalization to the body, and one such method of determination is 'Nadi Pariksha'. This Nadi predicts the disease when there is a deviation in bevel rate. The sensors are placed in Nadi region and analyzed to the disinfectant.

## 2. Ayurvedic Pulse Diagnosis

The three-fold Ayurvedic Diagnosis

### A. Sparshana

Sparshana, contacting or palpation strategy for analysis is the first in trividh pariksha (three-overlap determination), in which the professional analyzes the individual by contacting. The Prakriti (Vata, Pitta,

Kapha) of the individual is resolved. This stage is executed in our task utilizing optical heartbeat sensors and Artificial Neural Networks.

## B. Darshana

This is the direct observation diagnosis. The general physique type, movements, etc are observed. This phase can be analyzed using unsupervised machine learning algorithms.

## C. Prashna

The physician asks in detail about the background of the disease, his/her lifestyle, eating habits, change in any activities lately, etc. This analysis can be performed using classification analysis. The figure1 shows the pulse diagnosis by physical investigation.



Figure 1: Pulse Types

The combination of this nadi can be further classified in to

- ◎ **Ether + Air = Vata (Mobility)**
- ◎ **Fire + Water = Pitta ( Heat)**
- ◎ **Water + Earth = Kapha (Viscosity)**

Depending upon the nature Air, Fire and Water.

Nadi signals will vary at different ages. It gives you an insight on how to optimize your health in accordance with the elements which are predominant in your body. It gives detailed and accurate personalized and individual prognosis. Several chronic diseases like diabetes, infertility, obesity, hypertension, paralysis, mental disorders, severe joint pains and skin diseases can be detected by using this nadi pareeksha. One can know about his health status by checking the pulses at exact pulse points from a nadi pareeksha expert. The best time to check the pulse is in the early morning, physiologically the least active time of the day. The middle, index, and ring fingers can be used to check the pulses with the index finger placed closest to the wrist crease as shown in below figure 2. At first, the three positions are palpated simultaneously, lightly, then with medium pressure, and finally more strongly.

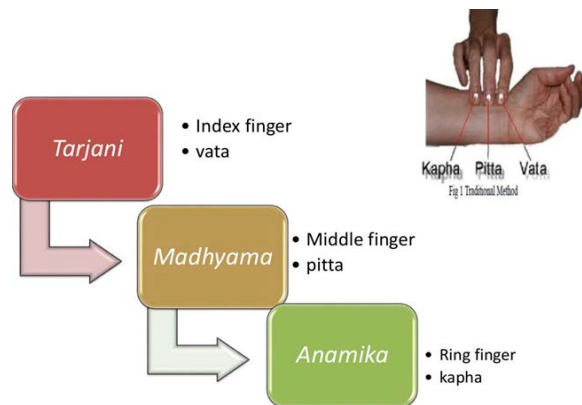


Figure 2: Types of Nadi

### 3. Identification of Nadi

- Tarjani
- Madhyama
- Anamika

These are three types of NADI.

Before placing the sensor on wrist of the subjects to acquire Nadi pulses, the following steps have to be done. The person whose pulses to be checked is asked to,

- **Relax their hand.** By examiner's index, Middle and ring fingers.
- **Palpations of Nadi pulses of a person are sensed.** If a sensor is used then this is the best place to place the sensor at right place in subjects' wrist. We acquired the subject's pulse waveforms by
- **Placing sensor in their wrist** when they are in the chair in relaxed state. After this, each position is checked separately. Different systems are used whereby the pulse at each position is identified with certain organs. When the pulse is taken, attention is given to the frequency, amplitude and quality of the pulse.

### 4. Block Diagram of Pulse Detection System Using Digital Storage Oscilloscope

- Physical signal from radial artery
- Pie electric sensor
- Feet input buffer
- Amplifier filter
- Digital storage oscilloscope

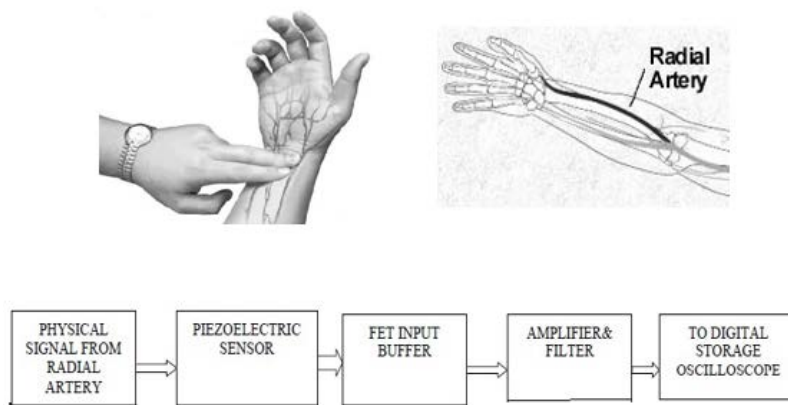


Figure 3: Pulse Detection System

### 5. Data for Diagnosis

Determination by heartbeat perusing is one of the central parts of finding in siddha arrangement of drug. A talented specialist is required to analyze the irregularity present in the body by perusing the beat of the patient. Heartbeat perusing in siddha framework alludes to the discovery of the irregularities in mukuttram (three humors), by feeling the beat of the patient by the technique recommended in the siddha writings. A siddha doctor feels the examples of vibration that speak to the metabolic procedures going on in the body at an explicit time.

As per siddha framework, 96 fundamental standards shape the reason for the physiological elements of the body. Any variation from the norm in the capacity of these standards, which are controlled by the

three humors can be detected in the beat. The three primary heartbeats are felt in the wrist area along the outspread vein with three fingers all the while. The forefinger faculties vatham; the center finger, the pitham; and the ring finger, the kabam. The proficient specialist can detect these three and in addition blends of the principle three and subdivisions of those heartbeats. Through and through, the gifted heartbeat taker can recognize upwards of 32 distinctive heartbeat characteristics. The cadence and vibrating development of these unmistakable heartbeats tell the analyst the state of the body frameworks and their working. The accomplished doctor can peruse, through the beats, the quality and essentialness of each interior organ, and even is rumored to have the capacity to analyze illnesses. It is the nearness of these vibratory characteristics gives them those names, for example, the snake beat, the frog beat, or the swan beat that alarms the doctor to the idea of the lopsidedness that is in charge of the patient's condition.

The place for feeling the beat is on the parallel part of the lower arm, 2cm up from the wrist. The record, center, and ring fingers are utilized to feel the three heartbeats in their individual request. Weight of fluctuating dimensions is connected with each finger on the supply route all together. Use of weight is rehashed the same number of times as required for diagnosing the sickness. In light of the prevailing heartbeat among the three and the course in which the beat movement is felt, a prepared professional recognizes more than 350 distinctive malady conditions. Sound human subjects have the three heartbeat amplitudes in the proportion of 4:2:1 separately. In any case, this proportion is accepted to pursue occasional varieties and changes with parameters, for example, time, temperature and moistness of the skin. The correct arm of male subjects and left arm of female subjects is utilized to peruse the beat.

### General Characteristics

Character	Vatham	Pitham	Kabam
Felt by	Index	Middle	Ring
Frequency	80-95	70-80	50-60
Rhythm	Irregular	Regular	Regular
Amplitude	Low	High	Moderate
Gait	Quick and leaps like a frog	Prominent, strong, high amplitude like snake	Deep, slow, broad like elephant
Tension	Low	High	Moderate
Volume	Low	High	Moderate
Temperature	Cold	Hot	Warm to cool
Texture	Rough, hard	Elastic, Flexible	Soft , thick

A siddha text called vaidya sadagam mentions vividly the symptoms/ disease conditions that are associated with each dominant pulse reading as tabulated below briefly.

Predominant pulse felt	Few associated Symptoms/ Disease conditions
<u>Vatham</u>	Loss of appetite, Flatulence, Abdominal distension, Diarrhea, Pain, Piles etc
<u>Pitham in vatham</u>	Indigestion, Regurgitation, Constipation, Laziness, Body pain etc
<u>Kabam in vatham</u>	Cough, Heart disease, Seasonal asthma, Fever, Bronchial asthma etc
<u>Pitham</u>	Body heat, Bone fever, Memory loss, Excessive thirst, <u>Menorrhagia</u> etc
<u>Vatham in pitham</u>	<u>Oligospermia</u> , Abdominal diseases, Indigestion, Acid peptic disease etc
<u>Kabam in pitham</u>	Jaundice, Eye disease, Sinusitis, Wasting disease, Loss of appetite etc
<u>Kabam</u>	Tuberculosis, Cough, Bronchial asthma, Vomiting, Anemia, Dropsy etc
<u>Pitham in kabam</u>	Fever with chills, Body pain, Hiccups, Jaundice, Dryness of mouth etc
<u>Vatham in kabam</u>	Abdominal distension, Hiccups, Nausea, Pain, Delirium, <u>Hemiplegia</u> , Diseases related to head etc

In addition to this, the text also describes the combination of other factors like heat, cool etc along with the dominant pulse sensed by the physician in the patient's body and the symptoms / disease condition associated with them. Also a condition in which all the three pulses dominate is mentioned which is called as thiri thodam. This indicates the complicated stage of any disease in which delirium like symptoms occur which may lead to death. Also in any disease if pitham dominates in kabam and kabam dominates in vatham, the prognosis is expected to be slow.

The pulse reading and diagnosis is done taking in to account of other factors like season, body constitution of the patient and time of the day in which the reading is done. These factors tend to influence the pulse thereby masking the actual state of pulse in the body.

Pulse reading is important in diagnosis of diseases in siddha system of medicine because treatment is primarily aimed at normalization of humours

## 6. Identification of Diseases

### Right Side of Hand

Dosha	Vata	Pitta	Kapha
Finger	Index	Middle	Ring
Superficial	Colon	Gall Bladder	Pericardium
Deep	Lung	Liver	Circulation

### Left Side of Hand

Dosha	Vata	Pitta	Kapha
Finger	Index	Middle	Ring
Superficial	Small Intestine	Stomach	Bladder
Deep	Heart	Spleen	Kidney

## 7. Symptoms of Diseases



Figure 5: symptom of disease

The symptom of diseases can be identified as illustrated in the figure above.

## 8. Ayur Informatics

A Process of incorporating Information Technology, Data mining, statistical methods and Ayurveda.

Ayurveda - the conventional medication arrangement of antiquated India, which sustains a person's physical quality and knowledge alongside keeping up an awesome offset with nature. Freak to its temperament, it has now turned into an idle superbness. Neither the exploration strategy nor the course book has changed in the course of recent years and clearing route for the advanced drug framework to advance. This work gives a persuading answer for Ayurveda to recover its lost magnificence with the consolidation of Information Technology, Data mining, Statistics and Bioinformatics, consequently framing another endeavor named Ayurinformatics. To demonstrate this, important data's were gathered from different writings of Ayurveda and information mining calculations. The discoveries come to by the usage of information mining calculations like k-Means calculation, Canny Edge identification calculation, Decision trees and deep learning strategies for finding a superior research strategy to distinguish a superior treatment technique, has made a critical reduction in both time and cash than present day prescription framework does. This was clear by the distinguishing proof of utilizing strategies like kth nearest calculation to bunch ayurvedic meds, forecast techniques for Bronchial Carcinoma-a kind of malignancy, Canny Edge Detection Algorithm for Medicinal Plants Disease Identification and AVD with Transitive content digging calculation for removing ayurvedic writings from natural databanks. This work emphatically authorizes that Ayurinformatics gives another lifestyle to Ayurveda with its creative way to deal with research technique and better treatment distinguishing proof strategies.

The figure below explains the type of Ayur informatics chart

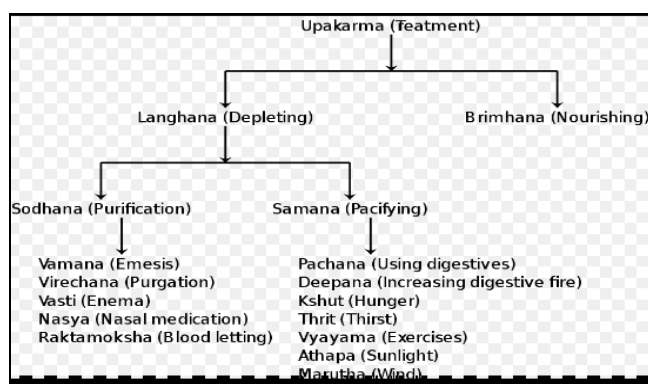


Figure 6: Ayur informatics

## 9. Medical Data Classification Techniques

Some of the machine learning techniques that adopted for different treatment of disease is shown below

Techniques	Purpose	Disease
Decision Tree	Decision Support	Cardio Vascular Diseases
ANN	Extracting patterns, Medical data Classification	Swine flu, Dengue
k-NN	Classification of Diseases	Diabetes, Cancer
SVM	Disease Classification	Diabetes
Naive Bayesian	Improving classification accuracy	Coronary Heart Disease, Liver disease

Figure 7: Medical data

## 10.Conclusion

As such it will in general be contemplated that determination of a vast part of the infections ought to be conceivable using a fitting sensor set up together the Nadi symptoms can be done. This Nadi predicts the disease when there is a deviation in bevel rate. The sensors are placed in Nadi region and analyzed to the disinfectant.

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