

Digital Approach For Siddha Pulse Diagnosis

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Abstract : The Siddha pulse finding is old type of medical diagnosis in the world. According to Siddha, 96 principles are representing 96 physiological functions of the body. These 96 principles have a pattern of the pulse; any abnormality in the pulse pattern represents the presence of a disease or malfunction of the specific physiological function. Knowing the disease or defect, the necessary treatment is provided. Digitalizing Siddha pulse diagnosis can help accurate findings of irregularities in the human body. Pressure Transducers are used here to assess the deformation of the radial artery, which ultimately senses pressure in them; three pressure transducers are used at three different reading spots, namely vadha, pita, and Kapha according to Siddha medicine. The demands read are then transmitted to a Smartphone application through a Bluetooth transmitter connected with an arduino board, the manipulations are done in the application using the already created database, and then the diagnosed reports are provided digitally.

Index Terms: siddha pulse diagnosis, pulse pattern, radial artery.

1. INTRODUCTION

Traditional Medicinal System(TSM) is one of the world's most traditional practices for the diagnosis of diseases in the Human Body. It is one of the critical aspects to lead a healthy life. Such a good diagnosis practice in Tamil Nadu is said to be the Siddha System of Medicine(SSM). Due to the domination of Allopathy, the Siddha System of Medicine(SSM) has been utterly failed to keep its fame and glory. Siddha System of Medicine(SSM) is an very old medical practice prevailing in significant of Tamil Nadu, and The medical practice is commonly called "Siddha," which refers to perfection. A group makes the diagnosis approach of practitioners called Siddhars. The drugs suggested by Siddha practitioners are degenerative to the human body. Food Diet and Yoga are part of the medicinal system of Siddha. Matter and Energy are two principles that form the basis of the Siddha System. They believed they have a significant influence on shaping the body. They are called Siva and Sakthi. One cannot exist without another. According to them, the living man is a combination of three thodam/mukkatram. They are generally described as Uyir thattukkal, which means "life force." The three basic principles are vatham, pitham, and kapham. As per the Siddha system, they are conscientious for the formation, protection, and damage of the mental personality of the human being body. The principles should be in the ratio of 4:2:1. It represents that they lead a healthy life. Any discrepancies in this ratio state that he/she may be suffered from abnormalities.

- VATHAM is said to be made of air and space. It governs motor and sensory activities. It includes activities like mind and body movements.
- PITHAM is said to be made of fire. It oversees the preservation of health. It includes activities like maintaining body heat.

- KAPHAM is said to be made of earth and water. It governs the joint movements and endurance. It is mainly responsible for head and neck regions

When a disturbance has occurred in the ratio of these principles, he/she may be affected. The factors which affect this ratio are the surroundings, weather situation, diet, physical behavior, and mental pressure. There are many diagnostic approaches followed by practitioners. One of them is Nadi. Based on the three doshas, one can be assumed to be diseased or not. The pulse analyzer will sense the three doshas and find whether an imbalance occurred or not in section I. An Arduino board will be connected to the pulse analyzer. The signals from the analyzer will be fed as an input to the Arduino board. Through Bluetooth transmitter, digital signals are fed to the mobile app in section II. Then comparisons are made as per the database results stored. Based on the comparison results, the type of person will be displayed. The abnormalities and their corresponding remedies will be demonstrated as a result of section III.

2. RELATED WORKS

The ancient Siddha system proposes a typical diagnosis approach for analyzing the physical characteristics of the human body. As per the Siddha system, our Human body contains three essential functions Vatham (AIR), Pitham (FIRE), and Kapham (EARTH AND WATER). Based on the variations in these three functions, the characteristics of the human body can be determined. Vatham should be measured in 1 unit. Pitham should be measured in ½ units. Kapham should be measured in ¼ units. The ratio of these three functionalities should be in the order of 4:2:1. If occurs any alteration in this ratio, then UYIR THATUKAL is said to be KUTRANGAL false thathus. Windy humor is felt by the index finger – VAYU, which is represented by the Movement of Snake. Bilious humor is felt by the middle finger – PITHA, which is represented by the Movement of Frog. Phlegmatic humor is felt by the Ring Finger – KAPHA, which is represented by the Movement of Swan.

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FEATURES	VATHAM	PITHAM	KAPHAM
MODE	INDEX	MIDDLE	RING
VIBRATIONS	NOT CONTINUOUS	CONTINUOUS	CONTINUOUS
PULSE	SNAKE PULSE	FROG PULSE	SWAN PULSE
TEMPERATURE	COLD	HOT	WARM TO COOL
VOLUME	LOW	HIGH	MODERATE
TENSION	LOW	HIGH	MODERATE
AMPLITUDE	LOW	HIGH	MODERATE
UNITS	1/4	1/2	1

Figure 1. Comparison chart

The obstacle in the diagnosis of the pulse is that they are affected by climatic conditions. For Example, Kapha doshas are increased in winters; hence, sunset or evenings are the right choices for pulse diagnosis. Vatha dosha is increased in summer; therefore, sunrise is the correct timing for pulse diagnosis. Pitha dosha is increased in the fall season; hence, noon is the proper timing for pulse diagnosis. Apart from seasons, timings also influence pulse diagnosis. The pulse should not be diagnosed at night. The correct timing for pulse diagnosis in the early morning.

There should be some procedures in taking the pulse diagnosis,

- Pulse reading should not be done immediately after exercise or hard work.
- They even should not be done in immediate hungry.
- They should not undergo diagnosis if they had taken food.
- The patient should not undergo any oil bath before pulse diagnosis.
- The patient should not either be wet or dry.

The disturbance in this ratio will be the cause of illness in the human body. The diagnosis process includes feeling the pulse from the arm, and it should be 2cm up from the wrist. The diagnosis process will be held in the gentleman of right upper and left armrest for feminine issues. The key, center and circle finger are supported in the diagnosis process. Based on the dominance in the pressure felt by these three fingers, an expert can make decisions on the physical characteristics of the human body.

From the results of pulse diagnosis, we can conclude some of the results.

DOSHAS	EFFECTS
VATHAM	Headaches, Body pain, arthritis, loss of appetite, flatulence, fever, voice changes, dry cough, etc..
PITHAM	Headache, insomnia, vertigo, stomach and heartburn, dryness of mouth, confusion, and diarrhoea.
KAPHAM	The disease of Kidney and chest, Heaviness of Body and Head, cough

	with phlegm, difficulty in breathing.
SANIPATHAM	All three doshas are either increased or decreased results in the death of the patient.

Figure 2. Effects of Doshas

IMBALANCE IN VATHA: The dominance in the Vatha indicates the presence of Diarrhea, Piles, Abdominal distension, etc.

IMBALANCE IN PITHA: The dominance in the Pitha indicates the presence of Body heat, Bone fever, Memory loss, etc.,

IMBALANCE IN KAPHA: The predominance in the Kapha suggests the presence of Vomiting, Anaemia, Tuberculosis, etc.,

3. PROPOSED ACCEMENET METHOD

The planned system defeats the problems of the previous system. The anticipated method uses pressure sensors to detect the sensing of pressure in the current three Siddha points, namely vatha, pitha, and kapha, respectively. The measured difference in pressures is then sent as an input to an Arduino board. From the Arduino board, the digital signals are generated. The digital signals are then broadcast to a smart phone application through a Bluetooth transmitter. From the obtained data, comparisons are made on a pre-designed database, and the disease is diagnosed, and the reports are generated.

3.1. SENSING RATIO OF PRESSURES

For the above diagnosis process, three blood pressure sensors were used. The blood pressure sensors were of the type DBPS. The features of the DBPS include the pressure range varies from 30-300 mm Hg. The three pressure sensors should be mounted on the wrist. These sensors will sense the pulse on the three different locations, namely vatha, pitha, and kapha. The three pressure sensors are arranged in such a way that one should not disturb others to avoid the collision. The Design has been interfaced with the Arduino board. The pulse form sensed by the three pressure sensors will be fed as an input to the Arduino board.

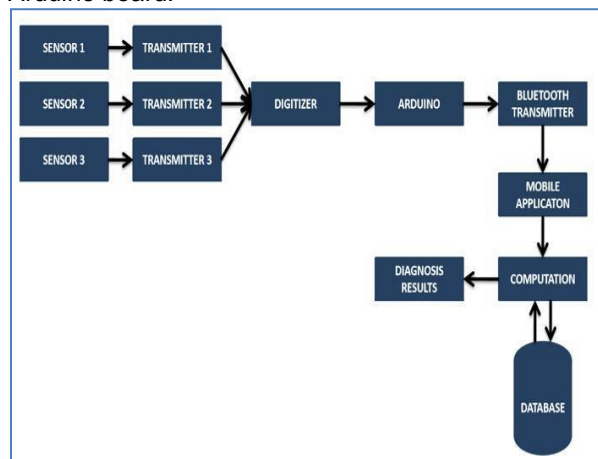


Figure 3. Proposed Architecture

3.2. TRANSMITTING DATA

An Arduino board is a microcontroller board that can be loaded with a specific program. This board is now programmed to receive data from the pressure sensors and then transmit those data to the smartphone application through a Bluetooth transmitter that is already connected to the Arduino board. Arduino boards measure data signals without much distortion or noise, and these boards also use a separate programming language called Arduino Programming Language that is widely used nowadays in the field of Artificial Intelligence and the Internet of Things.

4. APPLICATION

The most advanced approach in diagnosing the pulse is that it is digitalized through an Android app. Android app is very much compatible with the Arduino board. The pulse sensed is transmitted through a Bluetooth transmitter to the Android app. The android application can be well designed using the standard android application creation environment called the android studio. The front end of the application is developed using Extended Markup Language (XML), and the backend is designed with Java code. The database will be needed in case of the Knowledge management system. For the database purpose, we need to use Firebase. The developed application is then connected to a google firebase database with necessary predefined data and approaches. When the signals are generated from the transmitter to the app, the comparisons are made with the previously fetched data. The input data is then compared with the legacy data, and the results are screened and displayed.

5. KNOWLEDGE MANAGEMENT SYSTEM

The analysis process should be carried out for different age groups and different patients. Observations should be done from the previous analysis. This method allows us to diagnosis the kind of people and their respective disorders. The algorithm used for the knowledge management system should not depend only on the prior analysis works; slightly, it should also rely on the physician's experience. The awareness system will contain the record for dissimilar disorders, indication, and their corresponding remedies. As per the analysis of the results obtained from the mobile application, details on vadha, pitha, and kapha patients will be stored in the database. The Knowledge management system has a detailed analysis of the abnormalities based on the body's type. When a patient is undergone for the diagnosis approach, digital signals will be sensed. Based on the signals, the predominance will be measured. It will be compared with the database. From the comparisons made in the database, the type of patient's body will be analyzed. Again for the particular example of the body, corresponding abnormalities and their respective remedies will be displayed.

6. CONCLUSION

The usage of the pressure sensor will be an excellent approach for diagnosing traditional Indian medicine. Our pulse forms will be generating great accurate details compared to other diagnosis approaches on traditional Indian medicine. The pulse forms created are consistently compared to Siddha literature and formed reported features. New advanced Algorithms are needed to

differentiate pulses. As per the ancient records, our human body is not composed of a single disease. Thus it can be concluded that various diseases can be analyzed using a unique diagnosis approach. It reduces the need for multiple instruments. Even some of the disease which cannot be diagnosed using a single diagnosis approach can be diagnosed. The advantage of this instrument, over the other, will be that it enhances the traditional medical system. This will be significantly a precursor in endorsing our traditional medicine. Thus our system is capable of diagnosing the changes occurring in the radial artery without undergoing any further surjective. Future research includes the diagnosis of killer diseases.

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