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Remote Consultation Using Pulse Detection

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Abstract - *Pulse detection is ancient diagnosis technique emerged in India. It is procured from Ayurveda. In this technique wrist pulse analysis is used for recognition of health issues. Now days, this method is not in use. This ancient technique can be used with modern telecommunication technologies to provide health care at distance. In this paper, we are focusing on use of former pulse detection technique to provide remote consultation. This project is composed of device for pulse detection and system which can be accessed by doctors and patients remotely.*

Key Words*: *Pulse detection, telemedicine, vatta, pitta ,kapha

1.INTRODUCTION

The knowledge contained in Ayurveda deals with the nature, scope and purpose of life. It embraces both the metaphysical and physical, health and disease, happiness and sorrow, pain and pleasure. Three *doshas* determine individual constitution and govern functions of the body in normal conditions and, when out of balance, they contribute to the disease process[2].

There are three kinds of nadi or pulses vatta, pitta and kapha. The nadi's are named according to their functionalities and behaviour. Vatta, pitta and kapha move in the whole body producing good or ill effects upon the entire system according to the normal and provoked states.

Pulse detection can precisely diagnose mental and physical imbalances. It reaches to the source cause of health diseases. Diseases like hypertension, diabetes, infertility, obesity, mental disorders, paralysis can be detected using this pulse detection. At some point three different types of patterns are perceived that correspond to the level and tendency of vatta, pitta and kapha respectively.

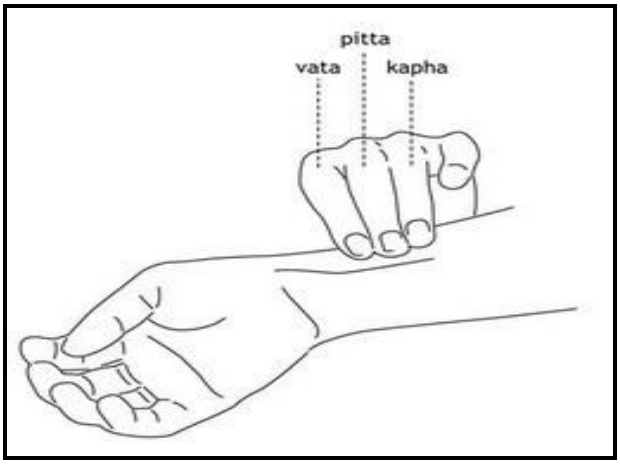

Fig. 1. Positions indicating vatta, pitta, kapha.

The waveforms of vatta, pitta and kapha can be distinguished by their movement, vatta wave resembles to cobra movement, pitta wave resembles to frog movement, kapha wave resembles to swan movement [1].

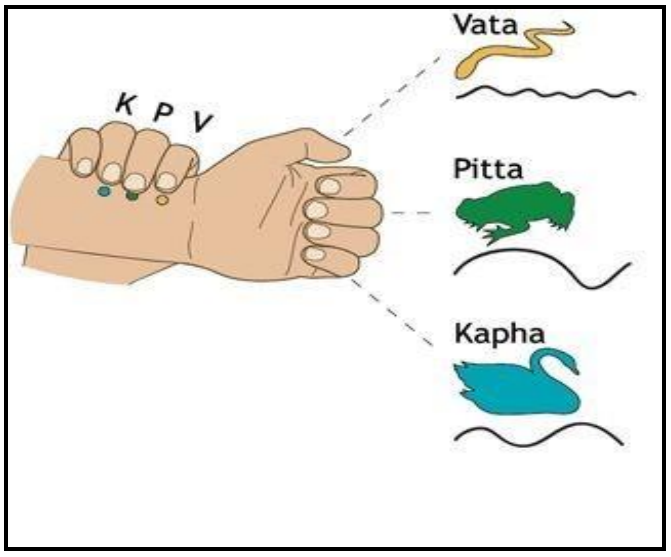

Fig.2. Shapes of waveform of vatta, pitta, kapha

The vatta, pitta and kapha pulses are examined at particular positions on the wrist of the patients. Vatta on index finger, pitta on middle finger and kapha on ring finger.

2. PROPOSED METHODOLOGY

In this section, we delineate the main features of our system. Our system in mainly composed of two parts, first is pulse detection device and second is online system for remote consultation. Web based health consultation offered health services which includes advice from doctors to individuals. A remote consultation is service in which patient can consult from doctor at remote location. Online consultation has been mainly text based, using internet server. We are using same idea of using internet for the interaction between doctor and patient or remote consultation. Fig. 3 shows block diagram of our system.

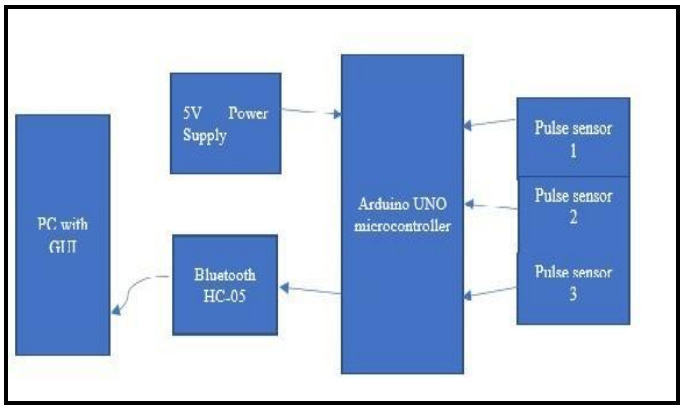

Fig. 3: System Block Diagram

Fig. 3 shows main components of system for remote consultation using pulse detection. The main components of our system are pulse detecting unit, Bluetooth module for transfer of data between pulse detecting device and user's device and online system for remote consultation.

The pulse detecting unit uses Arduino uno microcontroller, three pulse rate sensors and 5V power supply. Arduino uno is microcontroller board, it has 14 I/O pins, USB connector, power jack, reset button. It has 16MHz clock frequency. Arduino uno board is powered via USB connection also it can be powered with an external supply. We need power supply for conversion of AC voltage to regulated DC voltage.

The pulse sensors are placed on the radial artery as shown position of the fingers in Fig 1. If the sensors are positioned incorrectly then the signals may not be reflected efficiently. The Fig. 4 shows internal structure of sensor used for pulse rate sensing, it shows front and back view of pulse rate sensor.

The pulse rate sensor is used for heartbeat detection. It can be wore on the finger or earlobe and connected to Arduino microcontroller via cables. Pulse rate sensor is an optical heart rate sensor which has internal amplifying and noise-cancellation circuit. The dimensions of pulse rate sensor are 0.625" diameter and 0.125" thick.

Arduino Pin	Pulse Sensor Cable
Red	3V or 5V
Black	GND
Green	A0(Analog Pin 0)

Table 1. Pulse Sensor Hook-up

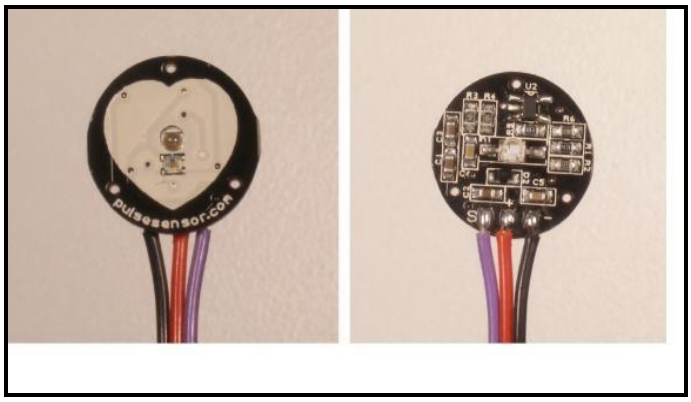

Fig.4: Pulse Rate Sensor

Bluetooth module used in our system is HC06 which is easy to use Serial Port Protocol module. Fig 5 shows structure of Bluetooth module. HC06 has in built 2.4GHz antenna[5].

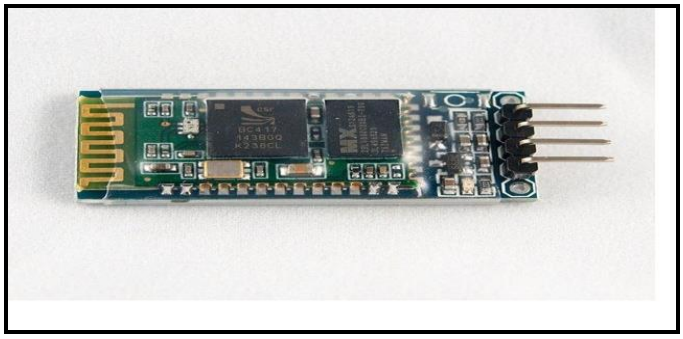

Fig. 5 HC06(Bluetooth Module)

Three pulse sensors are mounted on the wrist on three different pulse locations called vatta, pitta, kapha. Three sensor will sense the respective vatta, pitta, kapha values, these values are transferred from Arduino board to user's machine which can be any Bluetooth compatible device such as PC, laptop, mobile phone etc. using HC06. The real-time values of three pulses are used to plot the graph of vatta , pitta , and kapha waveforms, and these three graphs are sent

remotely to doctors using online consultation system. As by reviewing waveforms of pulses Ayurvedic doctors can properly diagnose the problem of user of our system.

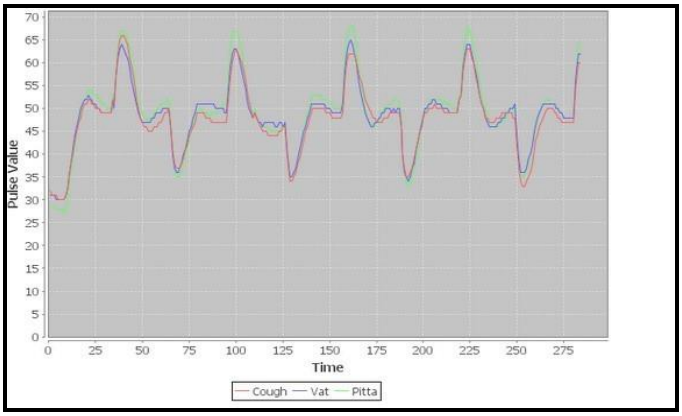

Fig. 6: Combined Waveform with Pitta Dosha

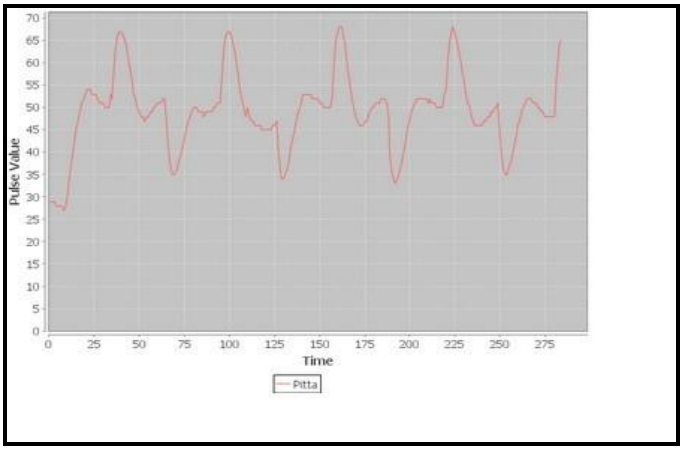

Fig. 7: Vatta Waveform

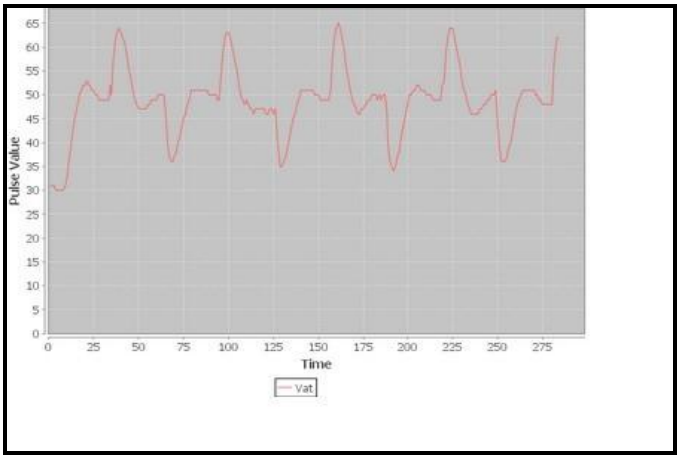

Fig. 8: Pitta Waveform

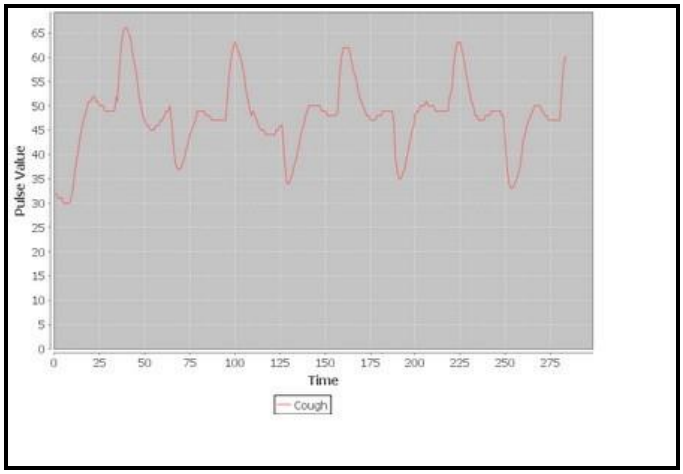

Fig. 9: Kapha Waveform

3. CONCLUSIONS

This work presents the idea of using modern pulse sensors for the ancient idea of disease diagnosis via pulse detection. Modern pressure sensors can imitate the 'feeling' information used in traditional Indian Ayurveda system. This system will helpful for physician who are not trained for Nadi pariksha. The developed system used in real time data collection. Further data are divided into vata, pitta, kapha and send it to the doctor.

FUTURE SCOPE

This work can be further expanded to provide diagnosis using pulse information without consulting to doctors. This can be achieved by taking pulse readings of already known patients of some disease. The dataset of such known patient's pulse readings should be very large for better accuracy. Hence by using very large dataset of pulse readings of known patient and by applying some statistical analysis techniques on it, we can also diagnose diseases using pulse detection device.

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