International Journal of Advance Research in Science and Engineering
Vol. No.9, Issue No. 01, January 2020
www.ijarse.com
IJARSE
ISSN 2319 - 8354

Detection of Prakriti of PersonWrist Pulse Acquisition and Recording System in Ayurveda

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Abstract:

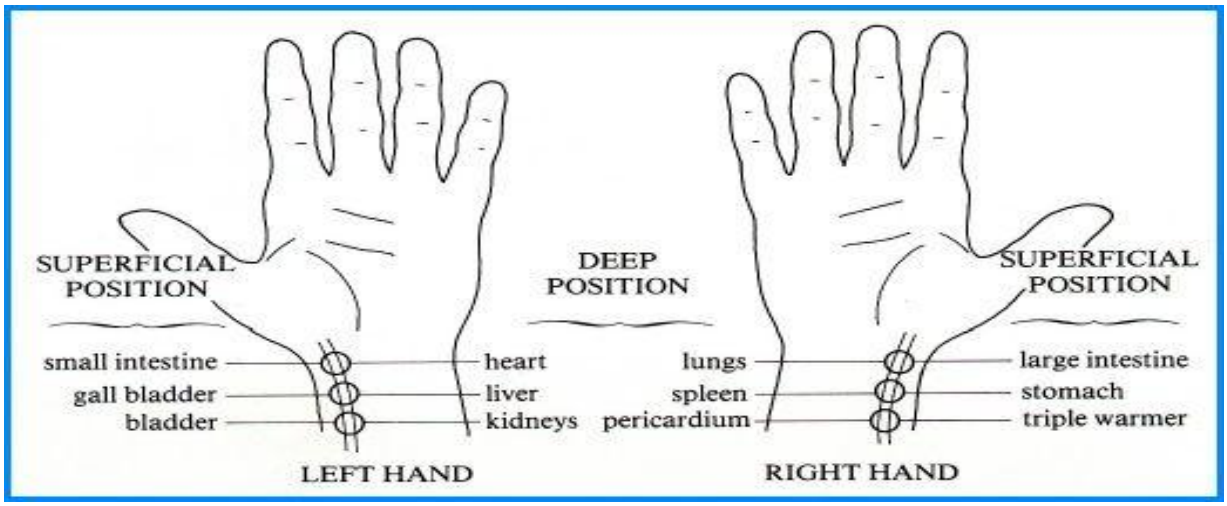
Traditional practitioner following Ayurveda (Ancient Indian Medicine) measures radial pulse signals using three fingers at three distinct radial pulse points identified as Vata, Pitta and Kapha and indentifies the abnormal health status accordingly. This method of diagnosis requires several years of experience. Being subjective in its nature, this approach depends upon the perception of individual practitioner as well. Hence a wrist pulse monitoring and recording system is essential to provide objectivity in measurement and to take the benefits of this ancient approach of diagnosis. This work focuses on the design and development of a novel wrist pulse acquisition and recording system. In this proposed system, three channel wrist pulse signals are acquired using pressure sensor. Signal conditioning circuit is implemented to amplify and filter the wrist pulse signals. Advance microcontroller having ARM Cortex M4 architecture is used for digitization of signals. These digitized signals are displayed on graphic color LCD for real time monitoring. Touch interface is also included for zoom-out or zoom-in purpose. Recording of the signals is done on micro SD memory card for off line processing and analysis. This system can be used for better understanding of wrist pulse signals and to train Ayurveda practitioner for the observation of pulse signal.

Keywords: Ayurveda,Pulse diagnosis, Wrist pulse signal, prakruti,vata, pitta, kapha.

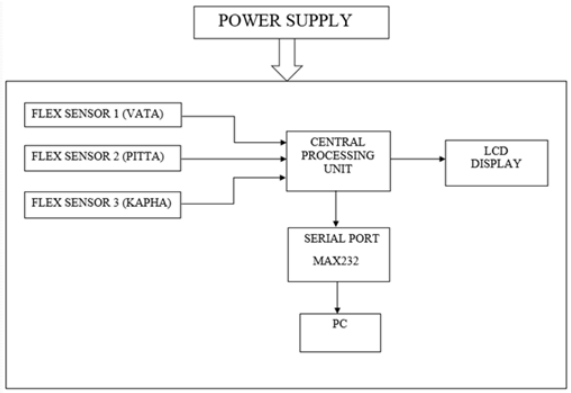
Introduction:

'Ayurveda' literally means 'science of life'. It demonstrates the science of diagnosing the imbalances within our body. According to Ayurveda, our body is made up of five elements- air, water, ether, fire, space. These five elements constitute three biological components 'vata', 'pitta' and 'kapha'.Vata(mobility)= air + space, pitta(heat)= fire + water and kapha(viscosity)= water + ether. Pulse diagnosis technique from ancient Ayurveda is one of the most powerful diagnostic tools for understanding the cause of ailments in human body. A pulse, too strong or too weak, denotes illness. Pulse reading helps to diagnose the problem at the first stage. That's why we are making a device which can detect the condition of our body based on three doshas that are 'vata', 'pitta' and 'kapha'.Using this device we can determine the imbalances of these doshas in the human body by comparing it with certain threshold values and can predict the diseases, the body is prone to. As the difference in pulse patterns of three pressure points are found clearly, operating at the deep pressure, we can predict other diseases like hypertension and diabetes through this method

"Figure1. Classical Method"



System block diagram:



"Figure2. System Block Diagram"

3. System consists of consists of:

1. Flex sensor:A force-sensing resistor is a material whose resistance changes whena force or pressure is applied. They are also known as "force-sensitive resistor" and are sometimes referred to by the initials "FSR". Force-sensing resistors consist of a conductive polymer, which changes resistance in a predictable manner

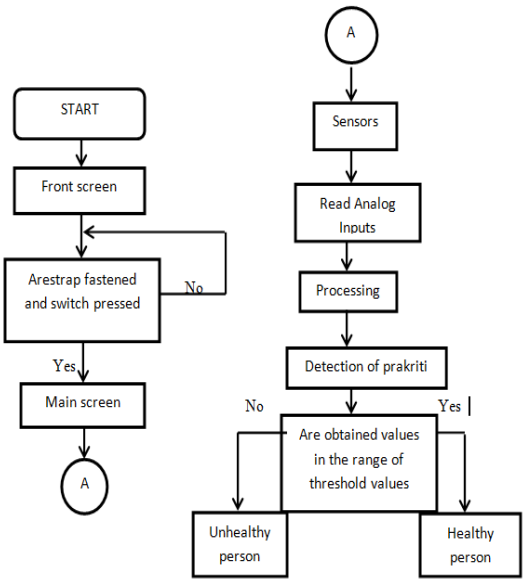
following application of force to its surface. They are normally supplied as a polymer sheet or ink that can be applied by screen printing. The sensing film consists of both electrically conducting and non-conducting particles suspended in matrix. The particles are sub-micrometer sizes, and are formulated to reduce the temperature dependence, improve mechanical properties and increase surface durability. Applying a force to the surface of the sensing film causes particles to touch the conducting electrodes, changing the resistance of the film. As with all resistive based sensors, force-sensing resistors require a relatively simple interface and can operatesatisfactorily in moderately hostile environments. Compared to other force sensors, the advantages of FSRs are their size (thickness typically less than 0.5 mm), low cost and good shock resistance. A disadvantage is their low precision measurement results may differ 10% and more. Force-sensing resistors are commonly used to create pressure-sensing "buttons" and have applications in many fields, including musical instruments, car occupancy sensors, Foot systems and portable electronics.

"Figure3. FSR"

2. Microcontroller ATmega16: The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega16 achieves throughputs approaching 1 MIPS per MHz allowing the system designed to optimize power consumption versus processing speed.

4. Working:

The actual working of the system can be understood by using the flow chart shown furtherwhen the logger is fixed to consumer end we just have to set the date and time and that's all. As soon as the pressure switch sense the pressure it gives a signal to microcontroller and microcontroller starts reading the values of different sensors and starts logging maximum and minimum value of respective sensor.



5. Expected Result:

After programming the LCD will display following outputs: Rate of Vata, Pitta and Kapha in human body. Comparison between threshold values and the values obtained from a person's body. Also from these values one can predict the ailments our body is prone to.

6. Conclusion:

Wrist pulse signals have been used from ancient time for health diagnosis. This work focuses on the design and development of a novel wrist pulse acquisition and recording system. High speed microcontroller, Analog and digital filter implementation, LCD with touch interface, micro SD card for data storage and PC interface for further analysis of signal have been used to make system reliable, fast responsive and user-friendly. This system can be used for better understanding of wrist pulse signals and to train Ayurveda practitioner for learning the characteristics aspects of the pulse signals in various health conditions. Future work concentrates on classification of pulses in healthy and unhealthy class. Frequency domain based analysis can be done for further processing.

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