Title: Digital Stethoscope

Problem statement

The limitations of Stethoscope lead to the innovated idea of digital stethoscope, that is for more sophisticated than the original conventional stethoscope. The acoustic stethoscope will attenuate sound transmission proportional to frequency created by heartbeat and blood flow in the veins. Inability to detect the frequency outside the normal range of human hearing, the DIGITAL STETHOSCOPE is emerged.

Digital Stethoscope is able to convert the acoustic sound to electronic signals. Digital Stethoscope is used to analyse and record the data of heart beat, blood flow in veins and respiratory system frequencies. which can be further amplified for optimal listening. This electronicsignals further processed and digitalized to transmit the data into computers or personal laptops.

By using Digital Stethoscope we can able to detect the auscultation of the cardiovascular system and can assist in timely diagnosis of valvular heart disease(VHD) ,congestive heart failure ,hypertensive disease ,arrhythmias such as atrial fibrillation ,obstructive arterial disease and structural heart disease among others

Digital Stethoscope can be achieved by following general and electronic components such as Stethoscope, Microphone, Lcdor Led display(pc), Raspberry pi, Preamplifier and anti-aliasing filter, SD module and cloud interface, Power supply and PCB.

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| REQUIREMENT LIST | | | | | |
| Serialno. | REQUIREMENT DESCRIPTION | REQUESTED BY | CATEGORY | PRIORITY | ACCEPTANCE CRITERIA |
| 1. | Stethoscope: Stethoscope is the medical tool used by doctor to hear the frequency sounds of heart and blood flow in veins |  | MEDICAL DEVICE | It is used primarily to listen to the lungs, heart, and intestinal tract |  |
| 2. | MICROPHONE:  A microphone is a device that translates sound vibrations in the air into electronic signals and scribes them to recording medium or loudspeaker. Microphones enable many types of audio recording devices for purposes including communications of many kinds, as well as music vocals, speech and sound recording. |  | OMNIDIRECTIONAL ELECTRET MICROPHONE | Electret microphones to |  |
| 3. | MONITOR OR DISPLAY:  A display is a computer output surface and projecting mechanism that shows text and often graphic images to the computer user, using a liquid crystal display (LCD), light-emitting diode, gas plasma, or other image projection technology. |  | LCD | To observe and analyse the data from microphone visually |  |
| 4. | RASPBERRY PI:  The Raspberry pi is a series of low cost,credit card sized,single board computers .It is just like an another computer and features built in Wi-Fi , Bluetooth .We can connect a keyboard ,mouse through USB or Bluetooth and a display monitor through HDML cable and start using it just like a normal computer |  |  | It works as a sensor node as well as controller |  |
| 5. | **Preamplifier:**  **A preamplifier**, also known as a **preamp,** is an electronic amplifier that converts a weak electrical signal into an output signal strong enough to be noise-tolerant and strong enough for further processing |  |  |  |  |
| 6. | ANTI-ALIASING FILTER:  In case of low frequency detection,the anti-aliasing filter is useful. An anti-aliasing filter is just a low pass filter with the cutoff frequency (i.e., the -3 dB frequency) set to the Nyquist frequency. This filter cuts out any higher order frequency content in the input signal as any frequencies higher than the Nyquist frequency would be aliased. |  |  |  |  |
| 7. | Cloud interface:  A Cloud API is a software interface that allows developers to link cloud computing services together. Application programming interfaces (APIs) allow one computer program to make its data and functionality available for other programs to use. Developers use APIs to connect software components across a network |  |  |  |  |
| 8. | Power supply:  A power supply is an electrical device that supplies electric power to an electrical load. The main purpose of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power the load |  |  |  |  |

