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Head Display Stethoscope with Temperature Sensor

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ABSTRACT

A stethoscope is a medical device for listening to the sound of heart and breathing in our body. The commonly used stethoscope is an acoustic stethoscope. The disadvantage of acoustic stethoscope is that the sound level is very low and this stethoscope is not very suitable to use in noisy environment as well as to detect internal sounds of babies as they are very low. However, acoustic stethoscope is commonly used because it is cheaper than electronic stethoscope. Electronic stethoscope electronically amplifies body sounds. As the sound signals are transmitted electronically, it can be wireless and can provide noise reduction. The primary aim of this paper is to develop and construct an electronic stethoscope using filters and based on wireless Bluetooth using Arduino Microcontroller that will make it easier to detect heart sound. In this paper we have discussed design and simulation of an electronic stethoscope which will not only provide us with a better signal but can also be wireless and interfaced with computers so that it can be further analyzed and stored for further uses.

Keywords :- Arduino , Amplifies Interface, Microcontroller, Stethoscope, Wireless.

I. INTRODUCTION

Stethoscopes are used regularly by medical personnel to listen to acoustic signals picked from the internal parts of the human body during diagnosis and treatment of patients. Typically, signals that are picked from the body for diagnosis include that of the heart, lungs, and bowels. The proposed wireless design, the signal captured from a patient can be broadcast to multiple users of the device within operational range with restricted access. In this work, we focus on the design reconfiguration and development of the electronic stethoscope by introducing wireless transmission between the chest-piece and the head-piece. The proposed design aims to enable different users in a team to select different examination modes from the broadcast data without interference, minimize the mobility issues during examinations, and also reduce some of the inherent problems associated with connecting cable of the modern electronic stethoscope.

II. LITERATURE REVIEW

Stethoscopes are used to listen to acoustic signals from the internal organs of the human body. Although stethoscopes play a very important role in the diagnosis process, the chest piece and the connecting cable are known to facilitate transmission of pathogens from patient to patient and from patient to

the user. Replacing the connecting cable with a wireless system may help reduce the potential risk and further allow broadcasting of the signals to multi-users for examination. This work reports on the design of a two-piece Bluetooth- based wireless system that eliminates the connecting cables in electronic stethoscopes. The design consists of a Bluetooth based integrated chest-piece module for captured acoustic sound transmission and a microcontroller- based (MSP430) head-piece receiver module for decoding the data for the three operational modes of the stethoscope. The design was first tested using a chirp signal source with frequency of 10 Hz – 5 kHz. Results obtained for the three operational frequency bands of the stethoscope were consistent with the expected behavior of the stethoscope.

III. PROPOSED METHODOLOGY

Heart sound stethoscope is primary stage to access diseases. In this paper design of an electronic stethoscope with the functions of wireless transmission is discussed. This electronic stethoscope based on embedded processor. The data can be transmitted through wireless transmission using Zigbee module. A microphone is used to pick up the sound of the heartbeat. Acoustic stethoscope can be changed into a digital stethoscope by inserting an electric capacity microphone into its head. The signal is processed and amplified to play with or without earphone. Heart sounds are processed, sampled and sent wirelessly using Zigbee module so that multiple doctors can do auscultation.

Fig 3.1. Head Display Stethoscope with Temperature Sensor

IV. RESULTS AND DISCUSSION FUTURE SCOPE

Available in adult and pediatric sizes, these probes offer accurate, continuous measurement of core vital sign. The esophageal stethoscope is obtainable with a soft, thin cuff that gives outstanding clarity of heart and lung sounds. The male luer fitting conveniently attaches to straightforward acoustical earpieces. Depth markings aid in proper placement. The long lead wire keeps the connector off from the surgical field. The probe quickly and accurately reflects changes in core vital sign. The merchandise offers single- • - patient use convenience and infection control. The merchandise is compatible with most multifunction patient monitors.

V. CONCLUSION

Nearly all medical personnel actively involved in the treatment and diagnosis of patients use stethoscopes on a daily basis. Stethoscopes are used for pulse measuring, blood pressure monitoring, and diagnosis of cardiovascular, respiratory, and digestive diseases. The majority of stethoscopes currently on the market

are acoustic devices that use purely passive mechanical parts to isolate and focus sound generated by the body. Though these methods have been used for years, the simplicity of such devices is overshadowed by poor sound quality, discomfort, and high cost. These devices are also difficult to interface with modern technologies such as computers to record and analyze body sounds. Therefore efficient electronic stethoscopes need to be designed that are comparable in cost, has better acoustic response, and can interface with modern technologies better than the current acoustic stethoscope.

Electronic stethoscopes have been used for the last couple of decades, although it is only recently that they have gained any acceptance in everyday medical practice. This is because historical electronic stethoscopes were typically bulky and non-portable, requiring large separate cases to house the electronics. Because of this, electronic stethoscopes were only used in research and advanced diagnostic settings. Recent advances in microelectronics have led to smaller, more portable devices, and a subsequent rise in electronic stethoscope usage in everyday medicine. This project is our effort towards designing such an electronic stethoscope which not only interfaces with computers and other display devices easily but is also cost effective and easy to use. we have used the simplest of components known so that the designing of this stethoscope can be universal and have simulated it through multisiom software which is rather simple software to work on. So considering the widespread use of stethoscopes for diagnostic purposes we hope the stethoscope we have designed to be a success keeping in mind its advantages over the acoustic and other bulky stethoscopes now being used.

VI. REFERENCES

[1]. Handbook of Biomedical Instrumentation by R.S. Khandpur, second edition published by Tata- McGraw-Hill publishing company limited.

[2]. A Course in Electrical and Electronic Measurements and Instrumentation, By A.K.Sawhney and Puneet Sawhney,17th Edition Published by DhanpatRai and Co.(P) Ltd.

[3]. Jia-Ren Chang Chien, “The Implementation of a Bluetooth-Based Wireless Phonocardio-Diagnosis System” ,IEEE International Conference an Networking, Sensing &Control 2004.

[4]. Yi Luo, “Portable Bluetooth Visual Electrical Stethoscope Research”,11th international conference on communication technology proceedings”,2008

[5]. A. Lewalski, Ebrahimi, “Sensor Telemetry Using Bluetooth Technology”, International Journal of Electrical & Computer Sciences IJECS- IJENS Vol : 10 No : 04, august, 2010. IEEE Journal on Selected Areas of Communications, Vol. 17, pp. 1205- 1211.

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