

Technique for Detecting, Measuring & Comparing Bio Signals

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Abstract

This paper describes a matlab based data comparing system to record various bio-signals for data acquisition and comparing applications. The system consists of detection of bio-signal and comparison of it. Platform used in this system is MATLAB R2009b. The data acquired through this system is in digital numerical and GUI form which can be easily stored (PC) and compared. In this data analysis comparison is also done considering two categories of people i.e. healthy person and non-healthy person. The data of two individuals would be recorded and will be measured and compared, and on the conclusion of both the result would be recorded.

Keywords: Data processing, MATLAB R2009b, data comparison and analysis, EMG, EEG, Heart rate, Body temperature

1. INTRODUCTION:

Bio signal is a chemical or physical signal that characterizes the property or state of human biological. The signal source could be at the molecular level, cell level, or a systemic or organ level. A wide variety of such signals are commonly encountered in the clinic, research laboratory, and sometimes even at home. Examples include the electrocardiogram (ECG), electroencephalogram (EEG) etc. They are all signals that are produced by organs within a body. Biological signals are caused by mechanical, chemical or electrical activities. Detection is done by applying various science and engineering principles and modalities to determine or measure these quantities. Bio signal detection is a procedure by which we can determine or measure these

quantities. Our project consists on detection of a signal, device for its measurement and its numerical and graphical analysis.

1.1 Importance of bio signal:

Clinically, biomedical signals are primarily acquired for monitoring (detecting) specific pathological/physiological states for purposes of diagnosis and evaluating therapy. In some cases of basic research, they are also used for decoding and eventual modeling of specific biological systems. Furthermore, current technology allows the acquisition of multiple channels of these signals. This brings up additional signal-processing challenges to quantify physiologically meaningful interactions among these channels.

Types of bio signals:-

1. Electrocardiogram signals (ECG)
2. Electromyogram signals (EMG)
3. Electroencephalogram signal (EEG)

1.2 Survey:

Bio signal based systems are needed that are reliable, not affected by various factors and easy to use. Example-System which can give numerical and graphical values to justify the living organism condition. The potential to employ bio signal based technology exist for a large market of user varying from the severely disabled, non disabled and pets. Finding physical condition of a living organism requires various tests or is done with guesses. Invasive technique are not preferred and many are time consuming or expensive. Other handy condition detection techniques are rarely present.

2. SYSTEM ARCHITECTURE:

The main components of the system consist of many subparts, which are as follow;

2.1 Bio Medical Sensors:

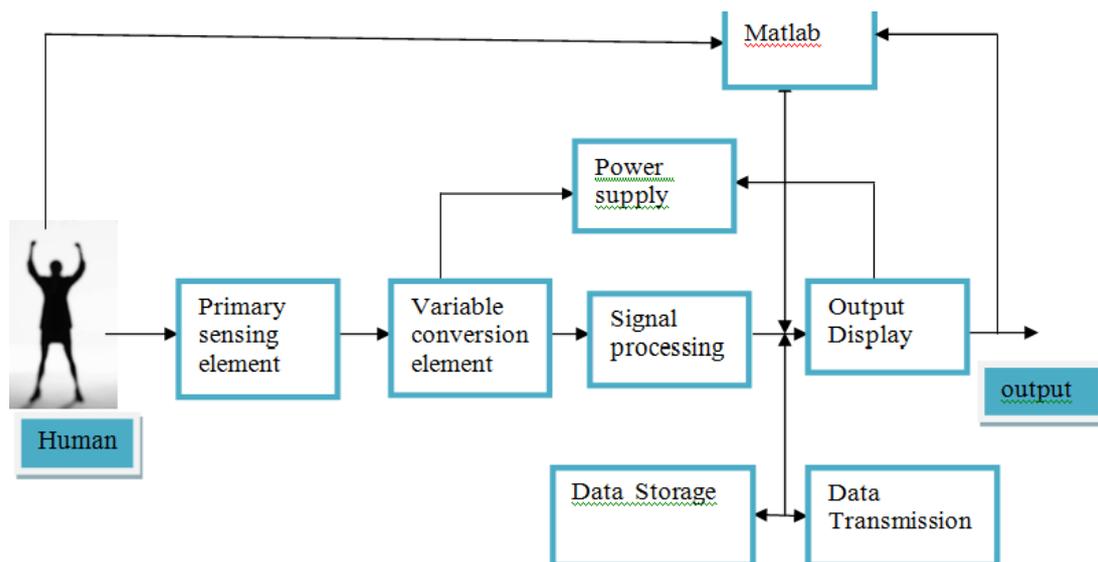
The sensors used are various bio-signal sensitive sensors. All sensors used are externally placed on surface of skin for collection of signals. The sensors used are as per the basic rating or as per the basic requirements .bellow table [1] shows the list of the sensors used;

Table-1: Type of Sensors used

Sensors information		
Type of sensor	quantity	Use of sensor
Heart rate sensor	1	To count the pulse of the heart.
Temperature sensor (LM325)	1	To measure the temperature of the body.
EMG sensors	3	To detect the vibration senses of the muscles.
EEG sensors	3	To detect the condition of the heart.

2.2 Software platform:

The software platform use for the processing and data analysis is MATLAB R2009b. The MATLAB is a low cost and very easy to access. MATLAB can be interfaced with various sensors such as ECG, EMG, EEG etc. It is software that helps people of all ages to compute and learn how to build various applications. MATLAB not only represent data in graphical form but also represents it in digital form. We can do various stimulations using this software.



3. DESCRIPTION:

Above fig [1] shows block diagram of .Here we have used a 8-bit AVR Microcontroller with 32k bytes In-system programmable flash. We have preferred this microcontroller because it has advance RISC Architecture, high performance and low

power. The sensors placed on the human body like EMG, ECG etc, senses the motion, beats, temperature etc and gives it to the signal conditioning circuit. in this circuit the signal is processed and been made in proper format to give it to the platform. For monitoring this all process and for displaying the result in GUI as well as numerical for, MATLAB software is used. The data is stored and is plot at every time moment and also tells the status of the person that is the person normal or unhealthy. Bellow Chart [1] shows chart of ECG and Heart rate.

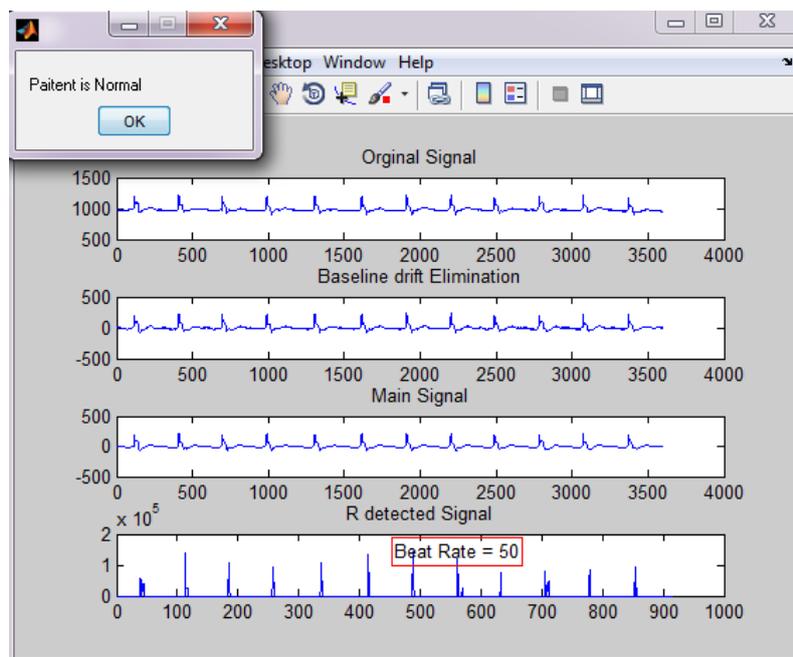


Chart 1: ECG and Heart rate of normal person

4. CONCLUSIONS:

In survey we found that the ECG, EMG etc signals where taken by invasive technique which was very harmful most of the time, so according to the survey we conclude that our system which is based on non-invasive technique of detection, measuring and comparing the bio-signal if more reliable than the older once. This system has greater scope in future and can be further developed.

5. ACKNOWLEDGEMENTS:

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