ISSN: 0975-766X
CODEN: IJPTFI
Available Online through *Research Article*
www.ijptonline.com

A REAL TIME SETUP FOR ACQUISITION OF ECG DATA

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Received on: 10.08.2016 *Accepted on: 06.09.2016*

Abstract:

The cardiogram (ECG) is a vital diagnostic tool that live and record the electrical activity of the center. a large vary of heart conditions may be detected once decoding the recorded graphical record signals. These qualities build the graphical record an ideal instrument for patient watching and management. The ordinarily used ECG-machine used for designation and management at this is pricey and stationary. The aim of this project is to develop wireless ECG system to monitor the heart condition of human and access via zigbee. Wireless patient watching has become a well-versed technology and a natural step during this progress is to develop a reliable graphical record system that contributes to the cable reduction in medical and physiatrics environments. Here a traditional kit is employed to record ECG of an individual. In extra a zigbee is employed to transmit the measured graphical record to portable computer. By exploitation matlab code signal is extracted.

1. Introduction

ECG means that Electro Cardio Gram that shows electrical activity of an individual's heart. graphical record is graphical illustration of heart beat. graphical record signal identifies the abnormal traditional conditions of the center. cardiograph measures the heartbeat electrical potential.AN graphical record is may outlined as a recording of the electrical activity of the center and it's bestowed as a continual strip chart .The graphical record is that the essential tool in viscus electrophysiology for analyzing and designation of vas diseases.Normally graphical record is of low amplitude signal. It contains low amplitude at high amplitude offsets and noise. ECG frequency is in Hz range. It consists noise vary of 50-60Hz. ECG voltage is in 0.5mv vary that is obtained from conductor. ECG might also contain the high offset voltages owing to 0.5 cell potential of conductor.

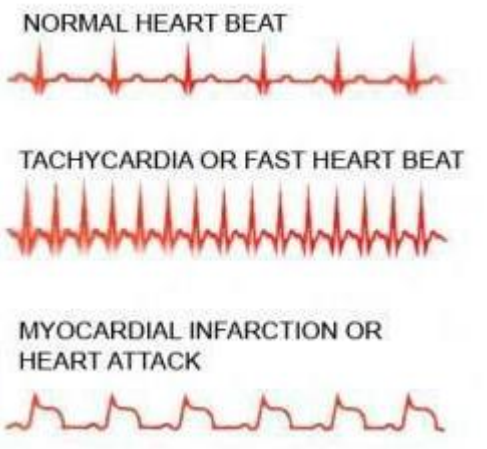
ECG helps in designation of some abnormal conditions like arrhythmias, carditis, enlargement of the center etc. principally it's utilized in abnormal heartbeats. Heartbeat is of 3 varieties

1) Normal heartbeat.

2) Tachycardia or quick heartbeat.

3) Myocardial infraction or heart attack.

Normal heartbeat rate is take issue from age and additionally take issue from male and feminine. for kids heartbeat is additional once compare to adults. Heartbeat is weakened once age grows on and traditional beat for ma is 60-100 BPM. Representation of various sorts of heartbeat are



Average Age	***Normal rate 50-85%***	***Heart Rate, 100%***
55 years	83-140 beats per minute	per 165 beats per minute
60 years	80-136 beats per minute	per 160 beats per minute
65 years	78-132 beats per minute	per 155 beats per minute
70 years	75-128 beats per minute	per 150 beats per minute
2-4 years	80-120 beats per minute	per 100 beats per minute
5-6 years	75-125 beats per second	per 100 beats per minute

Components:

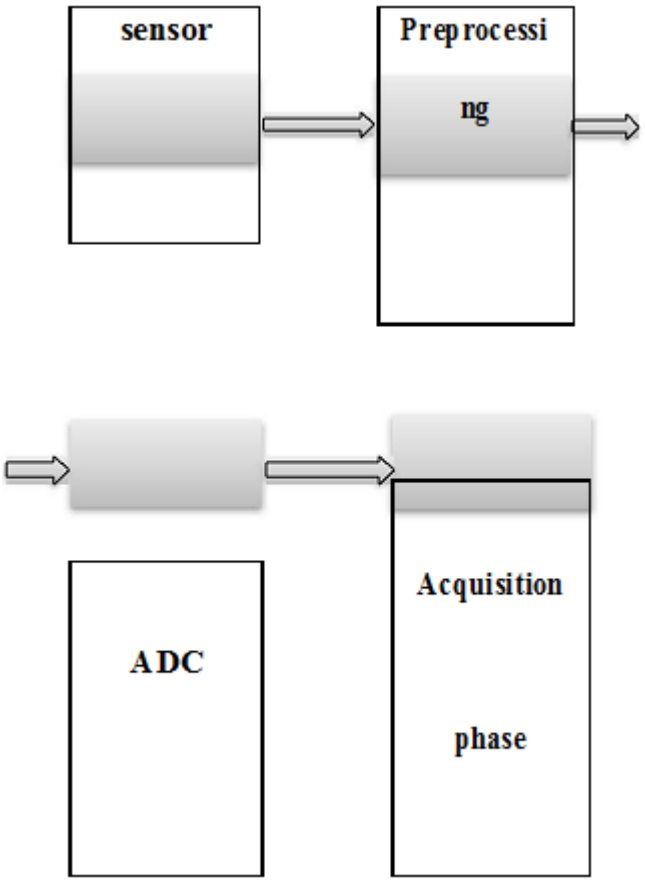
Kit consists of mainly four blocks

1) ECG sensor

2) Preprocessing

3) Analog to Digital converter

4) Acquisition phase



The ECG signal is perceived by sensing element and it's fed to preprocessing board during which signal undergoes some operation like amplification. ensuing block is ADC device during which analog signal is reborn into digital signal. In acquisition part the graphical record signal is taken and processed. Now digital signal is transmitted to a portable computer employing a wireless communication i.e., zigbee module. In the reception half the received signal is extracted by matlab code using wavelet transform.

Ecg Sensor

The ECG sensor consists of electrodes. It is composed of plastic substrate which is covered with silver or silver chloride

ionic material. Electrode is formed with an electrolyte gel in the gel cl- anion is present. Cl- ions are used because on skin topmost layer excess of chloride are present in the form of precipitate. When the electrode is placed on human body the silver ions on it is oxidized into solution by silver which is present on electrode. So the cl- ions that are present in electrode reacts with silver solution and forms agcl. As the silver chloride is less soluble in water it precipitates from the solution to silver electrode and it leads to agcl deposition. Using chemical conversion or electrolyte method sensor are converted silver into silver chloride. Ionic activity in the cells create electric potential on the skin of human body. ECG signal is origined from the excitable cells of the heart. In this way an ECG sensor performed.

Pre Processing*:*

According to the automatic analysis and depressing high frequency interference of the cardiogram signals, this paper applies low-pass filter to preprocess cardiogram signals, and proposes a QRS complicated detection technique supported riffle rework, that takes advantage of Marr riffle to decompose and filter the cardiogram signals with Mallat rule, mistreatment the connection between riffle rework and signal singularity to find QRS complicated with amplitude threshold technique in scale three, and to find P wave and R wave in scale four. Meanwhile, compositive detection technique is employed for re-detection, so to up the detection accuracy quantitative relation. At last, records from cardiogram information of MIT/BIH that is wide accepted within the world square measure accustomed take a look at the rule. and therefore the result shows that correction police investigation quantitative relation below this rule has been quite ninety nine.8 percent. The detection technique during this paper is straightforward and running quick, and is simple to be completed within the time period police investigation system mistreatment for clinical diagnosing.

Analog To Digital Converter:

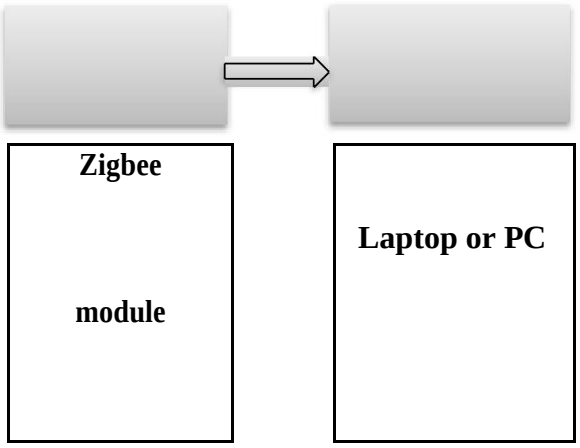
ADC analog front end is constructed by discrete components from the different semiconductor. Delta-sigma converters ar familiar to allow terribly high-resolution performance exploitation oversampling and noise-shaping principles. By scrutiny Figure one and Figure a pair of, it may be seen that there's a major reduction in hardware within the later diagram. this means lower price, size and power. 3 blocks are eliminated. Delta-sigma ADCs additionally considerably relax the anti-aliasing necessities before the ADC. The sophisticated active anti-aliasing filters, that might need many amplifiers to implement, may be replaced by a straightforward, single-pole RC filter. The DC interference high-pass filter is eliminated similarly, as a result of the inherent noise of the ADC is considerably below the previous resolution.

during this manner, the DC data isn't lost, and therefore the numerous filters can even be enforced digitally. Digital filter implementation additionally offers the designer flexibility to use adjustive DC removal filters for overall quicker response and higher and higher rejection of baseline wandering. One example of a face exploitation the design shown in Figure a pair of is that the ADS1298 from Texas Instruments. This device provides a low-power single-chip resolution for the whole analog front-end. It uses cooccurring sampling low-power delta-sigma converters to attain the breakthrough combination of size and power, that is essential for transportable ECG/EEG applications.

Acquisition phase:

In acquisition phase raspberry pi board is used. In the this stage the feature extraction is implemented and it is transferred to the laptop via zigbee. Raspberry Pi may be a single board. Raspberry Pi hardware has low-level interfaces meant to attach directly with external devices like A/D converters, sensors, motor drivers, etc. you'll profit of those low-level interfaces to develop pregnant real-world applications. The Raspberry Pi support package includes MATLAB command-line interfaces to speak with external devices connected to Raspberry Pi hardware. It can, as an example, flip a junction rectifier connected to 1 of the GPIO pins on or off or sense the position of a electric switch from the MATLAB prompt.

Most of the low-level interfaces of Raspberry Pi hardware aren't plug-and-play. To use these low-level interfaces, you need to have a sound understanding of basic electrical ideas. If you mis-wire a GPIO pin, as an example,you risk losing a GPIO pin, and, in some cases, your Raspberry Pi hardware.This example is meant to inform you with low level interfaces of the Raspberry Pi hardware, establish sound practices for wiring and connections once operating with external electrical elements and use MATLAB command-line interface for Raspberry Pi hardware to manage straightforward devices like LEDs, push buttons, and relays.



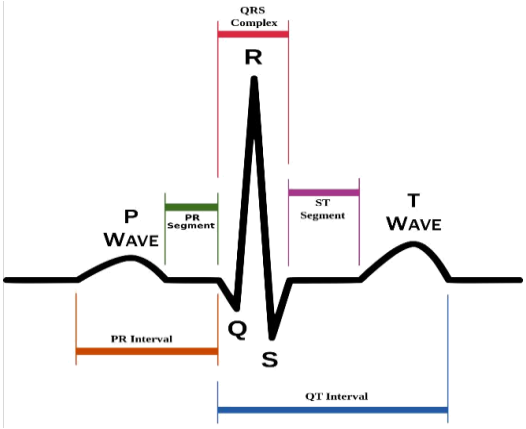
Reception Phase

By exploitation this sort of kit the complications that area unit in traditional may be decreased. sensor used here is simpler compare to existing one. In order that an individual will feel comfy and additional over versatile. Graphical Representation of ECG:

Here P and T represents waves. Q,R,S forma a peak point like triangle. P wave represents the atrial depolarization. QRS complex represents ventricular depolarization, T wave represents ventricular repolarization.

Ventricular depolarization delay portion shows the blocking of blood to flow into ventricles from atria. It happens due to contraction of atria and ventricular at the same time.

Ventricular repolarization means restoration of originality that occurred during ventricular depolarization.



Conclusion

As we know that the existing ECG system is somewhat complicated so a flexible and simpler ECG kit should be developed. From the above following we know that ECG system is simpler and flexible. In addition to this raspberry pi board is used so the system is more reliable and accurate.

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