A Review on Affordable ECG Monitoring And Report Generating System Using Smart Devices

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Abstract-: In 21st century life style of human being is changes day by day. It reflect on human body. Due to this Cardiovascular disease has become the leading cause of death worldwide. This disease is the most challenging problem for detection or identification in early stages of patients. ECG analysers have proved out to be very useful in the analysis of human heart beat and subsequently diagnosis of various human cardiovascular diseases. In this paper a virtual patient is proposed, which creates a real environment for the analysis of ECG analysers by generating real time ECG signals from the database of real acquired data, by making use of simple Microcontroller. In this paper, we study various existing ECG analyser makers.

Keywords: Electrocardiogram (ECG); Low cost ECG signal generator circuit; heart disease detection

I. INTRODUCTION

At present high rate of heart diseases is facing in the world. This has become the leading cause of death, and World Health Organization (WHO) says that more than 17 million people die annually from cardiovascular disease. The Global Hearts, a new initiative fair from WHO, as it aims to beat back the global measures threat of cardiovascular disease, including heart attacks and stocks to people living in countries with limited resources or in low-income groups. [1]. Most of the low and middle income peoples die from heart attacks and strokes in the world. This death rate can be minimized to a large extent by early detection of the symptoms of cardiovascular diseases. The different type of cardiovascular diseases diagnosis based on the ECG pattern. The cardiovascular diseases are Congestive Heart Failure, Coronary Artery Disease, Heart Attack, Cardiac Dysrhythmia , Ventricular Fibrillation, Tachycardia, Angina, Arthrosclerosis and so many cardiovascular diseases. In 1901, Willem Einthoven was invented an ECG machine by a string galvanometer to measure ECG and assigned letters P, Q, R, S and T Now a days medical science still shows clear results for diagnosis. The processing methods require real time for the diagnosis of cardiac diseases accurately. The ECG wave shape of the cardiac cycle is accounted with high energy concentration in QRS complex and low energy concentration in T wave and U wave. This two wave (T and U) is normally invisible in 50 to 75 percent of ECGs [2]

II. LITERATURE SURVEY

The typical system for detecting heart disease or cardiovascular diseases of a person is to diagnosis into the pathology center and take ECG signal for testing. Some research works have already made different ways out to minimize their sufferings. According to that a home

based cardiac monitoring system is proposed [3]. They have established an electrocardiogram (ECG) beat detector which is configured by the PDA version of Personal Health Information Management System. The system is designed in such a way that it should be used in a home environment. But the proposed system can be used anywhere. Continuous and real time monitoring of users cardiac condition is also introduced [4]. It has 3 main components; a disposable electrode, a controller, and personal gateway (e.g., cellular phone, PDA, and smart phone, etc.). They develop a monitoring ECG system where the patients have none of their own smartphone. Gimenez et al. developed a Lifestyle Change Supporting System (LCSS) for Integral community cardiac rehabilitation based on technological platforms [5].

III.   PROBLEM STATEMENT

To develop an ECG signal generator at very low cost for the patients who can receive his/her ECG signal and detect the probability of cardiovascular diseases instantly. This ECG signal is transmitted via Bluetooth/Wi-Fi/Zigbee module to smart device with support software simulation where feature extraction and detection algorithm is setup for cardiovascular disease. The typical system for detecting heart disease or cardiovascular diseases of a person is to diagnosis into the pathology center and take ECG signal for testing. Some research works have already made different ways out to minimize their sufferings. According to that a home based cardiac monitoring system is proposed. They have established an electrocardiogram (ECG) beat detector which is configured by the PDA version of Personal Health Information Management System.

Objective of System:

To contribute to bring under control heart diseases.

2. To detect the diseases of a person itself with its feature extraction and disease detection algorithm without using the internet.

3. To make a low cost ECG signal generator circuit to get real time detection of heart diseases

IV.   Algorithm

Algorithm: Feature Extraction and Detection

Step 1: Get raw ECG signal.

Step 2: Filtered of ECG noisy signal by using FFT/ FIR filter to remove of noise.

Step 3: Detection of R-R interval from filtered ECG signal to measure of heart rate (HRM).

Step 4: Apply proposed threshold on ECG signal.

Step 5: The peak of R waves is detect after filtering using threshold (T). Absolute and square are two common used rectification methods. So we can detected R wave.

Step 6: Repeat procedures for HRM.

Input: The sampling rate must chosen into the proposed system. The low sampling frequency may produce variation of estimate R wave.

Step 7: Calculate RR interval gives the heart rate in beats per minutes.

V.   PROPOSOSED APPROACH

To develop an ECG signal generator at very low cost for the patients who can receive his/her ECG signal and detect the probability of cardiovascular diseases instantly. This ECG signal is transmitted via Bluetooth module to smart device with support software simulation where feature extraction and detection algorithm is setup for cardiovascular disease. This network can be connected with the doctors and hospitals to get the fastest treatment.
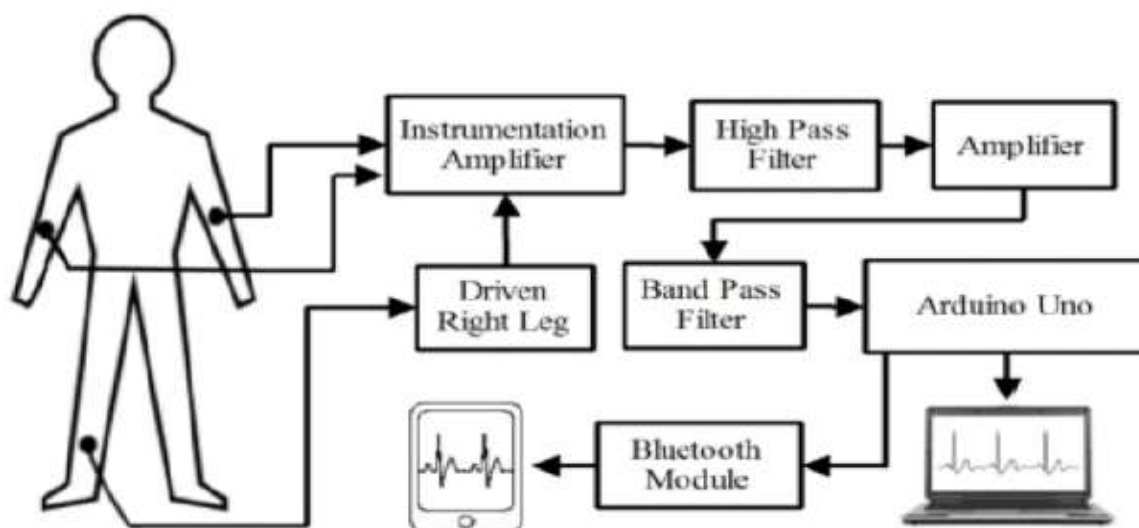
Fig: 1-System Architecture

The proposed system uses three electrodes which are placed on different points on the patient's body; leg, wrist and ankle These electrodes measure small potential difference between these points which are usually 1mV peak to peak .These electrodes get raw ECG signal with time varying example.

CONCUSION

This research work proposes a low cost portable ECG wireless system and feature extraction and cardiovascular disease detection algorithm. The system design consists of a portable ECG signal generator circuit, a data transfer device and a smart device. Someone can easily check the possibility of any heart disease using this system. The advantages of this system could be useful before, during, and after a cardiac arrest for real time monitoring of a patient at any place. Proposed System is more efficient and low cost as compare to existing system.

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