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Enhancement in Monitoring Patients Health,

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ABSTRACT

We propose the design and model for monitoring the health condition wirelessly. Our focus is mainly on the Electrocardiogram and temprature. By using this model we can detect the heart disease earlier. Mostly the optical sensors are used for analyzing heart rate. Our method uses a mobile which will get the data from electrodes for measuring the heart beat. By using the app the input received from the electrode is processed . We will be using the micocontroller for processing . It will also obtain the temprature using the sensor. The final outcome shows that our model will provide accurate result and it will be one of the economically benefitable prototype .The location as well as the current status of the patient can be tracked remotely.

Keywords: ECG, Audrino ,Health monitoring , Mobile Application

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INTRODUCTION

Mobile phones are used worldwide to monitor the health of the patient. It is easy to handle and the time taken for initial checkup will be reduced. Due to increase in the cost of healthcare many of them will not get a quality health checkup. By analyzing the health using mobile phone we can able to reduce the cost. Z.A.khan and W.Sohn[1] proposed a method for monitoring the elder people , by which we can able to monitor the heart rate , Depending upon the outcome an alert message is passed to the doctor. In many countries certain diseases are the major cause for the sudden death among elderly people. The heart disease plays a major role on that. It is not easy for the patients who are living in a rural area to diagnose their health periodically, Because they need to spend lot on transport , medical checkup and consulting fees. Sometimes their health condition will not permit them to travel that much large distance. It is also not possible for them to stay in the hospital for a long period of time because of the cost and their regular activities. The doctors can analyze the health condition of the patient by analyzing the report that is received from remote devices. In some situation an alert message or an alert call can help the doctor to find out the severity of the disease. Guidoux et al[2] proposed a method to estimate the day to day activities of the patient using mobile phone devices. Wearable devices play a major role in detecting the health condition of the patient remotely. Both the doctors and the patients can regularly monitor the health condition . Many Research is going on related to cardiac disease and how they can be identified earlier. Our proposed system will minimize the size of the processing system and to make it an economically affordable product.

RELATED WORKS

The increase in use of smart mobile phones has resulted in several enhancement in medical science for monitoring the health. The number of smart phone user increases every year with a higher percentage, because of the low cost smart mobile phone. H.H.Dai et al [3] describes that by using GPS technology in the mobile and current ECG details of the patient can be extracted. G.Andreoni et al[4] proposed a methodology for monitoring the heart beat using the wearable monitoring system. S.D.Min et al[5] proposed a method for finding the respiration rate with an ultrasonic sensor without any contact. The information about the wave is extracted by means of pwave other algorithms. H.C.Lee et al[6] describes a method for extracting ECG signal. C.Thanawattano et al[7] proposed a wearable model for continuously monitoring the signal that is produced by ECG. Kajendran .K and Pravin .A[8] proposed a novel technique in video analytics for finding the abnormal activity that can be performed by the person and reporting it immediately by sending alert. K.Pradeep and T.Prem Jacob[9] proposed an approach for task scheduling in cloud environment. Ramya Durga .G and Pravin .A[10] proposed an approach for finding out the moving objects and reporting. Yu.M.Chi and Cauwen bergths [11] proposed electrodes for sensing the body without contact and how optimized power consumption can be achieved. Luo Yudong et al[12] designed a radial pulse sensor for monitoring. L.Wang et al[13] used different categories of sensors for different set of model ,so that it can able to detect the possible actions.

Shaad Mahumd et al[14] proposed an approach for monitoring the patient using mobile phone and alert mechanism is also used by them. Media Aminian and Hamid Reza Naji[15] proposed an approach that monitor the heart rate, blood pressure and other details using the framework continuously, Better performance is achieved and the other factor is the energy consumption. Genghuang Yang et al[16] proposed a method for collecting the data and they have used the bluetooth technology for transmission, processing is performed and based on that further suggestion is provided. Md.Shaad Mahumd et al[17] described a framework in which the size of the entire hardware components that can be used for receiving and conversion is reduced and attached to the mobile.

PROPOSED METHOD

Overview

The existing systems will be larger in size and high cost. The electrodes and the gel that can be used to provide the contact between the skin and the electrode may cause some set of discomfort if the heart rate is to be measured periodically. The silver contact electrodes will be a better option to provide comfort to the patient.

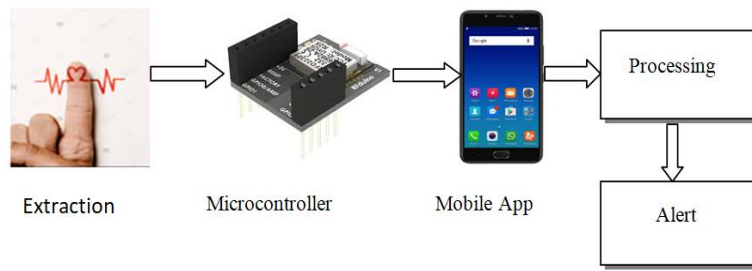


Figure 1: Architectural Diagram

The figure 1 explains the entire architectural process. The analog signal that is received from the patient to be converted digitally and the conversion is done by microcontroller called as RFduino. The accuracy can be improved by using the noise reduction facility that is available in the device. For performing filtering as well as amplifying the active components will be used to reduce the power consumption. The input will be sent to the mobile phone and the application will be used to find out the heart rate range and the other factors and the output will be displayed. The waveform will be displayed on the mobile and if there is any deviation that will be sent as an alert to the care takers through the GSM module and immediate action can be taken. The temperature sensor is used for temperature measurement of the human body. Depending upon the output received from the temperature sensor we can be able to know the current body temperature, whether it is normal body temperature or there is an increase in the body temperature. The figure 2 listed by Prasan Kumar Sahoo et al[18] gives a clear view about the normal and the abnormality in ECG.

Conversion Mechanism

The RFduino can use Arduino for coding. The logic is derived so that the corresponding operation can be performed. RFduino is supplied with 3V and it is well suited for application with low power consumption and where the size of the wearable device is less.

Algorithm

The process is initiated as shown in the figure 2 and the input analog signal is gathered from the patient through the electrode is filtered and it is converted in to digital signals by the ADC module. The comparison is done with the threshold that is calculated. The ECG signal is collected by the RFduino. Certain condition is checked to verify whether the signal is greater the value that is set and as well as the threshold value.

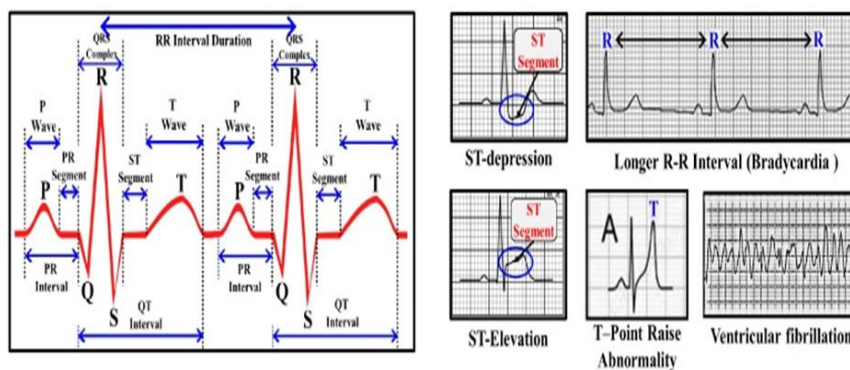


Figure 2: Normal and Abnormal ECG

Then the corresponding process is performed for both the condition and the data will be sent through the GSM module and then the suggestion will also be displayed in the application. The alert will reach the appropriate person to proceed with the further action in time.

Temperature

The temperature sensor is used for temperature measurement of the human body. Depending upon the output received from the temperature sensor we can be able to know the current body temperature, whether it is normal body temperature or there is an increase in the body temperature

Application

An Android app is developed to extract and to show the data. The signals can be converted into graph by using the application. Depends upon the signal that is obtained the application can guide the patient as well as the doctor with the detailed information related to that. An alert message will be sent to the concern. The destination of the alert message will be based on the contact information and it can be modified according to the change in the care takers and Doctors. And depends upon the result a set of solutions can be provided by the application. It will provide a guidance to the patient in terms of deciding what to do and whether immediate action to be taken.

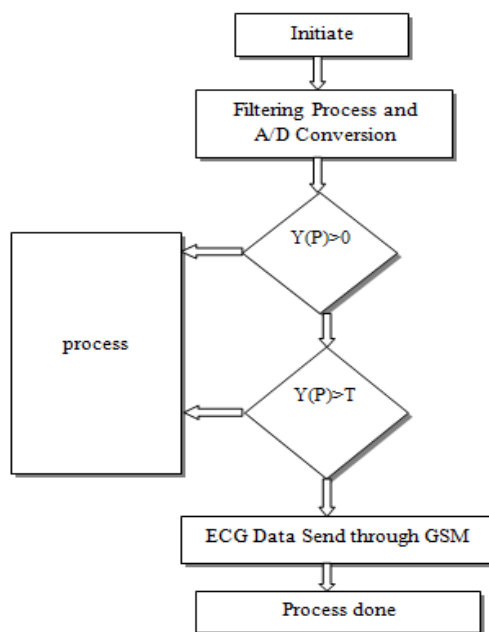


Figure 3: Flow Diagram

RESULT

The process is done by placing the electrode and the health condition can be monitored easily. Depending upon the different peak values the health condition is diagnosed. There will not be any major change in the result obtained if the electrode is placed in different fingers. The dry electrode is not fit for continuous assessment. Rusting may happen if the copper electrode is overused.

In the table 1 the transmission details of alert message is given, it gives a description about the approximate time taken for delivering the message. The conditions of the patient in which the alert message is to be sent to the hospital and other caretakers is also given in the table. The patient health is monitored continuously and the doctors are aware of the status at each and every time interval. The better results are achieved by using silver electrode. The major benefit of the entire framework is saving the life. The use of sensing mechanism can help in monitoring the status of the patient and will inform about the severity, will also guide the patients in taking a decision at the critical condition. The information will also help the hospital to get ready with all the procedures for the treatment by knowing the current condition of the patient.

Table 1: Transmission of Alert Message

Conditions	Indications	Time Duration
Heart Rate Increases	Alert message	28sec
Decrease in Heart Rate	Alert message	29sec
Increase in BP	Alert message	30sec
Low Blood Pressure	Alert message	29sec

CONCLUSION

In this paper we have presented a prototype that will be economically benefitable. The prototype will be very easy to handle, So that the patient will not be panic. The size of the entire system is reduced and the accuracy is also improved . The new set of electrodes will provide a better result . Finally the alert mechanism will help the doctors to save the patients.

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