Walking Stick with Heart Attack Detection

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Abstract: After a heart attack, the initial not many hours are basic in saving a significant part of the withering heart muscle which are keeping because of need from oxygen supply and forestalling lasting heart harm. The indications fluctuate from one individual to another and the most widely recognized justification basic deferrals is clinical treatment shows restraint ignorance and absence of early notice. It is feasible to distinguish the beginning of a coronary episode and educate the specialist or individual concerned. By embedding a chip into the body, the patient need not stress over gadget activity. The patient might be needed to convey a PDA outfitted with Bluetooth and GPS. When the embedded chip distinguishes a respiratory failure, it will caution the phone which thus will naturally call for help and give the patient's area. Hence it helps in giving early respiratory failure identification so the patient can stand out enough to be noticed inside the initial not many basic hours. It comprises of four fundamental sub activities ECG Circuit, Analysis Algorithm, GPS module, GSM module , Heart Bit sensor and microcontroller .The microcontroller on the stick runs a heart attack algorithm. Warning is given out to the person about his heart condition. The emergency calling system calls for medical help at the moment of heart attack. The effectiveness of the proposed method is confirmed by experiments on a commercially available walking stick. The proposed Walking Stick with Heart Attack Detection is cost effective and can save the lives of millions of old people by helping them in getting the earliest medical help in the condition of heart attack.

Keywords: Pic microcontroller, ECG Circuit , GSM Module , GPS Module, Heart Bit Sensor.

I. INTRODUCTION

Cardiovascular disease is one of the main causes of death in many countries and thus it accounts for the over 15 million deaths worldwide. In addition, several million people are disabled by cardiovascular disease. There is delay between the first symptom of any cardiac ailment and the call for medical help has a large variation among different patients and can have tremendous consequences. One critical result taken from epidemiological data is that deployment of resources for early detection and treatment of heart disease has a higher potential of reducing fatality associated with cardiac disease than improved care after hospitalization. Here new strategies are needed considering the order to reduce time before treatment. Monitoring of patients is one possible solution. Also, the trend towards an independent lifestyle has also incremented the demand for personalized non-hospital based care. Cardiovascular disease has shown that heart beat rate plays a key role in the risk of heart attack. Heart disease such as heart attack, coronary heart disease, congestive heart failure, and congenital heart disease is the leading cause of death for men and women in many countries. Most of the time, heart disease problems harm the aged person. Very frequently, they live with their own and no one is willing to monitor them for 24 hours a day. In this proposed device, the heart beat of patients are measured by using sensors as analog data, later it is converted into digital data using analog to digital converter because it is suitable for wireless transmission using SMS messages through GSM modem. Micro controller device is used for temporary storage of the data used for transmission.If a patient is already diagnosed with fatal heart disease, their heart rate condition has to be monitored continuously. This project proposes and focuses on the design of the intelligent heartbeat monitor that is able to monitor the heart beat rate condition of patient continuously. This signal is processed using the microcontroller to determine the heart beat rate per minute. Then, it sends SMS alert to the mobile phone of medical experts or patient's family members, or their relatives about the condition of the patient and abnormal details via SMS. Thus, doctors can monitor and diagnose the patient's condition continuously and could suggest earlier precaution for the patients themselves. This will also alert the family members to quickly for to rescue the patient

II. Literature Survey

After referring many available research papers, some of the related paper that we were referred are given below

Prof. Suvarna bhise ; abhilashkurhade ; krupesg shetty ; mukund sonawane; omkar desai.- This work proposes and centers around the heartbeat observing and ready framework that can screen the heart beat rate state of patient. The framework decides the heart beat rate every moment and afterward sends short message administration (SMS) caution to the versatile telephone of clinical specialists or patient's relatives, or on the other hand their family members through SMS. Hence, specialists can screen also, analyze the patient's condition constantly and could propose prior safeguard for the

patients themselves. This will likewise make the relatives aware of promptly take care of the patient. This framework is cost viable and easy to use and hence its utilization isn't limited or restricted to any class of clients. It is a very productive framework additionally exceptionally simple to deal with and hence gives incredible adaptability and fills in as an extraordinary improvement over other customary observing and ready frameworks.

Priyanga v, anshish christo, krithiga, murugavel, shveth sethil kumar - The strolling stay with cardiovascular failure location capacities have been planned in general. ECG waves were appropriately gathered from simple hardware unit utilizing an ECG module. The main improvement was the crisis calling part utilizing the GSM module which is far additional effective than utilizing a Bluetooth module. Conceivable future upgrades are better bundling of the wrist hardware, lower power utilization for fundamental units, more normal media as opposed to simply strolling sticks, more limited postponement between respiratory failure location and more exact and quicker heart assault calculation.

Jigar daki - The Walking Stick with Heart Attack Detection works as planned in general. ECG waves appropriately gathered from simple hardware unit. The sending and getting of A/D changed over waveform proceeded true to form. The most huge improvement was the crisis calling part. We effectively erased the PC between Bluetooth module and the cell phone when enacting crisis calling. The remote coronary failure indicator catches unusual heart beat signals. The ready framework on the strolling stick cautions the client to understand his ailment. Remote crisis calling framework calls for help right now of coronary failure by means of cell phone. Electrocardiogram (ECG) signal sent remotely from the wrist to the fundamental unit on the stick. This evades the bother of the connection of the adhere to the wrists. Programmed remote crisis calling framework. The beneficiary on the stick gets the advanced ECG signal, and the microcontroller runs a coronary failure calculation to recognize conceivable coronary failure indications. In the event that any indication of coronary episode is distinguished, the danger level ascents. At the point when the danger level reaches up to the crisis mode, through gsmmodule call 108 for clinical assistance. By utilizing GPS module capacity can find the client. Conceivable future enhancements are better bundling of the wrist hardware, lower power utilization for fundamental units, more normal media instead of simply strolling sticks, more limited postponement between cardiovascular failure location and crisis calling by means of wireless, and more exact and quicker heart assault calculation.

III. Proposed System

It is able to monitor the heart beat rate condition of patient continuously. This signal is processed using the microcontroller to determine the heart beat rate per minute. Then, it sends short message service (SMS) alert to the mobile phone of medical experts or patient's family members, or their relatives about the condition of the patient and abnormal details via SMS. Thus, doctors can monitor and diagnose the patient's condition continuously and could suggest earlier precaution for the patients themselves. This will also alert the family members to quickly for to rescue the patient

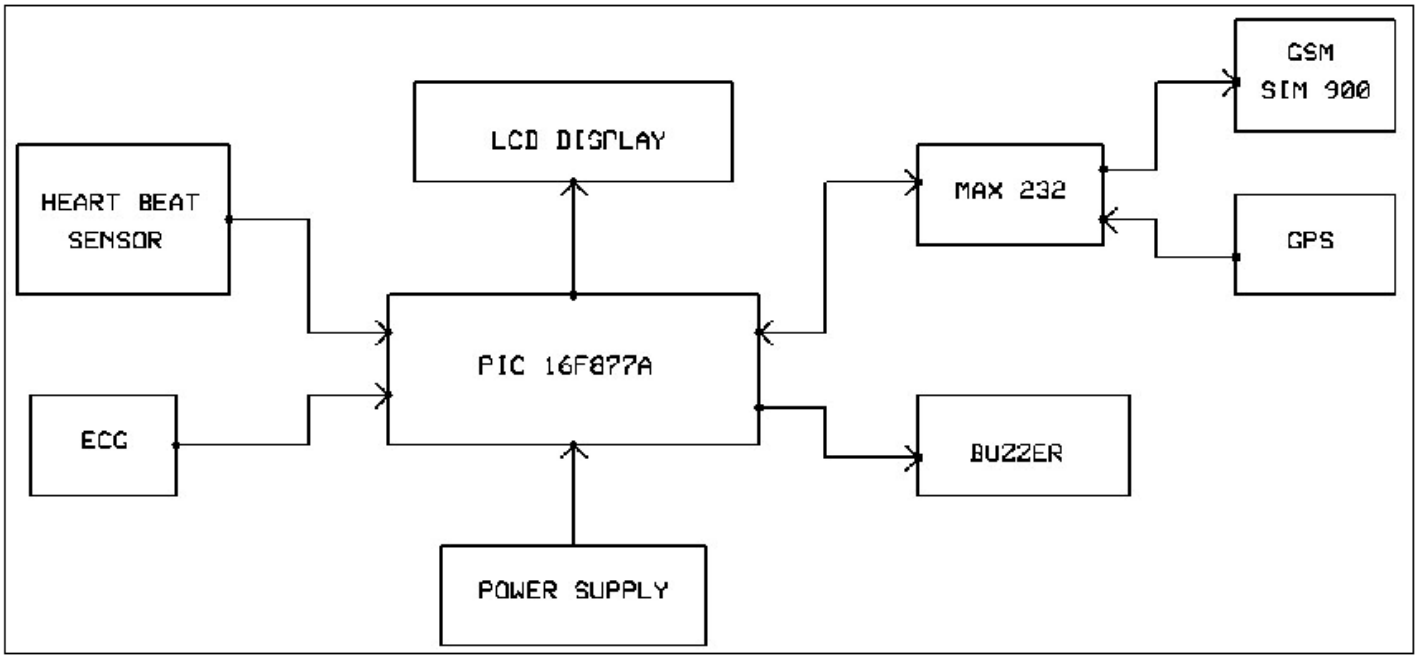

fig. block diagram

IV. System Description

To obtain a desired output, a correct algorithm is needed. There are following steps the algorithm consists of:

Step 1: Initial GPIO.

Step 2: Read ECG if true then read Hb else send SMS and GPS coordinates.

Step 3: Read Hb if true then return to main subroutine else send SMS and GPS coordinate.

Components:

A. PIC Microcontroller: The PIC microcontroller PIC 16f877a is one of the most renowned microcontrollers in the industry. This microcontroller is very convenient to use, the coding or programming of this controller is also easier. One of the main advantages is that it can be write-erase as many times as possible because it uses FLASH memory technology. It has a total number of 40 pins and there are 33 pins for input and output.

B. Bio- Sensors: Ag-AgCl ECG electrodes, we decided to use the same electrodes as our biosensors. The benefits of the electrodes include good electrical contact with human skin, low motion artifacts and strong adhesive quality to skin.

C. GSM Module: A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone .GSM (Global system for mobile) uses a process called circuit switching.

This method of communication allows a path to be established between two devices. Once the two devices are connected, a constant stream of digital data is relayed .GSM networks consist of thee major systems the Switching System (SS), The Base Station(BSS) and the Mobile station(MS).

D. Heart Beat Sensor: The heart beat comprises a light detector and a bright LED. The LED needs to be of super-bright intensity because maximum light passes and spreads if a finger placed on the LED is detected by the detector.When the heart pumps blood through the blood vessels, the finger becomes slightly more opaque; due to this, less amount of light reaches from the LED to the detector. With every heart pulse generated, the detector signal gets varied. The varied detector signal is converted into an electrical pulse. This electrical signal gets amplified and triggered through an amplifier which gives an output of +5V logic level signal. The output signal is also directed by a LED display that blinks on each heartbeat rate.

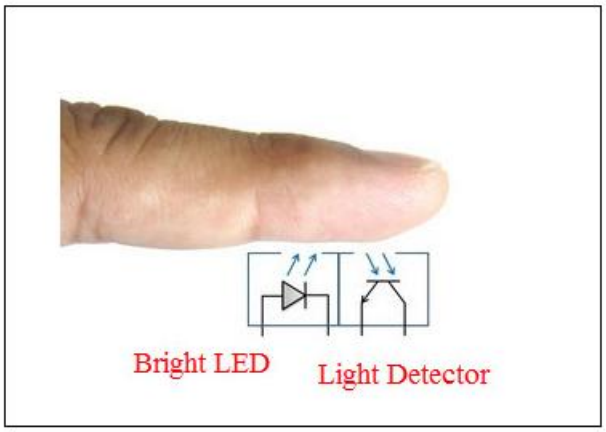

fig.Heart Beat Sensor

E. GPS Module:The Global Positioning System (GPS) is the solitary completely useful Global Navigation System (GNSS). The GPS utilizes a heavenly body of somewhere in the range of 24 and 32 Medium Earth Orbit satellites that send exact microwave flags that empower GPS recipients to decide their area, speed, heading, and time. A GPS beneficiary gets the signs from at any rate three satellites to figure distance and uses a triangulation method to

process its two measurement (scope and longitude) position or if nothing else four satellites to register its three measurement (scope, longitude and elevation) position.

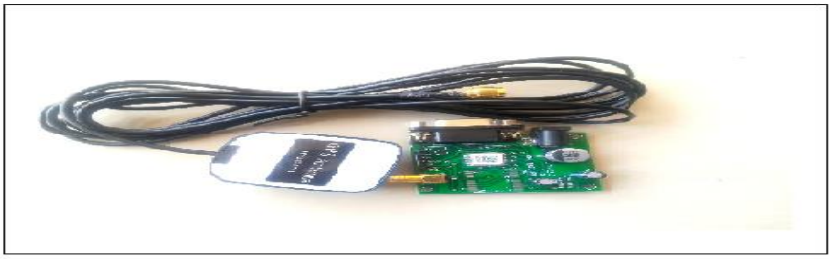

fig. GPS module

V. Conclusion

The Walking Stick with Heart Attack Detection functions as designed overall. ECG waves properly collected from analog circuitry unit. The transmitting and receiving of A/D converted waveform performed as expected. The most significant improvement was the emergency calling part. The mobile phone when activating emergency calling. The wireless heart attack detector captures abnormal heart beat signals. . The alert system on the walking stick warns the user to realize his health condition. Wireless emergency calling system calls for help at the moment of heart attack via mobile phone. Electrocardiogram (ECG) signal transmitted wirelessly from the wrist to the main unit on the stick. This avoids the inconvenience of the attachment of the stick to the wrists. Automatic wireless emergency calling system. The receiver on the stick receives the digital ECG signal, and the microcontroller runs a heart attack algorithm to detect possible heart attack symptoms. If any symptom of heart attack is detected, the risk level rises.

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