

# Intelligent Walking Stick with Heart Attack Detection

Prof. Suvarna Bhise, Abhilash Kurhade, Krupesh Shetty, Mukund Sonawane, Omkar Desai

Department of Electronics Engineering, Mumbai University/PVPPCOE, Mumbai, Maharashtra, India

## ABSTRACT

Heart attacks are tend to occur at any time at any place. A prototype of an automated electronic system with a popular 16-bit micro-controller Atmel 89S52 which detects the occurrence of heart attack and sends wireless plea for the emergency help. We have in this project, present a method which can identify an heart attack taking place. We have also described and discussed how an automated micro-controller based sub-system is activated soon after a heart attack is detected and given full details of how an automated microcontroller based subsystem is activated soon after an heart attack is detected and given full details of how it can send pre-recorded wireless messages to some selected and relevant individual for help and save the victims.

**Keywords:** ADC(Analog Digital Converter), GSM(Global System for Mobile), Photo transmitter, BPM(Beat per Minute).

## 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 [1]. 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 [1]. 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 (ADC) 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 [2]. 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 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.

## II. METHODOLOGY IMPLEMENTED

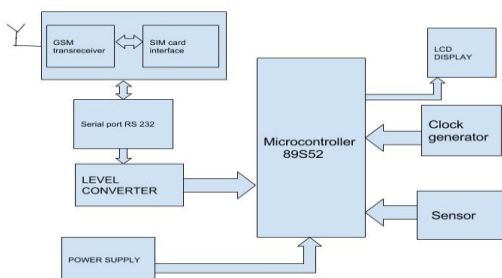
This work presents a lot of considerations and improvements that were incorporated in to the functionality of the device so as to reflect desired features such as cost, design complexity, size, software development, weight, lack of portability etc. This design uses a miniaturized pulse sensor (IC sensor) which has been optimized for very accurate sensing and measurement of changes in the heartbeat rate. The system calculates the heartbeat rate in beat per minute (BPM) with the help of the microcontroller, displays the measured heart rate on a 16X2 character LCD and sends an SMS with current BPM value, each time the heart rate goes above or below a fixed threshold, while at the same time setting off a buzzer alarm attached to the patient module to trigger an alert. With small size and portability in mind, the choice of the LCD display and miniaturized sensor aims at eliminating the need for a PC display, while making it easier to carry the system about, for continuous monitoring. It thus ensures flexibility in real-time remote monitoring regardless of distance and location. Another interesting feature of this particular design is the reprogrammable and open source nature of the product, which makes it easier to re-specify the particular heart rate to watch out for, as well as play with the system parameters, to suit the users need better. This is necessary due to varying environmental and patient conditions.

## III. IMPLEMENTATION AND DESIGN

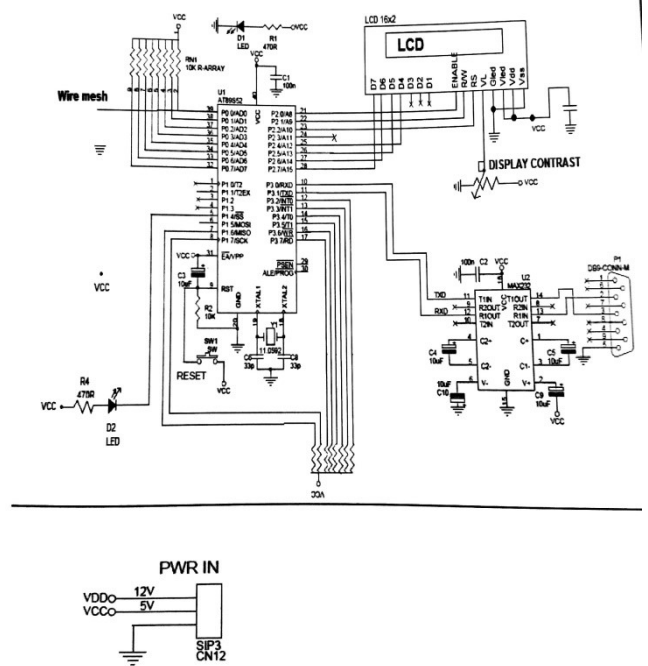
### A. Brief Description Of Block Diagram

The circuit is divided into mainly divided into 4 blocks are as follows:

1. sensor
2. microcontroller
3. serial communication
4. display



**Figure 1.** Block Diagram of Circuit Diagram Of Intelligent Walking Stick.



**Figure 2.** Circuit Diagram Of Intelligent Walking Stick with Heart Attack Detection.

We have used heart beat sensor which will detect heart beats. Our sensor is divided into Photo detector and Photo transmitter. The Photo transmitter will emit the beam of light into human body and will get reflected from the tissue i.e (blood which flow in human body through it) onto the photo detector. Depending upon the intensity of light the beat rate will get measured and value is send to microcontroller.

The microcontroller will receive the value from the sensor and compare it with a predetermined value stored in it, if the input data of microcontroller is greater than that of predetermined value, the microcontroller will send a signal to a serial communication, buzzer & to the display unit i.e (LCD 7-segment display).

The signal received by the serial communication IC will activate the GSM Modem and send the SMS to the number stored in microcontroller. At the same time buzzer will get activated which will enable the user to know that the his/her heart beat has increased and the current heart rate will be displayed on LCD.

### A. System Evaluation

This system is programmed such that it will sense and monitor the heartbeat rate whenever a fingertip is placed on the pulse sensor and triggers an alert by SMS

messages sent to the mobile of the health personnel and also buzz an alarm whenever the critical threshold value of the heartbeat rate is exceeded. The table below shows the summary of the entire system performance as well as the tests carried out on the complete system to ascertain if it's working according to the desired objectives and specifications intended for it. The entire system is examined based on the tests, observations and results captured in the table below.

**Table 1.** System Performance And Evaluation

| S/N | TEST                 | OBSERVATION                          | RESULT                     |
|-----|----------------------|--------------------------------------|----------------------------|
| 1   | INITIAL DISPLAY      | DISPLAYS "INTILLIGENT WALKING STICK" | SYSTEM ON                  |
| 2   | SIM CARD INSERTED    | DISPLAYS "WAITING FOR CONNECTION"    | SEARCHING FOR GSM NETWORK. |
| 3   | FINGER PLACED AT THE | DISPLAYS A VALUE                     | HEARTBEAT RATE DETECTED    |
| 4   | WHEN MSG IS SENT     | DISPLAYS "MSG SENT SUCCESSFULLY"     | ABNORMAL HEARTBEAT RATE    |
| 5   | MSG NOT SENT         | DISPLAYS "MSG NOT SENT".             | MSG SENDING FAILED         |

### B. Advantages

- 1) This is very powerful advantages for a remote device that has to send an alarm message before somebody breaks it.
- 2) Multiple recipients: Another advantages is that the same message can be sent once and delivered to many users.
- 3) SMS works in poor coverage area..
- 4)Speed: If you have to send a small amount of data, it much faster to do it with an SMS than with a data call, as the letter needs an initial modern handshaking procedure that may take up to 15 seconds. A SMS normally travels in 5 seconds.

### D. Future Scope

- 1) This project is a very useful device for hospitals and it's a emergency medium .
- 2) Project can be added with GPS system for providing position of patient and more easy location.
- 3) Messages provides location but this GPS can help in addition to it.
- 4) Waterproofed medium of this system can be used for additional feature.
- 5) This process of emergency locating can be used for other purposes of diseases and accidents by switch pressing etc.

### IV.CONCLUSION

This work proposes and focuses on the heartbeat monitoring and alert system that is able to monitor the heart beat rate condition of patient. The system determines the heart beat rate per minute and then sends short message service (SMS) alert to the mobile phone of medical experts or patient's family members, or their relatives 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 immediately attend to the patient. This system is cost effective and user friendly and thus its usage is not bounded or limited to any class of users. It is a very efficient system also very easy to handle and thus provides great flexibility and serves as a great improvement over other conventional monitoring and alert systems.

### V. REFERENCES

- [1]. <http://www.scribd.com/doc/137588313/gsm-based-heart-beat-monitoring-system>
- [2]. <http://www.isca.in/IJES/Archive/v2/i4/9.ISCA-RJEngS-2013-022.pdf>
- [3]. [http://en.wikipedia.org/wiki/Heart\\_rate\\_monitor](http://en.wikipedia.org/wiki/Heart_rate_monitor)
- [4]. Heartbeat Monitoring Alert via SMS by Warsuzarina Mat Jubadi Dept.
- [5]. M.D. Singh & K.B.Khanchandani,"Power Electronics",Mcgraw Hill, Seventh Edition.