

# Ultra-Portable Cardiac and Health Monitoring System using IoT

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**Abstract**— Here the main objective is to design a Remote Health Monitoring System to diagnose the health condition of the Cardiac patients and Soldiers. Proper implementation of such systems can provide timely warnings to the medical staff and doctors and their service can be activated in case of medical emergencies. Present-day systems use sensors that are hardwired to a PC next to the bed. The use of sensors detects the conditions of patient and the data is collected and transferred using a microcontroller. Doctors and nurses need to visit the patient frequently to examine his/her current condition. In the proposed system we use the idea of network technology with wireless applicability, providing each patient a unique ID by which the doctor can easily identify his/her status of health parameters.

**Keywords:**HM-10 BLE, Micro controller, Mobile application

## I. INTRODUCTION

In recent years, there has been a huge growth in the world of intelligent devices for automation. Such gadgets are designed in order to ease the interaction between people and daily home duties. Although individually they are simple to work with, each appliance has its own configuration interface which adds overhead to the general user experience. This paper presents a solution for connecting more devices into a single entity which is portable and are easily accessed at any time for quick monitoring of Cardiac attack patients and soldiers at war field. This implementation creates a huge impact in our society on health basis; rather than spending 3-4 lakhs on a device which can be implemented now as a portable, user-friendly and cost-efficient device. It integrates the functionalities of different automation devices into a single application.

The main objective is to design a Remote Health Monitoring System to diagnose the health condition of the Cardiac patients and Soldiers. Proper implementation of such systems can provide timely warnings to the medical staff and doctors and their service can be activated in case of medical emergencies. Present-day systems use sensors that are hardwired to a PC next to the bed. The use of sensors detects the conditions of patient and the data is collected and transferred using a microcontroller. Doctors and nurses need to visit the patient frequently to examine his/her current condition. In the proposed system we use the idea of network technology with wireless applicability, providing each patient a unique ID by which the doctor can easily identify his/her status of health parameters.

A simple wireless monitoring system design can be approached by the number of parameters it can detect. In single parameter monitoring system: a single parameter such as Electrocardiogram (ECG) is monitored. In Multi-parameter monitoring system, multiple parameters such as ECG, blood pressure, respiration and temperature rate are monitored. An example of such a system can be found in High Dependency Units (HDU), Intensive Care Units (ICU) and/or Post surgery recovery units in Hospitals. All these are made only as a huge system which rate up to 3-4 lakhs and are not portable. The Multiparameter monitoring system basically proof that a Soldier is alive or recovering. In developing countries, just after retiring from their daily career routine majority of the elderly age group, move to the rural areas. In developed countries, they may move to assisted living group homes. This is where a remote health monitoring system can come in handy.

## II. PROPOSED WORK

In the proposed system, data can be sent wirelessly to the Monitoring System, allowing continuous monitoring of the person. Contributing accuracy in measurements and providing security in proper alert mechanism give this system a higher level of customer satisfaction and low-cost implementation in hospitals. Thus, the patient can engage in his daily activities in a comfortable atmosphere where distractions of hardwired sensors are not present. This will allow development of such low-cost devices based on natural human-computer interfaces. The system proposed here is efficient in monitoring the different physical parameters of many bedridden Soldiers and then in alerting the concerned medical authorities if these parameters bounce above their predefined critical values. Thus, remote monitoring and control refer to a field of industrial automation that is entering a new era with the development of wireless sensing devices.

### A. Working principle

The main objective is to design a Remote Health Monitoring System to diagnose the health condition of the Cardiac patients and Soldiers. Proper implementation of such systems can provide timely warnings to the medical staff and doctors and their service can be activated in case of medical emergencies. Present-day systems use sensors that are hardwired to a PC next to the bed. The use of sensors detects the conditions of patient and the data is collected and transferred using a microcontroller. Doctors and nurses

need to visit the patient frequently to examine his/her current condition. In the proposed system we use the idea of network technology with wireless applicability, providing each patient a unique ID by which the doctor can easily identify his/her status of health parameters.

#### B. Block diagram

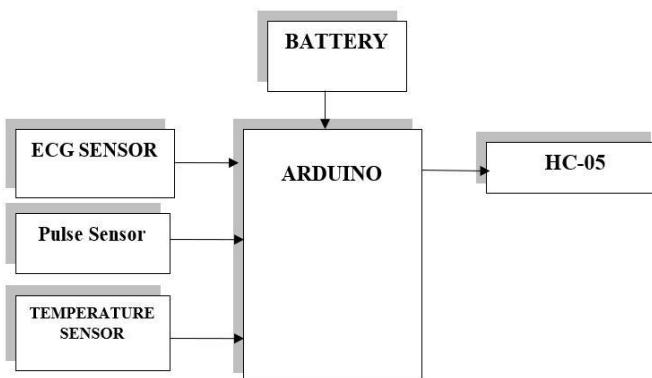


Fig2.1 Block Diagram

#### C. Logical block diagram

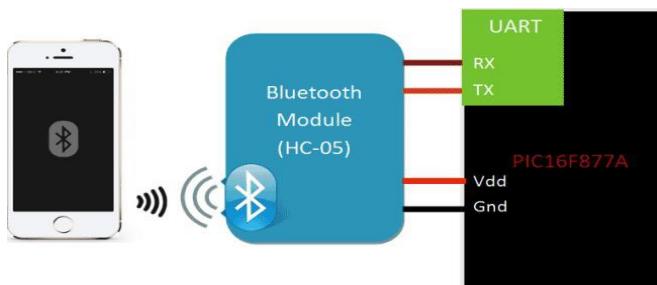


Fig.2.2 Logical Block Diagram

#### D. Applications

- Can be used in Warfield for quick monitorization of soldiers and also by entire society.
- Also be used by Cardiac patients with the suggestion of Doctors.
- Graphically reading shown in the device is easily understandable by the user.
- This device sends signals to host if anything critical happen to the patient.

#### E. Advantages

- It can be easily carried anywhere (Portable).
- The application is user friendly.
- Cost efficient compared to other devices.
- ECG, pulse and temperature monitoring sensors are all fixed together in handy.

- It can notify minor changes in body parameters within an instance.
- The application can be used to interact with the hardware without any internet connection. With the help of HC-05 Bluetooth module.
- The device is water resistant.

#### F. Algorithm for Entire Process

1. START
2. The device is placed on the user's arm.
3. All sensors start to fetch the data.
4. Compares the captured data with the reference data.
5. Case :
  - i. If there is any drastic changes in cardio, pulse, temperature readings, a signal will be sent to the user mobile to take immediate action.
  - ii. This mode continues for 30 seconds and goes to step 6
6. In normal condition, the signals are fetched, and the readings are displayed.
7. These 4 sensors will continuously sense the readings and notify the changes.
8. STOP.

## II. IMPLEMENTATION

This paper presents a solution for connecting more devices into a single entity which is portable and are easily accessed at any time for quick monitoring of Cardiac attack patients and soldiers at war field. This implementation creates a huge impact in our society on health basis; rather than spending 3-4 lakhs on a device which can be implemented now as a portable, user-friendly and cost-efficient device. It integrates the functionalities of different automation devices into a single application. This current module will give such a great impact to the society, implementing and providing this product in rural areas will be a great empowerment for villages and this mainly focus on health sectors .Military ground units can be benefited by the portable module withstanding wet, cold and muddy areas providing accurate reading for the quality of support for our soldiers. A simple wireless monitoring system design can be approached by the number of parameters it can detect. In single parameter monitoring system: a single parameter such as Electrocardiogram (ECG) is monitored, which provides great results compared to big ECG's and heart monitoring device such as DATEX Ohmeda.

## III. DEPLOYMENT

This current module will give such a great impact to the society, implementing and providing this product in rural areas will be a great empowerment for villages and this mainly focus on health sectors.

Military ground units can be benefited by the portable module withstanding wet, cold and muddy areas providing accurate reading for the quality of support for our soldiers.

#### IV. EXPERIMENTAL EVALUATION

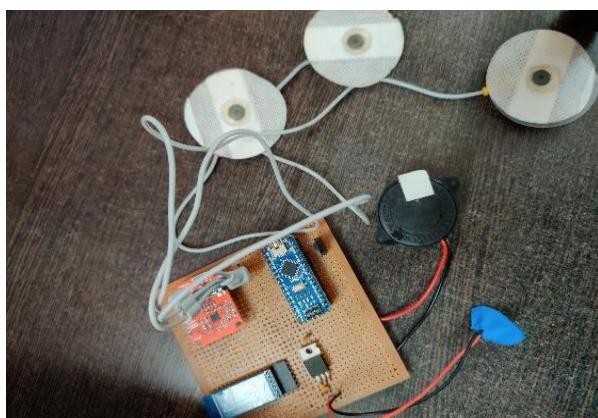


Fig.5.1 Module Image

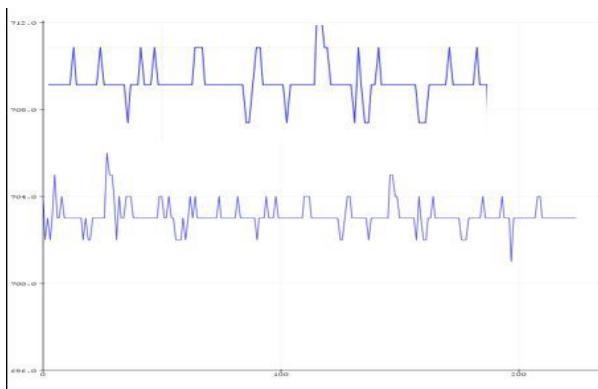


Fig 5.2 ECG Graph Readings

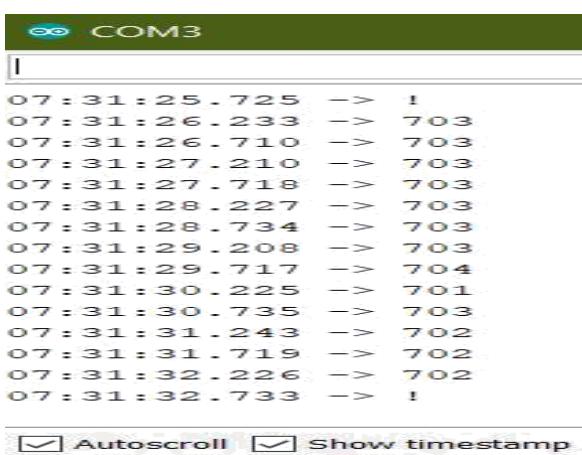


Fig 5.3 Plotter Readings

#### V. CONCLUSION

CVDs are the number 1 cause of death globally: more people die annually from CVDs than from any other cause. An estimated 17.9 million people died from CVDs in 2016, representing 31% of all global deaths. Of these deaths, 85% are due to heart attack and stroke.

Over three quarters of CVD deaths take place in low- and middle-income countries. Sudden mental shock could result an end to a person's life at Warfield which is so traumatic for one's family, inability to carry huge ECG's and heart monitoring devices under crucial time period could be a nightmare to the survivor. Hence the Ultra-portable Cardiac and Health Monitoring System powered up via IOT will lend a helping hand at most situations which could deliver such a great impact in day-to-day survival of cardio victims in the society.

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