Detection, Monitoring and Tracking Of Survivors under Critical Condition Using Raspberry-Pi

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***Abstract*— This paper reports the tracing of survivors in remote locations based on the continuous monitoring of health parameters using the Internet of things. In times of natural conflicts or other defects the survivors can be located using this tracking system. The important health parameters measured are breathing, pulse rate, heartbeat of survivors. In our proposed work, portable and miniaturized framework of sensors and other transmission units are integrated using GPS and mounted on the war zone soldiers. This provides continuous monitoring of their health and all the data obtained are transmitted using IOT to central base system. So, with the available information the survivors can be tracked during conflict and their safety can be ensured using the proposed model.**

Keywords—Global system for mobile; Internet of Things; tracking system; Raspberry Pi; Wireless fidelity.

I. INTRODUCTION

Internet of things plays a significant role in day to day life and over the years there have been a drastic development in the advancements of IOT technologies. IOT is used to integrate technologies in various fields like health monitoring system, sensor networks, artificial intelligence, smart homes etc and communicate the solutions obtained. The concept of IOT is to obtain reliable data from objects and to communicate it efficiently through available infrastructure.

Among the various applications of IOT, it provides a promising paradigm in health care system. The main aim is to integrate the available medical resources to provide efficient and smart health care services to the patients. The use of ubiquitous healthcare systems in remote areas is growing in demand. There is a need of continuous health monitoring and identification of survivors in natural conflicts in remote locations that can be accomplished by miniaturized sensors integrated with objects having embedded technology and an effective communication of the data collected using wireless sensor network.

From all the above-mentioned issues, we arrived at the objective of our paper, which is designing a new "smart military healthcare monitoring and tracking system" that would significantly reduce the effects of problems encountered during the combat. Our system grants the leader the ability to track his troops on the map application and monitor their health statuses continuously in battle, even in advanced lines, by accessing the Web page directly from the small central server or by using a mobile application.

The remainder of the paper is sorted out as pursues. In Section I deals with Introduction part which involves the purpose of IoT and various applications of internet of things, evolution of internet in our daily life. Section II, we talk about some similar applications to our system. Section III gives an existing system of the Architecture. Section IV talks about the used components and describes the implementation in detail. Section V describes the conclusion and future scope of this paper.

II. RELATED WORKS

Medically, health statuses of patients with critical conditions are a great concern for doctors who seek new and innovative healthcare systems. In the past, militarily armies monitored their soldiers with the aid of primitive communication systems, such as walkie-talkie, until the technological development enabled tracking systems using satellites.

F. JalaliBidgoli, S. Moghadami [1] By introducing life detection device and Doppler effect based system inorder to measure the parameters such as heart beat and breathing can be detected for soldiers or survivors under earthquake , injured soldiers on warfields. Both simulation and real time hardware output can be detected. It provides accurate results.

M. Wcislik et al [2] the most important factor is to monitor the patient's health condition through wireless communication. By using Internet of things, Patients medical parameters such as heart rate, body, respiration rate and body temperature can be measured by both local and remote areas. In this project we are using Raspberry pi board and different sensors. Web page is supported for laptops and android phones etc.

Amir-Mohammad Rahmani et al [3] The main motto of this project is patients monitoring system based on Internet of things. IoT is an ever growing and advanced technology for smart health care system, smart homes or hospitals etc. In this project we are using different sensor network and protocol used in the Internet. We have to measure the overall system performance, energy efficiency and highly demand for security purpose.

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Hoi Yan Tung [4] this paper mainly focused on Dual radio Zigbee home care Gateway, to support remote patient monitoring. It increases the transmission data rate of Zigbee.It mainly implemented health care service at home. It provides Zigbee tree network, polling data services, sensors can be supported in a single hop communication.

III. SYSTEM ARCHITECTURE

In the existing work, the main aim is to attain the data from various sensors and how efficiently the computing of the attained data is utilized. Arduino is used for regulating the operations and to send control signals when required. By using this method, the input from distant areas are sensed by sensors and sent to the Arduino controller, which gains knowledge about the surroundings and compute accordingly. As an improvement to this technique, the heart rate, pressure, body temperature and other parameters are measured and analyzed using Arduino software.

Normally in diagnosis of human health, some of the parameters are to be measured to indicate that a person is in normal condition. In order to measure the parameters, sensors have been available. The most important parameter to be identified in human is the body temperature and heart rate. The most widely used device for measuring body temperature is LM35. It provides accurate results. In order the measure the heart rate, the pulse rate of the person is determined. So, a sensing element is used to measure the pulse rate through which heart rate can be determined. The parameters like temperature of body and mean arterial pressure value etc measured using the sensors is displayed in the Arduino digitally. Thus, by using the available sensors various physiological parameters of human can be determined and can be utilized for further analysis and future diagnosis of diseases.

In practical situations, it is not feasible to measure the patient's health parameters manually all the time. It is a tedious process for doctors. Another drawback is that when the patient is in remote areas it becomes tedious for the doctors to monitor the patients health frequently.

So to overcome this a system is required where the patients recordings need to be stored. So designing of a system is required where the health parameters of a patient can be recorded, stored and monitored for future analysis using Arduino.

The Atmega 2560, was used to monitor the surrounding environment by the data's obtained from various sensors and control other operations like light controllers, actuators etc. All these and embedded in a network to provide adequate result.

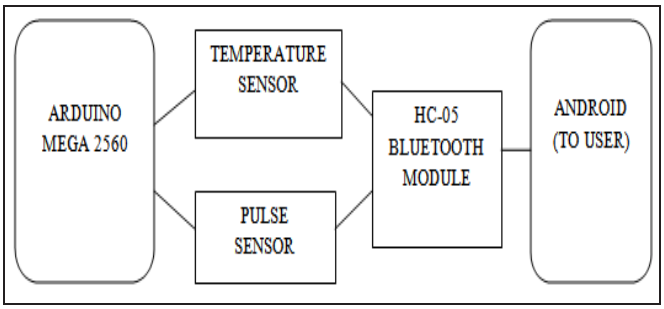

Fig 1: Block Diagram of Life-Detection device for Finding Survivors

IV.PROPOSED IMPROVEMENT TECHNIQUE

The main objective of the work presented in this paper is to design and implement a complete tracking system that is composed of a mini portable server as a central unit hosted on a Raspberry Pi to read soldier's location, state, and health information through wireless communication from a small monitoring unit that is attached to the soldier's arm. Moreover, the system provides an emergency button that requests help when pressed if a soldier is facing an urgent problem. A set of test cases has been applied and the results achieved by our prototype have presented a promising accuracy and efficiency when applying such a system.

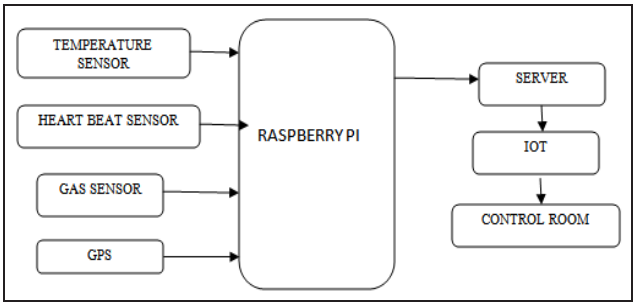

Fig 2: Block Diagram of the proposed model using Raspberry Pi

Our system provides a wearable device for each soldier and a portable device for the leader. This enhances his ability of caring about the band benefiting from a Web page and an Android application. This system has a humanitarian aim since it can decrease the effects of many issues in battle including soldiers unaccounted for and the difficulty of health status monitoring.

V. PERFORMANCE ANALYSIS
OUTPUT OF DHT 11

Fig 3: Output obtained from DHT 11

OUTPUT OF GAS SESOR

Fig 4: Output obtained from Gas Sensor

OUTPUT OF PULSE SENSOR

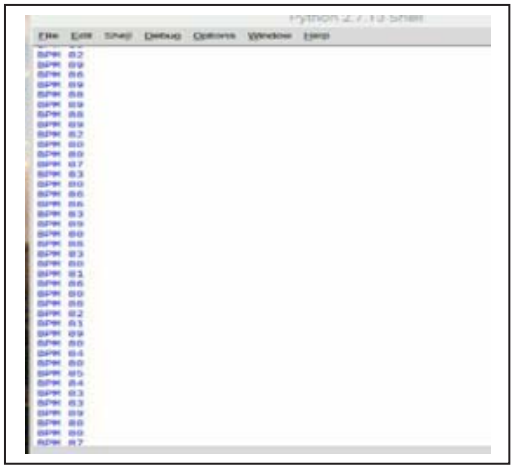

Fig 5: Output obtained from Pulse Sensor

Fig 6: Output displayed in web portal

VI. CONCLUSION AND FUTURE SCOPE

The main contribution of our work is the detecting the temperature, pulse and nearby harmful gases of the surrounding and the current location of the soldiers and visualizing the condition in web page. To design and implement a complete system for monitoring and tracking soldiers health information and location in a battle. Our system provides a wearable device for each soldier and a portable device for the leader. This enhances his ability of caring about the band benefiting from a Web page and an Android application. This system has a humanitarian aim since it can decrease the effects of many issues in battle including soldiers unaccounted for and the difficulty of health status monitoring. This system could be tested on real soldiers to prove its applicability.

The enhancement on the system could be by providing an agreed upon secret code to be sent with the emergency button in order not to abuse this facility by the enemy. Moreover, the range of the WIFI signals is limited 100 m, and the GSM cannot be used because its signals are weak in the battle area or they do not even exist. Our system can be improved by introducing a new communication system using microwave signals with frequencies lower than WIFI band (around 2.4GHZ).

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