



IOT BASED REAL TIME CARDIAC ACTIVITY MONITORING SYSTEM USING BODY SENSOR NETWORK

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Abstract

The healthcare industry is currently dependent a lot on the decisions made by humans. Sometimes these decisions are not accurate and are sometimes biased. In the pursuit to remove this deviation in rational and unbiased decision making, we decided to implement IoT in the healthcare system. By using a number of tiny and lightweight, wireless sensor nodes which are based onbody sensor network (BSN) technology, which is one of the core technologies of IoT developments in healthcare system, the various health parameters of a patient can be monitored. The usage of IoT eliminates a lot of human error. One of the most underdeveloped areas in the field of IoT with respect to healthcare is the implementation of the same for coronary heart disease and strokes. IoT can prove its mettle in the field of healthcare by tackling these two major areas. A dedicated device to monitor the pulse

and its variations continuously would be able to read and notify any panic situation with ease. We believe that if such a system is implemented the number of lives which are lost to circumstances will reduce.

Keywords: IOT, Healthcare, Heart Diseases, BSN, Wireless sensors.

1 INTRODUCTION

Technological advancements have led to the emergence of Internet of Things (IoT). In today's health care environment, the usage of IoT technologies has become popular in various medical fields such as real-time monitoring, patient information management, and healthcare management.

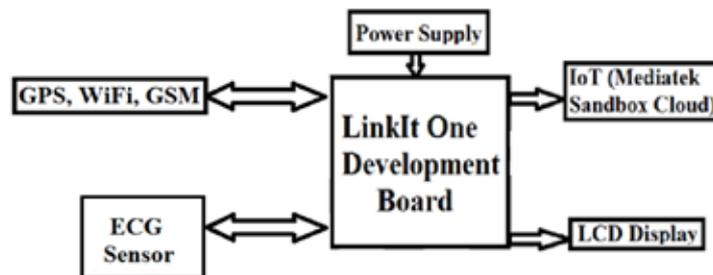
By using a number of tiny and lightweight, wireless sensor nodes which are based on body sensor network (BSN) technology, which is one of the core technologies of IoT developments in healthcare system, the various health parameters of a patient can be monitored. This article basically plans to demonstrate and the usage of BSN technology integrated with IoT to provide advancements in the study of coronary heart diseases and strokes. This article aims to produce an alternative to prevent these diseases and provide timely treatment for the same by fast response action.

This system is mainly used to monitor the pulse automatically. The collected data will be stored in the cloud and will be continuously monitored automatically for irregularities. When the pulse rate goes above or below normal values, the chances of heart rates are maximum and such a situation will be notified to both the user and a primary contact through IoT.

Notifications are sent through GPRS/GSM modules. The primary contact will also be given the location of the user in such a case if he/she is unable to contact the concerned person.

2 PROPOSED SYSTEM

We are proposing an IoT based system for detecting heart attacks on prone patients. Our wearable device can do real time monitoring of the patient and keep a database of the patient systematically maintained in the cloud space provided by Mediatek Labs called Mediatek Sandbox. Since notifying the user alone is not enough to provide the required help in such cases, thus, when the values are erratic or go past or below the pre-set threshold values, it immediately sends an SMS to all the emergency contacts saved in the device automatically along with the real time location of the patient wearing the device.



I. LinkIt One Development Board

It is a high performance board that uses an open source platform for prototyping of Wearable IoT devices. It combines MediaTek Aster which is the worlds leading SoC for Wearables with high performance Wireless-Fidelity and Global Positioning System chipsets. It provides pin-out features similar to Arduino boards and this helps to connect various sensors, peripherals, and Arduino shields easily.

II. ECG Sensor

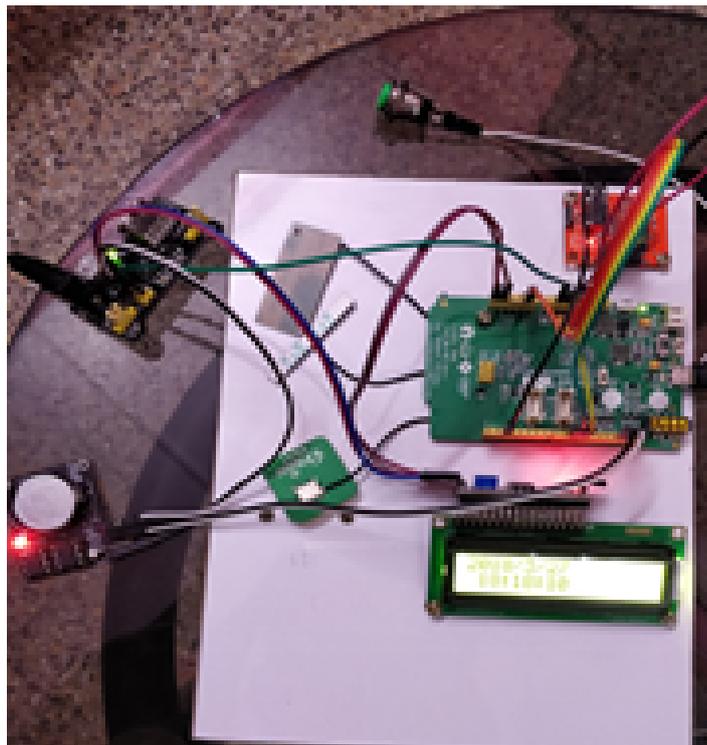
This sensor measures the muscular and electrical functions of the heart. By analyzing the exact waveform pattern, we can identify

electrolyte imbalances, rhythm, disturbances and conduction abnormalities.

3 RELATED WORKS

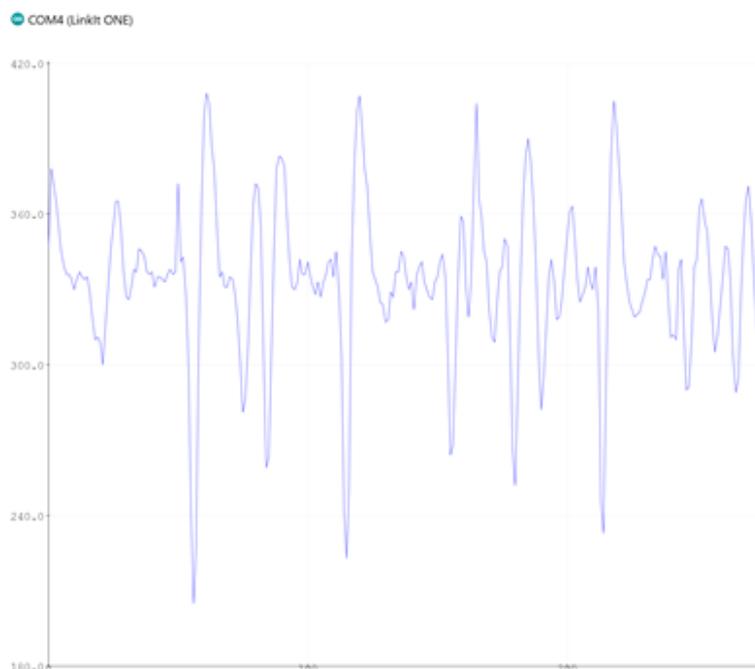
In the next ten years, IoT based healthcare applications will become commonplace throughout the world. There are different applications of IoT in healthcare such as blood glucose level monitoring using non-invasive techniques which is a boon for diabetes patients. Body temperature sensors aid in recording and transmission of body temperature. The percentage of oxygen in blood can be monitored using noninvasive method. The various health parameters of a patient can be monitored periodically at home and the data can be remotely accessed by the doctor using IoT technologies and proper treatment can be given to the patient. This kind of telemedicine solutions is a great boon to elder persons who are suffering from chronic illnesses. The remote monitoring solutions available at present are very expensive and complex. A newer advanced solution reduces the cost compared to traditional delivery models.

4 RESULTS



The above picture shows the implementation of the proposed system and the pictures below show the output of the GSM connectivity, WiFi connectivity, real time GPS tracking, current date, time, and real time cardiac activity monitoring using the serial monitor

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COM4 (LinkIt ONE)
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Initialize GSM for SMS
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GSM ready for Sending SMS
Connecting to AP...Success!
Connecting site...Success!
waiting for HTTP response...
Connecting to TCP...Success!
=====
2018/3/27 18:13:56
DAogR4Xg,c0B5RFX4M0qPT7hn,0send TCP heartBeat
Success.
latitude=13.0440      longitude=80.2117
Success.
2018/3/27 18:14:0
DAogR4Xg,c0B5RFX4M0qPT7hn,0Success.
latitude=13.0440      longitude=80.2117
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5 CONCLUSION

It can be concluded that if such a system can be produced successfully while ensuring security, accuracy and speed, it can do wonders in the field of medicine. Especially to improve the quick response time of Coronary Artery Disease and Cerebrovascular Accidents, i.e. in common language, Heart attacks and Strokes. This article is also open for further discussions in these areas. In the infancy stages of this prototype, such a concept looks very convenient. The true complexities and parities of actually creating such a system can be found only by vigorous research and open criticism of the same. Development and feasibility of such a system is yet to be assumed. The usefulness of this system and the various challenges like personal information security and accuracy are still a concern and will be discerned through the course of development of the prototype. Since almost all developments are based on previously existing equipment, the

success of this prototype depends on the accuracy rate of previously existing devices by a very large factor. Assuming each aspect to go in accordance with the proposed prototype, it may be fairly concluded that the prototype can be tested further without hesitation.

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