ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 5, Issue 4, April 2018

Real-time monitoring of heart diseases using Electro Cardiogram

[1] R.P.Rajeswari, [2] Parimala V.R, [3] Neha R Kulkarni, [4] Deepa P.J, [5] G. Sowjanya
[1] Assistant Professor, Department of computer science and engineering, RYMEC, Ballari, Visveswaraya Technological University,
[2][3][4][5] B.E. 8th sem, Department of computer science and engineering, RYMEC, Ballari, Visvesvaraya Technological University,

Abstract: **- The objective of this paper is to develop a wireless wearable ECG monitoring system embedded in an IOT platform. Heart disease is the leading cause of death for people across the world and it can be controlled by detecting the heart diseases at early stages. Comprehensive cardiac diagnostics including Arrhythmia and Cardiovascular diseases. Hence early detection of the heart disease is very crucial. The objective of this paper is to develop a wireless wearable ECG monitoring system embedded in an IOT platform. It enables early detection of cardiac diseases due to its ability to continuously monitor and analyze the ECGS in both resting and ambulatory modes. The system makes use of microcontroller (NodeMCU), ECG sensor, portable battery and allows monitoring a patient on a relatively large indoor area. A threshold value will be set when the system detects the heart beat range which crosses threshold value, then the system sends an alert message to the family members, patient and to the concerned hospital.**

Keywords: **- Wireless wearable ECG, microcontroller (NodeMCU), ECG sensor, detection of heart diseases at early stage.**

I. INTRODUCTION

There is a significant increase in the death rate due to the heart diseases across the world, by detecting the diseases at early stage there is a greater possibility of curing the diseases and controlling the death rate. In this paper, ECG monitoring system architecture based on the Internet-of-Things (IoT) cloud is proposed. A low power wearable ECG monitoring system using PSoC is used to sense the ECG signal from the human body. ECG monitoring system is connected to low powered NodeMCU which will transmit the data directly on to the Amazon Web Services (AWS) IoT cloud. Compared with Bluetooth or Zigbee, Wi-Fi can provide higher data rates and wider coverage areas. IoT Cloud In order to provide convenient and timely access to ECG data for users, both the HTTP and MQTT servers are deployed in the AWS IoT cloud. AWS IoT is a managed cloud platform that lets us to connect devices easily and securely and interacts with cloud applications and other devices. AWS IoT can support billions of devices and trillions of messages and can process and route those messages to AWS endpoints and to other devices reliably and securely. With AWS IoT, ECG monitoring system can keep track of and communicate with doctors all the time, when they connected.

II. EXISTING SYSTEM

In existing proposed ECG sensor nodes are based on a dedicated integrated front end, that sometimes includes a DSP, and require a second off-the-shelf chip to implement the radio link. However, power consumption mostly in such sensors is mainly due to the radio link and therefore the optimization obtained by the use of the dedicated front-end has a limited impact on the power performance of the complete sensor. In addition, the following sections will show that a general purpose high-performance and high resolution standard ADC can outperform the noise performance of many dedicated front-end chips.

III.PROPOSED SYSTEM

The platform has three main parts: the sensor and network(AWS) and Node MCU . Lightweight wearable ECG sensors collect data and send them in real time via a wireless protocol to a gateway connected to the home router. The architecture has been developed with the aim of enabling the integration of sensor networks based on different networks protocols. The IoT server converts the raw payload from heterogeneous nodes into a “universal” format, containing object identifier, object type, measurement unit, and data field. Then, it makes the data

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 5, Issue 4, April 2018

available to applications and users. The wearable ECG sensor consists of some dry plastic electrodes and the electronic printed circuit board. The circuit extracts, filters, amplifies and digitizes the ECG signal, which is then acquired by the microcontroller and wireless sent to the IoT server.

ECG Sensor

The ELECTROCARDIOGRAM (ECG) is a type of tool which can be used to diagnose the muscles electrical activity of the heart. It records the signals generated by heart muscles, which propagate in pulsating the electrical waves.

Fig 1: ECG sensor

AWS IoT

AWS IoT is a managed cloud platform which lets the user to get connected to the devices easily and interacts securely with various applications over the cloud and with various devices. It supports many devices and multiple messages and further processes those messages to AWS endpoints and devices securely. It can keep track of and communicates with all the devices at all the time even though when not connected.

NodeMCU

NodeMCU is an open source IoT platform. It includes firmware which runs on the ESP8266 and hardware which is based on the ESP-12 module. It has 4MB of internal flash memory and 11MB storage space.

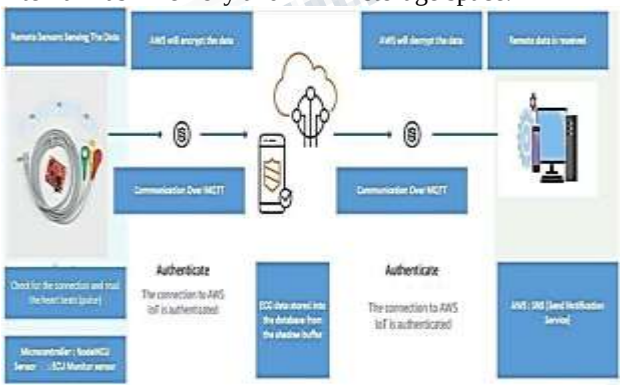

Fig 1: overview of proposed system

IV. EVALUATION AND RESULTS

The proposed system is served as a portable, wearable ECG. The experiments can be conducted on different activities based on age of the patient. When heart rate exceeds the fixed threshold value an emergency notification is sent to the doctor in the form of message.

Fig 3. Shows the ECG waveform during resting and ambulatory modes. The peak of the signal was correctly obtained and detected, as shown in the figure 3, the waveform obtained during walking is different from the resting activity .The proposed system has high performance in measuring waveform of the ECG in various modes. It can also detect the abnormal waveform of the ECG and alert patient and doctor whether the heart rate is normal or abnormal.

V.CONCLUSION

The, proposed system provides a remote patient health monitoring , where the patients are located in distant locations and cannot reach to doctors immediatedly. The usage of the ECG wearable device in the ADHOC IOT environment promotes not only monitoring the patient's condition but also giving the suggestions to reduce the severity of the patient's health condition. By using the ARM11 processors in the monitoring system,ARM11 process the values very rapidly and also it has support for inbuilt wireless LAN technology. Remote wireless monitoring of ECG is done with very minimal cost.

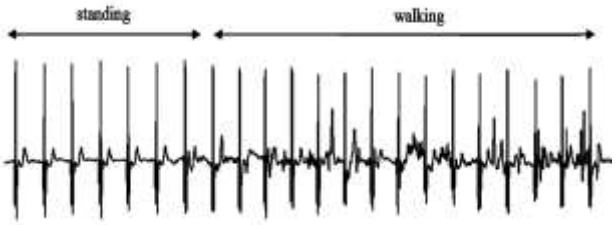

Fig 2: Sample ECG signal recorded while standing and walking

REFERENCES

[1] Byron Narvaez R., Martha Villac ´ıs D., Marjorie Chalen T., W. Velasquez,´ member IEEE Escuela Superior Politecnica del Litoral, ESPOL, Facultad de Ingenier ´ıa en Electricidad y Computacion´Campus Gustavo Galindo Km 30.5 V´ıa Perimetral, P.O.Box 09-01-5863, Guayaquil,Ecuador(byrvinar, mrvillac, mchalen, wavelasq)@espol.edu.ec

[2] JIANQIANG LI1, GEN QIA DENG1,WEIWEI2, HUIHUI WANG3, Member, IEEE, AND ZHONG

MING1 1College of Computer Science and Software Engineering, Shenzhen University, Shenzhen 518060, China 2School of Computer Science and Engineering, Xi'an University of Technology, Xi'an 710048, China 3Department of Engineering, Jacksonville University, Jacksonville

[3] Yedhukrishna PRajagiri School of Engineering and Technology Dept. Electronics and Communication Cochin,Kerala,India Email:yedhu3586@gmail.com

[4] Malti Bansal, Bani Gandhi Department of Electronics and Communication Engineering Delhi Technological University (DTU) Delhi-110042, India maltibansal@gmail.com

[5] Y.Yama, A. Ueno, and Y. Uchikawa, "Development of a wireless capacitive sensor for ambulatory ECG monitoring over clothes," in Proc. 29th Int. Conf. IEEE EMBS, Lyon, pp. 5727–5730, Aug. 2007.