ISSN: 2348-2079

Volume-10 Issue-3

International Journal of Intellectual Advancements and Research in Engineering Computations

INFANT INCUBATOR MONITORING SYSTEM USING CLOUD WITH IOT

K.Shalini*[1], K.Rajeshwari[2]

1PG Scholars, ME, Department of Computer science and Engineering, Mahendra Engineering College, Mallasamudaram, Namakkal - 637503
2Asst professor, M.E, P.hd, Department of Computer science and Engineering, Mahendra Engineering College, Mallasamudaram, Namakkal – 637503

***Corresponding Author: K. Shalini**

ABSTRACT

Healthcare services based on the Internet-of-Things (IoT) have great business potential; however, a comprehensive platform is still missing. In this paper, an intelligent home-based platform, the iHome Health-IoT, is proposed and implemented. In particular, the platform involves an open-platform-based intelligent incubator enhanced connectivity and interchangeability for the integration of devices and services and flexible and wearable bio-medical sensor device (Bio-Patch) enabled by the state-of-the-art inkjet printing technology and system-on-chip. The proposed platform seamlessly fuses IoT devices (e.g., wearable sensors, intelligent medicine packages, etc.) with baby healthcare services (e.g., telemedicine) for an improved user experience and service efficiency. The feasibility of the implemented incubator Health-IoT platform field trials. The ESP32 is a 16-bit microcontroller that has a number of special features not commonly available with other microcontrollers: - Complete system on-a-chip — includes LCD control, ADC, I/O ports, ROM, RAM, basic timer, watchdog timer, UART, etc.

Keywords: ECG, Energy consumption, Endto-end delay, Hospital healthcare, wireless sensor network, wireless body area network

INTRODUCTION

At present day to make human life more comfortable Wireless Sensor Network (WSN) are used to understand the critical conditions of human body. It is smallest unit which have unique features. The wireless sensor supports reliability, mobility etc. The body sensor network helps to people providing healthcare services like medical data access, medical monitoring in incubator and communication with physician in emergency situations through SMS or GPRS. It also provides fully remote method to acquire and detect and monitor the physiological signals without any interruption in baby's normal life. The wireless sensor network improves life quality. The present monitoring in incubator system sensor is placed beside the monitors or PC, which have limitation of baby's bed. But in modern system we used wireless network and wireless devices which removes the limitation of baby's bed. To make human life more comfortable Wireless sensor networks (WSNs) are an emerging technology in existing research and have the potential to transform the way of human life (i.e., make life more comfortable). A wireless sensor is the smallest unit of a network that has unique features, such as, it supports large scale deployment, mobility, reliability; etc Body sensor network systems can help people by providing healthcare services such as medical monitoring in incubator, memory enhancement, medical data access, and communication with the healthcare provider in emergency situations through the SMS or GPRS [1]. Also, these systems provide useful methods to remotely acquire and monitor the physiological signals without the need of interruption of the baby's normal life, thus improving life quality. Today's systems need the sensors to be placed bedside monitors or PCs, and limit the baby to his bed. But now, there is no relation between the sensors and the bedside equipment due to the wireless devices and wireless networks. The modern healthcare monitoring in incubator system not requires the limitation to the baby's to his bed. The baby can move around but in a limited area from the control room or monitor in the modern system. In this system we also use infrastructure oriented wireless networks such as 3G network or commercial cellular or wireless LAN. But in this case emergency signal may not transmitted from baby to physician because the coverage of infrastructure oriented wireless network changes with location and time.

There is Healthcare Monitoring in incubator system using WSN with Zigbee. But main drawback of this system is that we can monitor the babys for 100 meter distance only. The There is Healthcare Monitoring in incubator system using WSN with GSM we can monitor the babys any where across the world. During the early 1980s, analog cellular telephone system was experiencing rapid growth in Europe,

particularly in Scandinavia and United Kingdom, but also in France and Germany. Each country developed its own system, which was incompatible with everyone else's in equipment and operation.

This was an undesirable situation, because not only was the mobile equipment limited to operation within national boundaries, which in a unified Europe were increasingly unimportant, but there was also a very limited market for each type of equipment, so economies of scale and the subsequent savings could not be realized. The Europeans realized this early on, and in 1982 the conference of European posts and telegraphs formed a study group called the group special mobile (GSM) to study and develop a pan-European public land mobile system. The proposed system had to meet certain criteria. Good subjective speech quality.

Low terminal and service cost. Supports for international roaming. Support for range of new services and facilities. Spectral efficiency and ISDN compatibility. In 1989, GSM responsibility was transferred to the European Telecommunication Standards Institute (ETSI), and phase I of the GSM specifications were published in 1990. Commercial service was started in mid-1991, and by 1993 there were 36 GSM networks in 22 countries, with 25 additional countries having already selected or considering GSM.

Although standardized in Europe, GSM is not only a European standard. GSM networks are operational or planned in almost 60 countries in Europe, the Middle East, the Far East, Africa, South America, and Australia. In the beginning of 1994, there were 1.3 million subscribers worldwide. By the beginning of 1995, there were over 5 million subscribers. The acronym GSM now aptly stands for Global System for Mobile communications. The developers of GSM chose an unproven (at the time) digital system, as opposed to the then-standard analog cellular systems like AMPS in the United States and TACS in the United Kingdom.

They had faith that advancements in compression algorithms and digital signal processors would allow the fulfillment of the original criteria and the continual improvement of the system in terms of quality and cost. The nearly 6000 pages of GSM recommendations try to allow edibility and competitive innovation among suppliers, but provide enough standardization to guarantee the proper interworking between the components of the system. This is done by providing functional and interface descriptions for each of the functional entities defined in the system.

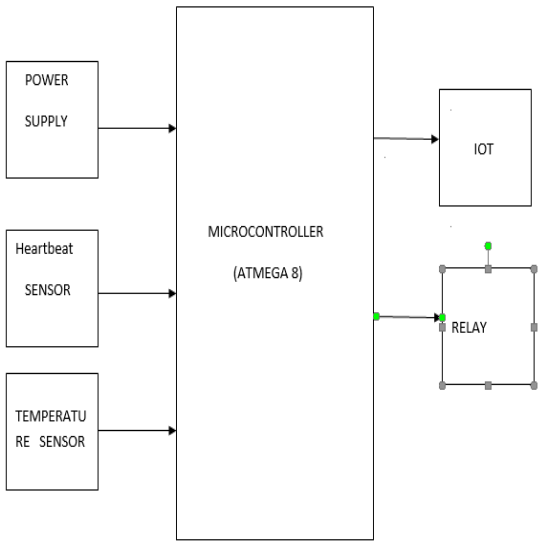
EXISTING WORK

Monetary misfortunes because of cardiovascular dis-facilitates in low and center pay nations somewhere around 2011 and 2025 are assessed to be USD 3.76 trillion to which coronary illness contributes significantly. Moving far from existing scenario of treating babys for post cardiovascular entanglements to a framework able to do early recognition of anomalous or basic heart condition can turn out be an existence rescuer for some heart babys. Nonstop checking of heart including Electrocardiogram (ECG) signals as a major aspect of a remote observing framework connected with screening by specialists in claim to fame doctor's facilities improves the odds of early identification of any sort of cardiovascular abnormality.

PROPOSED SYSTEM

In this system we are continuously monitoring in incubator the baby's different parameters such as body temperature, Heart Beat monitoring in incubator and transmitting this data to the doctor's cabin continuously as well as displaying data at transmitter side so that baby also observed the relevant outputs and then at the receiver side or in doctors cabin the data is collected with Wi-Fi and microcontroller and displayed on relevant displays. The device can be used outdoors. The ESP32 is a 16bit microcontroller that has a number of special features not commonly available with other microcontrollers: - Complete system on-a-chip — includes LCD control, ADC, I/O ports, ROM, RAM, basic timer, watchdog timer, UART, etc.

BLOCK DIAGRAM



DESIGN OF BABY BODY SENSOR NETWORK SYSTEM

The architecture of baby's body sensor network is shown in figure 1. It consists of four parts. First part consists of the Wireless Body Sensor Network (WBSN). The WBSN includes four types of Sensor which are used for collecting the physiological signals from the baby's body. Second part consists of the Wireless Multi-Hop Relay Node (WMHRN). The WMHRN consist of wireless relay nodes which are used to forwarding heath data of baby from WBSN to base station.

Third part consists of base station (BS). The base station receives the data from relay node and this data is send to PC of control room via cable. Fourth part consists of graphical user interface (GUI) [2]. By using GUI, we can is used to store, analyze and present the received data in graphical and text format. The GUI sends SMS to physician or baby's family through WIFI module.

HARDWARE

- Power supply unit
- Microcontroller atmega8
- Thermo electric plate
- Temperature Sensor
- Heartbeat sensor
- RELAY
- Wi-Fi ESP8266

SOFTWARE REQUIREMENT

- Platform - AVR STUDIO
- In System Programmer - ProgISP 172
- Compiler – Win AVR

RESULTS

In this study, we present preliminary results that show the wearability and functionality of each of the discussed sensor subsystems and the resulting power consumption. This proof of concept is limited to the ability of each of the sensors to produce reasonable preliminary output in controlled environments under protocols and carried out in specialized physiology and environmental exposure facilities.

CONCLUSION

This paper has presented an IoT-based baby health monitoring in incubator approach . Collected health parameters are sent, via a iot, to a data analysis module. The results are displayed via Web dashboards. The communication links of iot are low-cost, low-power and secure, thanks to the use of the transmission protocol. There are several areas for future research. First, we plan to implement the analysis module of IOT using machine learning techniques to enable a smart diagnosis of a baby's situation. Second, we want to develop an alert system to notify health professionals if critical situations have been detected. Finally, we also have the idea of storing small amounts of continuous data like ECG and EEG locally on the end node and automatically send when a sign of anomaly is detected.

REFERENCES

1. Mathers CD, Loncar D. Updated projections of global mortality and burden of disease, 2002-2030: data sources, methods and results. world Health Organization (World Health Organization); October 2005.
2. You L, Liu C, Tong S. Community medical network (CMN): architecture and implementation. In: Global Mobile Congress (GMC), Oct 2011; 2011. p. 1-6.
3. Yang G, Xie L, Mantysalo M, Zhou X, Pang Z, Xu LD, ¨ S. Kao-Walter, Q. Chen, and L. Zheng, A health-iot platform based on the integration of intelligent packaging, unobtrusive bio-sensor, and intelligent medicine box. IEEE Trans Ind Inform. 2014 [online];10(4):2180-91. doi: 10.1109/TII.2014.2307795.
4. Rasid MFA, Musa WMW, Kadir NAA, Noor AM, Touati F, Mehmood W et al. Embedded gateway services for internet of things applications in ubiquitous healthcare. In: 2nd international Conference on Information and Communication Technology (ICoICT); 2014. p. 145-8.
5. Ahmed MU, Bjorkman M, Causevic A, Fotouhi H, Lind M. en, "An overview on the internet of things for health monitoring in incubator systems". In: 2nd EAI International Conference on IoT Technologies for HealthCare; October 2015. p. 1-7.
6. Istepanian RSH, Hu S, Philip NY, Sungoor A. 'The potential of internet of m-health things "m-iot' for non-invasive glucose level sensing. Annu Int Conf IEEE Eng Med Biol Soc Annual international conference of the IEEE Engineering in Medicine and Biology Society. 2011;2011:5264-6. doi: 10.1109/IEMBS.2011.6091302, PMID 22255525.
7. Takpor TO, Atayero AA. Integrating internet of things and ehealth solutions for students healthcare. In: Proceedings of the world congress on engineering 2015 Vol I WCE 2015; July 2015. p. 256-68.
8. Jara AJ, Zamora-Izquierdo MA, Gmez-Skarmeta AF. Interconnection framework for mhealth and remote monitoring in incubator based on the internet of things. IEEE J Sel Areas Commun. 2013;31, no. 9-Supplement,:47-65.
9. Riazul Islam SM, Daehan Kwak, Humaun Kabir M, Hossain M, Kyung-Sup Kwak. The internet of things for health care: A comprehensive survey. IEEE Access. 2015;3:678-708. doi: 10.1109/ACCESS.2015.2437951.
10. Yang L, Ge Y, Li W, Rao W, Shen W. A home mobile healthcare system for wheelchair users. In: 18th international Conference on Computer Supported Cooperative Work in Design (CSCWD). IEEE Publications; May 2014. p. 609-14.
11. Zawoad S, Hasan R. The enemy within: the emerging threats to healthcare from malicious mobile devices. Clin Orthop Relat Res, vol [abs]/1210.2149. 2012:1-9.