International Journal For Advanced Research In Science & Technology
A peer reviewed international journal
www.ijarst.in
ISSN: 2457-0362

HEALTH CARE MONITORING SYSTEM

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ABSTRACT

The main objective of this project is to avoid the usage of human monitoring over a wide range of areas where every single object must be observed and to be attended in critical cases. The concept of the project is to monitor every patient/bed in a ward for the pre-defined parameters such as temperature, heart beat rate, saline levels etc. This project can be extended in future for further parameters like blood pressure, panic button etc., and to give an alert message to the concerned nurse/ doctor when a parameter is observed to overtake the pre defined values set by the user and indicate the respective area to be attended. The monitoring kit placed at each bed is constructed using MCS51 series micro controller AT89c52, eight channel ADC0809, NTC 16X2 Dot matrix LCD display, opto coupler and GSM modem etc., and the information is sent to the central observation doctor and displayed in a lcd display. The sensors in different room/ward are connected to different channel in ADC0809. When the information about critical situation is transmitted via the message, it shows the area of the situation and the parameter to be attended. This project is very useful in cases like hospitals, mass communication centers etc., where a large no. of cases is to be handled by few no. of persons.

1. INTRODUCTION

Tao et. Al (2009) developed a wearable sensor system to monitor the movements of the patients. The system was calibrated to a threshold level less than 5percent with the aim of minimizing the error rate of the captured data. Stefano et. Al (2012)proposed a detection system to monitor the move- ments of patients which recognizes a drop and automatically sends a request for help to the care takers. Gennaro et. al(2012) developed a personal health diagnosis based on the symptoms of the patient. A huge amount of collected data is used to analyze the disease and risk of the patients. Franca et. al (2012) has discussed that the innovations of the new gener- ation systems are the development of continuous monitoring features for the patient and the improvement of workflows and productivity of medical personal. There has been emphasize on the various wireless technologies and the advantages of using those technologies for faster communication. eHealth Service Support In IPv6 Vehicular Networks by Imadali S et al(2012) This paper provides an IPv6 vehicular platform which integrates e-Health devices and allows sending captured health-related data to a Personal Health Record (PHR) appli- cation server in the IPv6 Internet. Security is a key concern in the IoT devices management.

The four identified security requirements are (i) Secure authentication and authorization, (ii)Secure bootstrapping of objects and transmission of data,

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(iii)Security of IoT data, (iv)Secure access to data by au- thorized persons. According to Mohammed (2015) the key distribution is required to secure the e-health applications. A protocol for key mnagement which allows the captured data to be transferred in a secured channel was proposed. An IoT deployment in healthcare needs more security because the data of any patients is more sensible and it should not be misused by any bad elements in the society. Rohan Tabish et al (2014) Application save readings from the sensors into a file that can be downloaded by a remote server using a free Cloud service such as Ubuntu. Debiao and Sherali(2016) discussed the security requirements and authentication schemes for RFID based on elliptic Curve Cryptography (ECC). Jieranet. al(2012) developed a RFID technology and intelligent systems, which detects the disinfected articles and alerts the medical staff to wash the hands after the contact with the disinfectant articles. IoT techniques can be used to promote healthcare in a better way. The health related information could be interacted with doctors who are in emergency.

Long et. al(2015) discussed the necessary and requirements details of the software for healthcare and proposed an architecture for healthcare and IoT. Also taken the parameters like ECG, blood oxygen, respiration, temperature. Kaleem Ullah,MunamAli Shah et.at(2015) this presents the model named as k-Healthcare makes use of four layers, sensor layer, network layer, internet layer and service layer. Suman Sankar Bhunia et al (2014) Fuzzy logic resembles human thought hence is much more intuitive and easy to use due to event driven data acquisition, unnecessary consumption of energy. Manat et al (2014) the context aware decision approach helps in optimal prioritization of medical resources without human labour. Brian Blake (2015) commented that the human users could be alerted proactively based on their fitness and historical medical or genetics history.

2. EMBEDDED SYSTEMS

2.1 INTRODUCTION:

An embedded system can be defined as a computing device that does a specific focused job. Appliances such as the air-conditioner, VCD player, DVD player, printer, fax machine, mobile phone etc. are examples of embedded systems. Each of these appliances will have a processor and special hardware to meet the specific requirement of the application along with the embedded software that is executed by the processor for meeting that specific requirement. The embedded software is also called “firm ware”. The desktop/laptop computer is a general purpose computer. You can use it for a variety of applications such as playing games, word processing, accounting, software development and so on. In contrast, the software in the embedded systems is always fixed listed below: Embedded systems do a very specific task, they cannot be programmed to do different things. . Embedded systems have very limited resources, particularly the memory. Generally, they do not have secondary storage devices such as the CDROM or the floppy disk. Embedded systems have to work against some deadlines. A specific job has to be completed within a specific time. In some embedded systems, called real-time systems, the deadlines are stringent. Missing a deadline may cause a catastrophe-loss of life or damage to property. Embedded systems are

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ISSN: 2457-0362

constrained for power. As many embedded systems operate through a battery, the power consumption has to be very low. Some embedded systems have to operate in extreme environmental conditions such as very high temperatures and humidity.

2.2 APPLICATION AREAS:

Nearly 99 per cent of the processors manufactured end up in embedded systems. The embedded system market is one of the highest growth areas as these systems are used in very market segment-consumer electronics, office automation, industrial automation, biomedical engineering, wireless communication, data communication, telecommunications, transportation, military and so on.

2.3 CONSUMER APPLIANCES:

At home we use a number of embedded systems which include digital camera, digital diary, DVD player, electronic toys, microwave oven, remote controls for TV and air-conditioner, VCO player, video game consoles, video recorders etc. Today's high-tech car has about 20 embedded systems for transmission control, engine spark control, air-conditioning, navigation etc. Even wristwatches are now becoming embedded systems. The palmtops are powerful embedded systems using which we can carry out many general-purpose tasks such as playing games and word processing.

2.4 OVERVIEW OF EMBEDDED SYSTEM ARCHITECTURE:

Every embedded system consists of custom-built hardware built around a Central Processing Unit (CPU). This hardware also contains memory chips onto which the software is loaded.

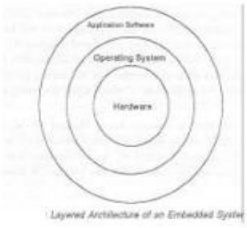

Fig 2 overview of embedded system architecture

The software residing on the memory chip is also called the 'firmware'. The embedded system architecture can be represented as a layered architecture as shown in Fig. The operating system runs above the hardware, and the application software runs above the operating system. The same architecture is applicable to any computer including a desktop computer. However, there are significant differences. It is not compulsory to have an operating system in every embedded system.

3. NODE MCU MICROCONTROLLER

3.1 Introduction to NodeMCU

NodeMCU is an open-source LUA based firmware developed for the ESP8266 wifi chip. By exploring functionality with the ESP8266 chip, NodeMCU firmware comes with the ESP8266 Development board/kit i.e.NodeMCU Development board.

Figure 2 :NodeMCU Development Board/kit v0.9 (Version1)

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Since NodeMCU is an open-source platform, its hardware design is open for edit/modify/build.NodeMCU Dev Kit/board consist of ESP8266 wifi enabled chip. The ESP8266 is a low-cost Wi-Fi chip developed by Espressif Systems with TCP/IP protocol. For more information about ESP8266, you can refer to the ESP8266 WiFi Module. There is Version2 (V2) available for NodeMCU Dev Kit i.e.NodeMCU Development Board v1.0 (Version2), which usually comes in black colored PCB.

4. PROGRAMMING THE FLASH

4.1 INTRODUCTION:

The AT89C51 is normally shipped with the on-chip Flash memory array in the erased state (that is, contents = FFH) and ready to be programmed. The programming interface accepts either a high-voltage (12-volt) or a low-voltage (VCC) program enable signal. The low-voltage programming mode provides a convenient way to program the AT89C51 inside the user's system, while the high-voltage programming mode is compatible with conventional third party Flash or EPROM programmers. The AT89C51 is shipped with either the high-voltage or low-voltage programming mode enabled. The respective top-side marking and device signature codes are listed in the following table.

	V_{PP} = 12V	V_{PP} = 5V
Top-side Mark	AT89C51 xxxx yyww	AT89C51 xxxx-5 yyww
Signature	(030H) = 1EH (031H) = 51H (032H) =F FH	(030H) = 1EH (031H) = 51H (032H) = 05H

The AT89C51 code memory array is programmed byte-byte in either programming mode. To program any nonblank byte in the on-chip Flash Memory, the entire memory must be erased using the Chip Erase Mode.

4.2 PROGRAMMING INTERFACE:

Code byte in the Flash array can be written and the entire array can be erased by using the appropriate combination of control signals. The write operation cycle is self-timed and once initiated, will automatically time itself to completion. All major programming vendors offer worldwide support for the Atmel microcontroller series.

CONCLUSION

The implementation of Heartbeat Monitoring System using GSM is done successfully. The communication is properly done without any interference between different modules in the design. Design is done to meet all the

specifications and requirements. Software tools like Keil Uvision Simulator, Proload to dump the source code into the microcontroller The performance of the system is more efficient. Continuously reading the output from the sensors and pass the data to the doctor's mobile whenever the read values exceed the normal values or whenever the doctor sends a request to the controlling unit is the main job carried out by the microcontroller. The mechanism is controlled by the microcontroller. It can be concluded that the design implemented in the present work provide portability, flexibility and the data transmission is also done with low power consumption.

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