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Real Time Healthcare Monitoring System

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ABSTRACT

This paper shows the system which is used to monitor the patient's Health 24x7. Now a days, due to pandamic situation monitoring patient health physically could be dangerous.So to avoid this contact ae are using this project. This system can monitor physical parameters form patient body at every 5 seconds. This system is checksand collects pulse, body temperature and heart bit from the patient's body and send the data into Cloud platform by using WIFI-Module and health details of patient stored in the cloud. It avoids the contact between patient and the doctor. It is the efficient way to treat the patient.

Keywords—Contact, Wi-Fi Module, Health Care, efficient.

INTRODUCTION

The health care is vast area requiring continuous monitoring. Continuous measurement of patient parameters such as heart rate and rhythm, respiratory rate, blood pressure, blood- oxygen saturation and, many other parameters have become a common feature utilized in major health care systems. When accurate and immediate decision-making are crucial, electronic monitors have been extensively used to collect and display physiological data. Also, there are scenarios where patient is not ready to wait in the queue and appointments for the check- up and also constant monitoring of their health. Usually, patient monitoring system detects for and also warns against serious or life- threatening events in patients or critically ill. Patient monitoring system can be rigorously defined as repeated or continuous observations of the patient's physiological function, and the function of life support equipment, for the purpose of guiding management decisions.

When accurate and immediate decision-making are crucial, electronic monitors have been extensively used to collect and display physiological data. Also, there are scenarios where patient is not ready to wait in the queue and appointments for the check- up and also constant monitoring of their health. The developed system also provides a solution for the problem of maintaining a single database of patients in hospitals using a web server, apart from the personalization of critical health- related criteria. In this system, the gas sensor is used to identify an unexpected occurrence that contrasts the performance with the threshold and produces a PPM signal if the output value crosses the threshold.

LITERATUREREVIEW:

Unique In the most recent decade the humanservices checking frame-works have drawn impressive considerations of the scientists. The prime objective was to build up a dependable patient checking framework with the goal that the social insurance experts can screen their patients, who are either hospitalized or executing their ordinary day by day life exercises. In this work, we present a cell phone-based remote human services checking framework that can give constant online data about physiological states of a patient. Our proposed framework is intended to quantify and screen imperativephysiological information of a patient so as to precisely depict the status of her/his wellbeing and wellness

METHODOLOGY:

IoT based Smart healthcare with the help of smart devices and objects improves the healthcare monitoring system effectively, thus by reducing the inefficiencies of existing healthcare system. Smart devices with new and upgraded technologies enhances the data accuracy to be collected, real-time accessibility of patient's condition, intelligent integration of data collected, maintaining the integrated data smartly through cloud service, etc. IoT along with smart devices reduce complexity and complications in the healthcare system.

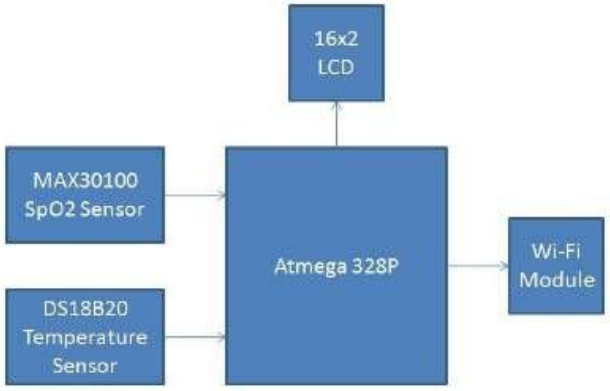
The penetration of mobile technologies and smart devices over healthcare system cause huge impact on the world. The full-fledge utilization of M-health and E- health applications in today's world is made aware tothe people for improving and maintaining the good quality of life.

Apart from regular monitoring of patient's condition through M-health system, the main objective is to educate them through recommendations of healthy eating habits and effective workout routines for improving their quality of healthy life. In remote mobile health monitoring system, the patient health parameters are recorded by a smart phone by eliminating an additional hardware and transmit data through a web interface. It facilitates end to end monitoring screen through three steps.

Organization of project:

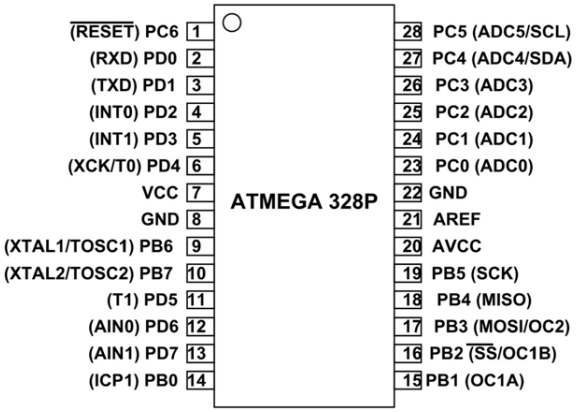
1. To choose the proper technology to build the project.
2. To do each part of project properly stepwise.
3. complete the hardware part.
4. Building the software part.
5. Interfacing both and testing the results.

Hardware Discription:



ATmega 328P:

The ATmega328P provides the following features: 4/8/16/32K bytes of In System Programmable Flash with Read-While-Write capabilities, 256/512/512/1K bytes EEPROM, 512/1K/1K/2K bytes SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible Timer/Counters with compare modes, internal and external interrupts, a serial programmable USART, a byte-oriented 2-wire Serial Interface, an SPI serial port, a 6-channel 10-bit ADC (8 channels in TQFP and QFN/MLF packages), a programmable Watchdog Timer with internal Oscillator, and five software selectable power saving modes. The Idle mode stops the CPU while allowing the SRAM, Timer/Counters, USART, 2-wire Serial Interface, SPI port, and interrupt system to continue functioning.The Power- down mode saves the register contents but freezes the Oscillator, disabling all other chip functions until the next interrupt or hardware reset.In Power-save mode, the asynchronous timer continues to run, allowing the user to maintain a timer base while the rest of the device is sleeping. The ADC Noise Reduction mode stops the CPU and all I/O modules except asynchronous timer and ADC, to minimize switching noise during ADC conversions. In Standby mode, the crystal/resonator Oscillator is running while the rest of the device is sleeping. This allows very fast start-up combined with low power consumption.

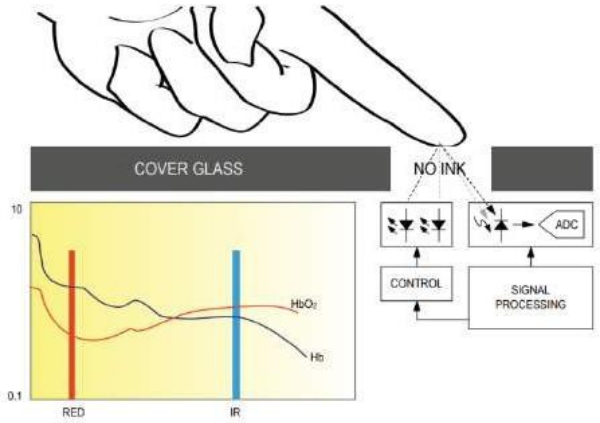


MAX 30100 SPO2 Sensor:

The MAX30100 is a complete pulse oximetry and heartrate sensor system solution designed for the demanding requirements of wearable devices. The MAX30100 provides very small total solution size without sacrificing optical or electrical performance. Minimal external hardware components are needed forintegration into a wearable device.

The MAX30100 is fully configurable through software registers, and the digital output data is stored in a 16- deep FIFO within the device.

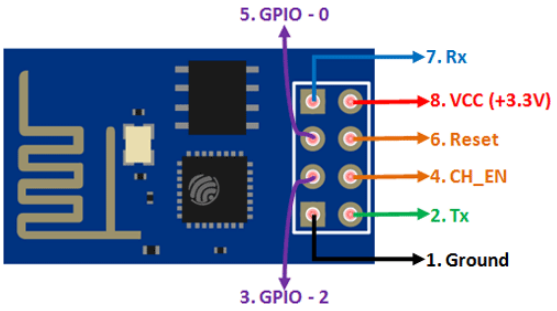
The FIFO allows the MAX30100 to be connected to a microcontroller or microprocessor on a shared bus, where the data is not being read continuously from the device's registers. The SpO2 subsystem in the MAX30100 is composed of ambient light cancellation (ALC), 16-bit sigma delta ADC, and proprietary discrete time filter. The SpO2 ADC is a continuous time oversampling sigma delta converter with up to 16-bit resolution.



Wi-Fi Module:

In 2014, an ESP8266 Wi-Fi module was introduced and developed by third party manufacturers like AI thinkers, which is mainly utilized for IoT-based embedded applications development. It is capable of handling various functions of the Wi-Fi network from another application processor. It is a SOC (System On-chip) integrated with a TCP/IP protocol stack, which can provide microcontroller access to any type of Wi-Fi network. This article deals with the pin configuration, specifications, circuit diagram, applications, and alternatives of the ESP8266 Wi-Fi module.affects the functionality of the blood circulation hence the heart rate. The blood circulates through the body fasterwhen the temperature rises to bring the temperature back to its optimumvalue.

An ESP8266 Wi-Fi module is a SOC microchip mainly used for the development of end-point IoT (Internet of things) applications. It is referred to as a standalone wireless transceiver, available at a very low price. It is used to enable the internet connection to various applications of embedded systems.

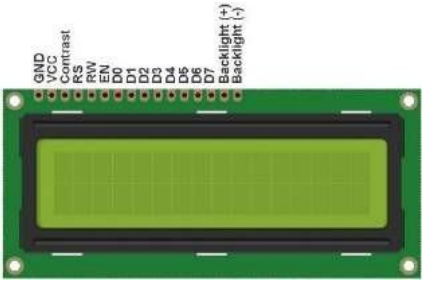


16 X 2 LCD Display:

In LCD 16×2, the term LCD stands for Liquid Crystal Display that uses a plane panel display technology, used in screens of computer monitors & TVs, smartphones, tablets, mobile devices, etc. Both the displays like LCD & CRTs look the same but their operation is different. Instead of electrons diffraction at a glass display, a liquid crystal

display has a backlight that provides light to each pixel that is arranged in a rectangular network.

Every pixel includes a blue, red, green sub-pixel that can be switched ON/OFF. Once all these pixels are deactivated, then it will appear black and when all the sub-pixels are activated then it will appear white. By changing the levels of each light, different colour combinations are achievable.



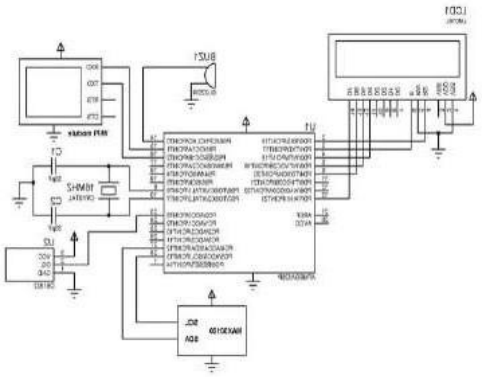
SOFTWARE DESIGN:

We used software as Arduino IDE and the language of writing code is Embedded C. The description of software is given below:

The Arduino Integrated Development Environment (IDE) is a cross-platform application that is written in functions from C and C++.It is used to write and upload programs to Arduino compatible boards, but also, with the help of third- party cores, other vendor development boards. The source code for the IDE is released under the GNU General Public License, version The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub *main()* into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution.

By default, argued is used as the uploading tool to flash the user code onto official Arduino boards. AVRDUDE is an acronym for AVR downloader uploader. It is an open-source software used to program AVR microcontrollers. You can also use it to program EEPROM, Flash memories, and even fuse and lock bits.

SYSTEM IMPLEMENTATION:



A medical device is intended for use in the diagnosis, or in the cure, treatment, or prevention of diseases. This work proposes and focuses on the heart beat rate and body temperature monitoring system that is able to monitor the condition of the patient. The system determines the pulse rate and body temperature per minute or as per the time specified and then sends it to an android application. The data is also stored in the database. Thus, the doctors can monitor and diagnose the patient's condition continuously and could suggest earlier precaution for the patients themselves.

This system is cost effective and user friendly and thus its usage is not restricted or limited to any class of users. It is a very efficient system and very easy to handle and thus provides great flexibility and serves as a great improvement over other conventional monitoring system.By using this system, the trekkers can be monitored and in case of crisis help can be sent to them as soon as possible. Also, for professionals like wild life photographers and vet doctors who have to go deep into the jungle can make use of this system. This system is useful for the miners too as they work in deep caves and might face health issues.

SYSTEM OPERATION:

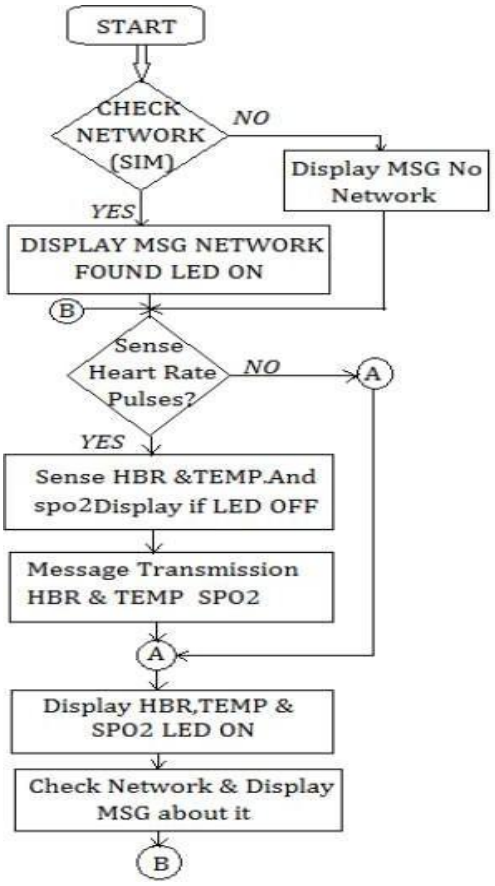
The circuit is built around IC ATmega 328P. the system comprises IC Atmega328P, Wi-Fi module ESP8266, temperature sensor DS18B20, SpO2module MAX30100, 16x2 LCD display.

MAX30100 module is used to read heart rate and SpO2 level of human body. It measures these parameters using fingertip. It is communicated with DS18B20 sensor is used to measure body temperature of human body. It gives digital output through single wire. It is connected to pin no. 23 of microcontroller.

The Wi-Fi module ESP8266 is used to access the internet. The Wi-Fi module is connected to internet router. The Wi-Fi module communicate with microcontroller through UART.16x2 LCD display is used to display the values of heart rate, temperature and SpO2.Ubidots.com is used as IoT platform. All the parameters read by microcontroller are sent to the Ubidots cloud. We can access this data through the web page. Microcontroller send all the parameters through http request.

When circuit is turned on microcontroller send the commands to Wi-Fi module to connect with router. Once the connection with router is done then controller read heart rate and SpO2 values from MAX30100 module. Then controller read the body temperature using DS18B20. All the parameters are shown on LCD by controller. All these parameters are sent to Ubidots through Wi-Fi module.

SYSTEM FLOWCHART:



RESULTS & CONCLUSION:

Parameter	Range
Temperature	96-103° C
Blood Pressure	70-120 mm of hg
Electrocardiography(Heart beat)	60-100 bpm
Breathing rate	12-25 times per min

The availability of low-cost single-chip microcontrollers, and advances in wireless communication technology has encouraged engineers to design low-cost embedded systems for healthcare monitoring applications. Such systems have ability to process real-time signals generated from bio sensors and transmit the measured signals through the patient's phone to the medical centre's server.

We also consider improve the system from robot to multiple robots for collaborative performance. We even consider equipping the current mobile robot, with a drone robot partner which can fly in collaboration with the current system for faster performance in addition for operation in higher elevations.

Existing methodologies in patient monitoring system focuses on providing better healthcare facilities to a number of patients with limited medicinal resources. These monitoring systems limit the patients to the bed and enable them to move around only a particular range from the bed side. Out of this range there is no possibility to collect the data from patients. Thedecisions or suggestions given by the system are not highly accurate.

The traditional forecasting techniques do not provide timely and accurate results. This increases the risk of error in providing appropriate clinical services. Remote patient monitoring system eliminates the hurdles such as distance and improves the access of medical services. Patient monitoring through android mobile phone enables the clinicians to monitor the patient from multiple locations

APPLICATION & FUTURE SCOPE:

Giving Patients and Caregivers Peace of Mind with IoT Monitoring

Increased Independence for Patients with IoT HomeMonitoring

Smart Medicine for The Right Dose, Every Time.Measuring Temperature, Oxygen Level of patient

Remote device monitoring systems, therefore, can change the way patient care takes place by massively reducing effort and error. Consequently, infrequent hospital visits are driving down costs and encouraging adoption.

Research firm IHS suggests that, wireless remote monitoring devices will be used by more than 1.8 million people worldwide in four years. Soon these systems could become a standard across the industry, driven by high receptiveness and progressin database maintenance.

These tests are making remote check-ups for device maintenance, effective and convenient. Additionally, these devices have been enabled to relay statistics such as arrhythmias, which could help avert emergency situations.

Technology such as this is providing valuable support to healthcare professionals, particularly in providing care to patients that need regular monitoring. A whole segment of patients that suffers from long term conditions including congestive heart failure, high blood pressure and diabetes stand to benefit from Remote Device Motoring (RDM) with the convenience of care without spending time at clinics.

REFERENCES:

[1] K. Malhi, S. C. Mukhopadhyay, J. Schnepper, M. Haefke, and H. Ewald, "A Zigbee-based wearable physiological parameters monitoring system," IEEE Sensors J., vol. 12, no. 3,pp. 423–430, Mar. 2012.

[2] P. A. Shaltis, A. T. Reisner, and H. H. Asada, "Cuffless blood pressure monitoring using hydrostatic pressure changes,"IEEE Trans. Biomed. Eng., vol. 55, no. 6, pp. 1775–1777, Jun. 2008.

[3] T. Shany, S. J. Redmond, M. R. Narayanan, and N. H. Lovell, "Sensors-based wearable systems for monitoring of human movement and falls," IEEE Sensors J., vol. 12, no. 3, pp. 658–670, Mar. 2012.

[4] P. Salvo, F. Di Francesco, D. Costanzo, C. Ferrari, M. G. Trivella, and D. De Rossi, "A wearable sensor for measuring sweat rate," IEEE Sensors J., vol. 10, no. 10, pp. 1557–1558, Oct. 2010.

[5] ZiyuLv, Feng Xia, Guowei Wu, Lin Yao, Zhikui Chen," iCare: A Mobile Health Monitoring System for the Elderly" School of Software, Dalian University of Technology Dalian 116620, China.

Project Photo: