IOT-Based Health Monitoring System

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Abstract- *In the modern health care Environment, The usage of IOT with GSM bring convenience of physicians and Patients statistics reveal that every minute a human is losing his/her life across the globe because of various Diseases. The interconnection of various device through internet is called internet of things (IOT).as a Result, Visits of a doctors to the patients constantly are decreased as the information regarding patients health directly reaches to doctor's monitor screen from Any Where the patients Resides Automatic measurements Reading Proposed method will improve the health care center performance.*

Keywords- Microcontroller,GSM, Heart Rate Sensor, Body temperature Sensor,LCD display.

I. INTRODUCTION

In today's era, Health Problems are increasing day-by-day at a high place .therefore we proposing a change in wireless sensors technology by designing a system which included different wireless sensors to receive information with respective human body Temperature ,Blood pressure ,heart rate etc..that will be undoubtedly further transmitted on the IOT platform which accessible by the user via internet.an accessible data base is created about patient's health history which can be further monitored and Analyzed by the doctor if Necessary.the data storage can be saved on the server permanently or can be reset via the Software .This paper proposes a health monitoring system which is capable of detecting multiple parameter of our body such as blood Pressure ,Temperature, Heart Rate&further transmitting this information on an IOT server through 2G/3G/4G GSM Technologies. Also In case of Emergency, Automatically generating alerts will be send to doctors and family members if any unusual activity is detected by or near the patients .a continuous record of body health parameters can be used to detect the disease in a more efficient manner using various Sensors. Temperature sensor used to measure surface temperature of skin satisfactory work is done in the health monitoring by using ARDUINO as well as IOT.in this paper we in investigated recent paper related to health monitoring systems &IOT.IOT is the interconnecting of devices and services that reduces human intervention to live a better Life. This paper as showing the advancements in health care management Technology, It would save patients from the feature health problems that would arise and would also help doctors to take an appropriate measure or action at a proper time regarding patient's health.

II. RELATEDWORK

As the demand for health care rises rapidly, traditional diagnosis services have become insufficient. With the rapid increasing of the elderly population coupled with a longer life Span e-health is targeted to provide low cost and everyday household usage [1]. classified these solutions in two groups [2]: The first group uses smart phones (or PDAs) equipped with biosensors that record the heart signals and transmit them to a healthcare center or hospital for analysis. Some solutions can store the signals locally as well. Examples include Alive technology[3], described the implementation and experiences with a WAP-based telemedicine system for monitoring. Authorized users can access to patients' general data, and can monitor blood pressure and electrocardiogram on WAP devices in store-and-forward mode. Software and Hardware [4] , There concerns around RMHM systems are complexity and the cost. Except forindispensable sensors, additional equipment, such as a Personal Digital Assistant (PDA)and a special electrical board, might bring higher cost and inconvenience to users, Especially due to the confusion with manual instructions [10]. Unfortunately, in most RMHM systems, such as CodeBlue [5] Various RMHM systems have Beenproposed, but there are still limitations and challenges in improving their application. The main drawback of traditional health monitoring systems is that patients are "constrained" within smart rooms and beds fitted with monitoring devices [6,7]. These solutions use (wearable) wireless sensors to monitor patient's vital signs (e.g. ECG,Temperature, blood pressure). The European Project Myheart [8].

III. SYSTEM ARCHITECTURE AND SYSTEM COMPONENTS:

System architecture

In this health monitoring system multiple sensors used to measure Temperature, Counting of heart beats, which is stored on database.If There is any raising of both temperature and counting of heart beat rate which alerts Neighbours to the particular person in which Neighbours are may be relations or doctors. The alert sends through a message to indicate the Patients health state

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The ac voltage, typically 220V is connected to a transformer, which steps that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation.

A regulator circuit removes the ripples and also remains the same dc value even if the input dc voltage varies, or the load connected to the output dc voltage changes. This voltage regulation is usually obtained using one of the popular voltage regulator ICunit.

3.1Arduino Uno

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter. Arduino Uno has a number of facilities for communicating with a computer, another Arduino board, or other microcontrollers.

3.1 LCD DISPLAY

A liquid crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements. LCDs are used in a wide range of applications including computer monitors, televisions, instrument panels, aircraft cockpit displays, and signage. They are common in consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones, and have replaced cathode ray tube (CRT) displays in most applications. They are available in a wider range of screen sizesthan CRT and plasma displays, and since they do not use phosphors, they do not suffer image burn-in. LCDs are, however, susceptible to image persistence.

The LCD screen is more energy efficient and can be disposed of more safely than a CRT. Its low electrical power consumption enables it to be used in battery-powered electronic equipment. It is an electronically modulated optical device made up of any number of segments filled with liquid crystals and arrayed in front of a light source (backlight) or reflector to produce images in color or monochrome. Liquid crystals were first discovered in 1888. By 2008, worldwide sales of televisions with LCD screens exceeded annual sales of CRT units; the CRT became obsolete for most purposes.

3.2Temperature Sensor

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in ˚ Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1⁄4˚C at room temperature and ±3⁄4˚C over a full −55 to +150˚C temperature range. It LM35 is the main temperature sensor. It connected to the arduino UNO. The arduino can sense the increasing temperature.

3.3GSM

The SIM900A is a complete Dual-band GSM/GPRS solution in a SMT module featuring an industry standard interface the SIM800 delivers GSM/GPRS900/1800MHzper for voice, SMS in a small form factor and with low power consumption. With a tiny configuration of 24mmx24mmx3mm,SIM800 can fital most all the space requirement siny our applications especially for slimand compact demand of design.The GSM Module is also connected with this ARDUINOUNO.When any problem arrise temperature is increase the Arduino send this problem to the GSM module.

3.4 Heartbeat Sensor

It is used to measure the heartbeat of the patient. It gives a digital output of heart beat when a finger is placed on it. It is compressed in size. The working voltage of heart beat sensor is +5V DC. It works on the principle of light modulation by blood flow through finger at each pulse. Heart beat sensor is used to measure heart beat which normally lies between 60- 100bpm.

VOLTAGE LAW

The voltage induced across the secondary coil may be calculated from Faraday's law of induction, which states that:

$$V_S = N_S \frac{\mathrm{d}\Phi}{\mathrm{d}t}$$

Where VS is the instantaneous voltage, NS is the number of turns in the secondary coil and Φ equals the magnetic flux through one turn of the coil. If the turns of the coil are oriented perpendicular to the magnetic field lines, the flux is the product of the magnetic field strength B and the area A through which it cuts. The area is constant, being equal to the cross-sectional area of the transformer core, whereas the magnetic field varies with time according to the excitation of the primary. Since the same magnetic flux passes through both the primary and secondary coils in an ideal transformer, the instantaneous voltage across the primary winding equals

$$V_P = N_P \frac{\mathrm{d}\Phi}{\mathrm{d}t}$$

Taking the ratio of the two equations for V_S and V_P gives the basic equation for stepping up or stepping down the voltage

$$\frac{V_S}{V_P} = \frac{N_S}{N_P}$$

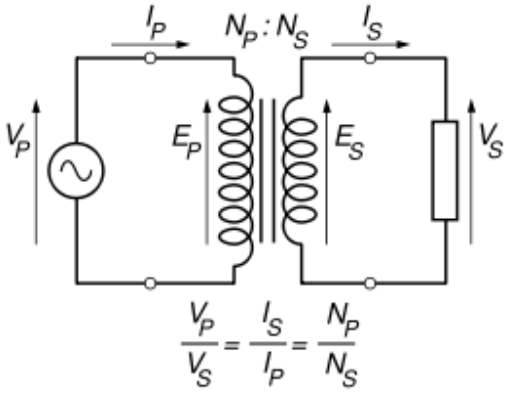
IDEAL POWER EQUATION:

If the secondary coil is attached to a load that allows current to flow, electrical power is transmitted from the primary circuit to the secondary circuit. Ideally, the

transformer is perfectly efficient; all the incoming energy is transformed from the primary circuit to the magnetic field and into the secondary circuit. If this condition is met, the incoming electric power must equal the outgoing power.
Incoming = $I_P V_P$ = Outgoing = $I_S V_S$

Giving the ideal transformer equation

$$\frac{V_S}{V_P} = \frac{N_S}{N_P} = \frac{I_P}{I_S}$$



$P_{in\text{-}coming} = I_P V_P = P_{out\text{-}going} = I_S V_S$

Giving the ideal transformer equation

$$\frac{V_S}{V_P} = \frac{N_S}{N_P} = \frac{I_P}{I_S}$$

If the voltage is increased (stepped up) ($V_S > V_P$), then the current is decreased (stepped down) ($I_S < I_P$) by the same factor. Transformers are efficient so this formula is a reasonable approximation.

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The impedance in one circuit is transformed by the square of the turns ratio. For example, if an impedance Z_S is attached across the terminals of the secondary coil, it appears to the primary circuit to have an impedance of

$$Z_S \left(\frac{N_P}{N_S}\right)^2$$

This relationship is reciprocal, so that the impedance Z_P of the primary circuit appears to the secondary to be

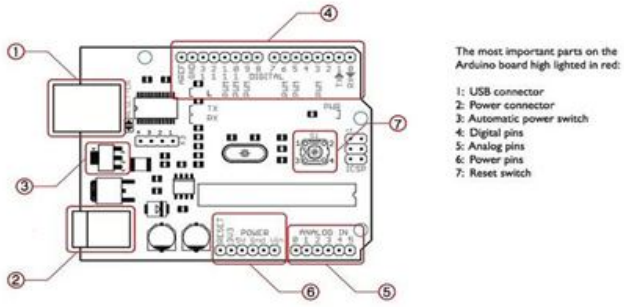
$$Z_P \left(\frac{N_S}{N_P}\right)^2$$

ARDUINO UNO R3 MICROCONTROLLER

The Arduino Uno R3 is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega 16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

Revision 2 of the Uno board (A000046) has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode.



Revision 3 of the board (A000066) has the following new features:

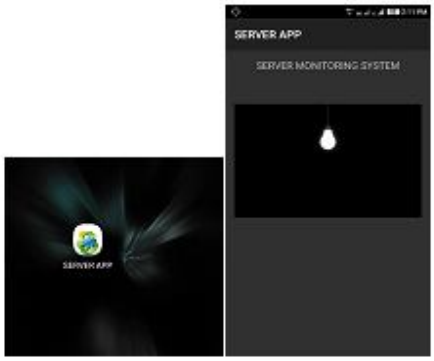
1.0 pin out: added SDA and SCL pins that are near to the AREF pin and two other new pins placed near to the RESET pin, the IOREF that allow the shields to adapt to the voltage provided from the board. In future, shields will be compatible with both the board that uses the AVR, which operates with 5V and with the Arduino Due that operates with 3.3V. The second one is a not connected pin, that is reserved for future purposes.

Stronger RESET circuit.

Atmega 16U2 replace the 8U2.

IV. MODULES

This application is used to find out the patient location Identify status of machines in the network with the robust server monitoring system Understand how much network load the server handles. With the service monitoring capability, monitor any TCP/ IP service



An ambulance is a self-propelled vehicle specifically designed to transport critically sick or injured people to a medical facility. Most ambulances are motor vehicles, although helicopters, airplanes, and boats are also used. The interior of an ambulance has room for one or more patients plus several emergency medical personnel. It also contains a variety of supplies and equipment that are used to stabilize the patient's condition while en route.platform, access to it is provided as a Service.Database services take care of scalability and high availability

A cloud database is a database that typically runs on a cloud computingof the database. Database services make the underlying software-stack transparent to the user.

Patient Information

Sno	Temperature	Heart Beat	Pressure	Author	Date / Time	Details
1	26.37	11	145	5070123268837	2018-03-17 06:23:59	Details
2	26.86	10	145	5070123268837	2018-03-17 06:22:58	Details
3	85.94	0	145	5070123268837	2018-03-17 06:22:14	Details
4	27.34	0	200	5070123268837	2018-03-17 06:21:46	Details
5	26.86	0	201	5070123268837	2018-03-17 06:21:32	Details
6	26.86	0	202	5070123268837	2018-03-17 06:20:40	Details
7	80.57	0	144	5070123268837	2018-03-16 11:40:42	Details

V. CONCLUSION

In this paper we have analyzed Arduino based health monitoring system using IOT.Any abnormalities in the health conditions can be known directly. It is informed to the particular person through GSM technology or via internet. The proposed system is Simple, Power efficient and easy to understand.it acts as a connection between patient and doctor.

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