Comma Patient Observing System(IoT)

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Abstract- *This project is entitles as "IOT BASEDCOMMA PATIENT OBSERVING SYSTEM" is developed using IOT hardware kit as the transmitter and cloud sever as receiver. Hyper terminal tool has been used for PC interface. The main objective of this project is to develop a web based application to communicate with an internet server in a secured manner for comma patients. Multi sensors have been interacted in this hardware, such as heart beat sensor, Accelerometer sensor, Thermostat sensor. All the above-mentioned hardware process has been implemented in a single interface controller board. All the sensors will be wired over the body of the comma patients. The sensors value will be uploaded in a centralized cloud server. A threshold value will be assigned for each sensor. In case of any abnormal means, the warns immediately to the user interface end. By doing this we can keep observe the patients from the home as well as the cost will not be expensive.*

Keywords- Sensors ,PIC microcontroller.

I. INTRODUCTION

The Internet of Things (IoT) is an important topic in technology industry, policy, and engineering circles and has become headline news in both the specialty press and the popular media. This technology is embodied in a wide spectrum of networked products, systems, and sensors, which take advantage of advancements in computing power, electronics miniaturization, and network interconnections to offer new capabilities not previously possible. An abundance of conferences, reports, and news articles discuss and debate the prospective impact of the "IoT revolution"—from new market opportunities and business models to concerns about security, privacy, and technical interoperability.

The large-scale implementation of IoT devices promises to transform many aspects of the way we live. For consumers, new IoT products like Internet-enabled appliances, home automation components, and energy management devices are moving us toward a vision of the "smart home'', offering more security and energy-efficiency. Other personal IoT devices like wearable fitness and health monitoring devices and network-enabled medical devices are transforming the way healthcare services are delivered. This technology promises to be beneficial for people with disabilities and the elderly, enabling improved levels of independence and quality of life at a reasonable cost.

IoT systems like networked vehicles, intelligent traffic systems, and sensors embedded in roads and bridges move us closer to the idea of "smart cities'', which help minimize congestion and energy consumption. IoT technology offers the possibility to transform agriculture, industry, and energy production and distribution by increasing the availability of information along the value chain of production using networked sensors. However, IoT raises many issues and challenges that need to be considered and addressed in order for potential benefits to be realized.

Iot In Today's World

A number of companies and research organizations have offered a wide range of projections about the potential impact of IoT on the Internet and the economy during the next five to ten years. Cisco, for example, projects more than 24 billion Internet– connected objects by 2019; Morgan Stanley, however, projects 75 billion networked devices by 2020. Looking out further and raising the stakes higher, Huawei forecasts 100 billion IoT connections by 2025. McKinsey Global Institute suggests that the financial impact of IoT on the global economy may be as much as $3.9 to $11.1 trillion by 2025. While the variability in predictions makes any specific number questionable, collectively they paint a picture of significant growth and influence.

Some observers see the IoT as a revolutionary fully–interconnected "smart" world of progress, efficiency, and opportunity, with the potential for adding billions in value to industry and the global economy. Others warn that the IoT represents a darker world of surveillance, privacy and security violations, and consumer lock–in. Attention-grabbing headlines about the hacking of Internet-connected automobiles, surveillance concerns stemming from voice recognition features in "smart" TVs, and privacy fears stemming from the potential misuse of IoT data have captured public attention. This "promise vs. peril" debate along with an influx of information though popular media and marketing can make the IoT a complex topic to understand.

Fundamentally, the Internet Society cares about the IoT as it represents a growing aspect of how people and institutions are likely to interact with the Internet in their personal, social, and economic lives. If even modest projections are correct, an explosion of IoT applications could present a fundamental shift in how users engage with and are impacted by the Internet, raising new issues and different dimensions of existing challenges across user/consumer concerns, technology, policy and law.IoT also will likely have varying consequences in different economies and regions, bringing a diverse set of opportunities and challenges across the globe.

This overview document is designed to help the Internet Society community navigate the dialogue surrounding the Internet of Things in light of the competing predictions about its promises and perils. It provides a high-level overview of the basics of IoT and some of the key issues and questions that this technology raises from the perspective of the Internet Society and the core values we promote. It also acknowledges some of the unique aspects of the Internet of Things that make this a transformational technology for the Internet.

As this is intended to be an overview document, we do not propose a specific course of action for ISOC on IoT at this time. Rather, we see this document as an informational resource and starting point for discussion within the ISOC community on IoT-related issues.

Problem Definition

Still manual methods are used for much treatment application. Curtsey killing is keep on increasing in medical application. Especially for comma and Brain dead patients are affecting more in this case. This is due to more expensive in maintaining a patient in hospital. In order to overcome this problem here we are introducing IOT based Comma Patient monitoring. This project will reduce the expense of comma patient monitoring.

Fig.1 : IOT Vision

II. EXISTING SYSTEM

There are many continuous monitoring systems available in the medical field such as life scope vismo PVM-2703.LIFESCOPE VISMO PVM-2703 This machine enables to monitor ECG, pulse respiration, NIBP(non - invasive blood pressure amplifier), temperature. A large touchscreen enables quick and intuitive operation. Even though it provides good results.It contains some disadvantages too**.**

Drawbacks Of The Existing System

- Still many companies are taking manual reading to know the current status of the machine.
- While taking reading range can be checked manually
- It is a tedious process to take date wise reading from the machines
- Parameter wise reading is not possible.
- In case the machine got over loaded, there will not be any warning will be generated from the machine side.
- Maintenance is not much easy.
- Need to invest more for the maintenance.

III. PROPOSED SYSTEM

The concept of the internet of things, or IOT, is spreading its wings wider and stronger in the current it scenario, and is gradually taking part in every facet of our lives. Look at the way the healthcare industry wants to be connected with each and every thing associated with it. There is a high level of adoption of medical devices that are connected to each other. In fact, the adoption level shows an increasing trend and there will be more takers for these devices in the future. The tech experts opine that like the internet, the internet of things too is going to be a part of our everyday life. With an increasing number of medical devices getting connected to the internet, the idea of interconnected healthcare sphere gets more fascinating. It is also evident that several software, service, and product companies are showing interest in connecting devices with a view to make their primary product or service more attainable

The internet of things (IOT) provides the opportunity to enable and extend digital business scenarios, helping you better connect people, processes, devices and other m2m assets, and better harness data across your business and operations. Improving efficiencies, enabling innovation and fuelling transformation are the cornerstones of Microsoft’s vision for the digital business. With Microsoft azure IOT services, you can monitor assets to improve efficiencies, drive operational performance to enable innovation, and leverage advanced data analytics to transform your company with new business models and revenue streams.

An IOT device can be tested and diagnosed remotely. For example, a technician can connect from their own office and run diagnostics on an mri that has failed. The technician can pinpoint the problem's root cause and leverage a knowledge management application to find answers to common problems. The technician can also remotely connect to hospital technicians to provide hands-on support. When the root cause is identified, a new part can be shipped with instructions for replacing the defective part—or it can be delivered by a field engineer.

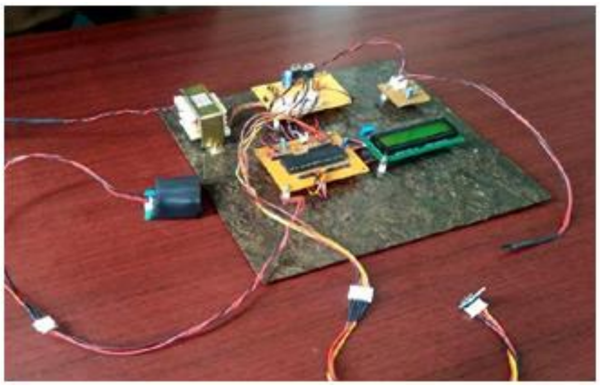


Fig. 2 : Hardware Output

Advantages of proposed system

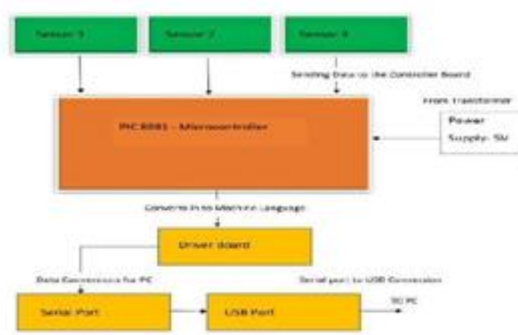
- Can monitor the patients in remote
- Using Enhanced cryptography, the encryption will process will done before reaching the cloud server.
- Data can be accessed in all types of mobile applications
- No need to configure the cloud environment always, once the configuration done means the connection will get established automatically.
- Using RFID, the data validation has been done from the hardware side. So no need to change the code for data validation.
- In future offline can be processed can be done using temporary memory.

Hardware phase

The phase 1 is the hardware phase, where the sensors such as the heartbeat sensor, Accelerometer sensor and the thermostat sensor are connected and the readings are displayed in the LCD display.

Fig. 3: LED display

Block Diagram



System Requirements

Modules

- Hardware Interface
- COMM port Communication
- Data Upload
- Configuring a Centralized cloud Server
- Data Verification
- Sensors

IV. MODULES DESCRIPTION

Hardware Interface

This is the initial Module of this project. The entire hardware and sensor interface will be available in this module. Here PIC or Arudino Microcontroller has been used for efficient sensor interface. This project supports multiple sensor interface model. All sensors will be embedded with LCD for offline communication. Microcontroller has been connected with power supply unit.

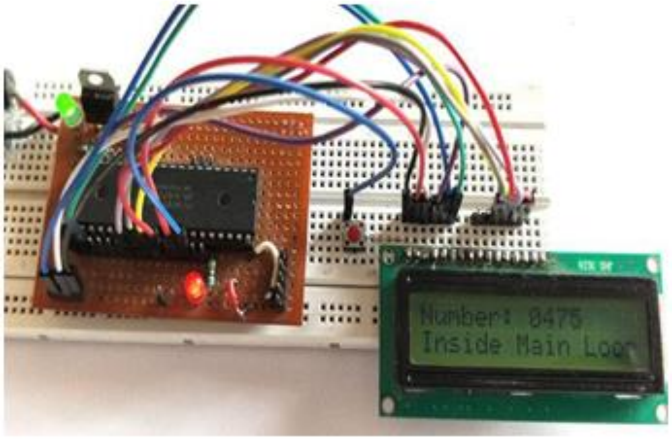


Fig. 4: Hardware Connection Layout

Sensors

What Is Sensor..?

A sensor is a device that detects and responds to some type of input from the physical environment. The specific input could be light, heat, motion, moisture, pressure, or any one of a great number of other environmental phenomena. The output is generally a signal that is converted to human-readable display at the sensor location or transmitted electronically over a network for reading or further processing.

There are various types of sensors are available in market. They are follows.

- Light, motion, temperature, magnetic fields, gravity, humidity, moisture, vibration, pressure, electrical fields, sound, and other physical aspects of the external environment
- Physical aspects of the internal environment, such as stretch, motion of the organism, and position of appendages (proprioception)
- Environmental molecules, including toxins, nutrients, and pheromones
- Estimation of biomolecules interaction and some kinetics parameters
- Internal metabolic indicators, such as glucose level, oxygen level, or osmolality
- Internal signal molecules, such as hormones, neurotransmitters, and cytokines **.**

Heart Beat Sensor:

Here we are using IR sensor for detecting the HEART BEAT. IR has less noise and ambient light than at normal optical wavelengths. The light is produced only when current passes through in the forward direction and block current in the reverse direction.

Plethysmograph is an infrared photoelectric sensor used to record changes in pulsatile blood flow from the finger. The Plethysmograph operates by recording changes in blood volume as the arterial pulse expands and contracts the microvasculature.

This is a non-invasive measurement for changes in finger blood flow during wakefulness and sleep. Pulse wave amplitude (PWA) is the most

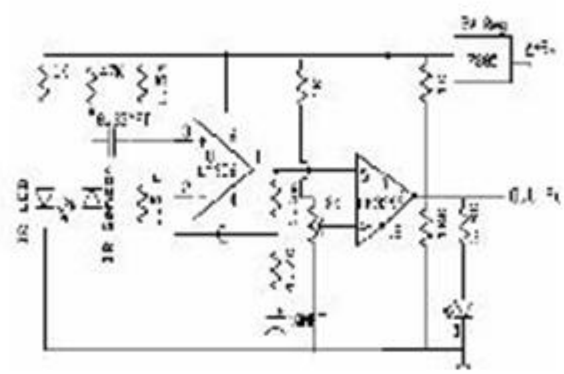


Fig. 5:Circuit Diagram

frequently used parameter obtained by finger plethysmography. PWA is directly and positively correlated to finger blood flow. The hypothesis of this study was that finger plethysmography detects pharmacologically induced changes in finger blood flow, in particular changes induced by stimulation and blockade of vascular a-receptors.

Due to the anatomic structure of the finger we expected that alterations of vascular tone following sympathetic activation or inhibition might be reflected by changes of PWA. A change in finger blood flow, reflected by PWA is derived from the finger plethysmography. PWA derived from finger plethysmography allows continuous, noninvasive measurement of changes in finger blood flow during wakefulness and sleep. Finally, to demonstrate the ability of finger plethysmography to continuously monitor vascular tone, PWA responses to obstructive breathing and concomitant arousal events in patients with obstructive sleep apnea were recorded and analysed.

Applications

- Monitors pulse rate and rhythm.
- Alphanumeric LCD Display.

- Pulse monitoring by sound beeps and LED indication.
- Shows Pulse Rate per minute after every 5 pulse count. 10 or 15 pulse count average also selectable.
- Infra-Red Optical Finger /Ear Lobe Clip sensor.
- Bar Graph to display signal sensitivity.
- 15 Memories.
- Lightweight, Easy to handle, Simple operation.
- Works on power and battery both.
- Recommended for hospitals, small clinics, medical research centers, exercise / workout Gyms and sports activity centers.
- Latest Technology - Very economically priced.

Fig. 6 :Heart beat sensor

Accelerometer Sensor - Adxl335

The ADXL335 is a complete 3-axis acceleration measurement system. The ADXL335 has a measurement range of ±3 g minimum. It contains a polysilicon surface-micromachined sensor and signal conditioning circuitry to implement an open-loop acceleration measurement architecture. The output signals are analog voltages that are proportional to acceleration. The accelerometer can measure the static acceleration of gravity in tilt-sensing applications as well as dynamic acceleration resulting from motion, shock, or vibration.

The sensor is a polysilicon surface-micromachined structure built on top of a silicon wafer. Polysilicon springs suspend the structure over the surface of the wafer and provide a resistance against acceleration forces. Deflection of the structure is measured using a differential capacitor that consists of independent fixed plates and plates attached to the moving mass. The fixed plates are driven by 180° out-of-phase square waves. Acceleration deflects the moving mass and unbalances the differential capacitor resulting in a sensor output whose amplitude is proportional to acceleration. Phase-sensitive demodulation techniques are then used to determine the magnitude and direction of the acceleration. The demodulator output is amplified and brought off-chip through a 32 kΩ resistor. The user then sets the signal bandwidth of the device by adding a capacitor. This filtering improves measurement resolution and helps prevent aliasing.

Mechanism

The ADXL335 uses a single structure for sensing the X, Y, and Z axes. As a result, the three axes' sense directions are highly orthogonal and have little cross-axis sensitivity. Mechanical misalignment of the sensor die to the package is the chief source of cross-axis sensitivity. Mechanical misalignment can, of course, be calibrated out at the system level.

Performance

Rather than using additional temperature compensation circuitry, innovative design techniques ensure that high performance is built in to the ADXL335. As a result, there is no quantization error or nonmonotonic behavior, and temperature hysteresis is very low (typically less than 3 mg over the −25°C to +70°C temperature range).

Power Supply Decoupling

For most applications, a single 0.1 µF capacitor, CDC, placed close to the ADXL335 supply pins adequately decouples the accelerometer from noise on the power supply. However, in applications where noise is present at the 50 kHz internal clock frequency (or any harmonic thereof), additional care in power supply bypassing is required because this noise can cause errors in acceleration measurement. If additional decoupling is needed, a 100 Ω (or smaller) resistor or ferrite bead can be inserted in the supply line. Additionally, a larger bulk bypass capacitor (1 µF or greater) can be added in parallel to CDC. Ensure that the connection from the ADXL335 ground to the power supply ground is low impedance because noise transmitted through ground has a similar effect to noise transmitted through VS

You can use an accelerometer's ability to sense acceleration to measure a variety of things that are very useful to electronic and robotic projects and designs:

- Acceleration
- Tilt and tilt angle
- Incline
- Rotation
- Vibration
- Collision
- Gravity

Acceleration is a measure of how quickly speed Changes.

Fig 7:Micro controller

Just as a speedometer is a meter that measures speed, an accelerometer is a meter that measures acceleration. Accelerometers are useful for sensing vibrations in systems or for orientation applications. Accelerometers can measure acceleration on one, two, or three axis. 3-axis units are becoming more common as the cost of development for them decreases. You can use an accelerometer's ability to sense acceleration to measure a variety of things that are very useful to electronic and robotic projects

Features

- Low Current Consumption: 400 µA
- Sleep Mode: 3µA
- Low Voltage Operation: 2.2 V – 3.6 V
- High Sensitivity (800 mV/g @ 1.5g)
- Selectable Sensitivity (±1.5g, ±6g)
- Fast Turn on Time (0.5 ms Enable Response Time)
- Self Test for Freefall Detect Diagnosis

Applications

- Medical
- Self balancing robots
- Tilt-mode game controllers
- Model airplane auto pilot
- Car alarm systems
- Crash detection/airbag deployment

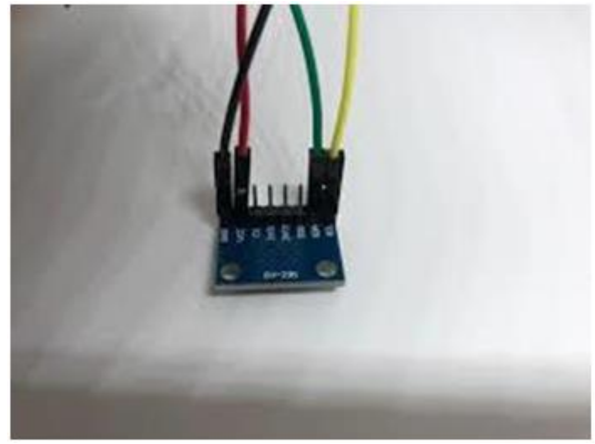


Fig 8:Accelerometer sensor

4.5 Temperature Sensor

The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in ºC). The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified.

Pin Diagram:

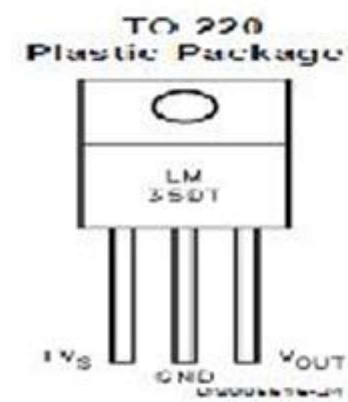


Fig 9:Pin diagram layout

Description

It has an output voltage that is proportional to the Celsius temperature.

- The scale factor is .01V/ºC
- The LM35 does not require any external calibration or trimming and maintains an accuracy of +/-0.4 ºC at room temperature and +/- 0.8 ºC over a range of 0 ºC to +100 ºC.
- Another important characteristic of the LM35DZ is that it draws only 60 micro amps from its supply and possesses a

low self-heating capability. The sensor self-heating causes less than 0.1 ºC temperature rise in still air.

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 ±¼°C at room temperature and ±¾°C over a full -55 to +150°C temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 µA from its supply, it has very low self-heating, less than 0.1°C in still air.

The LM35 is rated to operate over a -55° to +150°C temperature range, while the LM35C is rated for a -40° to +110°C range (-10° with improved accuracy). The LM35 series is available packaged in hermetic TO-46 transistor packages, while the LM35C, LM35CA, and LM35D are also available in the plastic TO-92 transistor package. The LM35D is also available in an 8-lead surface mount small outline package and a plastic TO-220 package

Features:

- Calibrated directly in ° Celsius (Centigrade)
- Linear + 10.0 mV/°C scale factor
- 0.5°C accuracy guarantee able (at +25°C)
- Rated for full −55° to +150°C range
- Suitable for remote applications
- Low cost due to wafer-level trimming
- Operates from 4 to 30 volts
- Less than 60 µA current drain
- Low self-heating, 0.08°C in still air
- Nonlinearity only ±1⁄4°C typical
- Low impedance output, 0.1 W for 1 mA load

Fig. 10: Temperature sensor

V. CONCLUSION AND FUTURE WORK

Conclusion

The comma patients are maintained in the hospital till they come to conscious and it is very expensive to keep them in hospitals and take care.So,we came up with the project named IOT BASED COMMA PATENT OBSERVING SYSTEM where we can take care of the comma patients from the home with the help of the sensors. Sensors like Accelerometer sensor Temperature sensor and Heart beat sensor are wrapped around the body to get the readings. Here the readings are displayed in the 16x2 LCD display.

Future Work

In the future we are going to update the readings in the cloud for every 30 secs.The cloud is centralized so that the data can be distributed to multiple Nodes. Data warning will be given for the Abnormal range.Data filters can be applied ,so that the data will be displayed in the charts.If there is any change in the body condition that particular part will be highlighted. We can also predict the recovery of the patient with the help of the data.

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