

A Conceptual Framework for IOT-Based Healthcare System Using Cloud Computing

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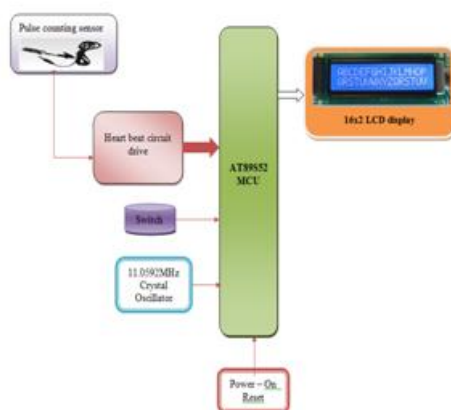
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Abstract:

Internet of Things (IoT) envisions a future in which anything/anyone/any service can be linked by means of appropriate information and communication technologies which will bring technological revolution in the fields of domestics, smart homes, healthcare systems, goods monitoring and logistics. The design and implementation of an IOT-based health monitoring system for emergency medical services which can demonstrate collection, integration, and interoperation of IoT data flexibly which can provide support to emergency medical services like Intensive Care Units(ICU).

Existing System:

This project describes the design of a simple, low-cost microcontroller based heart rate with LCD output. Heart rate of the subject is measured from the thumb finger using IRD (Infra Red Device sensors and the rate is then averaged and displayed on a text based LCD).. The device LCD displaying the heart beat rat and counting values through sending pulses from the sensor



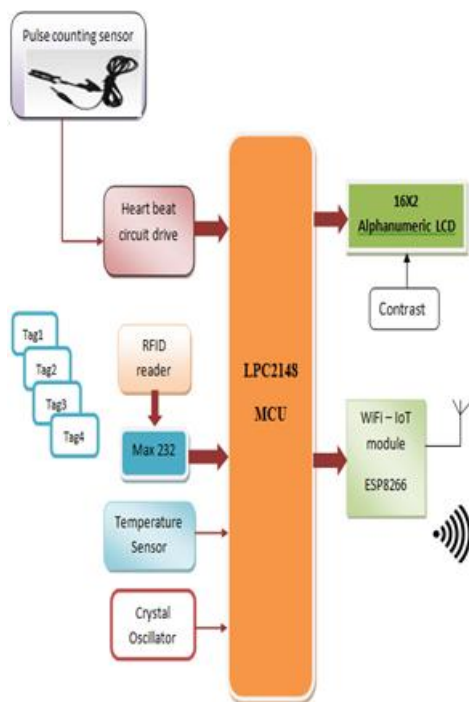
Drawback:

No temperature measurement. Remote monitoring is not possible.

Proposed System:

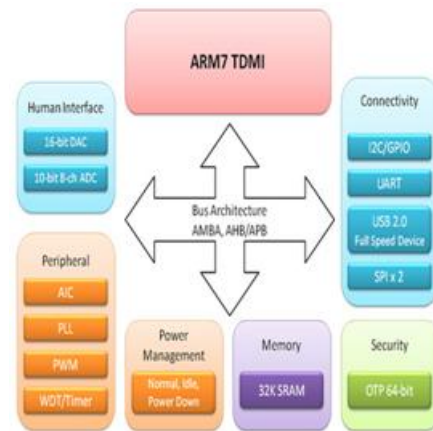
Here the patients are provided with a unique patient ID card. After placing this RFID card near the reader our controller takes the patient details from that RFID card and then the patient condition will be updated using different sensors. This project describes the design of a simple, low-cost controller based patient health monitoring system. Heart rate of the subject is measured from the thumb finger using IRD (Infra Red Device sensors). This instrument employs a simple Op to electronic sensor, conveniently strapped on the finger, to give continuous indication of the pulse digits. A temperature sensor is included to know the patient's temperature.

This project uses LPC2148 as its controller. By reading the values of heart rate controller will display on LCD. Heart beat values will be taken and updated in the web server about the condition of the patient using IoT module interfaced to the controller. The proposed model enables users to improve health related risks and reduce healthcare costs by collecting, recording, analyzing and sharing large data streams in real time and efficiently.

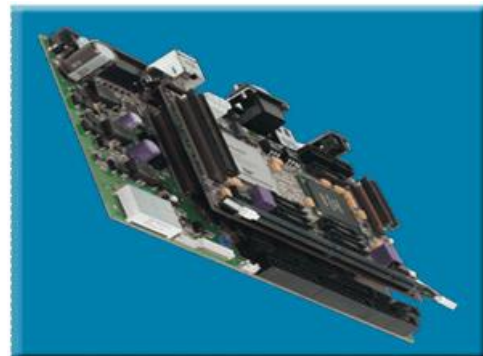


Modules used in this project:

The **LPC2148** are based on a 16/32 bit ARM7TDMI-ST[™] CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal performance penalty. With their compact 64 pin package, low power consumption, various 32-bit timers, 4- channel 10-bit ADC, USB PORT, PWM channels and 46 GPIO lines with up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access control and point-of-sale. With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.



ARM PROCESSOR



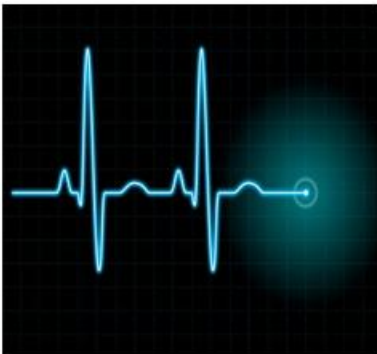
ARM7TDMI Processor Core

- Current low-end ARM core for applications like digital mobile phones
- TDMI
 - T: Thumb, 16-bit compressed instruction set
 - D: on-chip Debug support, enabling the processor to halt in response to a debug request
 - M: enhanced Multiplier, yield a full 64-bit result, high performance
 - I: Embedded ICE hardware
- Von Neumann architecture

Pulse Counting Sensor:

Heart rate is the speed of people's emotional state, exercise intensity and objective indicator of cardiac function. But most people are very difficult to accurately measure the time and his heart rate values.

If the heart rate monitor with me, heart ECG electrodes will be detected by monitoring the signal processing device, the user can at any time that your heart rate changes, changes in heart rate, self-monitoring status.



Heart rate monitor for heart rate range (60 ~ 160) / min. Circuit by adjusting the relevant components, in the (60 ~ 160) / min within the audible alarm can change the heart rate range. This heart rate range the width of the design center values $\pm 20\%$ range. If central values such as emphasis on the 100 / exceptionally, the heart rate signal range (80 ~ 120) / min, if the heart rate exceeds this range, the lower limit, the instrument does not sound, if the heart rate in the range of the instrument ECG is the sound issue.

LM35:

FEATURES DESCRIPTION:

- Calibrated Directly in ° Celsius (Centigrade)
- Linear + 10 mV/°C Scale Factor • 0.5°C Ensured Accuracy (at +25°C) • Rated for Full -55°C to +150°C Range
- Suitable for Remote Applications
- Low Cost Due to Wafer-Level Trimming
- Operates from 4 to 30 V

- Less than 60- μ A Current Drain
- Low Self-Heating, 0.08°C in Still Air
- Nonlinearity Only $\pm 1/4^\circ$ C Typical
- Low Impedance Output, 0.1 Ω for 1 mA Load

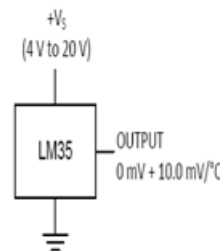
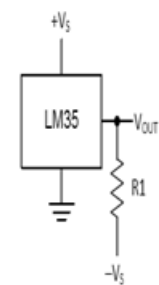


Figure 1. Basic Centigrade Temperature Sensor (+2°C to +150°C)



Choose $R_1 = -V_S / 50 \mu A$
 $V_{out} = 1500 \text{ mV at } 150^\circ C$
 $V_{out} = 250 \text{ mV at } 25^\circ C$
 $V_{out} = -550 \text{ mV at } -55^\circ C$

Figure 2. Full-Range Centigrade Temperature Sensor

INTERNET OF THINGS:

Internet is helping people to communicate each other using different applications



Internet of things helps the things to communicate each other using IoT module

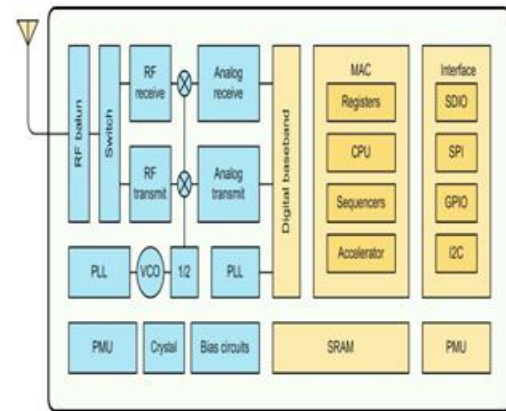
ESP8266EX:

- ▶ The Internet of Things (IoT) is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data.



Different Modules:

- ▶ ESP8266(ESPRESSIF)
- ▶ ESP8089
- ▶ ESP6203



Wi-Fi Module:

ESP8266EX offers a complete and self-contained WiFi networking solution; it can be used to host the application or to offload WiFi networking functions from another application processor. When ESP8266EX hosts the application, it boots up directly from an external flash. It has integrated cache to improve the performance of the system in such applications. Alternately, serving as a WiFi adapter, wireless internet access can be added to any micro controller-based design with simple connectivity (SPI/SDIO or I2C/UART interface).

ESP8266EX is among the most integrated WiFi chip in the industry; it integrates the antenna switches, RF balun, power amplifier, low noise receive amplifier, filters, power management modules, it requires minimal external circuitry, and the entire solution, including front-end module, is designed to occupy minimal PCB area. ESP8266EX also integrates an enhanced version of Tensilica's L106 Diamond series 32-bit processor, with on-chip SRAM, besides the WiFi functionalities. ESP8266EX is often integrated with external sensors and other application specific devices through its GPIOs; sample codes for such applications are provided in the software development kit (SDK).



Advantages:

- Ease of operation
- Low maintenance cost
- Fit and forget system
- No wastage of time
- Durability
- Accuracy

Applications:

- Hospitals
- Remote heart rate monitoring applications
- Body temperature Monitoring
- Local monitoring applications
- Designed for Home and Clinical Applications

Conclusion:

Here we have designed a simple, low-cost controller based wireless A Wireless Tracking System for At-home Medical Equipment for patients.

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