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Smart Health Care Diagnosys System

Vamsi Chakravarthy Nannapaneni M.Tech Student, Dept of Electronics & Communication Engineering, QIS College of Engineering & Technology, Ongole, A.P.

ABSTRACT:

The project aims in designing a system which is capable of tracking the location of cardiac patients and also monitoring of heart rate alerts in case of emergency through SMS to predefined numbers Now a day's technology is running with time, it completely occupied the life style of human beings. It is being used everywhere in our daily life to fulfill our requirements. We can not only increase the comfort of life but also increase the health monitoring techniques by making use of advanced technology.

In this project we are making use of technology to sense serious health problems so that efficient medical services can be provided to the patient in appropriate time. This project aims in sending alert messages in emergency times, i.e. when a person is alone in home or travelling and his heartbeat or body temperature rises or lowers then alerting messages will be send to the mobile phone, the message consist of location of that person also. Also, we can get the heart rate of the person by simply sending a pre-defined format SMS.

Here we get the alerting message from the Wi-Fi. The functioning of this device is based on the truth that the blood level circulation during expansion and contraction of heart which can be sensed by Heart beat sensor. Depending upon the rate of circulation of blood per second the heart beat rate per minute is calculated. This device consists of a microcontroller which takes the input from the heart beat sensor and calculates the heart rate of the patient. Ganadi Ramesh Babu Assistant Professor, Dept of Electronics & Communication Engineering, QIS College of Engineering & Technology, Ongole, A.P.

Introduction to Embedded Systems:

Embedded systems are electronic devices that incorporate microprocessors There with in implementations. The main purposes of the microprocessors are to simplify the system design and provide flexibility. Having a microprocessor in the device means that removing the bugs, making modifications, or adding new features are only matters of rewriting the software that controls the device.

Or in other words embedded computer systems are electronic systems that include a microcomputer to perform a specific dedicated application. The computer is hidden inside these products. Embedded systems are ubiquitous. Every week millions of tiny computer chips come pouring out of factories finding their way into our everyday products.

Embedded systems are self-contained programs that are embedded within a piece of hardware. Whereas a regular computer has many different applications and software that can be applied to various tasks, embedded systems are usually set to a specific task that cannot be altered without physically manipulating the circuitry.

Another way to think of an embedded system is as a computer system that is created with optimal efficiency, thereby allowing it to complete specific functions as quickly as possible.



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BLOCK DIAGRAM:



ARM Microcontroller: LPC2148:

The LPC2141/42/44/46/48 microcontrollers are based on a 16-bit/32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combine microcontroller with embedded high speed flash memory ranging from 32 kB to 512 kB. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30 % with minimal performance penalty. Due to their tiny size and low power consumption, LPC2141/42/44/46/48 are ideal for applications where miniaturization is a key requirement, such as access control and point-of-sale. Serial communications interfaces ranging from a USB 2.0 Full-speed device, multiple UARTs, SPI, SSP to I2C-bus and on-chip SRAM of 8kB up to 40kB, make these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high processing power. Various 32-bit timers, single or dual 10-bit ADC(s), 10-bit DAC, PWM channels and 45 fast GPIO lines with up to nine edge or level sensitive external interrupt pins make these microcontrollers suitable for industrial control and medical systems. The application program may also erase and/or program the flash while the application is running, allowing a great degree of flexibility for data storage field firmware upgrades, etc.



ARM7TDMI-S processor has two instruction sets: The standard 32-bit ARM set.

• A 16-bit Thumb set.

The Thumb set's 16-bit instruction length allows it to approach twice the density of standard ARM code while retaining most of the ARM's performance advantage over a traditional 16-bit processor using 16bit registers. This is possible because Thumb code operates on the same 32-bit register set as ARM code. Thumb code is able to provide up to 65 % of the code size of ARM, and 160 % of the performance of an equivalent ARM processor connected to a 16-bit memory system. The particular flash implementation in the LPC2141/42/44/46/48 allows for full speed execution also in ARM mode. It is recommended to program performance critical and short code sections (such as interrupt service routines and DSP algorithms) in ARM mode. The impact on the overall code size will be minimal but the speed can be increased by 30% over Thumb mode.

Power supply:

In this project we have power supplies with +5V & -5V option normally +5V is enough for total circuit. Another (-5V) supply is used in case of OP amp circuit .Transformer primary side has 230/50HZ AC voltage whereas at the secondary winding the voltage is step downed to 12/50hz and this voltage is rectified using two full wave rectifiers .the rectified output is given to a filter circuit to fiter the unwanted ac in the signal After that the output is again applied to a



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regulator LM7805(to provide +5v) regulator. Whereas LM7905 is for providing –5V regulation (+12V circuit is used for stepper motors, Fan and Relay by using LM7812 regulator same process like above supplies.)Do not use the word "essentially" to mean "approximately" or "effectively". In your paper title, if the words "that uses" can accurately replace the word "using", capitalize the "u"; if not, keep using lower-cased.

16 * 2 Alphanumeric LCD:

Liquid crystal display is very important device in embedded system. It offers high flexibility to user as he can display the required data on it. A liquid crystal display (LCD) is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals (LCs). LCs do not emit light directly. LCDs therefore need a light source and are classified as "passive" displays. Here the lcd has different memories to display data, those are discussed below. Display data RAM (DDRAM) stores display data represented in 8-bit character codes. Its extended capacity is 80 X 8 bits, or 80 characters. The area in display data RAM (DDRAM) that is not used for display can be used as general data RAM. So whatever you send on the DDRAM is actually displayed on the LCD. For LCDs like 1x16, only 16 characters are visible, so whatever you write after 16 chars is written in DDRAM but is not visible to the user.Figure below will show you the DDRAM addresses of 2 Line LCD.

SERIALCOMMUNICATION:

Computers transfer data in two ways: parallel and serial. In parallel data transfers, often 8 or more lines (wire conductors) are used to transfer data to a device that is only a few feet away. Examples of parallel transfers are printers and hard disks; each uses cables with many wire strips. Although in such cases a lot of data can be transferred in a short amount of time by using many wires in parallel, the distance cannot be great. To transfer to a device located many meters away, the serial method is used. In serial communication, the data is sent one bit at a time, in contrast to parallel communication, in which the data is sent a byte or more at a time. The 8051 has serial communication capability built into it, thereby making possible fast data transfer using only a few wires. When a microprocessor communicates with the outside world, it provides the data in byte-sized chunks. In some cases, such as printers, the information is simply grabbed from the 8-bit data bus of the printer. This can work only if the cable is not too long, since long cables diminish and even distort signals. Furthermore, an 8-bit data path is expensive. For these reasons, serial communication is used for transferring data between two systems located at distances of hundreds of feet to millions of miles apart. The Figures shows serial versus parallel data transfers.

TEMPERATURE SENSOR:

Temperature Sensor which converts temperature value into electrical signals. We used IC called LM 35 as a temperature sensor. LM35 series sensors are precision integrated-circuit temperature sensors whose output voltage is linearly proportional to the Celsius temperature. The LM35 requires no external calibration since it is internally calibrated. The LM35 does not require any external calibration or trimming to provide typical accuracies of $\pm 1/4^{\circ}$ C at room temperature and $\pm 3/4^{\circ}$ C over a full -55 to $+150^{\circ}$ C temperature range.



LM35

LM35 is precision integrated circuit temperature sensor. Its output voltage is linearly proportional to temperature (in Celsius).

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 $\pm 1/4$ °C at room temperature and $\pm 3/4$ °C over full -55 to +150°C temperature range.



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Pu/se Oximetry Sensor:

Pulse Oximetry is fast, non-invasive, easy to use and continuous method for measuring the oxygen saturation (Sp02) and Heart Rate. Oxygen Saturation means how much oxygen dissolved in blood, based on dection of Hemoglobin and Deoxy hemoglobin and Heart Rate means number of the heart can contracts in a period of one minute. Two different Light Wavelengths 660nm (red light spectrum) and 940 nm [10] (infrared light spectrum) are used to determine the actual dissimilarity in the absorption spectrum of HbOz and Hb. A photo detector in the sensor receives the non-absorbed light from the LEDs. This signal is inverted using an OpAmp and result signal like Figure 2. This signal represents the light that has been absorbed by the finger is separated in a DC and AC component. The DC part represents the light absorption of the venous blood, tissue and nonpulsatile arterial blood. The AC part represents the pulsatile arterial blood. The pulse oximeter analyzes the light absorption of two wavelengths from the pulsatile-added volume of oxygen rated arterial blood (ACIDC) and absorption ratio using equation

Wireless Network Technology: Embedded Serial to Wi-Fi Modules



Wifi stands wireless fidelity Wireless technology has become common in modern society .It can be used in many application because the power consumption is very less expensive . It is very simple ,reduces wiring harness compare with the olden devices .wifi module efficiently transmit data up to 100 meters compare with the blue tooth the range of wifi is very high. This is the one of the standard protocol to transmit the data the IEEE 802.11.b.g/n and in the wireless application it can place special role by using this Wi-Fi we connect the network anywhere, if you know the encryption password you can access easily monitoring everything on the internet. In the early 2007, embedded serial to Wi-Fi modules have become eagerly obtainable in public consumer markets. Each brand boasts similar features such as low power consumption and onboard wireless encryption or firewall security. The following section will investigate two embedded serial to Wi-Fi modules currently available on the market. Embedded serial to Wi-Fi modules function as device servers bridging serial devices to 802.11b/g wireless LANs. The Wireless-fidelity modules utilize RS232 serial ports in conjunction with UART to interact with serial machines. Some Wi-Fi modules such as the Wireless fidelity employ custom serial protocols .Additionally the modules are prepared with programmable processor chipsets with an OS that coordinates the data transfer between serial and Internet protocols. The Wi-Fi modules attach to wireless access points by utilize a built-in wireless adapter.

The typical embedded serial to Wifi module is designed for somewhat simple installation. The attachments involve a Data bus 9 pass end to end serial cable that links the module to a serial port terminal. For most modules, power is supplied by a 4 -12v dc voltage un fettered , 3.3V regulated, or in some cases 2-3 V low down power battery sources. Initially, users must configure the module by connecting to a PC and utilizing the provided installation software prior to connecting the module to a serial module to controller device.



What's New in µVision4?

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Configuration Wizard for dialog based startup and debugger setup. μ Vision3 is fully compatible to μ Vision4 and can be used in parallel with μ Vision4.

What is **µVision4**?

 μ Vision3 is an IDE (Integrated Development Environment) that helps you write, compile, and debug embedded programs. It encapsulates the following components:

•A project manager.

•A make facility.

•Tool configuration.

•Editor.

•A powerful debugger.

To help you get started, several example programs (located in the C51Examples, C251Examples, C166Examples, and ARM..., Examples) are provided.

•HELLO is a simple program that prints the string "Hello World" using the Serial Interface.

•MEASURE is a data acquisition system for analog and digital systems.

•TRAFFIC is a traffic light controller with the RTX Tiny operating system.

•SIEVE is the SIEVE Benchmark.

•DHRY is the Dhrystone Benchmark.

•WHETS is the Single-Precision Whetstone Benchmark.

Additional example programs not listed here are provided for each device architecture.

Building an Application in µVision4

To build (compile, assemble, and link) an application in μ Vision4, you must:

1. Select Project –

(forexample,166\EXAMPLES\HELLO\HELLO.UV4).

2. Select Project - Rebuild all target files or Build target.

 $\mu Vision4$ compiles, assembles, and links the files in your project.

Conclusion:

The project "SMART HEALTH CARE DIAGNOSYS SYSTEM "has been successfully designed and tested Integrating features of all the hardware components used have developed it. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced IC's and with the help of growing technology the project has been successfully implemented.

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