



ADVANCE TECHNOLOGY IN HEALTH CARE MONITORING SYSTEM USING WIRELESS COMMUNICATION

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ABSTRACT:

Wireless-sensor-network-based home observation system for aged activity behavior involves practical assessment of daily activities. During this paper, we have a tendency to according a mechanism for estimation of aged well-being condition supported usage of house-hold appliances connected through varied sensing units. We have a tendency to outline to new health functions to work out the standing of the aged on playing essential daily activities. The developed system for observation and analysis of essential daily activities was tested at the homes of for completely different aged persons living alone and also the results area unit encouraging in deciding health of the aged.

Keywords: Activities of daily living, elder care, home observance, smart home, wellness, wireless device network.

1. INTRODUCTION:

Wireless-sensor-network-based home observance system for senior activity behaviour involves useful assessment of daily activities. we have a tendency to reported a mechanism for estimation of senior well-being condition supported usage of house-hold appliances connected through varied sensing units. Associate intelligent home observance system supported ZigBee wireless sensors network has been designed and developed to watch and assess the well-being of the senior

Living alone in an exceedingly home atmosphere. Welfare of senior will be evaluated for prognostication unsafe things throughout observance of standard activities. The intelligent software package, in conjunction with the electronic system will monitor the usage of various house appliances and acknowledge the activities to see the well-being of the senior. Also, the system interprets all the essential senior activities like making ready breakfast/lunch/dinner, showering, rest-room use, dinning, sleeping and self grooming. Basically, the system operate supported the usage knowledge of electrical and non-electrical appliances among a

home. At the hardware level, wireless device network with ZigBee elements are connected within the kind of network topology, and a central organizer of the sensing units collect knowledge from the sensors connected to numerous appliances. During this system, a needed range of sensors for observance the daily activities of the senior are used. a sensible device organizer collects knowledge from the sensing units and forward to the pc system for processing. Collected device knowledge are of low level data containing solely standing of the device as active or inactive and identity of the device. To sense the activity behaviour of senior in real time, subsequent level software package module can associatealyze the collected knowledge by following an intelligent mechanism at varied level of knowledge abstraction supported time and sequence behaviour of device usage.

A. summary of the System

Block diagram:

Patient section:

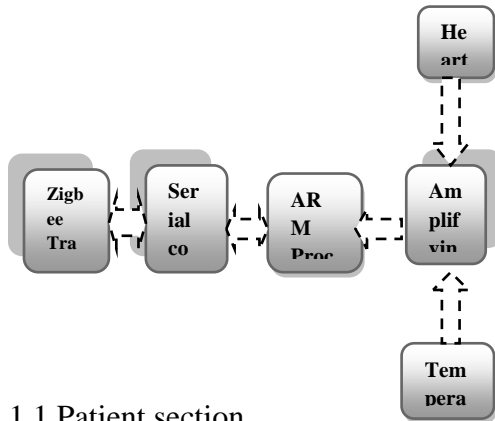


Fig 1.1 Patient section

Above diagram representing the patient section, in this we have a tendency to be unceasingly observance the patient data by victimization wireless device networks, i.e., Temperature and heart beat of patient. Which data we are able to forward to the room section by victimization Zigbee technology.

Control room section:

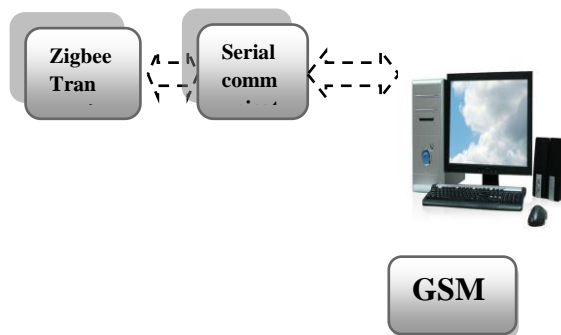


Fig 1.2 Control Room section

From patient section we have a tendency to transferring the knowledge that's received by room section through Zigbee and in laptop it'll check and if any condition occurs it'll send SMS to user by victimization GSM technology.

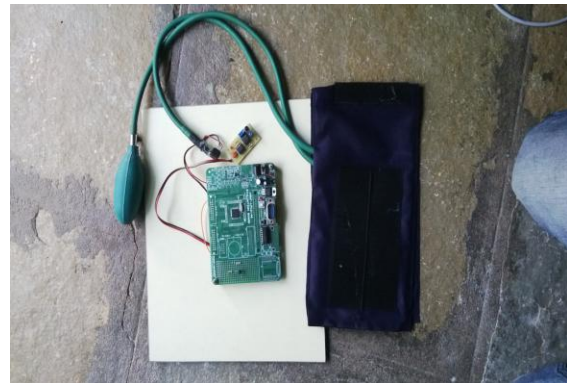


Fig: Patient section using ARM

B. Micro Contoller (ARM7) FAMILY

The ARM7 family includes the ARM7TDMI, ARM7TDMI-S, ARM720T, and ARM7EJ-S processors. The ARM7TDMI core is that the industry’s most generally used 32-bit embedded architecture microchip resolution. Optimized for price and power-sensitive applications, the

ARM7TDMI resolution provides the low power consumption, small size, and high performance required in transportable, embedded applications.

The ARM7TDMI-S core is that the synthesizable version of the ARM7TDMI core, out there in each VERILOG and VHDL, prepared for compilation into processes supported by in-house or commercially out there synthesis libraries. Optimized for flexibility and that includes a uniform feature set to the arduous macro cell, it improves time-to-market by reducing development time whereas permitting accumulated style flexibility, and sanctioning & get 98% fault coverage. The ARM720T arduous macro cell contains the ARM7TDMI core, 8kb unified cache, and a Memory Management Unit (MMU) that enables the employment of protected execution areas and store. This macro cell is compatible with leading operational systems as well as Windows metal, Linux, palm OS, and SYMBIAN OS.

The ARM7EJ-S processor may be a synthesizable core that gives all the advantages of the ARM7TDMI – low power consumption, small size, and {also the} thumb instruction set – whereas also

incorporating ARM’s latest DSP extensions and Jazelle technology, sanctioning acceleration of java-based applications. Compatible with the ARM9™, ARM9E™, and ARM10™ families, and Strong-Arm® design software package written for the ARM7TDMI processor is 100 percent binary-compatible with different members of the ARM7 family and forwards-compatible with the ARM9, ARM9E, and ARM10 families, moreover as merchandise in Intel’s robust ARM and scale architectures. This provides designers a selection of software-compatible processors with robust price-performance points. Support for the ARM design these days includes:

- Operating systems such as Windows CE, Linux, palm OS and SYMBIAN OS
- More than 40 real-time operating systems, including qnx, wind river’s vx works

C.LPC2148 MICROCONTROLLER

LPC2148 Microcontroller design. The ARM7TDMI-S may be a general purpose 32-bit microchip, that offers high performance and extremely low power

consumption. The ARM design is predicated on Reduced Instruction Set laptop (RISC) principles, and therefore the instruction set and connected decipher mechanism are abundant easier than those of small programmed complicated Instruction Set Computers (CISC). This simplicity ends up in a high instruction turnout and spectacular period interrupt response from little and cost-efficient processor core.

Pipeline techniques are utilized so all elements of the process and memory systems will operate unceasingly. Typically, whereas one instruction is being dead, its successor is being decoded, and a 3rd instruction is being fetched from memory. The ARM7TDMI-S processor additionally employs a singular fine arts strategy called Thumb that makes it ideally suited to high-volume applications with memory restrictions, or applications wherever code density is a problem.

The key plan behind Thumb is that of a super-reduced instruction set. Primarily, the ARM7TDMI-S processor has 2 instruction sets:

- The normal 32-bit ARM set.
- A 16-bit Thumb set.

The Thumb set's 16-bit instruction length permits it to approach double the density of ordinary ARM code whereas retentive most of the ARM's performance advantage over conventional 16-bit processor victimization 16-bit registers. This can be attainable as a result of Thumb code operates on an equivalent 32-bit register set as ARM code. Thumb code is ready to supply up to sixty five maximize the code size of ARM, and a hundred and sixty maximize the performance of identical ARM processor connected to a 16-bit memory system



Fig 1.3: ARM evolution Board

D. Heart beat sensors

The device consists of light-weight light-weight a lightweight} supply and photograph detector; light is shone through the tissues and variation in blood volume alters the number of sunshine falling on the detector. The supply and discoverer will be

mounted aspect by aspect to appear at changes in mirrored lightweight or on either aspect of a finger or ear lobe to detect changes in transmitted lightweight. The actual arrangement here uses a wood clothes pin to carry associate below red lightweight emitting diode and a matched phototransistor. The below red filter of the phototransistor reduces interference from fluorescent lights, that have an oversized AC element in their output

The skin could also be well-lighted with visible (red) or infrared LEDs victimization transmitted or mirrored lightweight for detection. The terribly little changes in reflectivity or in transmission caused by the varied blood content of human tissue are virtually invisible. Varied noise sources could turn out disturbance signals with amplitudes equal or perhaps above the amplitude of the heartbeat signal. Valid pulse mensuration thus needs in depth preprocessing of the raw signal.

The setup delineate here uses a red crystal rectifier for transmitted lightweight illumination and a pin Photodiode as detector. With solely slight changes within the preamplifier circuit an equivalent hard- and software package can

be used with different illumination and detection ideas.

The detectors photograph current (AC Part) is born-again to voltage and amplified by affordable operational electronic equipment (LM358). A PIC16F877 microcontroller converts the analog signal with ten bits resolution to a digital signal. a median is calculated from 250 readings confiscate a twenty milliseconds amount (This equals one amount of the emu transmission line frequency of fifty Hz).

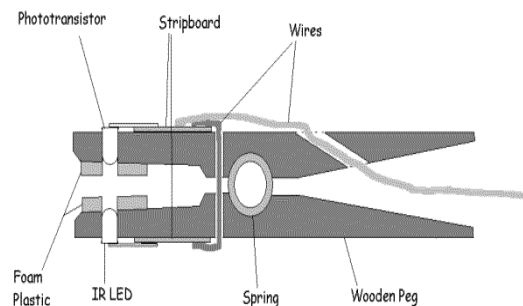


Fig 1.4: a pair of Heart beat sensors

E. Temperature device

The LM35 series are preciseness integrated-circuit temperature sensors, whose output voltage is linearly proportional to the craniologist (Centigrade) temperature. The LM35 therefore has a bonus over linear

temperature sensors label in ° Kelvin, because the user isn't needed to take off an oversized constant voltage from its output to get convenient Centigrade scaling. The LM35 doesn't need any external activity or trimming to supply typical accuracies of $\pm 1/4^{\circ}\text{C}$ at temperature and $\pm 3/4^{\circ}\text{C}$ over a full -55 to $+150^{\circ}\text{C}$ temperature vary. Low price is assured by trimming and activity at the wafer level. The LM35's low output electric resistance, linear output, and precise inherent activity create interfacing to readout or management electronic equipment particularly simple. It will be used with single power provides, or with and and minus provides. Because it attracts solely sixty μA from its provide, it's terribly low self-heating, but zero.1 $^{\circ}\text{C}$ in still air. The LM35 is rated to control over a -55° to $+150^{\circ}\text{C}$ temperature vary, whereas the LM35C is rated for a -40° to $+110^{\circ}\text{C}$ vary (-10° with improved accuracy). The LM35 series is out there packaged in tight TO-46 semiconductor unit packages, whereas the LM35C, LM35CA, and LM35D are out there within the plastic TO-92 semiconductor unit package. The LM35D is additionally out there in associate 8-lead surface mount little define package and a plastic TO-220 package.

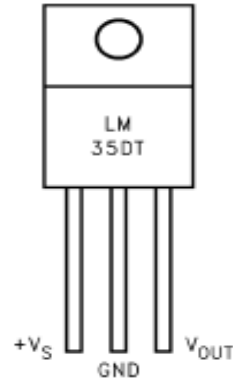


Fig 1.5: Temperature device

Wireless communication

A. GSM Technology

To achieve necessary data of cars, one GSM Module is additional into the automobile security system. Siemens TC35I GSM electronic equipment will quickly send SMS messages to appointed portable or SMS server. That the owner and therefore the police will be knowledgeable at the primary time. If another GPRS module is additional in, the image knowledge might additionally sent to data

GSM electronic equipment will be associate external device or a laptop Card / PCMCIA Card. Typically, associate external GSM electronic equipment is connected to a laptop through a serial cable or a USB cable.

GSM electronic equipment within the kind of a laptop Card / PCMCIA Card is meant to be used with a laptop pc. It ought to be inserted into one in every of the laptop Card / PCMCIA Card slots of a laptop pc. Sort of a GSM portable, GSM electronic equipment needs a SIM card from a wireless carrier so as to control. As mentioned in earlier sections of this SMS tutorial, computers use AT commands to manage modems. Each GSM modems and dial-up modems support a standard set of ordinary AT commands. You'll be able to use GSM electronic equipment a bit like dial-up electronic equipment.



Fig 2 :Gsm Module

H) Sms Commands

- AT+CIMI

Note: scan the IMSI

- AT+CMGS="'+33146290800'"

Note: Send a message in text mode

- AT+CMGR=3

Note: scan it

- AT+CMGD=3

Note: Delete it Note: Message

B. Zigbee module

The Xbee/Xbee-PRO RF Modules are designed to control among the ZigBee protocol and support the distinctive wants of cheap, low-power wireless device networks. The modules need least power and supply reliable delivery of knowledge between remote devices. The modules operate among the belief a pair of.4 gigacycle per second waveband and are compatible with the following:

- XBee RS-232 Adapters
- XBee RS-232 pH (Power Harvester) Adapter
- XBee RS-485 Adapters
- XBee Analog I/O Adapter
- XBee Digital I/O Adapter
- XBee device Adapter

- XBee USB Adapter
- XStick
- Connect Port X Gateways
- XBee Wall Router.

Medical Section

(a).RF transmitter and receiver

Radio Frequency, any frequency among the spectrum related to electromagnetic radiation propagation. once associate RF current is provided to associate antenna, associate magnetic attraction field is formed that then is ready to propagate through area. Several wireless technologies are supported RF field propagation Radio Frequency: the ten rates to three hundred giga cycle per second frequency vary which will be used for wireless communication. Additionally used usually to discuss with the radio radiation generated by the system transmitter, or to energy gift from different sources which will be picked up by a wireless receiver.

The XBee/XBee-PRO ZB computer code unleash will be put in on XBee modules. This computer code is compatible with the ZigBee 2007 specification, whereas the ZNet a pair of.5 computer code is predicated on Ember's proprietary "designed for ZigBee" mesh stack (EmberZNet a pair of.5). ZB and ZNet a pair of.5 computer code are similar in nature, however not over-the-air compatible. Devices running ZNet a pair of.5 computer code cannot ask devices running the ZB computer code.

(b)Transmitter

The TWS-434 very little, and are glorious for applications requiring short-range RF remote controls. The transmitter module is barely 1/3 the scale of a regular stamp, and might simply be placed within a little plastic enclosure.

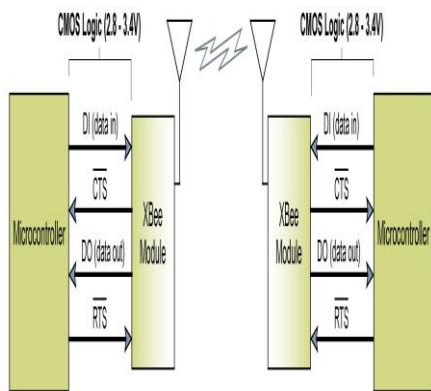
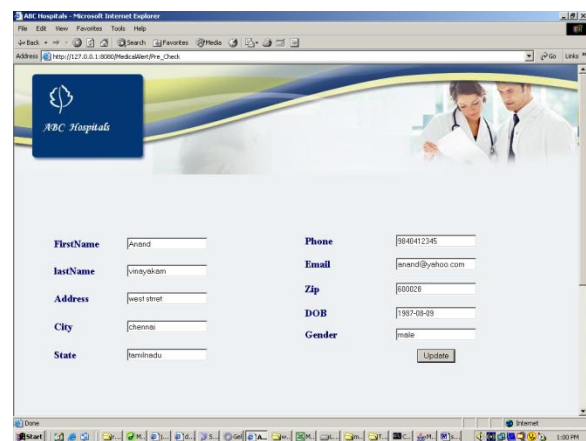
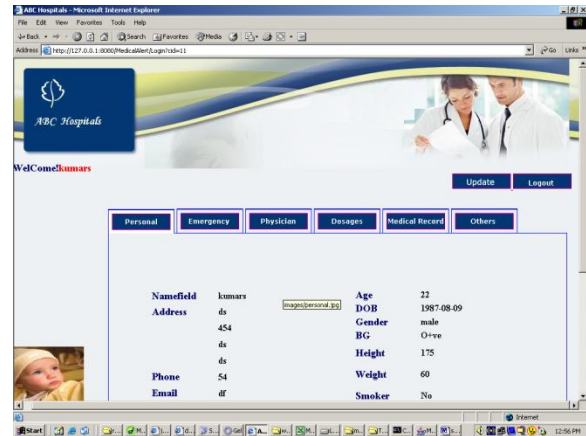


Fig 2.1: Data flow diagram for Zigbee

TWS-434: The transmitter output is up to 8mW at 433.92MHz with a variety of roughly four hundred foot (open area) outdoors. Indoors, the vary is around two hundred foot, and can undergo most walls.RWS-434: The receiver additionally operates at 433.92MHz, and contains a sensitivity of 3uV. The WS-434 receiver operates from four.5 to 5.5 volts-DC, and has each linear and digital output.

Transmitting and receiving:

Full duplex or synchronic two-way operation isn't attainable with these modules. If transmit and receive module are in shut proximity and knowledge is shipped to a far off receive module whereas making an attempt to at the same time receive knowledge from a far off transmit module, the receiver are going to be overlade by its shut proximity transmitter. This can happen even though encoders and decoders are used with completely different address settings for every transmitter and receiver try. If 2 approach communications is needed, solely 0.5 duplex operations is allowed



Screen for Medical knowledge storing

CONCLUSION

In this time, model biotelemetry system is being enforced into operating resolution. However, there's area for enhancements in each idea and implementation details of this method. Model biotelemetry system is presently designed for indoor use by one patient solely. Additional near instances of inner a part of model bio telemetric system managed by single outer part of system are

attainable, however there exists one to 1 mapping between patient and ZigBee network. Future enhancements could embrace support for out of doors operation with communication enforced victimization 3G mobile technology and patient's trailing by GPS system. With advancements in low-power high-density FPGA solutions, FPGA programmable system on chip technology appears to be promising for purpose of this bio telemetric system

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Biography

R.Aravind was born in Karimnagar district, A.P, India. He received B-Tech in Electronics and Communication Engineering from Ganapathy Engineering College, Warangal (dist), A.P, India. Pursuing M. Tech in Embedded Systems at SR Engineering College, Warangal, A.P, India.

Dr. Syed Musthak Ahmed (Prof) completed B.E (Electronics) and M.E (Electronics) from Bangalore University (Karnataka) and PhD from Vinayaka Mission’s University (Tamil Nadu). He has 28 years of teaching experience in reputed engineering colleges and he is presently working as Prof &HOD (ECE), SR Engineering College, Warangal, A.P. He is Doctoral committee member as well as Indian examiner in reputed Universities. He is a member of various professional societies viz SMIEE, MISSS FITEE, MISTE, MIAENG, MIATM. He has various publications in National & International Journal/Conferences.