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Home Based Wireless Health Monitoring System

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ABSTRACT: Home Based Wireless Health Monitoring System give a detailed insight into design and implementation of the system. Biomedical engineering is the application of engineering principles and techniques to the medical field. The development of biomedical engineering is responsible for improving healthcare diagnosis ,monitoring and therapy. The novel idea behind Health line is to provide quality health service to one and all.The idea is driven by the vision of a cable free biomedical monitoring system. On body sensors monitor the vital parameters (blood pressure, ECG, temperature and heart beat rate) and transmits the data to doctors end via wireless communication network. Periodic health monitoring (or preventative care) allows people to discover and treat health problems early, before they have consequences. Especially for risk patients and long term applications, such a technology offers more freedom, comfort, and opportunities in clinical monitoring.The very idea of the health line is to provide service to community. Chronic diseases have a significant influence on healthcare costs and are common among people. Changes in demographic structure and lack of health and social care personnel force us to study new innovations, which could o← er a relief to these challenges. Seniors have to make frequent visits to their doctor to get their vital signs measured. The vital signs include Pulse rate ,Blood pressure,Body temperature ,ECG,etc.

KEYWORDS: Body Sensor Monitor, Vital Parameters, wireless sensor network.

I.INTRODUCTION

The goal of Home Based Wireless Health Monitoring System is to develop a low cost, low power, reliable, non-intrusive,and non-invasive vital signs monitor which collect different type of body parameters and the sampled parameters are wireless transmitted to a health care professional.The main part of our project is to design and build a sensing and data conditioning system to acquire accurate heart rate, ECG, blood pressure, and body temperature readings. After processing of data we have to find a proper method of transmission and signal display.Constant monitoring is also required in case of hospitals where the patients must be under active medical care or under continual observation for longer duration. Even though the patient is not in dangerous situation, the doctors would still need confirmation on their health. In recent times, the expenses for hospitalization and medical care are unimaginably high and expensive. Hence the health policies in countries like USA, UK has shifted its focus from providing reactive, acute care to providing preventive care outside the hospital.

II.METHODOLOGY

The scope of this project is to build a device for individuals over the age of 65 years. This limitation is added to simplify our project and ensure it is achievable with the restricted time and resources available. Since the target subjects for this device are individuals over 65 years of age, the most important feature of this device is that it must be easy to use.The methodology adopted for this project is to use non-invasive sensors to measure heart rate, blood pressure, ECG, and body temperature. The sensors used are inexpensive and are easy to use by the patient. Signal conditioning circuits are designed to filter and amplify the signals to provide desired output. All the components used in these circuits are low powered and inexpensive. The acquired data is sent to PC of health care professional after analog-to-digital conversion (ADC).

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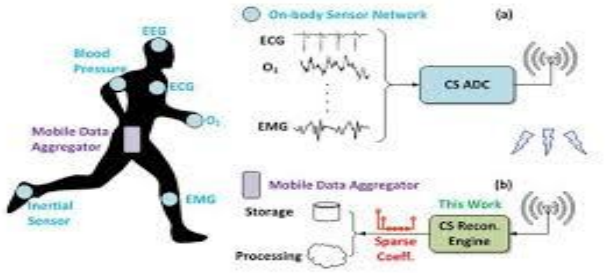

In spite of the improvement of communication link and despite all progress in advanced communication technologies, There is still very few functioning commercial Wireless Monitoring Systems, which are most off-line, and there are still a number of issues to deal with. Therefore, there is a strong need for investigating the possibility of design and implementation of an interactive real-time wireless communication system. In our project, a generic real-time wireless communication system was designed and developed for short and long term GSM Based remote patient monitoring applying wireless protocol.

Fig:GSM Based home security System

The primary function of this system is to monitor the Heart Beat and temperature of the Patient and the Data collected by the sensors are sent to the Microcontroller. Microcontroller and then display the result over the LCD display. If there is a dangerous change in patient's status a message is sent to the doctor's mobile. Cost reduction pressures and the need for shortened in-patient stays are promoting the use of wireless patient monitoring systems in hospitals & Life line Ambulances. Their contribution to better process management, superior flexibility and increased efficiency within hospitals is further underlining the appeal of wireless networking options for patient monitoring systems.

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This device can be used in lifeline ambulance to monitor patient's conditions before reaching hospitals. By this doctor can understand the present condition of the patient before reaching the hospital. Thus doctor can arrange for any immediate necessities for patient. This can also be used in ICU, CCU, MICU & POCCU in hospitals where the condition & pulse rate monitoring of patient is necessary. With the advanced flexible PCB technology & SMT we can make devices suitable to embed with patient's body so that doctor can monitor the patient even if he is in the remote area.

III .SYSTEM DESIGN

The Health Tracker 2000 combines wireless sensor networks, existing RFID (Radio Frequency Identification) and Vital Sign Monitoring technology to simultaneously monitor vital signs while keeping track of the users' location. The use of wireless technology makes it possible to install the system in all types of homes and facilities.Radio frequency waves can travel through walls and fabric, sending the vital sign and location information to a central monitoring computer via a miniature transmitter network. Such information can easily be accessed from any location over the Internet.

(A)RF Wireless Transceiver and Receiver

An RF wireless transceiver system is designed in this case study. The transmitter system is a onestage Intermediate frequency (IF) superheterodyne transmitter, with a baseband frequency of 300MHz. The receiver uses a two stage IF downconverter, downconverting the RF first to1000MHz and finally to 300MHz. The received power at PORT2 is 10.402dBm. Analysesshowed that as the link distance increased from 0.5-2.5Km, the received power decreased from16.054-2.538 dBm; the decrease is almost linear. Also, a linear increase in Transmitter antennagain (TxGain) with received power (IFout). From budget power gain analysis, link1 showed thehighest loss in power while amp2 showed the highest gain. Link1 and Amp2 showed a highcontribution in noise figure (6.380 and 19.015) to the system.

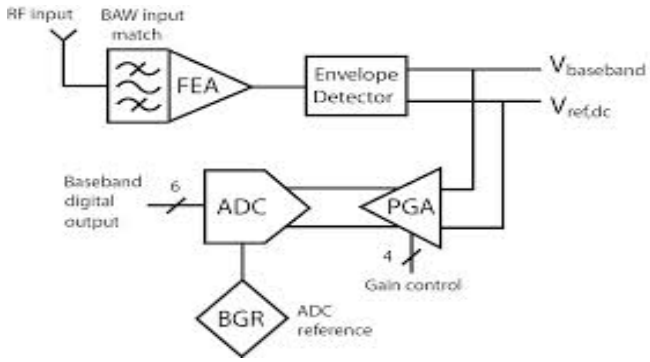

Fig: RF wireless transceiver system

A transceiver is any device comprising both a transmitter and a receiver which are combined andshare common circuitry or a single housing. The figure below shows the block diagram of an RFwireless Transceiver, showing the transmitter, wireless link and the receiver. Transceivers enableduplex communication modes (half or full). Various applications of transceivers includeWLANs, GPS, RF-Identification systems (RF-IDs), Home Satellite Networks,GSM,Satellite Phones ,Blue tooth devices , Pagers etc.Transceivers circuits are implemented with IC chip in a drive towards miniaturaization ,cost and linearity.

(B) MEMS WIRELESS MONITORING SYSTEM

Norwood, MA (06/04/2013) - Analog Devices, Inc. (ADI) today introduced a wireless vibration sensing system that allows industrial systems operators to remotely monitor production equipment health, improve system performance, and reduce maintenance costs. The new networked system includes the ADIS16229 iSensor® wireless vibration sensor node, which combines dual-axis digital MEMs (micro-electro mechanical systems) acceleration sensing with advanced frequency-domain and time-domain signal processing. The sensing system also includes the ADIS16000 gateway node, which supports up to six ADIS16229 sensors at one time using a proprietary wireless

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protocol, managed through an SPI interface compatible with most embedded processor platforms. The wireless function enables the remote monitoring of equipment in hard to reach or dangerous locations, while the vibration sensing and detection node is easy to install into existing infrastructure and allows continual monitoring that can be used to evaluate equipment performance and schedule predictive maintenance.

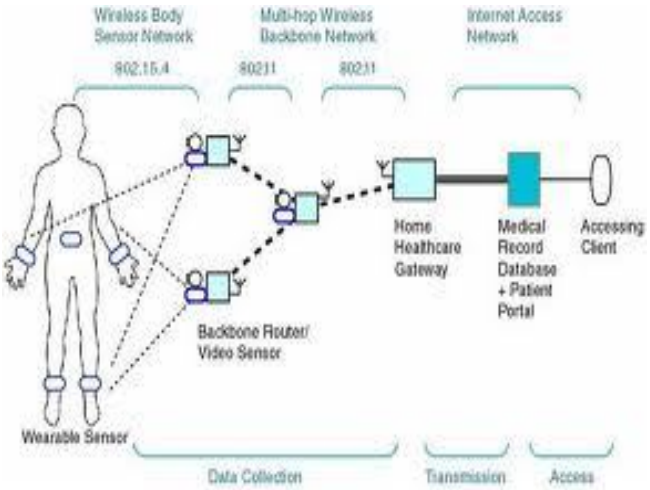
The primary driver of predictive maintenance is the reduction of factory system downtime, which currently relies on periodic off-line performance trend analysis," said Bob Scannell, iSensor business development manager, MEMS/Sensors Group, Analog Devices. "With MEMS-based vibration sensors that continuously monitor machine tools, turbines, pumps, conveyors, compressors, engines and other equipment, factory operators receive real-time statistical performance data and process control feedback that allow them to prevent costly system shut-downs."

Download data sheet, view product page, order samples and evaluation boards: ADIS16229 To learn more about improving industrial control using MEMS inertial sensors visit: MEMS Sensors More About the ADIS16229 and ADIS16000 The ADIS16229 is a complete sensor node featuring a MEMs vibration sensor, an RF transceiver, and embedded frequency and time domain signal processing. The device captures shifts in equipment performance through direct analysis and reporting of the frequency-domain signature using a 512-point, real-valued FFT (fast Fourier transform), FFT magnitude averaging, and programmable spectral alarms. An FFT record storage system offers users the ability to track changes over time and capture FFTs with multiple decimation filter settings.

The ADIS16000 gateway node wirelessly connects with up to six sensor nodes, and then interfaces with most embedded processor platforms, through a standard SPI interface.

ADIS16229 and ADIS16000 Key Features

(i) MEMS wireless vibration system: 862 MHz to 928 MHz
(ii) Sensor node (ADIS16229): Dual-axis, ±18g MEMS accelerometer
(iii) 5.5k-Hz resonant frequency
(iv) Sample rate up to 20 kSPS
(v) Programmable wake-up capture, update cycle times
(vi) Internal self-test, with status flags
(vii) Single-supply operation: 3.0 V to 3.6 V
(viii) Gateway node (ADIS16000)
(ix) SPI to RF function- Manage up to 6 sensor nodes



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IV.CONCLUSION

A wireless communication system is designed and developed for remote patient monitoring. The primary function of this system is to monitor the temperature of a patient's body, and display the same to the doctor through RF communication. In this proposed system transmitting module continuously reads patient's body temperature through a digital temperature sensor, displays it on the LCD screen and sends it to the microcontroller which transmits the encoded serial data over the air by RF (radio frequency) through an RF module.At the receiving end, a receiver is used to receive the data, decode it and feed it to another microcontroller which is then displayed on an LCD screen.

The receiver module is kept in the doctor's chamber to continuously display the patient's body temperature wirelessly. This paper presents a newly designed integrated wireless monitoring system that supports real-time data acquisition from multiple wireless sensing units. The selected wireless transceiver consumes relatively low power and supports long-distance peer-to-peer communication. In addition to hardware, embedded multithreaded software is also designed as an integral component of the proposed wireless monitoring system. A direct result of the multithreaded software paradigm is a wireless sensing unit capable of simultaneous data collection, data interrogation and wireless transmission. A reliable data communication protocol is designed and implemented, enabling robust real-time and near-synchronized data acquisition from multiple wireless sensing units

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BIOGRAPHY

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