

Multipurpose Mobile Based Health Care System by using Wearable Technology

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Abstract— The worth of aid is increasing throughout the globe. While not tumultuous changes, an outsized a part of the population in several developed countries cannot be quick to acquire sustenance of health by 2040. A district of the answer can return from concentrating on preventative. Having personal tools at everyone's distributes will which is capable to aid households to watch over their health and to vary their reactions can alter unwellness hindrance. Management of human weight and managing stress area unit to social relative challenges wherever an activity amendment will have large worth of savings. It's planned that it's shown, however wearable sensing element devices are a unit ready to cite health parameters and reports to native homeowners utilize and remote utilizes like doctors, home, and so along

It is projected that a scheme for remote observing the respiration of people that may presence at the existence of respiration rate and a fusion of respiratory and establish coughing events, Temperature, etc. The Shimmer platform having an MCU with few ADC inputs that area unit worn to attach the sensors, and Bluetooth. The data from the sensors is transmitted wirelessly to a utilize mobile via Bluetooth for native observance and so more transmitted to server for remote observing. The information will then be processed and analyzed in period.

Keywords: MCU-micro controller unit, MMHCS-Location-based mobile health care System.

1. INTRODUCTION

The rising value of in-bed hospitalization and therefore the recent technological advances in low-power microcircuit sensors as well as the introduction of capable power protocols like Bluetooth and GPRS has attracted researchers to check the institution and usage of wireless networks as a vehicle for transmission patients' connected data while not the necessity to confine them to a foundation Wireless primarily based non-confining observance systems improve the standard of life for the patients whereas serving to as a price effective answer to the matter of health care observance that's folded with the raise within the population old.

Wireless technology is an intelligent pursuit system has become a preferred analysis with the event of communication result. folks area unit utilizing the deserves of embedded system into observance and system for an intelligent aid system attributable to numerous advantages. For many, the term 'wireless' is daunting as a result of it brings forth a full lexicon of extra terms and acronyms like Wi-Fi, 2G, 3G, GPRS and Bluetooth that area unit new and alarming. aid service is furnished to endlessly collect medicine signals from multiple locations. To scrutinize and valuate the center Beat Rate signals in immediate, here mobile device is employed as a mobile observance terminal.

Monitoring parameters of temperature and humidness is a very important means that for getting high-quality surroundings. Health observance is a good technique so as to avoid interference surroundings and improve potency by remotely. Health information area unit being coordinated into the aid cloud handling service (Web server system and internet server dataset) to ensure a immaculate aid observance system and anytime and anyplace coverage of network affiliation is out there. beside an internet page application, check-up information area unit simply approached by medical professionals or relatives. The system demonstrates superior accessibility of off-site and latest patient information, which may facilitate sight health issues early and maintain old patients out of the hospital room, so providing a far better and extra widespread aid cloud handling service. GPRS is wireless network with special concurrence. it's elevated prices, onerous to be developed and therefore the coverage signal are going to be finite. WSN give out with the big prices of wiring, WSN technologies area unit most fitted for health care applications comparison with Wi-Fi and Bluetooth.

2. PROPOSED MODEL

The proposed system is a location-based mobile health care system (MMHCS) is to help out hospitals and doctors to monitor their breathing and heartbeat of patients. In the emergency position, this proposed system can smooth the

progress of heartbeat and respiration of patients to locate the nearest healthcare points (HP).

MMHCS consists of three main subsystems:

- (1) A monitoring scheme for the heartbeat and respiration of patient
- (2) A system to track the position of the heart rhythm and respiration of patients in emergency situations.
- (3) Monitoring and guide them to the nearest hospital for Emergency Medical Services (EMS).

This involves a Bluetooth-enabled wireless network of various body parameter sensors [e.g. Respiration, electrocardiogram (Heart Beat Rate) and temperature] that can transmit with the mobile device (a cellular phone or PDA). The heart beat rate is from Bluetooth-compliant and transmits via mobile telephone to the PAN, operating in a slave point-to-point configuration. Wearable jacket computed all sensors attached to a human body with Battery 6v Ni-Cd 2500 mAh Size C, our proposed constitution is very small that is readied into the wearable jackets.

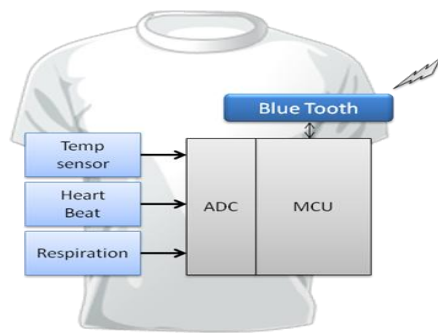


Figure1 Represents the proposed model of MMHCS

3.SYSTEM DESCRIPTION

The system is intended and built using the temperature sensor, heart beat monitor sensor, respiration sensor and memos, ADC, PIC16F88 Micro controller. *Architecture of MMHCS is expressed in Fig.2 consists of Sensors (the MMHCS Wearable Device, and any additional devices), a mobile phone with the Mobile Patient Application (MPA) to transmit information from the sensors to the waiter, a Server to take delivery and store the data and the doctor Application that displays the data to the primary care provider.* Both the *Wearable device* and the *MPA* are designed to trace health parameters over time and cushion them until they can be uploaded to the *Server*. This buffering emulsion enables the patient to use the *Wearable device* to trace data without suffering to be within range of the mobile phone. The temperature detector is utilized to evaluate the surrounding area temperature. Beats per Minute (BPM) rate. It works using the principle of light modulation of blood flow through the digit at each round. For determining the patient's activity and watching against the possibility of falling down, The accelerometer is used in order to find out whether the patient is stable and is in the right place (standing or sitting) or has fallen drop (sudden vertical change of the place). Monitoring & transmitting as shown in Fig3.

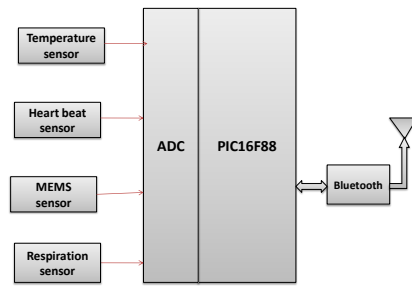


Fig 2: Represents architecture of MMHCS

Fig3: Represents way of monitoring& transmitting of proposed system



4.Temperature sensing element

Temperature watching and management is very important in industrial surroundings. Sensing components are usually used for the dimension of temperature. Normally, a temperature sensing element alters the temperature into a corresponding voltage output of a detector. Here we have a tendency to specify a straightforward temperature mensuration and show system supported sensing element and PIC16F88 microcontroller. The temperature in degrees stargazer is incontestable on a wise mobile screen.

The key characteristics of this method are:

- Continuous watching of temperature with 1-second update interval (which may be modified within the course of study)
- Temperature mensuration victimisation exactitude integrated-circuit sensing element
- Precise analogue-to-digital conversion victimisation intrinsic 10-bit analogue- to-digital converter (ADC) of PIC16F88 microcontroller.

5. RESPIRATION SENSOR:

Whereas the respiration sensing element is routinely referred to as a stock gauge, the Thought Technology sensing element doesn't use Associate in Nursing actual gage to judge ventilation. The Respiration sensing element is sensitive to enlarge. once strapped around a client's chest or belly, it'll renovate the growth and contraction of the skeletal structure or abdominal space, to increase and go forth out of the signal on the sieve. The respiration signal may be a relative assess of chest growth, so at that amount aren't any commonplace units

of evaluating for breath. From the first signal gesture kind, the software system is ready to estimate the respiration rate and relative breath amplitude.

6. BLUETOOTH

The speedy development within the telecommunication field and mobile technology has accelerated up the introduction of telemedicine as a viable and reliable chance. Recent work includes victimisation Bluetooth technology including the GPRS technology to detail symbols to PDAs control by the patient or his doctor. perceptive supported radical wideband-based personal space networks got Associate in Nursing branch of knowledge framework for a arrangement that utilizes mobile techniques to wirelessly keep the guts Beat Rate of viscus patients. The performance matter, and describes the system design of a Bluetooth sensing element network for patient watching, compared to Bluetooth (HC-05), GPRS provides higher network flexibility and a much better transmission vary with low power use. Recently, GPRS-based wireless networks were tested in numerous applications. the utilization of GPRS and mobile telephones ar in watching old patients with diabetes or heart diseases. A GPRS, WI-Fi nursery system for patient watching was projected. The work bestowed here merely makes an attempt to probe into the pertinence, usefulness, and usefulness of victimisation wireless-GPRS based mostly network in watching the cipher of patients on a hospital floor and encompassing space while not detain them to a layer. The getable resolution is supposed to be each trendy, value economical and hopefully causes bottom intrusion with the patient's quality and mollify. A wearable sensing element unit, taken over to the patient's body, reads and sends away the patient's fatal signals to a conveyable GPRS-based receiver carried around by a nurse or doctor or to a hospital server. additional options embody the deposit of those interpretations during a central information or access via the network.

7. MEMS measuring device

Micro-Electro-Mechanical Systems (MEMS) is a sophisticated technology that has been designed up by leaps and bounds recently. This engineering has extended the standard two-dimensional style of chips; it's these days potential to construct three-dimensional structures into the semiconducting material wafer. The aim of all this is often to assign the ability to assign a complete system onto one semiconductor unit. the rise in micromachining technology; many MEMS may be ready from one 8-inch wafer of semiconducting material. Below is a picture that shows however tiny MEMS ar compared to a dime. as a result of a complete system may be ready this tiny and in such quantities, costs ar condensed for merchandise that incorporate this instrumentation. MEMS also has no touching elements, then they're a lot of additional devoted than a macro system. due to the compact worth and improved responsibility, there's nearly no hope to MEMS, thus it may be may be used for many applications.

This story deals with the topic of micro-electromechanical systems or MEMS. MEMS encompasses the process-based technologies used to fabricate little integrated devices and schemes that integrate functionalities from totally different physical domains into one device. Such devices ar made utilizing a broad vary of technologies having in common the ability to supply social systems with micro-weighing machine and even Nano-scale accuracies. The merchandise direct size from a Few microns to millimeters.

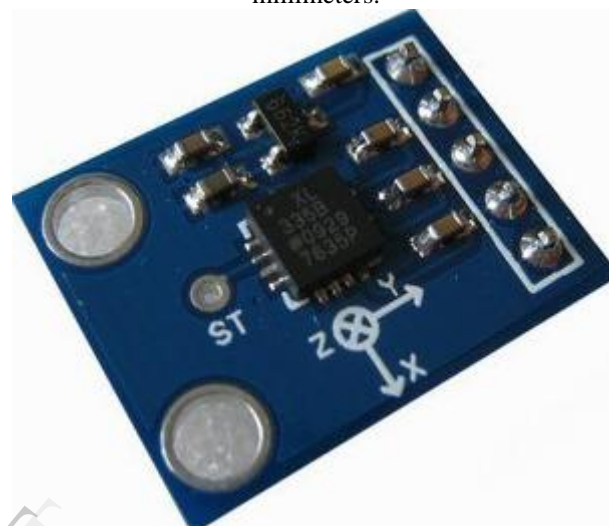


Fig 5: MEMS

8. PIC16F88 MICRO CONTROLLER

PIC is a family of modified Harvard architecture microcontrollers prepared by Microchip Technology, derived from the PIC1650 in the beginning developed by General Instrument's Microelectronics classification. The call PIC initially populated to "Peripheral Interface Controller" now it is "PIC" only. PICs are popular with both industrial developers and hobbyists alike due to their low value, wide avail facility, large consume base, extensive collection of application notes, avail facility of low value or free development tools, and serial programming (and re-programming with flash memory) cap facility.

Performance:-The architectural judgment is directed at the maximization of speed-to-value ratio. The PIC architecture was among the first scalar CPU designs and is still among the simplest and economical. . An example of this is a video sync pulse generator. This is no longer true in the innovativeness PIC models; because they have a synchronous interrupt latency of three or four cycles.

Advantages:-

- Easy to learn because of Small instruction set
- RISC architecture
- Oscillators are in built with selectable speeds
- Entry level is very easy, in-circuit programming plus in-circuit debugging PICK
- Microcontrollers are expensively very high

- Wide range of interfaces it includes I²C, SPI, USB, USART, A/D and comparators are programmed, PWM, LIN, CAN, PSP, and Ethernet
- Easy to handle for hobby utilize due to Avail facility of processors in DIL package

Restrictions: - One accumulator

- Schedule-bank switching is needed to access the entire RAM of many devices
- Operations and schedules are not orthogonal; some instructions can address RAM and/or immediate constants, while others can utilize the accumulator only.

9 CONCLUSION AND FUTURE SCOPE

The project “Design of compact multipurpose mobile based health care device with Location tracker using wearable technology” has been successfully designed and tried. Incorporating the features of all the hardware components used have evolved it. Presence of every module has been reasoned out and placed carefully thus contributing to the safe working of the unit. Secondly, utilizing highly advanced IC’s and with the service of growing technology the project has been successfully carried out. The above to alter the kit in which a PIC Micro controller (i.e. PIC16F88) by utilizing the software tools such as IAR embedded work bench used to acquire the firmware for the PIC16F88 and embedded c program is executed using the IAR compiler to interface the devices and sensors with the microcontroller. Therefore an application oriented project is changed.

Future Scope: A ambulatory and uncontrolled measurement system for Mobile based Health Care Device with Location Tracker using wearable technology has been offered. The wireless attribute enables the uncontrolled psychological parameters of the human body as resist to a wired monitoring device and causes the system rightly transferable. This permits the organization to be unionized in a muddled home environment. The small form factor and lightweight aspect of the sensor nodes also allow easy attachment to the extremity. As balanced with other existing improvements, the advanced system is convenient and comfortable to apply. It leaves the patients to be monitored without restraint, and rehabilitation can be borne out in a home environment instead of a specialized laboratory at the infirmary. For future study, experiments conducted with stroke patients in cooperation with a hospital are being projected using the developed system. More tests can also be taken to look into the effect of Bluetooth interference from other patient monitoring devices and wireless organizations.

Solution:-



Fig 6: Health care system

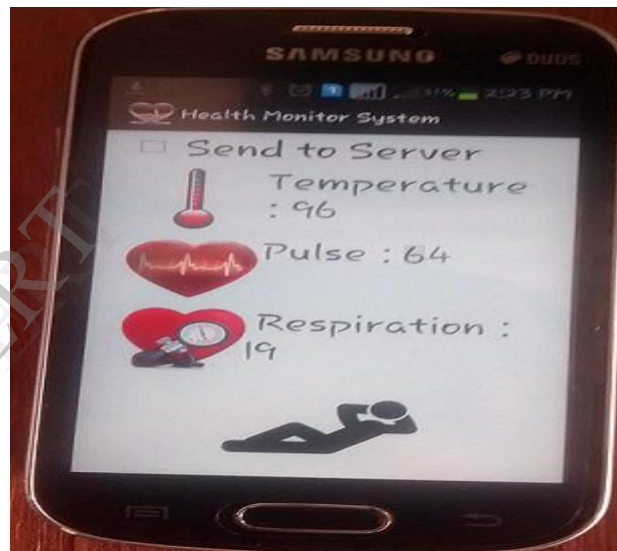


Fig7: Health monitoring report through android smart phone

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