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SMART PORTABLE HEALTH CONSULTING USING MOBILE APPLICATION

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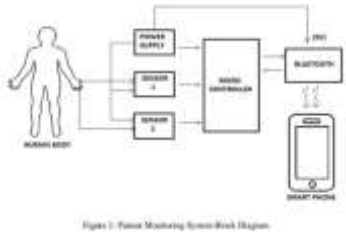
ABSTRACT - *This paper describes a wireless communication system. Zigbee based monitoring for older peoples and physically challenged people. We use the Zigbee receiver as alert in the mobile application as the result to monitor 24/7 in the emergency cases. Thus, our mechanism is reliable to satisfy the need for reducing medical expenses or responding in emergency situations. People who are not capable to follow their health condition properly without personal equipment to perform continuous monitoring –At mega 328 microcontrollers are used. To increase the efficiency of elder peoples for continuous health monitoring using Zigbee technology. The main approach of this paper is monitoring patient's conditions in all emergency situations. Heartbeat sensor of the patient is measured using an IR sensor and displayed on the PC monitor and mobile phone. Also Temperature sensor for measuring patient's body temperature to check whether it is normal or abnormal. It is mainly used for mobilizing and retaining the various monitoring information about patients in a hospital or in homes. Mobile health care may be used to get an immediate report of their health using the online application.*

Keywords: Zigbee, at mega 328 microcontrollers, heartbeat sensor, IR sensor, Temperature sensor, and pc monitor or mobile.

1. INTRODUCTION

In recent years, there is a huge improvement in our day-to-day life. This may lead to an issue regarding many health problems. To overcome certain health issues, Zigbee technology using mobile application plays a vital role in emergency cases. In the field of wireless, this technology gives us about patient's health condition continuously. In future applications, it may be more sophisticated. Alert using android for a regular consultant of doctor may reduce time complication, stress, and medical expenses. The health care is a vast area, it requires continuous monitoring of the patient's for the doctor.



Sensor 1-Temperature sensor
Sensor 2-Heartbeat sensor

Many technologies about wireless are used only for tracking the patient's location and gives to nearest hospitals. But one important way to improve patient's health by 24/7 of doctor's consultant using Wi-Fi. This will monitor and gives detailed information about patient's health using alert in a mobile application. In our attempt, it also describes developing a technology which takes heartbeat and temperature as input in Zigbee transmitter. Here it will be used to monitor the heart rate &body temperature of the patient continuously. So that immediate doctor can receive patient's results as a message for further treatment if necessary.

BLOCK DIAGRAM EXPLANATION:

1.1 ZIGBEE

Zigbee is an IEEE 802.15.4 based specification for a high-level data communication and referred as simple microcontroller board. It operates at ISM radio bands. It refers to the waggle dance of honey bees. It is less expensive when compared with other wireless personal area networks such as Bluetooth. Internet protocols used to create personal area networks and to monitor. Also, it covers a distance of up to 100 meters. It may transmit data over long distances through a mesh network. Data rate for transmission varies from 20kbit/s (868 MHz) to 250kbit/s (2.4 GHz). It also delivers low latency communication with small, low power digital radios, home automation, medical devices to store patient's reports and low bandwidth. It ranges from 10 to 20 meters.

Applications: Wireless light switches, traffic management, low power consumption also limits the transmission data rate up to 10 to 100 meters.

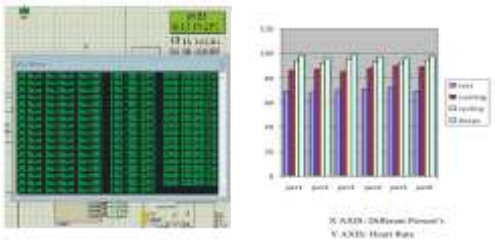
1.2 TEMPERATURE SENSOR

A Temperature sensor is an instrument commonly a thermocouple or RTD, used to measure the body temperature of a patient through an electrical alert. Two unrelated metals build a thermocouple, which initiates electrical potential in absolute breeding to have variations in the temperature.

Temperature Sensor

2. HEARTBEAT SENSOR

This sensor detects the heartbeat, with the help of LED flashes the microcontroller, is connected with the output of the HB sensor, while measuring the heartbeat simultaneously. Light modulation is the principle used, by blood flow through finger at each pulse. The heartbeat per minute was measured between 70-90 beats. When the heartbeat raised between 150-400 beats per minute, it leads to cardiac arrest. The patient will convert back to normal sinus rhythm about 20 seconds and which doesn't require cardioversion.



A Final result of the various heartbeats of patients

3. ARDUINO:

The Arduino Uno is an open source platform which is used by both hardware and software companies. It is a single board microcontroller that can function and limit both substantially and dynamically. At mega 328 provides UART 5v serial communication. It has 14 digital input and 6 analog output pins.

4. MOBILE:

A communication tool to explain that you need a mobile phone using its URL we can see the patient's heartbeat and temperature from anywhere.

5. TRACKING:

An IPS is a system used inside a building using light, radio waves and magnetic fields. But GPS will not extend to the indoor system due to loss of GPS signal strength. E.g.: Wi-Fi/Li-Fi. Due to signal attenuation caused by construction materials, the satellite-based GPS loses its significant power on the indoor system and satellite signals are not accurately traceable like IPS.

Initialization the Bluetooth module and the sensors. Then read the data from the sensors, and transmit the data through the Bluetooth. It opens the android application and establishes the connection made and pulse sensor senses the data which are counted for 15 seconds and multiplied with 4 and then it is displayed.

APPROACH:

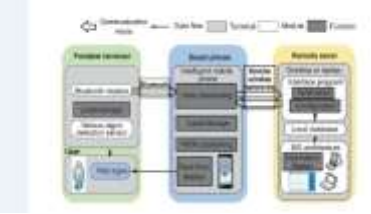
Wi-Fi-based IPS is an advanced feature of GPS and where it is inadequate. In which this system may be useful to geolocate the Wi-Fi or wireless access point includes MAC address. But proximity based IPS is more effective, it is low of cost and increases distance than Wi-Fi. Buildings like hospitals cover a lot of areas to visit and becomes challenging for visitors to reach where they want to reach. This can be overcome with IPS. All these approaches are used to monitor the patient's health conditions without putting them on risk and regular check-ups to reduce stress and expenses. This technology is used for monitoring the victim all the time so that it indicates during an emergency.

Overall view of patient monitoring using Wi-Fi

INDOOR POSITIONING SYSTEM:

The Indoor positioning system is the newest way and advanced application of GPS. It provides continuous health monitoring with wearable and body sensor networks, it

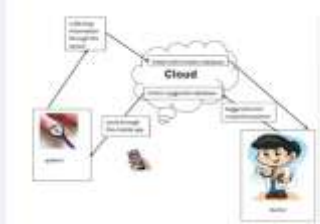
will detect patients at risk. Used not only in hospitals but also in homes to get accurate results of patients conditions. This system is useful to monitor the patient's physiological signals without interrupting in normal life for improving their life quality. This paper is about to solve the indoor localization instead of outdoor technology (GPS), by improving technologies for IPS to get better results.



Terminal to server connections

LITERATURE REVIEW:

Reduces frequent visits of elder peoples and visually challenged peoples for hospitals regarding regular check-ups to avoid daily visits and expenses. Also, the history of patient's data cannot be displayed, only current data is displayed. So these problems can be overcome using certain Wi-Fi access to see total patients record in particular URL for better results.



Collecting information through sensor with mobile

Table-1

Parameters	Pulse Rate (BPM)	Temperature (°C)
Patient 1	62bpm	35.12
Patient 2	72bpm	37.45
Patient 3	68bpm	34.18
Patient 4	80bpm	36.72
Patient 5	76bpm	35.68
Patient 6	65bpm	37.00
Patient 7	74bpm	37.10

Variations in pulse rate and temperature

The Indoor positioning system is a newer way and advanced application of GPS. It provides continuous health monitoring with wearable and body sensor networks, it will detect patients at risk. Used not only in hospitals but, also in homes to get accurate results of patients conditions. Not only for patients may this be benefits too for their family. This system is useful to monitor the patient's physiological signals without interrupting in normal life for improving their life quality. This paper is about to solve the indoor localization instead of outdoor technology (GPS), by improving technologies for IPS to get a better result.

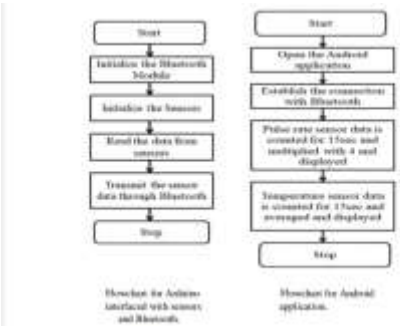
Transmitting a database from the server

ADVANTAGES

Different systems meanwhile take existing wireless network infrastructure, for indoor positioning used at markets, malls, hospitals, airports, complexes, conferences, and many indoor specialties.

LIMITATION

Every room in a building must use wired IR reader and be installed in the ceiling to activate the IR sensor.



Flow chart for Bluetooth and android application

FUTURE IMPLEMENTATIONS:

In future implementations, we also try to explore new technologies such as barometer sensor-equipped Smartphone and iBeacon technology. Victim's condition can be monitored by biomedical telemetry method where there is a wireless transformation between microcontrollers. The temperature, heartbeat sensors are

all monitored by using sensors placed in the patient's body that is under investigations.

Therefore in the future, there may be demand in the lack of urgency service, so there should be a solution to satisfy the need for the patients. The only solution is that the patients must be monitored in all the time so that we are able to make a frequent action towards the patient rapidly. Accordingly, the system is developed to monitor the patient continuously, which alerts the family members in the emergency minute. The developed system measures the heartbeat and the temperature, if it is bad it alerts the relatives of the patients and the doctor, who will appear on time and this will provide a rapid action.

3. CONCLUSION

Heartbeat and Temperature sensor of patients are monitored by using wearable sensor technology and displayed in a particular URL. Also, it gives as an alert using the Zigbee receiver, when a patient's condition is critical for further treatment. In early systems, sensors to be placed near bedside monitors or PCs, it also limits patients on the bed for monitoring. Due to wireless devices and wireless networks, there is no relation between sensors and bedside equipment. Thus patients are not limited on the bed and they can move wherever for a certain distance from the monitor. Infrastructure oriented monitoring will be commercial/3G network or wireless LAN. They may change according to different locations. These restrictions are not possible for continuous health monitoring and patient's signals may not be transmitted.

4. RESULT AND DISCUSSION

There are so many feedback organizations struggling tough to store the lives of the people on the case of urgencies but it may be successful at sometimes and it may be failed sometimes to run across the time to reach the patients. Accordingly, the system is developed to monitor the patient continuously, which alerts as a message to the family members, relatives, and doctor in emergency situations, who will appear in time.

Heartbeat and temperature sensor-final result display

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