Android Mobiles in Machine-To-Machine Health Care Solution

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ABSTRACT

This paper discusses about the prototype that has been designed to monitor the respiration rate and breathe rate of a drainage cleaning employee which is measured using electronic sensors. It is implemented by the machine-to-machine health care solution that combines mobile and IPV6 technique. The sensors are connected to ATMEL AT89C51 micro controller. The main objective is to monitor the respiration rate of a drainage cleaning employee during his work process and rescue him by the machine-to-machine health care solution (breath analyzer-android mobiles). The steps involve monitoring the respiration rate of a drainage cleaning employee. Under critical condition the safety officer immediately receives a signal through embedded system to rescue him. The GSM identifies area of networking and Passes an immediate signal to doctor’s android mobiles by using Android IDE Eclipse. To execute coding for the sensor Keil compiler software is used.

Keywords: Heart beat rate, electronic sensors, Bluetooth module, Android mobiles and GSM (Global system for mobile communication).

INTRODUCTION

Health Care Solutions

Clear and always available communication between doctors and maintenance staffs, patients’ families and other emergency medical personnel are critical for quality care of patients. While the hospital complex itself may be designed with patient safety in mind, a concrete with towers between each wing for easy defense against fire often provides difficult for wireless communication. TE’S in building wireless systems guarantee to satisfy the highly variable needs of health care in the most complex of facilities. TE health care solutions meet the needs of application including clinics, medical centers, and hospitals.

M-TO-M in Health Care

Machine -to- Machine communication for health care is emerging for the idea behind these concepts is to extend human-to-human communication to machine or device interaction with persons or machines so that human life style can be enhanced using the internet for the information structure. Health care is moving from an approach based on the reactive responses to acute conditions to a pro-active approach characterized by early detection, prevention and long-term management of health conditions.

Health Care and M-TO-M

Wireless talks about how cellular machine-to-machine communication have opened the door to a world of new beneficial healthcare application previously thought to be unfeasible. The ability to design, manufacture and distribute device that can monitor and collect information in real-time around the clock has led to innovative and useful application that can improve people’s health and well-being and that’s trend that is sure to continue well into future.

Wellness Connected

Linking patients and treatment systems over the GSM or internet can save time, resources and lives. Advocates of machine-to-machine (M2M) enabling technologies are always ready to talk up the kinds of application it could benefit. Typically, M2M can be seen in a range of applications security, surveillance, building, automation, and supply chains and logistics management. However, it is health care that is best place to do progress beyond profit of concept stage when it comes to the device shall speak into device model. In short, the M2M model uses wired or wireless...
connectivity to exchange information and communication between webs connected devices without the need for human intervention. The advantages are

1. Established Tele-medicine systems.
2. Provides real-time statistics.
3. Faster responses
4. Increases product life time.

**BENEFITS OF MONITORING**

Doctors provide patients with wireless devices to monitor conditions such as diabetes, blood pressure, obesity and cardiac problems. Patients can take their own readings and transmit them to doctors via internet or fit discrete devices that monitor and transmit automatically. Doctors analyze the readings and respond by arranging a patient visit or adjusting medicain. Mobile health works a number of manufacturers have developed portable devices that allow health care professionals to work more efficiently while they are travelling or remotely based. The devices can scan patient monitoring equipment and transmit data to other professionals or compare the data with patient records loaded on to the device. It can accelerate diagnostically results and also enable medical expertise to administer or advice on immediate treatment. It provides early warning. It can reduce pressure on surgery waiting times, allows patients to remain in their homes rather than have to travel to surgeries or hospitals. Towards better health care by giving health care professionals better real time data, M2M application supports pro-active treatment that can save lives. It frees-up doctors and nurses to concentrate on patient care. Tracking devices and system enables careers to monitor patients’ locations and find them easily. The devices can be programmed to alert careers if a patient wander outside a safe zone. Its application roles are

1. Home health monitoring for patients with chronic conditions.
2. Improving fitness and athletic training.
3. Assisting people with dis-abilities.

**M2M Supporting Health Care Professionals**

M2M in healthcare is developing medical information transmitted in real time. Through M2M technology the healthcare professionals demand can be relieved and increases industrial efficiency and response times. The potential of M2M in health care industry is rapidly being discovered and explored, rising demand in patient care has placed increasingly heavy responsibility and pressure on medical staff. Nearly a billion people worldwide suffer from chronic illnesses that require continuous monitoring, the health care industry will need to find better way to reach and treat patients and M2M technology is one of the ways to achieve patient safety. Remote monitoring devices can allow doctors and caretakers to keep track of health of patients who are not in the hospital or with in their sight. Common conditions that are increasingly being monitored while patients are at home include irregular heartbeats (cardiac arrhythmia), high blood pressure, glucose levels of diabetes patients and blood lipid levels. Medical staff can be alerted to changes in their patient’s health and provide treatment quickly when necessary. M2M technology can also be used to monitor medication uptake by patients or when a prescription is due run out.

**PROPOSED SYSTEM**

![Block Diagram of Proposed System](image-url)
The proposed system based on the usage of android mobile devices in global network by a wireless M2M healthcare. More over the proposed systems include warning system which has light weight, low power sensors at low cost, ease of measurement, extension of network, accessibility and reliability. The proposed system also promises to help improve the expansion of healthcare service coverage by providing efficient support for IPv6 over low power wireless personal area network (6LoWPAN) and mobile technology in wide areas. By using humidity sensor and heart beat sensor, amplify both the signal and then ATMEAL AT89C51 Micro controller provides highly flexibility in the embedded control application.

**Heartbeat Sensor DPM1157**

Heart beat sensor is designed to give digital output of heart beat when finger is placed in it. When the heart beat detector is working, the beat LED flashes in unison with each heartbeat. This digital output can be connected to microcontroller directly to measure the beats per minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse. The sensor consists of a super bright red LED and light detector. The LED needs to be super bright as the maximum light must pass spread in finger and detected by detector. Now, when the heart pumps a pulse of blood through the blood vessels, the finger become slightly more opaque and so less light reached the detector. With each heart pulse the detector signal varies. This variation is converted to electrical pulse. This signal is amplified and triggered through an amplifier which outputs +5V logic level signal. The output signal is also indicated by a LED which blinks on each heartbeat.

**Features**

1. Microcontroller based SMD design.
2. Heartbeat indication by LED.
3. Instant output digital signal for directly connecting to microcontroller.
4. Compact size.
5. Working voltage +5V.

**Application**

1. Digital heart rate monitor.
2. Patient monitoring system.

**Humidity Sensor HS220**

Humidity sensor also called a hygrometer. A person with a respiratory illness or certain allergies might use a home humidity sensor because low humidity can exacerbate breathing problems and cause joint pain, while high humidity encourages bacteria, mold and fungus growth. Home humidors and wine cellars often have a humidity sensor that helps to maintain a consistent relative humidity optimal to safe long-term storage.

**Applications**

1. Used in Respiratory equipment’s.
2. Sterilizer’s and incubators.
3. Pharmaceutical processing.

**Atmel At89c51 Microcontroller**

The AT89C51 is a low power, high performance CMOS 8bit microcontroller with 4K bytes of in system programmable flash memory. The device is manufactured using Atmel’s high density nonvolatile memory technology and is compatible with the industry standard 80C51 instruction set and pin out. By combining a versatile 8-bit CPU with in system programmable Flash on a monolithic chip, the Atmel AT89C51 is a powerful microcontroller which provides a highly flexible and cost-effective solution to many embedded control applications. The AT89C51 provides the following standard features: 4K bytes of Flash, 128 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, two 16-bit timers/counters, a five vector two level interrupt architecture, a full duplex serial port, on chip oscillator and clock circuitry.
Features of Keil C Compiler

A cross compiler is similar to the compiler but write a program for the target processor on the host processor. It means being in one environment you are writing code for another environment is called cross development and the compiler used is called cross compiler. It generates software that run on computers with a new architecture that cannot host their own compilers. They are popularly used for embedded development. Typically, an embedded platform has restricted RAM, no hard disk and limited I/O capability. Code can be edited and compiled on a fast host machine and the resulting executable code can then be downloaded to the target to be tested. Cross compiler is beneficial whenever the host machine has more resources than the target. Keil C supports a huge amount of host and target combinations and also supports 8-bit microcontrollers like Atmel and Motorola.

Android Eclipse

Android Development Tool (ADT) is a plugin for the Eclipse IDE that is designed to give you a powerful, integrated environment in which to build Android applications. ADT extends the capabilities of Eclipse to let you quickly set up new Android projects, create an application UI, add packages based on the Android Framework API, debug your applications using the Android SDK tools, and even export signed. Developing in Eclipse with ADT is highly recommended and is the fastest way to get started. With the guided project setup, it provides as well as tools integration, custom XML editors and debug output pane, ADT gives you an incredible boost in developing Android applications.

Flowchart

Figure 2: Flow chart of Proposed System
RESULTS

Bluetooth Activating

![Figure 3: Bluetooth Activating](image)

The Android platform includes support for the Bluetooth network stack, which allows a device to wirelessly exchange data with other Bluetooth devices. The application framework provides access to the Bluetooth functionality through the Android Bluetooth APIs. The APIs let applications wirelessly connect to other Bluetooth devices, enabling point-to-point and multipoint wireless features.

Heart Beat Monitoring

An ECG is used to measure the hearts electrical conduction system. It picks up electrical impulses generated by the polarization and depolarization of cardiac tissue and translates into waveform. The waveform is then used to measure the rate and regularity of heartbeats, as well as the size and position of chambers, the presence of any damage to the heart, and the effects of drugs or devices used to regulate the heart, such as pacemaker. Most ECGs are performed for diagnostic or research purposes on human hearts, but may also be performed on animals, usually for diagnosis of heart abnormalities or research.

![Figure 4: Heart beat Monitoring](image)
HEARTBEAT WAVEFORM

An ECG produces a pattern reflecting the electrical activity of the heart. It can give information regarding the rhythm of the heart, whether that impulse is conducted normally throughout the heart, or whether any part of the heart is contributing more or less than expected to the electrical activity of the heart. It can also give information regarding the balance of salts in the blood or even reveal problems and cannot reliably measure the pumping ability of the heart, for which ultrasound based test are used. The ECG device detects and amplifies the tiny electrical changes on the skin that are caused when the heart muscle depolarizes during each heartbeat. At rest, each heart muscle cell has a negative charge, called the membrane potential, across its cell membrane. This is detected as tiny rises and falls in the voltage between two electrodes placed either side of the heart, which is displayed as a wavy line either on a screen or on paper. This display indicates the overall rhythm of the heart and weaknesses in different parts of the heart muscle.

CONCLUSION

The Machine-to-Machine to health care solution using android mobiles has been simulated in the android-eclipse environment. The breathe rate, heart beat rate is monitored. Even though there are some safety precautions. Recently many of the drainage cleaning employees die due to the harmful gases while cleaning. We have implemented our project in order to save the lives of the drainage cleaning employees. This project is done to save the human life who makes clean the whole environment.
FUTURE ENHANCEMENT

In future, M2M devices provides better achievements of user oriented healthcare services with maximum mobility and flexibility to the patients who are in urgent need of such services. The measurement of temperature and oxygen rate is also possible in upcoming days. Harnessing a range of technologies makes it possible and feasible to create a more advanced mobile healthcare system.

REFERENCES


