MONITORING AND LOCALIZATION OF THE PATIENT'S HEALTH CONDITIONS FROM HEALTH CENTER THROUGH ZIGBEE AND GPS

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ABSTRACT:- *In this project Localization of Health Center Assets throughaGPS and zigbeeEnvironment, provides a near-real time tracking tool for medical systems. The rapid advances in modern wireless technology open the door for new applications usingZigbee. In the medical field, staff members of a certain hospital are in need for a system that tracks where patient's/medical staff/devices are at any given time.Localization in indoor positioning systems plays an important role. Location Based Zigbeeapplications range from tracking objects.Low-level functionality of the patient's health system. The spirit of the project paradigm employed by localization makes the system both flexible and scalable, by leveraging collaboration between embedded and Zigbeecloud systems. The rapid advances in modern wireless technology open the door for new applications using the GPS technology. In the medical field, staff members of a certain hospital are in need for a system that tracks where patient's/medical staff/devices are at any given time. Which is Localization of Health Center Assets through a GPS Environment, provides a near-real time tracking tool for medical systems using the existing Zigbee infrastructure?*

Keywords: Microcontroller, Temperature sensor, MEMS, Pulse sensor, GPS, Zigbee.

1. INTRODUCTION

Hospitals and medical centers have been integrating technology in all aspects of medical field to improve the quality of service and efficiency. Obtaining an accurate and reliable record of patients, staff, and asset flows has historically been a challenge in the health care industry. Human error, misuse, and/or abuse are just a few of the issues that are inherent in traditional methods of resource management in health care centers. To address this challenge some health care centers have begun to adopt real-Time Locating Systems (RTLS) to gain the upper hand in asset management. RTLS can provide users with both historical and real time data. This information can be used to locate assets and can also be used as an analysis tool for process improvement. Unfortunately, there are several constraints (technical, monetary, social/legal) that are particularly obstructive to the adoption of new

technologies in the health care industry. For this reason, the goal of the Localization of Health Center Assets throughanZigbeeEnvironment system initiative is to develop a low-cost, low-impact solution to address these issues. Localization provides a viable RTLS solution due to widespread usage of WLANs in health care facilities and the signal loss of the cellular networks inside some areas of these facilities, due to electromagnetic interference. This helps to alleviate the initial costs of an RTLS by eliminating investment in unnecessary hardware installation such as Zigbee technology. Localization of a node can estimate its location in a building by referencing the location of the wireless access point. Using this functionality, in this system can track the flow of doctors, patient's, nurses, and physical assets over time. Moreover, theembedded node can communicate over the WLAN to provide a telemetry interface for medical devices to relay health monitoring data and usage statistics where data can be stored indefinitely and shared later.

1.1 EXISTING SYSTEM:

In this project existing system is the use of a radio-frequency based system for locating and tracking users, by recording and processing signal strength information at multiple base stations positioned to provide overlapping coverage in the area of interest. An industry implementation of 802.11 based RTLS system is the Aero Scout system which requires the use of proprietary Wi-Fi enabled locator tags and a "location grade" wireless infrastructure that can support the accurate localization of tags throughout the structure. This system also requires sensors emitters to increase the accuracy of the system to room-level.

1.2 PROPOSED SYSTEM:

Localization health center is designed as an asset tracking system incorporating; GPS, and Zigbee wireless technologies to provide a low-cost alternative to traditional real time locating systems. Experimental data shows that a reasonably accurate distance measurement can be attained from Zigbee wireless management frames. The ability to estimate these distance measurements

between distributed wireless access points provides an opportunity to utilize 802.11 wireless network technologies for more than just data transmission. The leverages this opportunity to create an centric solution for health care environments.

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Our world is consisted of various "things". As one of the enablers of smart world, internet of things (IoT)
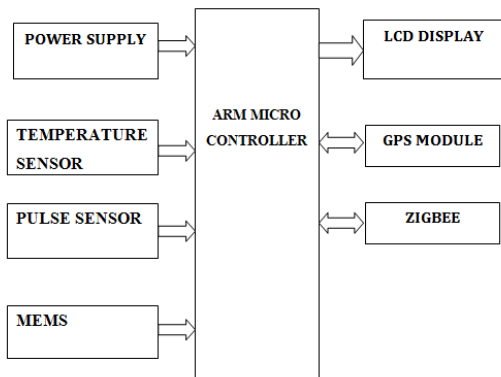
2. BLOCKDIAGRAM

Fig-3.1: System block diagram

2.1 System Overview

2.1.1 Power Supply:

This section is meant for supplying Power to all the sections mentioned above.It basically consists of a Transformer to step down the 230V ac to 9V ac followed by diodes. Here diodes are used to rectify the ac to dc. After rectification the obtained rippled dc is filtered using a capacitor Filter. A positive voltage regulator is used to regulate the obtained dc voltage.

2.1.2 Microcontroller:

This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

Fig-3.2: LPC2148 IC

2.1.3 LCD Display

This section is basically meant to show up the status of the project. This project makes use of Liquid Crystal Display to display / prompt for necessary information.
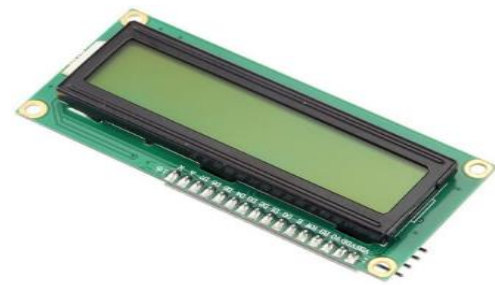

Fig-3.3: LCD display

Temperature sensor

Thermistors are a temperature sensing devise. It is used to sense the temperature. In this project by depends on the value of temperature the exhaust fan will run.

Fig-3.4: TMP103

2.1.4 Pulse sensor

Heart rate data can be really useful whether you're designing an exercise routine, studying your activity or anxiety levels or just want your shirt to blink with your heart beat. The Pulse Sensor Amped is a plug-and-play heart-rate sensor. Simply clip the Pulse Sensor to your earlobe or finger tip.

2.1.5 MEMS

Accelerometers are acceleration sensors. An inertial mass suspended by springs is acted upon by acceleration forces that cause the mass to be deflected from its initial position. This deflection is converted to an electrical signal, which appears at the sensor output. The application of MEMS technology to accelerometers is a relatively new development.

GPS

A GPS modem is used to get the signals and receive the signals from the satellites. In this project, GPS modem get the signals from the satellites and those are given to the microcontroller. The signals may be in the form of the coordinates; these are represented in form of the latitudes, longitudes and altitudes.

Fig-3.5: GPS module

2.1.6 Zigbee

Zigbee is new wireless technology guided by IEEE 802.15.4 Personal Area Network standard. It is primarily designed for the wide ranging controlling applications and to replace the existing non-standard technologies. It currently operates in 868MHz band at a data rate of 20Kbps in Europe, 914MHz band at 40kbps in USA, and the 2.4GHz ISM bands Worldwide at a maximum data-rate of 250kbps.

Fig-3.6: Zigbee module

3. CONCLUSION

This paper reviewed some of the most adaptable techniques and algorithms in Zigbee localization. These techniques were grouped according to their approaches: distance estimation, sense analysis, and proximity. The paper highlighted the benefits and drawbacks of each of these localization techniques for Zigbee wireless system.

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