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Emergency Medical Equipment's Management and Tracking System using Wireless sensor network (WSN) and Internet of Things (IoT)

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ABSTRACT
- In recent years, small devices with communication capabilities have been accepted in real-world applications, and these applications have increased business performance. Using a wireless sensor network, we created an asset tracking framework. A wireless sensor network, middleware, and an IoT user interface are the three components of the programme. The sensor network is made up of mobile nodes that refer to each other. The sensor network specification is abstracted by the middleware. The graphical user interface has been designed to meet the needs of nurses and physicians. The application reduces the time it takes to find mobile medical assets from 20 minutes to 20 seconds. The nurses will be able to spend more time caring for patients and their families if the asset quest time is shortened. Tracking framework is both versatile and scalable thanks to the spirit of the IoT model, which leverages collaboration between embedded and cloud systems. Additional implementations, such as hardware integration, will be supported in the future thanks to this versatility (e.g., new hardware components). This can include data collection such as utilisation rates and patient health information from the past.
Compiling this information could pave the way for potential disease vector research or be used to improve the quality of treatment provided for specific conditions. Although the consequences of an IoT system like TRACKING are various, its primary purpose is to provide a simple, low-cost solution for tracking the location of medical assets in real time. Reduces the amount of time it takes to save a life in an emergency situation.

KEYWORDS: Present sensor, step down transformer, bride rectifier, regulator, and so on are some of the terms used.

I. INTRODUCTION

To enhance the quality of care and performance, hospitals and medical centres have been incorporating technology into all facets of the medical sector. Historically, obtaining an accurate and reliable database of patients, staff, and asset flows has been difficult in the health-care industry. Traditional methods of resource management in health care facilities have a number of flaws, including human error, misuse, and/or violence. To combat this issue, some health-care organisations have begun to use real-time location systems (RTLS) to gain a competitive edge in asset management. RTLS can offer both historical and real-time data to users. This knowledge can be used to identify properties as well as a method for process management analysis. Unfortunately, the implementation of emerging technologies in the health-care industry is hindered by a number of constraints (technical, monetary, and social/legal). As a consequence, the target of the IoT-based Localization of Health Centre Properties. The use of wireless devices in the implementation of everyday life tasks .The removal of wired or corded devices has simplified and minimised the hardware implementation, making it more accessible and easier to apply, particularly in an indoor environment where the application of wireless devices varies depending on its surroundings in which various objects can scatter, diffract, reflect, and absorb radiation As more variables, such as moving people and other factors, shift roles on a daily basis, the circumstances become more varied. Devices carried within a region that transmit a signal at the same frequency as the main transmitter, such as stationary in both space and time. This necessitates a more subjugated research and profiling in the signal propagation study of a system and its surroundings in order to allow for reliable and effective signal wave propagation, making the ability to predict signal behaviour in indoor environments much more important. When

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a signal travels from a single transmitter to a single receiver, the signal transmission mechanism must be taken into account as a factor that can affect signal transmission quality. If there are other things between the transmitter and the receiver or in the channel, this must be taken into account as a major factor. . As a result, channel measurement is critical to grasping signal propagation. Many researchers have calculated a variety of channels for nearly identical purposes, including both indoor and outdoor channels. The following are some of the previous measurements. We explain the measurement of 5 different paths in an indoor environment using wireless devices in this paper.

II. COMPONENTS FOR IMPLEMENTATION

1. Present sensor (A)

A current sensor is a system that senses and produces a signal proportional to the current flowing through a cable. An analogue voltage or current, or even a digital output, may be produced. The produced signal can then be used to show the measured current in an ammeter, be saved for further analysis in a data acquisition system, or be used for the transmission of data.

Fig1:Present sensor

2. VOLTAGE REGULATER

Any electrical or electronic device that keeps the voltage of a power source within appropriate limits is known as a voltage regulator. The voltage regulator is needed to keep voltages within the acceptable range for electrical equipment that uses that voltage. To balance the output voltage of the generator, such a system is commonly used in all types of motor vehicles.

Fig 2: Voltage Regulator

3. NODE MC

As Arduino.cc started creating new MCU boards based on non-AVR processors, such as the ARM/SAM MCU used in the Arduino Due, they needed to adjust the Arduino IDE to make it reasonably easy to adapt the IDE to accept alternative toolchains so that Arduino C/C++ could be compiled for these new processors. With the arrival of the Board Manager and the SAM Core, they were able to accomplish this.

Fig 3: Node MC

The Board Manager and the Arduino IDE both require a "heart" of software components to compile an Arduino C/C++ source file for the target MCU's machine language. The "ESP8266 Core for the Arduino IDE" was created by some ESP8266 enthusiasts as an Arduino core for the ESP8266 Wi-Fi SoC. For the numerous ESP8266-based devices, this has become a leading software development platform.

4. STEP DOWN TRANSFORMER

A transformer is a non-moving, static device that converts electrical power from one circuit to another with voltage and current changes but no frequency shift. Transformers are divided into two categories based on their function: Step-up and step-down transformers are two types of transformers. A Move Forward A transformer is a system that steps up the input voltage by converting the low primary voltage to a high secondary voltage. A Step down Transformer, on the other

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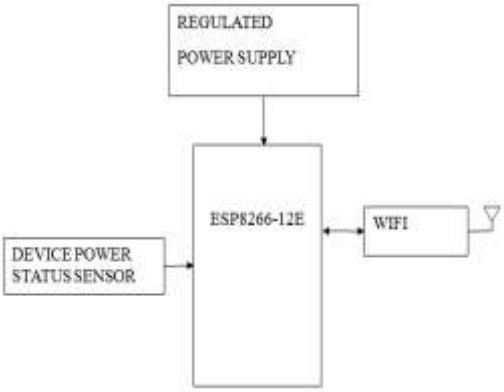
hand, reduces the input voltage by lowering the secondary voltage below the primary voltage... A Step down Transformer is a type of transformer, which converts a high voltage at the primary side to a low voltage at the secondary side.

Fig 4: Step down Transformer

EXPERIMENTALSETUP



A pair of transmitters and receivers were used in this experiment. To incorporate an IoT centric solution for RTLS in a health care environment, the tracking device combines Wi-Fi signals (802.11), wireless networking, embedded devices, and cloud computing platforms. This tracking system's architecture is divided into three parts: There is only one equipmentmodule. Module number two. Module 3: IoT. The equipment allocation and positioning are set in the experiment. Meanwhile, during the experiment, the number of people inside the office was held to a bare minimum, with only one person in charge of reading the signal intensity and another person in charge of moving the transmitter inside the equipment module The position I chose could also result in a major contribution to the potential development of my own wireless asset tracking system.

The step down transformer is 230 volts, however we need to regulate the voltage to 12 volts using a bride rectifier, and the regulator also decreases the power voltage for the microcontroller. For connecting system units, MCU8677 has a Wi-Fi module. There are two mcu for each ward.This project proposes a wireless sensor network and an IoT-based monitoring system. Every piece of equipment and every ward serves as a wireless node. A central controller is used to link the information to a computer, where the data can be accessed quickly.

III. HARDWARE CONNECTIONS

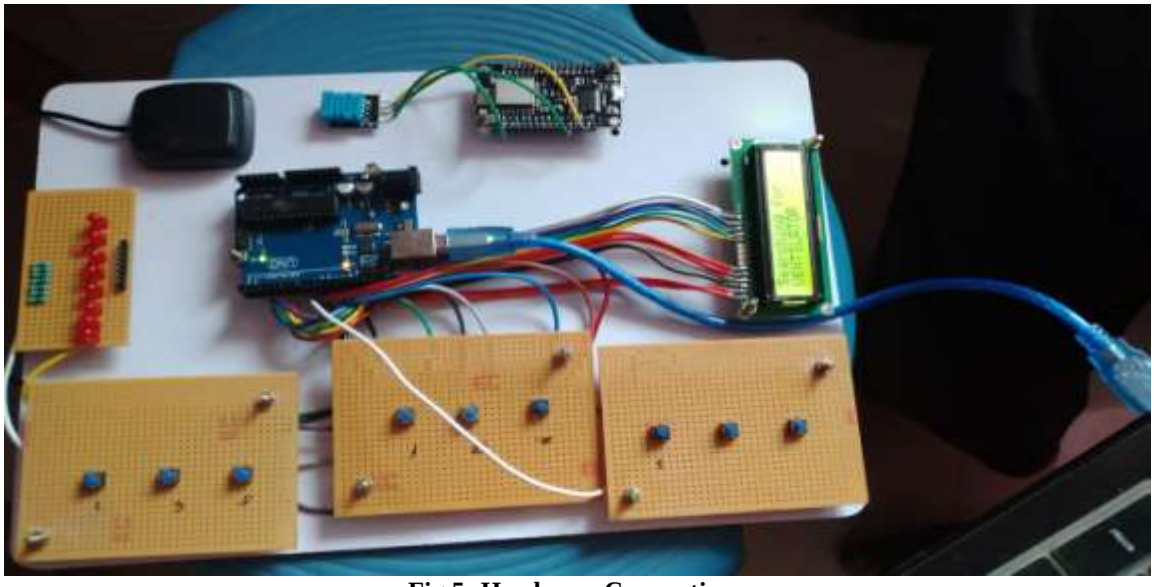


Fig 5: Hardware Connections

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IV. TOOLS

A) SOFTWARE TOOLS

Development - PC with Windows 7 OS, TargetDevice-ESP8266-12E,CVariant-Embedded 'C' IDE–Arduino, IDE, Compiler-AVR-gcc,PCApplicationVB .NET using MS Visual Studio

B) HARDWARE TOOLS

1. Programme-Inbuilt ICSP Programmer Oscilloscope- Tektronix DSO, Soldering IronSoldron 25W,Multimeter - Mastech Digital Multimeter

C) OBJECTIVE

To track and control medical equipment and assets in hospitals in order to avoid needless confusion during an emergency by monitoring the location and status of each medical equipment present at the tracking.

V. RESULTS

The current system for recording and monitoring medical equipment relies solely on manual logging and entry, either into a paper ledger or into a computer. http://contraptions.in/projects/sr18172 to medical asset tracking/app.php. Using this project in clinics, health care facilities, and industries

VI. OUTPUTS

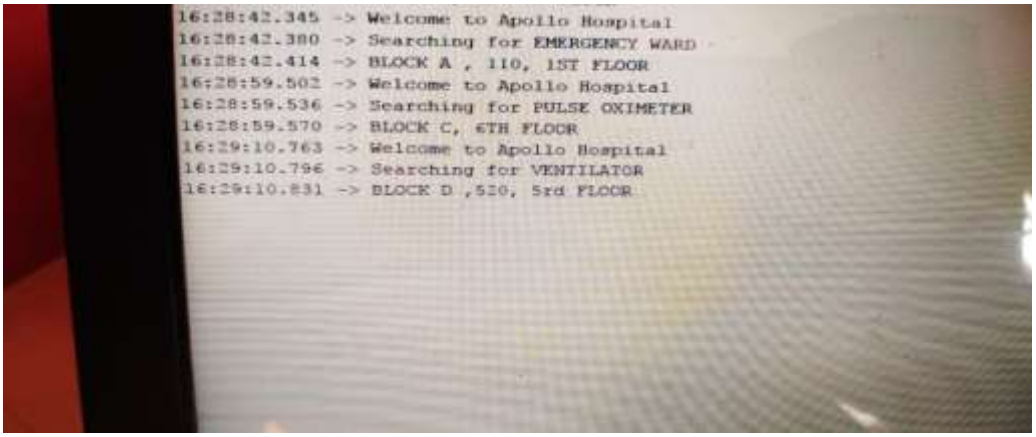

Fig 6: Output

VII.FUTURE ENHANCEMENT

This project focuses on a real-time pervasive healthcare management system that uses IoT and cloud computing to benefit elders and patients with chronic diseases. The existing strategies for realising healthcare facilities are surveyed, as well as the problems that come with them.This paper proposes an adaptive real-time patient monitoring device that uses a PHD prototype model to track and identify any abnormalities in the subject's vital parameters such as temperature, pressure, fall detection, breath operation, and ECG.On the basis of the diagnosis of the given collection of symptoms, appropriate drugs are recommended. In the event of any abnormality, the device sends a warning message to the caregivers and doctors via WBAN. The system helps physicians to make the best use of available medical services while lowering the cost of patient monitoring.We will focus on improving the wearing sensor experience in the future by using softer materials and enabling regulated information sharing among doctors, patients, and patients' families through a social networking paradigm.

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