

IoT based Asset Tracking System

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Abstract - Asset tracking is the method of asset of tracking an asset either by scanning barcode labels attached to the assets or by using tags using. These technologies can also be used for indoor tracking of equipment wearing a tag. The GPS systems are today most well known location tracking systems. These systems are not capable of pinpointing exact locations or locations of an entity within a building or on a particular floor or room. So we propose a smart asset tracking system it allows tracking the location of object.. In the proposed system it makes use of RF technology along with IoT to achieve this system. This system has the location tracking capability to exact room it is currently located in.

Key Words: Asset tracking, Internet of Things (IoT).

1. INTRODUCTION

Nowadays, safety is one of the major issues. IoT Based Asset Tracking System is focused with the tracking of assets in hospitals. Asset tracking is the method of tracking an asset either by tracking RFID tag and reader by scanning the barcode, etc. The proposed IoT Asset Tracking System has been developed to ensure safety and security of assets like medical equipment or people. The major advantage is the use of sensors like sound sensor and vibration sensor that sense and alert. Radio Frequency Identifier consists of transmitter and the receiver. Transmitter is placed with the object to be tracked which sends radio waves to the receiver. If the tracked object moves out of frequency range, an alert message or call will be sent to specified guardians through Global System for Mobile communication. This web application is used to view and track the medical equipment.

Hospital management are groups of people who act as the central point of control within hospitals. These individuals may be previous or current clinicians, or individuals with other hospitals. Indeed, the IoT based asset tracking system for hospital management enhances the operational capabilities and boosts transparency in reporting process. There are the aspects to increase the safety of women, children, people with mental disorder and any valuable items through the technology of Radio Frequency along with IoT which comprises of the various tracking systems in asset tracking for hospital management. Asset tracking is the method of tracking an asset either by tracking RFID tag and reader by scanning the barcode, etc.

The block diagram of proposed system is shown in fig.1.1. It shows the flow of information in the system.

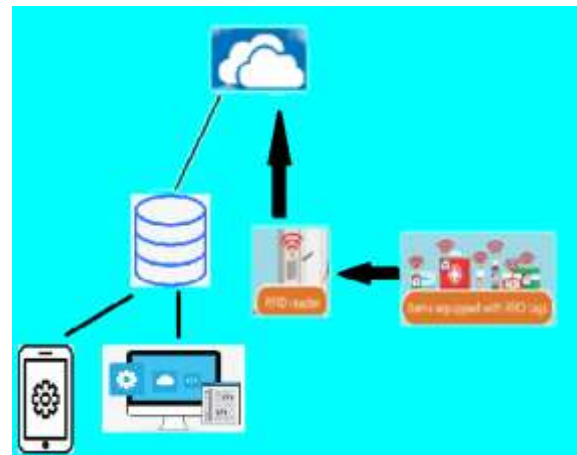


Fig.1.1 Block Diagram

The system consists of two types of users as follows:

- Doctor (Admin)
- Patient (User).

Data of patients can be stored and retrieved from the database server using Internet. Each and every user access the related data stored on database server using their Web Application.

1.1 Objectives of the proposed system

- To create high professional IoT Based Asset Tracking System for Hospital Management.
- To monitor the medical equipment.
- To track the location of medical equipment.
- Send quick messages via Short Message Service and call when it moves out of bound.
- To ensure maximum security.
- Enable tracking by providing current location.

1.2 Proposed System

The Importance of Asset Tracking one way to quickly improve asset management is by utilizing Radio Frequency Identification (RFID) technology to automatically track those assets. A Radio Frequency Identification (RFID) asset tracking system uses

electromagnetic fields to transmit data from an RFID tag to a reader. And the patient id is the unique id that given to each and every doctor and using that they make entries to the application and the working of IoT Asset tracking System using with RFID tag and reader and the block diagram is shown below in Fig.1.2.

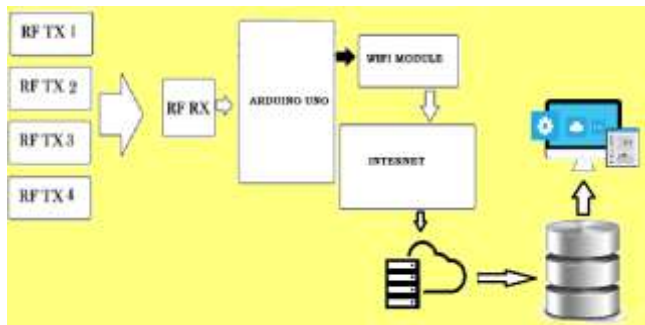


Fig.1.2 Block Diagram of Proposed system

Radio Frequency module consists of transmitter and receiver. The transmitter is placed with the object to be tracked which sends radio waves to the receiver. If the object being tracked moves out of frequency range, an alert message and call will be sent to specified guardians through Global System for Mobile communication. Further the location of the object can be tracked whenever required through Global Positioning System.

In addition, sound and vibration sensors are used to sense human behavior like loud voice and movement of human body. If the sensor reading exceeds threshold value, messages are sent to specified mobile numbers. The frequency range between transmitter and receiver and location of assets are displayed in thing speak which is an open source IoT platform.

Advantages

- Improved Efficiency.
- Increased Data Security & Retrieve-ability.
- Improved Patient Care.
- Improve data security.
- Easy to track the medical equipment.
- Easy Access to Data.

2. SYSTEM ARCHITECTURE

The web application consists of admin module, user module, inpatients module, outpatient module, reports quick launch module, search engine module, appointment module, asset tracking module. The web application is useful for the doctors and patient. It is useful for computerize all details about to maintain the details of patients and hospital. Admin has full rights in the system. Admin creates Doctor, Nurse,

Patient and other users. Attractive dashboards for Doctor, Patient, Nurse and more and manage complete hospital operations and diagram is shown below in Fig.2.1.

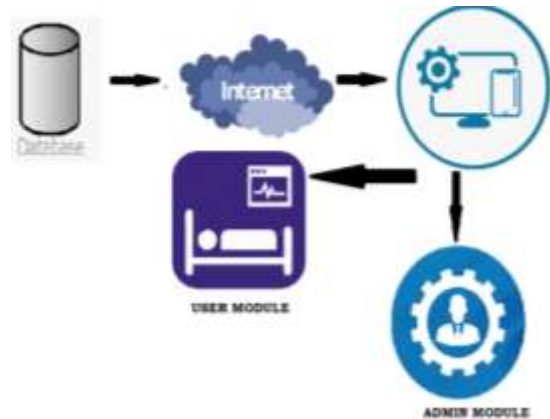


Fig.2.1 System architecture

2.1 Admin Module

In this module, admin can view the Patients, Doctors, Appointments and New queries. Admin can add doctor’s specialization and mange doctors. Admin can view users detail and also have right to delete irrelevant user. Admin can view patient’s detail and admin can view appointment history. Admin can view reports of patients in particular periods.

2.2 User Module

In this module, patients can view his/her profile, appointments and book appointment and patients can see his/her own appointment history. User can update his/her profile, change the password and recover the password.

2.3 Patient Registration Module

When a patient visits the first time in hospital they will get an ID number (unique for all patients) so this section will track the no. of visits of a single patient. It will consist of all the details of patients like the name, email, contact number, address, birth date, employer and insurance to provide the benefits of the hospital.

2.4 Appointment Module

This module allows doctors and nurses to view available time slots and allocate appointments accordingly. This module prevents the system from creating an appointment if the doctor is on leave or absent or busy in the OT. When a patient makes an appointment, they will get the details about their appointment on mobile through SMS or mail which they have provided on the time of registration. Staff will also get access to see appointments to clarify with the doctors about the date and time of the appointments. Patients will get the option to make appointments online and offline.

2.5 Inpatient Module

In this module, admission request will be made. Request for admission is made before patient admitting the hospital. Doctor can view the inpatient list when the users are logged in to web application. Admin can manage hospitalized patients and have facilities to convert outpatient to inpatient details.

2.6 Outpatient Module

In this module, manages activities related to patient who visits the hospital or resident doctor or consultant doctor for medical consultations, diagnosis and treatment. Doctor can view the outpatient list when the users are logged in to web application. Users can check the appointments and check medical history with hospital and check invoices and other details of the outpatients.

2.7 Report Module

In this module, was designed to provide a feature-rich and user-friendly web interface for managing reports. Generate report to get insight and total bed occupancy report and total operation report and shows hospital performance report. Patient can view the reports.

2.8 Asset Tracking Module

In this module, it is useful for doctor to track the patient through RFID. RFID Tag is placed with the assets and the reader will be placed. With the help of RFID reader doctor can track the patients and the location of the patient will be shown through GPS.

2.9 Implementation

Asset Tracking was developed by using C Language. With the help of Arduino UNO and the software used for compiling and run the program is Arduino IDE.

And Desktop application was developed using C Sharp. Then it was converted into a web application for computer and laptop using Visual studio and MySQL as back-end database.

3. RESULT

The results from the Desktop Application are represented with pictures of each page of the Web Application. The results shown are from the login. It tells the step-by-step process of each user login capabilities in a systematic way.

3.1 Hardware Kit

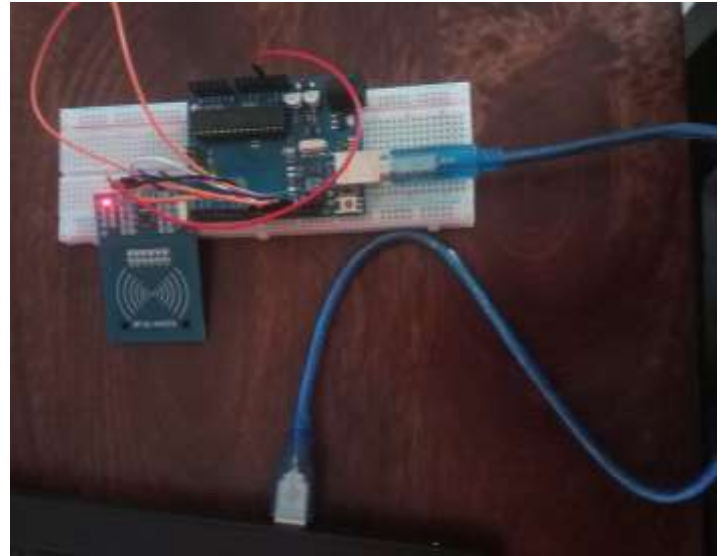


Fig.3.1 Hardware Kit

3.2 Login Page



Fig.3.2. Login Page

3.3 Admin Login Page



Fig.3.3 Login into Admin

3.4 User Login Page



Fig.3.4 User Login Page

3.7 Search Engine for Inpatient



Fig.3.7 Inpatient Search Engine

3.5 Inpatient Module



Fig.3.5. Inpatient Module

3.8 Search Engine for Outpatient



Fig.3.8 Outpatient Search Engine

3.6 Outpatient Module



Fig.3.6 Outpatient Module

3.9 Asset Tracking Module

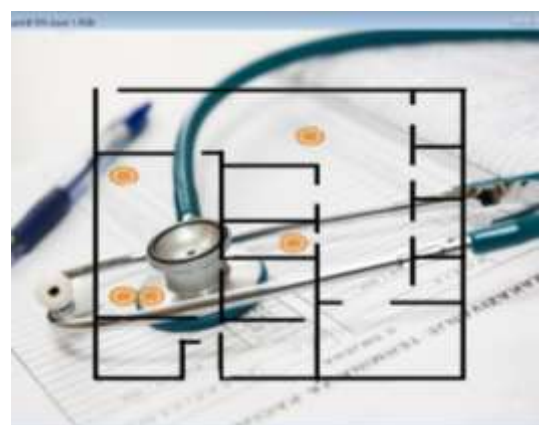


Fig 3.9 Asset tracking Module

3.10 Change Password



Fig.3.10 Change Password Module

4. CONCLUSION AND FUTURE SCOPE






WEB APPLICATION FOR IoT BASED ASSET TRACKING SYSTEM FOR HOSPITAL is developed for tracking the medical equipment. It is easy to track the medical equipment. It greatly reduces the time by managing this web application.

Future work involves integrating the patient data in to the web application so that we can use this system for hospitals. This web application can surely help to improve the hospitals. Suitable Mobile Application for Hospital Asset Tracking will be created.

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