RFID Based on Personnel / Equipment Tracking in Hospitals

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Abstract: This paper implements superior radio frequency identification based solutions targeted for smart hospital asset management and access control. Our Radio Frequency Identification (RFID) systems will be used to track patients, doctors and expensive equipment in hospitals. RFID tags can be attached to the ID bracelets of all patients, or just patients requiring special attention, so their location can be monitored continuously. Our systems also can provide an electronic link for wireless communication of patient data. An instant assessment of critical equipment and personnel locations also possible through RFID.

Keywords: RFID tag, RFID reader

I. INTRODUCTION

In hospitals there is no particular information of equipment's presence. They are distributed in different places of hospital. Therefore there is no security & responsibility for equipment. In super specialty hospitals due to large number of patients, equipment there is no perfect tracing system. Everything is done manually. The key to a successful RTLS deployment lies in picking the right RTLS option(s) and solution(s) for the application(s) or problem(s) at hand. Where this application-technology match has not been carefully thought of, any technology will be doomed to failure or to achieving less than optimal results.

Throughout various complex processes within hospitals, context-aware services and applications can help to improve the quality of care and reduce costs. For example, sensors and Radio Frequency Identification (RFID) technologies for e-health have been deployed to improve the flow of material, equipment, personal, and patient. Bed tracking, patient monitoring, real-time logistic analysis, and critical equipment tracking are famous applications of Real-Time Location Systems (RTLS) in hospitals. In fact, existing case studies show that RTLS can improve service quality and safety, and optimize emergency management and time critical processes. In this paper, we propose a robust system for position and orientation determination of equipment. Our system utilizes passive (RFID) technology mounted on flooring plates and several peripherals for sensor data interpretation. The system is implemented and tested through extensive experiments. The results show that our system's average positioning and orientation measurement outperforms existing systems in terms of accuracy.

II. LITERATURE SURVEY

Equipment Location in Hospitals Using RFID-Based Positioning System Ali Asghar Nazari Shirehjini, Abdulsalam Yassine, and Shervin Shirmohammadi, Senior Member, IEEE[1] **.**Throughout various complex processes within hospitals, context-aware services and applications can help to improve the quality of care and reduce costs. For example, sensors and Radio Frequency Identification (RFID) technologies for e-health have been deployed to improve the flow of material, equipment, personal, and patient. Bed tracking, patient monitoring, real-time logistic analysis, and critical equipment tracking are famous applications of Real-Time Location Systems (RTLS) in hospitals. In fact, existing case studies showthatRTLS can improve service quality and safety, and optimize emergency management and time critical processes. In this paper, we propose a robust system for position and orientation determination of equipment. Our system utilizes passive (RFID) technology mounted on flooring plates and several peripherals for sensor data interpretation. The system is implemented and tested through extensive experiments. The results show that our system's average positioning and orientation measurement out performs existing systems in terms of accuracy. The details of the system as well as the experimental results are presented in this paper.

RFID-based Hospital Real-time Patient Management System Belal Chowdhury, Rajiv Khosla[2]. In a health care context, the use RFID (Radio Frequency Identification) technology can be employed for not only bringing down health care costs but also facilitate automating and streamlining patient identification processes in hospitals and use of mobile

devices like PDA, smart phones, for design a health care management systems. In this paper, we outline a RFID model for designing a system in the health care. An application of the architecture is described in the area of RFID-based Real-time Hospital Patient Management System (HPMS).

III.   PROPOSED SYSTEM

In hospitals there is no particular information of equipment's presence. They are distributed in different places of hospital. Therefore there is no security & responsibility for equipment. In super specialty hospitals due to large number of patients, equipment there is no perfect tracing system. Everything is done manually. In existing System, there is no facility to track the patient location and equipment. Patient information cannot access or update through RFID card, So it is a delay process. Due to these disadvantages we have proposed the current system. Generally in hospitals there will be number of medical equipment's whose positions are changed frequently depending on the usage. Their presence must be detected immediately in some situations, but manual detection takes a lot of time, creating a problem for the patient.

So we proposed an RFID application where we can track the equipment and patients using RFID tags. These RFID tags emit signals frequently so there will be an antenna it catches the signals and trace the equipment. Patients are also provided with a RFID tag so that using the tag patient's information can be traced. This proposed system has many advantages. Tracking each patient's location continuously, Real time tracking of the location of doctors and nurses in the hospital, Track location of expensive and critical instruments and equipment, is done easily. Restrict access to drugs, pediatrics, and other high-threat areas to authorized staff, Monitor and track unauthorized persons who are loitering around high-threat areas, Use the patient's RFID tag to access patient information for review and update as shown in fig 1.
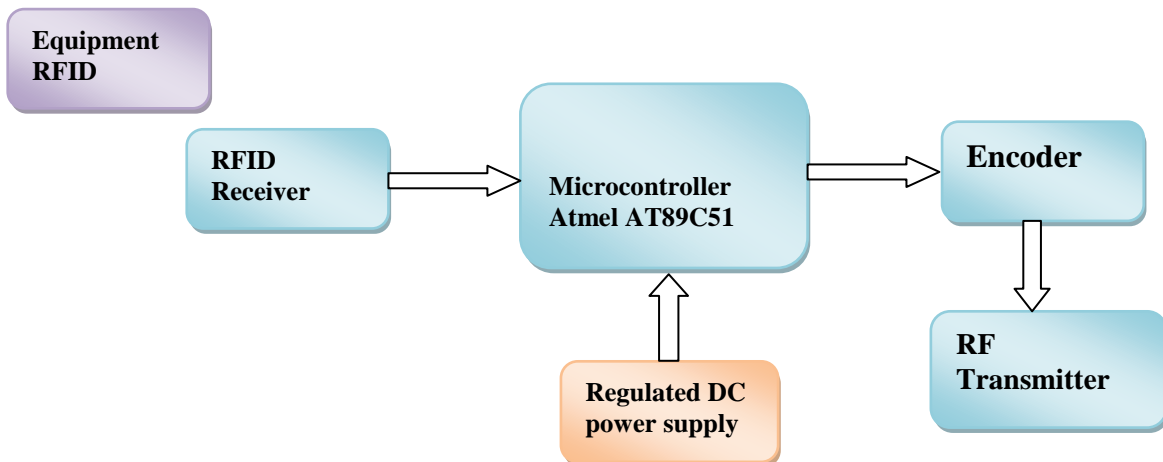
Fig[1]:Equipment Tracking Device Block Diagram
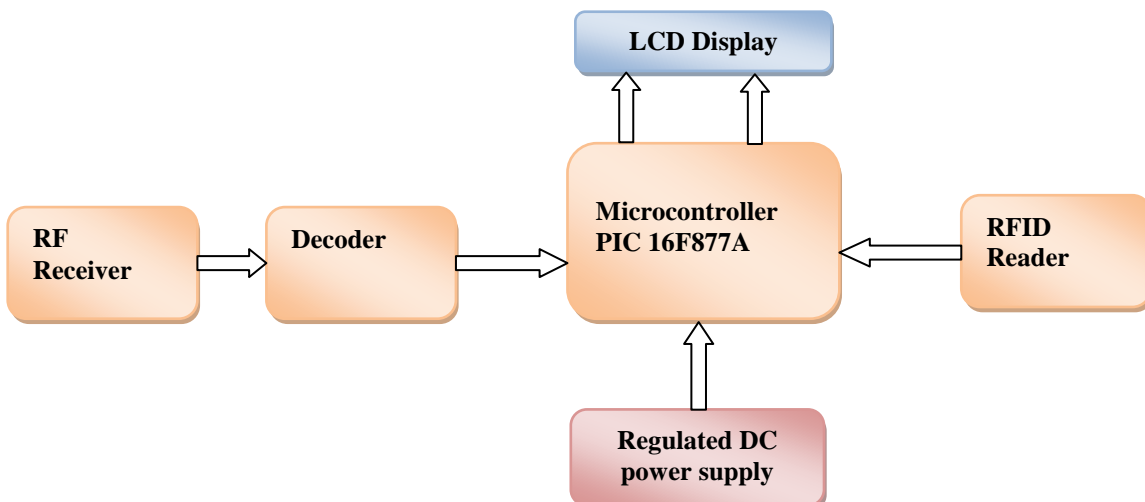
Fig[2]:Information Display Device Block Diagram
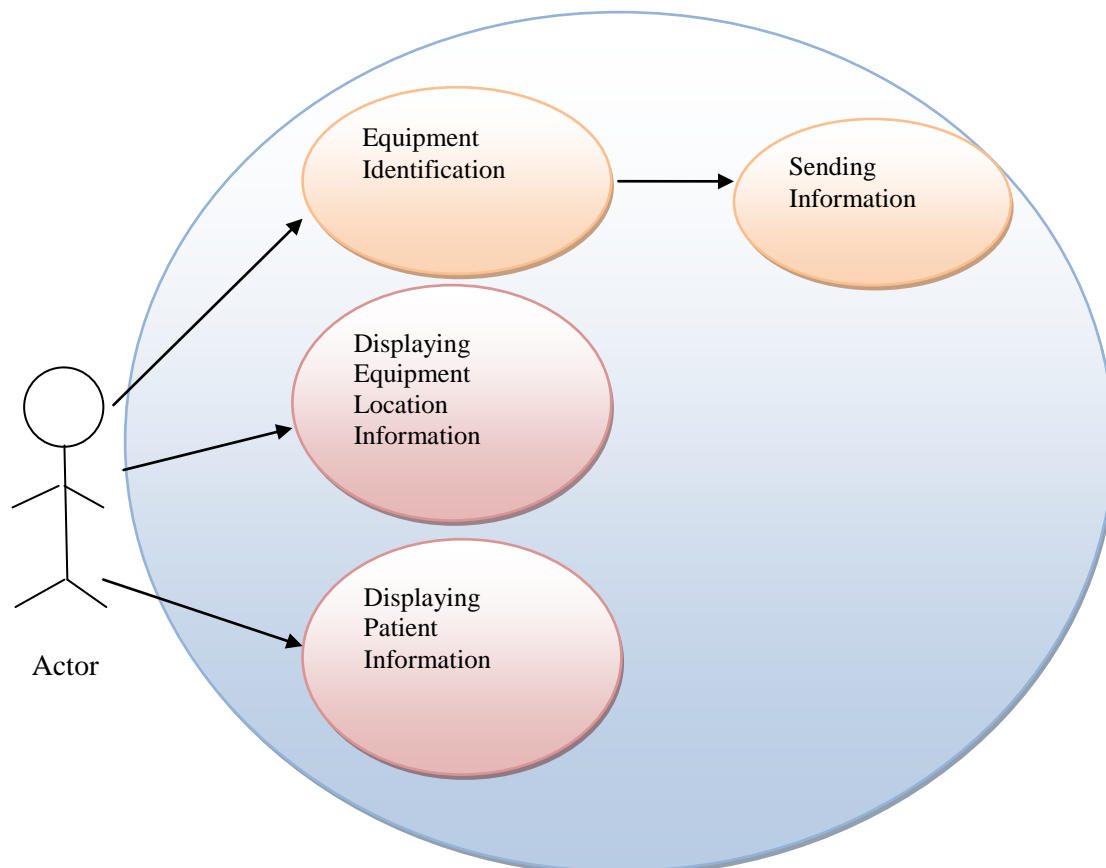
Fig[3]:Use case diagram

IV. RESULT AND DISCUSSION

RF communication works by creating electromagnetic waves at a source and being able to pick up those electromagnetic waves at a particular destination. These electromagnetic waves travel through the air at near the speed of light. A radio receiver is the opposite of a radio transmitter as shown in fig 2 and fig 3. It uses an antenna to capture radio waves, processes those waves to extract only those waves that are vibrating at the desired frequency, extracts the audio signals that were added to those waves, amplifies the audio signals, and finally plays them on a speaker. AT89C51 is an 8-bit microcontroller and belongs to Atmel's 8051 family. ATMEL 89C51 has 4KB of Flash Programmable and Erasable Read Only Memory (PEROM) and 128 bytes of RAM. It can be erased and program to a maximum of 1000 times.

The following Modules are implemented:

1. **Admin:** Administrator will control all users in our application like patient, Doctor.This admin can register all the user (Doctor, patient etc…) and allocate RFID tags to each person. After that admin need to give permission to enter in to the particular rooms, only authorized persons only allowed to enter in to the rooms. And also admin can view Users location (Doctor, patient etc…..)

2. **User:** In our application we have two types of users. Hospital management(doctor, lab reporter, nurse etc…), and patient. Doctor can add patient and view the location of patients after getting appropriate permission. In this module patient can be added after assigning the tag. By using tags only these people enter into the rooms.

3. **RFID Reader and Tag:** An RFID tag, consists of a chip and an antenna. A chip can store a unique serial number or other information based on the tag's type of memory, which can be read-only, read-write, or Write Once Read-Many (WORM). The antenna, which is attached to the microchip, transmits information from the chip to the reader, In order for an RFID system to function, it needs a reader, or scanning device, that is capable of reliably reading the tags and communicating the results to a database. A reader uses its own antenna to communicate with the tag. When

a reader broadcasts radio waves, all tags designated to respond to that frequency and within range will respond. A reader also has the capability to communicate with the tag without a direct line of sight.

V. CONCLUSION

Our proposed work provides hassle free tracking of Equipments and Economic friendly system design. Incorporation of more identification of equipments with more limit as per hospital environments. Access over patient information using RFID tag. Authentication of patients is achieved.

REFERENCES

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