RFID BASED INFANT SECURITY SYSTEM

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Abstract

One of the biggest problem nowadays in hospital is the new born babies getting abducted and mismatched due to lack of ability to distinguish between features of an individual infant. Thus a smart infant monitoring system based on Radio Frequency Identification (RFID) is proposed to reduce the potential risks in hospitals. The child monitoring system is implemented to effectively integrate a system that could monitor infants by using Radio Frequency Identification (RFID) technology. The smart infant monitoring system can be used in neonatal department in hospitals with integrated RFID modules. This System is done using active RFID tag interfaced with receiver and ARDUINO UNO with a door locking security system. RFID tag transmits signal data to receiver. The received signal is monitored by security officials in the hospital, which provides security to Infants. By Radio frequency Identification a system which allows the new born babies being monitored every time without interrupting the regular care of the infants.

INTRODUCTION

Radio Frequency Identification (RFID) is a silicon chip-based transponder that communicates via radio waves. Radio Frequency Identification is a technology uses tags as a component in an integrated supply chain solution set that will evolve over the next several years. RFID tags contain a chip which holds an Electronic Product Code (EPC) number that points to additional data detailing the contents of the package. RFID readers identify the EPC numbers at a physical contact. Middleware perform initial filtering on data from the readers. Applications are evolving to comply with shipping products to automatically processing transactions based on RFID technology RFID Reader Module, are also called as interrogators. They convert radio waves returned from the RFID tag into a form that can be passed on to Controllers. RFID tags and readers have to be tuned to the same frequency in order to communicate. RFID systems use many different frequencies. RFID Tag – The actual data carrying tool of an RFID structure, ingeneral comprise of an antenna (coupling element) and an electronicmicro-chip.

RFID is a common term that describe a device transferring data with the help of radio waves. RFID tags comprise of a RFID transceiver for transferring data from one system to another system.There are 2 kinds of RFID tags- Active tags & Passive tags. Passive tags comprise of three key components, namely, an in-built chip, a substrate and an antenna. The in-built chip is also known as a circuit and is utilized to perform some precise tasks along with accumulating data. Passive RFID tags can comprise of various kinds of micro-chips depending on the structural design of a particular tag. These chips can be MO (read only) or WORM (write once chip other than read many) or RW (read write) chip.

Active tags comprise of same components that exists in passive tags. They comprise of a micro-chip and an antenna, the only comparison between the two is that the size of the micro-chip in active tags is larger than passive tags' chip. An active tag is incorporated with a built-in power supply.

RFID systems currently operate in four main ranges of the frequency spectrum: Low Frequency (LF), High Frequency (HF), Ultra-High Frequency (UHF), and Microwave frequency range. All RFID system components must be selected and configured according to the system's operating frequency. RFID systems use the frequencies classified worldwide as ISM frequency ranges.

Radio Frequency Identification (RFID) is a silicon chip-based transponder that communicates via radio waves. Radio Frequency Identification is a technology uses tags as a component. RFID tags contain a chip which holds an electronic product code (EPC) number that points to additional data detailing the contents of the package. Readers identify the EPC numbers at a distance, without line-of-sight scanning or involving physical contact

PROPOSED SYSTEM

In a typical year many infants are abducted by strangers or getting mismatched from their parents in hospitals. This proposed system can be implemented to avoid the abduction of new born babies or getting swapped. The main objective of INFANT SECURITY USING RFID is to effectively integrate a system that could monitor infants by using Radio Frequency Identification (RFID) technology and also a door locking security system. An active RFID module embedded in such a way that a system can be generated that could ensure the complete safety of the infant.

The Proposed system is based on RFID communication protocol. Every Infant, born in hospital is allocated with ID along with his/her mother's name. The active RFID tag which is covered with latex free band is fixed in ankle of baby's leg which acts as transmitter simultaneously transmits signals to the RFID receiver and with help of the received data, controller displays ID'S information in the monitoring system. Security official inside hospital and particular ward nurse station officials where baby is situated will be monitoring 24*7 repeated.

The active RFID tag once fixed in the baby's leg should not be removed until the discharge period (the time will be fixed at the time of birth of baby). Active RFID tag fixed in the baby's leg has a frequency of 20khz which is very low frequency range and will not affect baby's health in any cause. Similarly the tag is water resistant and also the tag is reusable , once a baby uses the tag and discharges from the hospital the same tag can be used by another baby who is in hospital .The Status of the baby is monitored regularly by the Security official inside the hospital.

This system also has an door locking security system, which prevents the infants being abducted. If the infant moves to other ward images of the person who is near to the door. Even if the tag is been cut into pieces or tag has been removed before the
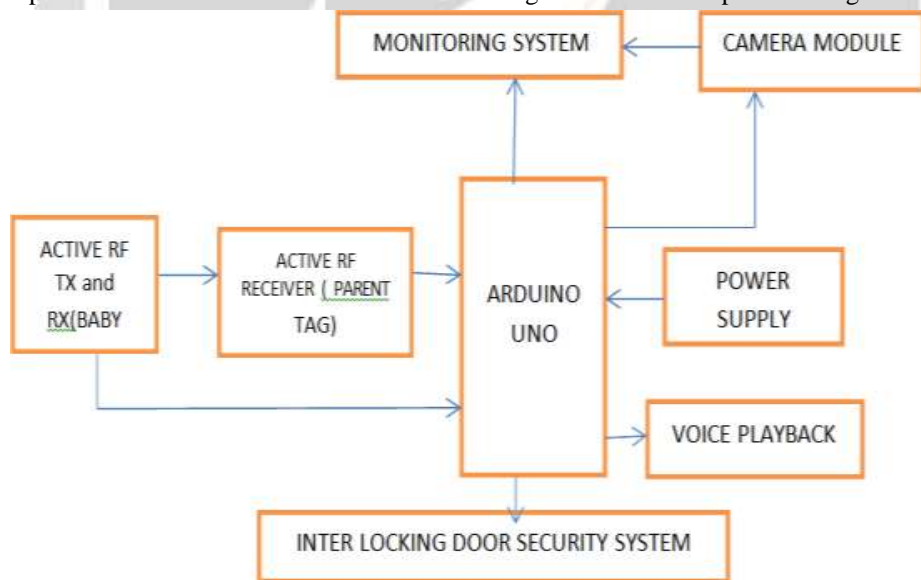
discharge time else the power supply has been turned off suddenly then alerts to the security officials with activating voice play back automatically takes place.

Automatic Door Security System

Automatic door locking security system is the main advantage of proposed system. The working of this system is given below as a flow chart:
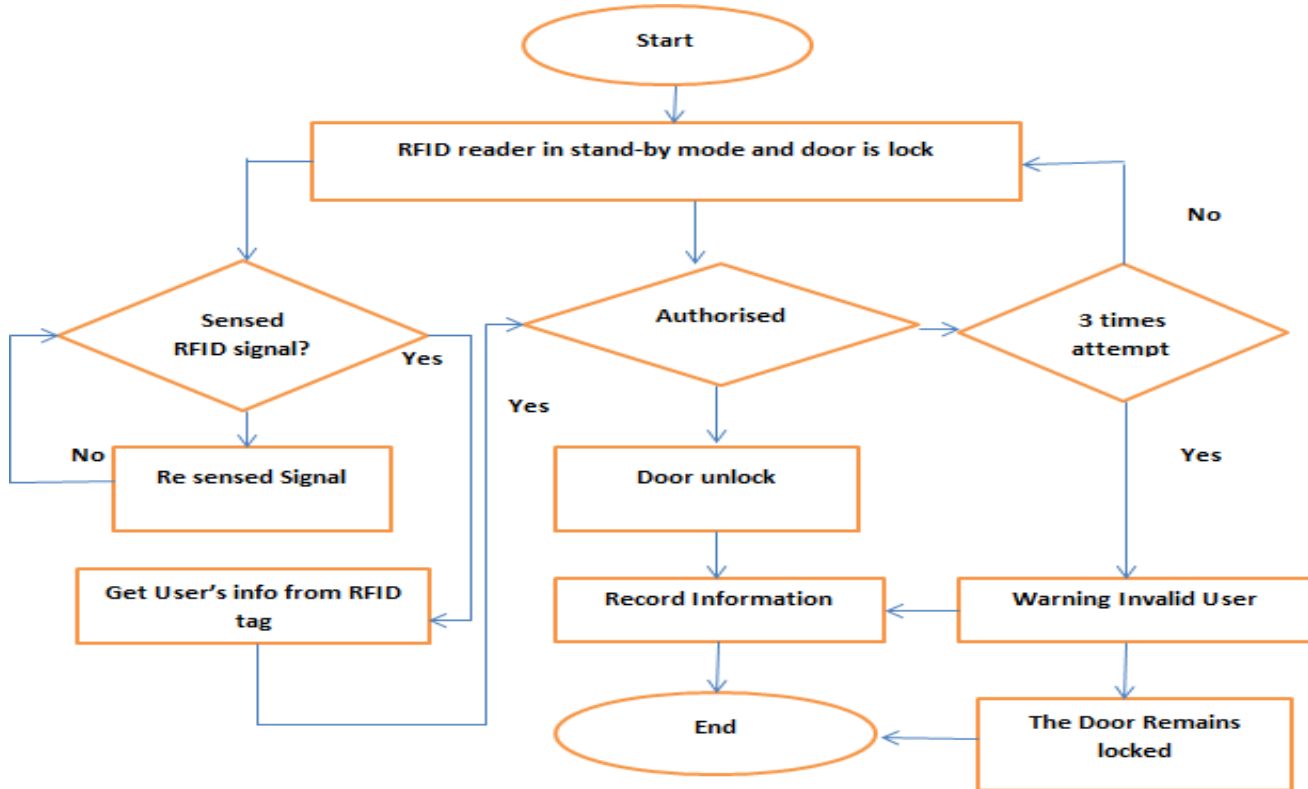

Flow diagram of Automatic door security system

HARDWARE AND SOFTWARE REQUIREMENT RFID Tag

A radio-frequency identification system uses tags, or labels attached to the objects to be identified. Two-way radio transmitter-receivers called interrogators or readers send a signal to the tag and read its response.

RFID tags can be either passive, active or battery- assisted passive. An active tag has an on-board battery and periodically transmits its ID signal. A battery- assisted passive (BAP) has a small battery on board .

ARDUINO

Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and   analog   input/output (I/O) pins that may be interfaced to various expansion boards or breadboards (shields) and other circuits. The boards feature serial communications   interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed used a dialect of features from the programming languages C and C++. The Arduino project provides an integrated development environment (IDE) based on the Processing language project.
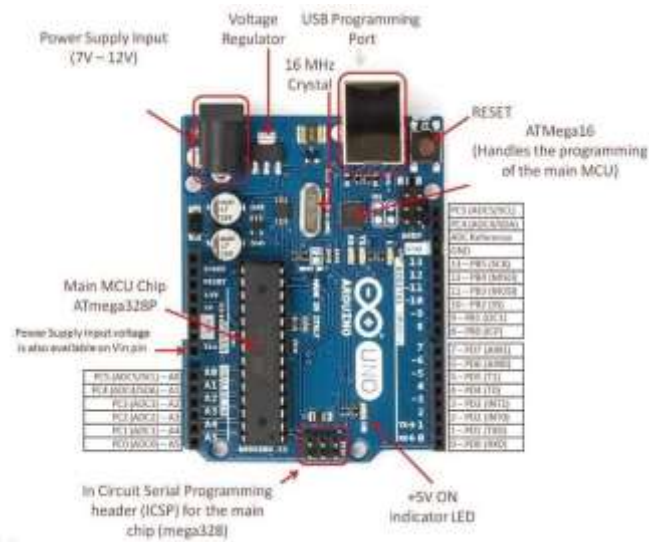
HT12E-Encoder

HT12E is an encoder integrated circuit of 2^{12} series of encoders. They are paired with 2^{12} series of decoders for use in remote control system applications. It is mainly used in interfacing RF and infrared circuits. The chosen pair of encoder/decoder should have same number of addresses and data format.

HT12D-Decoder

HT12D is a 2^{12} series decoder IC (Integrated Circuit) for remote control applications manufactured by Holtek. It is commonly used for radio frequency (RF) wireless applications. By using the paired HT12E encoder and HT12D decoder we can transmit 12 bits of parallel data serially.

OV7670 Camera module

- Optical size 1/6 inch

- Resolution 640×480 VGA

- Onboard regulator, only single 3.3V supply needed

- Standard 0.1inch (2.54mm) pin pitch header connector

- Mounted with high quality F1.8 / 6mm lens

Relays

A relay is an electrically operated j+switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid- state relays. A type of relay that can handle the high power required to directly control an electric motor or other loads is called a contactor. Solid-state relays control power circuits with no moving parts, instead using a semiconductor device to perform switching.

CONCLUSION

The RFID based infant security system will be helpful in preventing abduction of Infants and mismatching of infants from their parents in hospitals. This shows how Infant security system using RFID tags can be achieved in the protection of infants. Arduino UNO used is a simple prototype model which works more efficiently. Aim is to implement this system especially in government hospitals because the percent of abduction of infants takes place high in government hospitals. The complete setup of the project is low cost so that even common people can use this security system, also the components used in the system is low cost and efficiency is more. It will be useful for common people.

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