

## A Study of WSN Based Application Using RFID

J.P. Keerthana<sup>1\*</sup>, R. Chithirai Selvi<sup>2</sup>

<sup>1,2</sup>Department of CS, IT, BCA, Rabiammal Ahamed Maideen College For Women, Tiruvarur, Tamilnadu, India

Corresponding Author: Jayakeerthana2094@gmail.com

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**Abstract** — WSN, which aims to exchange data wirelessly in a short distance using short-wavelength radio transmissions, is providing a necessary technology to create convenience, intelligence and controllability. Using RIFD technique to sense and monitoring the environment. Integrating RIFD with WSN not only provides identity and location of an object but also provides the information regarding the condition of the object carrying the sensors enabled RIFD tag. This paper discuss about the RIFD technology, which are used by the WSN through Zigbee device such as in Agriculture, Home Appliances and Health Care Monitoring. These applications are used for managing the user’s time and cost and also reduced human resources and improve productivity.

**Keywords**— WSN, RIFD Applications, Zigbee, Arduino

### I. INTRODUCTION

**Wireless Sensor Network (WSN)**, used to collect and transmit information about their surrounding environment. **Radio Frequency Identification (RFID)** uses electromagnetic fields to automatically recognize and track tags attached to objects. Using AIDC (Automatic Identification and Data Capture), we can store and capture the data as electrically. RIFD relates to the technique of transmitting the recognition of an object in the form of a unique serial number using radio waves.

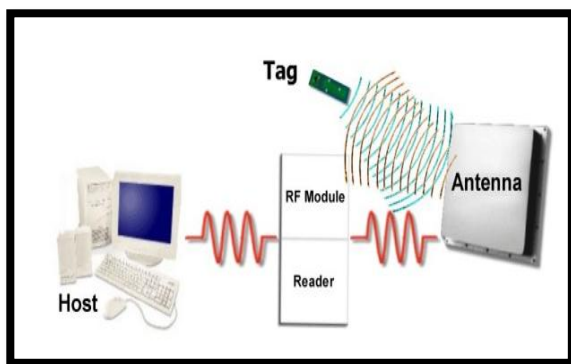


Fig.1 Architecture of RFID

The basic components of RFID technology are Tag, Readers, Host Computer and Antenna are shown in Fig.1. In this RFID reader is a network connected device (fixed or mobile) with an antenna

That sends power as well as data and commands to the tags. **Zigbee** is a high-level communication protocols used to create personal area networks with small, low-power digital radios, such as for home automation, medical device data collection, and other low-power or low-bandwidth needs, designed for small scale projects.

In **Health Care Monitoring**, RIFD can track patients, doctors and medical instruments. Monitor inside the hospital, patient’s physiological data and control the drug administration. In **Home Appliances**, RIFD detect the home condition, temperature, humidity, gas and raise the alarm signal to alert the user for some critical situation. In **Agriculture**, RIFD detect soil moisture, wind speed and its directions, temperature, water level.

### II. RELATED WORKS

RFID reader is able to read and write data to tags wireless transmission. RFID uses backscatter technique and operates in UHF bandwidth between 865-956MHZ [1]. In Health Care Monitoring, sensor device used to support sensing and monitoring. It also provides a spatial context for data association and analysis. All devices are connected to a more resourceful backbone [2]. In Agriculture, RFID tag resisted on the animals, for the whole duration of the test, it did not significant any structural damage and did not require any particular maintenance. But the results obtained during data retrieving and updating were positive [3]. In Home Appliances, RFID Reducing Energy Consumption, Increasing Family Safety [4].

### III. RFID TECHNOLOGY

RFID provides a communication infrastructure at the radio frequencies between a unique tag and reader device that can identify the tag, and allows for establishing communication between devices within the system without any physical contact, or even without seeing each other.

In this observe, communication comfort can be provided with RFID technologies in environments where technologies which require that the devices must accurately see each other, like the case in barcode systems.

#### A. RFID Tag

The tags are transponders that have an identifier of the object with which it is connected. The tags typically consist of an antenna and an electronic microchip. The antenna is conscientious for creating communication between the tag and the reader.

There are two main energy classifications of a tag. They can be submissive, obtaining energy through the magnetic field generated by readers through antennas, or they can be dynamic, with a battery that provides the energy required to execute processing and modulation of the signal. Active tags require a power source they're either connected to a powered substructure or use energy stored in an incorporated battery.

#### B. RFID Reader

An RFID Reader can read through most anything with the exclusion of conductive materials like water and metal, but with modifications and positioning, even these can be surmount.

The RFID Reader emits a low-power radio wave field which is used to power up the tag so as to pass on any information that is contained on the chip.

In accumulation, readers can be fitted with an additional interface that converts the radio waves returned from the tag into a form that can then be conceded on to another system, like a computer or any other device.

A radio frequency identification **reader (RFID reader)** is a device used to assemble information from an **RFID** tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a **reader**.

### IV. APPLICATION

#### A. Health Care Monitoring

Using Health Care Monitoring System, health care providers (e.g., hospitals) improve patient's safety by capturing basic data (such as patient unique ID, name, blood group, drug allergies, drugs), thwart/reduce medical errors, increases

competence and productivity, and cost savings through wireless communication through RFID to retrieve the personal information that are used in the time of emergency. It also contains the app that is premeditated to help the patient in case of emergency.

Using this knowledge all medical information is stored and retrieved online at any given point of time. It is easy to update, acclimatize and develop.

Trying to recognize an insensible patient or patient who is unable to communicate can lead to delay in treatment. Certain records, like medical records require high privacy as shown in Fig.2.

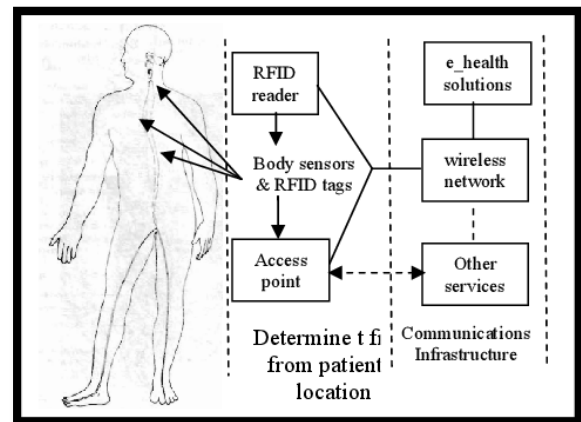


Fig.2 Health Monitoring using RFID

The RFID card is used to create secure access to the patient's personal data and medical records. The patient ID can be accessed by the respective doctor by scanning the RFID card, after logging into doctor's account.

The doctor can observe and update patient's medical records and prescriptions. The patient can login into his account and he can perform functionalities that is view his previous medical reports and prescriptions.

#### B. Home Appliances

We are using Arduino and RFID transceivers to categorize and track the RFID object based on its range, orientation, and the type of material which contact with it. RFID reader reads the tag ID received by the user and reports the tag ID to system. System verifies RFID tag with its distinctive identification and performs the expected task.

People can control and secure their houses very easily using RFID technology; system offers many convenient applications to the customer, leaving them with peace of mind when they are not able to manually control appliances and other devices as shown in Fig.3.

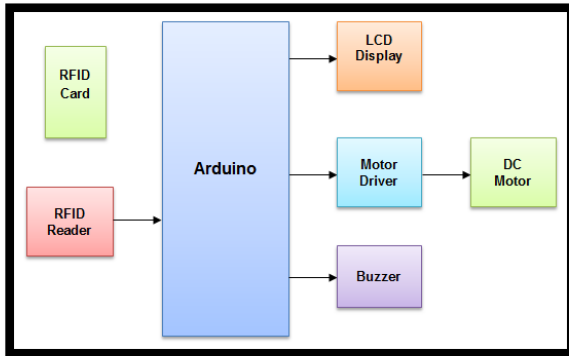


Fig.3 Home Appliances using RFID with Arduino

Our system will concern Radio Frequency technology which consists of RFID Tags, RF Readers with antennas, Arduino, transmitter- receiver, and added networking properties to discover and trail object. With the exercise of these readers, the system is able to effectively accommodate users to predetermined conditions and create a secure environment which also provides handiness to the users.

#### C. Agriculture

RFID has been used for many years in animal identification and tracking, being a common perform in many farms. Also it has been used in the food chain for traceability control.

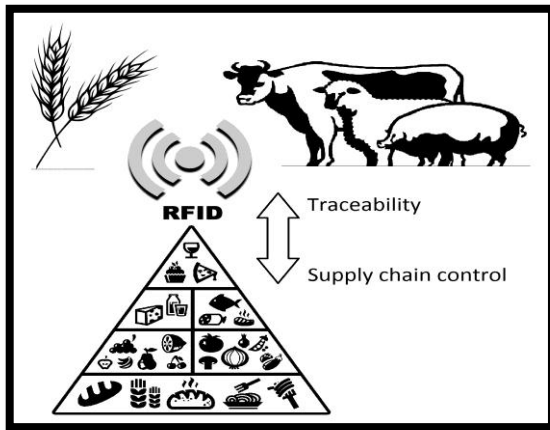


Fig.4 RFID in Agriculture

The accomplishment of sensors in tags, make feasible to monitor the cold chain of consumable food products and the development of new applications in fields like environmental monitoring, irrigation, specialty crops and farm machinery.

RFID enabled sensor network automation in agriculture in areas such as environmental monitoring, precision agriculture, machinery management, facility automation, and agricultural traceability. A computer-assisted decision-making module is essential in precision agriculture to calculate and facilitate variable controls for all involved applications. There are generally two mechanisms in such

decision-making modules, namely a predictive and a reactive approach.

#### V.CONCLUSION

In the future version of **Health care monitoring** using RFID, we will explore the functionality to access patient's medical records from other health care provider's databases through internet. Also mounting the functionalities for accessing and updating patient records remotely by medical professionals or consultant using devices such as smart phones.

We can add the emergency contacts of a particular patient. In **precision Agriculture** using RFID, the food sector use arises from the need to find a system to improve the management of tracking along the production chain and protect the consumer against untrue claims on the product.

RFID technology for smart **Home appliances** continues to evolve; the range of capabilities is only going to grow. Many are designed to sync up to other devices and systems so that your home automation system can continue to evolve as household's progress. Thus, these technologies may also raise the real estate value of your home.

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