Authentic Detection in Moving Object Tracking System by Using RFID

Mr Sunil K. khode

ME II Year (Digital Electronics)
SIPNA'S College Of Engineering & Technology, Amravati-Maharashtra [India]

Prof. P.R. Gumble

Assistant Professor Department of Electronics & Telecommunication Engg.
SIPNA'S College Of Engineering & Technology, Amravati-Maharashtra [India]

Abstract

Radio frequency identification technique tracks which students have entered the classroom, and by comparing the list of entering students with the class list, the system could generate a provisional list of present students. This system consists of three components: (1) a tag (2) a Reader and (3) a host computer.

Modulation is also taken place in this system. Tags modulate an identification code onto radio frequency signal and transmit the resulting tag signal at fixed intervals. The antennas receive and process the response, and determine the presence of the tags by proximity and triangulation. The Reader sends data from the antenna to a host computer. The host computer collects the data and resolves them into positional estimates. Data are archived in a data warehouse, such as an access database. This technology is also used for tracking objects in a supply chain, monitoring the object's status, enhancing security, and many other applications.

Keywords: RFID, Active Tag, Reader, Modulation, Transceiver.

INTRODUCTION

Historically, human-activity tracking techniques have focused on direct observation of people and their behavior with cameras, worn accelerometers, or contact switches. A recent promising avenue is to supplement direct observation with an indirect approach, inferring people's actions from their effect on the environment, especially on the objects with which they interact. The new upcoming technology, which does not require line of sight communication, is the RFID technology, using contact-less smart card, which uses active tags for the tracking mechanism. The RFID technology promises the object tracking from few meters range. So it is mostly suited for the college campuses for the attendance record of the students, In time & Out time of the students. RFID tags are being used by corporations to track people and products in just about every industry. This technology can completely replace barcodes. The automotive industry makes use of small RFID tags that offer a high level of security at low cost.

I. Importance of RFID System

1. Every authorized person will get a tag. So the unauthorized person will not get entry. In this way authentic entry will be done.
2. It is easy to maintain the record of persons.
3. Due to computer interface, there is no need to keep record of the pervious readings.
4. Storage of information and data.
5. Greater accuracy of system.
6. Ease of obtaining information and greater reliability.

II. Conceptual Information of RFID Cards

RFID cards are also known as "proximity", "proxy" or "contact less cards and come in three general varieties: passive, semi-passive (also known as semi-active), or active.

Fig No. 1: Visual System of RFID Tags

A. Passive Tag

Passive RFID tags have no internal power supply. The minute electrical current induced in

the antenna by the incoming radio frequency signal provides just enough power for the CMOS integrated circuit in the tag to power up and transmit a response. Most passive tags signal by backscattering the carrier signal from the reader. This means that the antenna has to be designed to both collect power from the incoming signal and also to transmit the outbound backscatter signal. A tunning transformer for high frequency RFID was proposed for adjustment of resonant frequency [3].

B. Active Tag

Active RFID tags have their own internal power source which is used to power any ICs that generate the outgoing signal. Active tags, due to their onboard power supply, also transmit at higher power levels than passive tags, allowing them to be more effective in "RF challenged" environments like water (including humans/cattle, which are mostly water), metal (shipping containers, vehicles), or at longer distances. Many active tags have practical ranges of hundreds of meters, and a battery life of up to 10 years. With the proper antenna on the reader and the tag, a 915MHz tag can be read from a distance of 100 feet or more.

C. Semi Passive Tag

Between the active and the passive tags are the semi-passive tags. These tags have a battery, like active tags, but still use the reader's power to transmit a message back to the RFID reader using a technique known as backscatter. These tags thus have the read reliability of an active tag but the read range of a passive tag. They also have a longer shelf life than a tag that is fully active. Due to unique characteristics and technical challenges, developing a wireless sensor network for industrial applications requires a combination of expertise from several different disciplines [6]. First of all, industrial expertise and knowledge are required for application-domain-specific ledge. Second technology expertise is essential to fully understand issues associated with sensor calibration, transducers and clock drift. The third RF design and propagation environment expertise is necessary to address communication challenges and RF interference problems in industrial environments [5].

III. Hardware Modeling Of RFID System

This system typically has three components: (1) a tag (the item being identified) (2) an Reader (a device which detects the presence of a tag), and (3) a system (typically including cabling, computers, and software which tie together the tags and Readers into a useful solution).
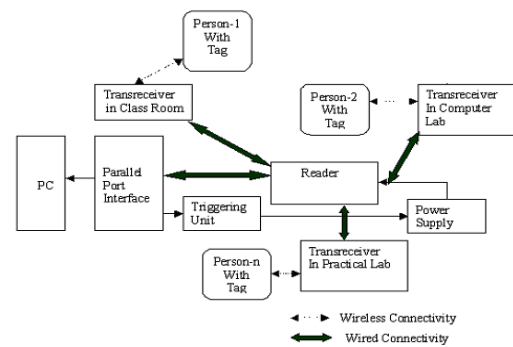

Fig No.2: System Block Diagram

Tags modulate an identification code onto RF signal and transmit the resulting tag signal at fixed intervals. The antennas receive and process the response, and determine the presence of the tags by proximity and triangulation. The Reader sends data from the antenna to a host computer. The host computer collects the data and resolves them into positional estimates. Data are archived in a data warehouse, such as an access database [4].

IV. Analysis system of RFID System

During analysis of the system a standard test setup should be available. The automatic wireless authentic detection and monitoring system by using RFID is also had a predesigned test setup. The RFID based Location Tracking System is tested in the following test conditions.

1. Class room of size 32" * 32" * 35" is preferred.
2. Receiver is located at the centre of the room over ceiling.
3. The reader is located near the computer around 32 feet from receiver.
4. Mobility of the tag can be anywhere in the setup room. The reports of various kind can be generated using the application software. The preview of the report or print copy can also be taken as per the users requirement. The format of reports to be generated is as follows.
1. All Data Reports
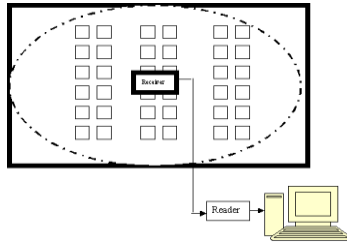2. Person Wise Reports
3. Class Wise Reports

Fig No.3: Detection of Classrooms Students

A. All Data Reports

Table No. 1: All Data Reports

Id No.	Class No.	Date	Time
1	1	10/02/12	10: 10:30
2	2	10/02/12	10:11:25
3	3	11/02/12	11:11:11
1	2	11/02/12	11:12:10
2	2	12/02/12	12:10:15
3	3	12/02/12	01:15:12
1	3	13/02/12	11:10:10
2	2	13/02/12	11:11:18
3	1	13/02/12	11:12:30
1	2	14/02/12	12: 12:58
2	2	14/02/12	12: 12:58

B. Person Wise Reports

Table No. 2: For Tag Id1

Id No.	Class No.	Date	Time
1	1	10/02/12	10: 10:30
1	2	11/02/12	11:12:10
1	3	13/02/12	11:10:10
1	2	14/02/12	12: 12:58

Table No. 3: For Tag Id2

Id No.	Class No.	Date	Time
2	2	10/02/12	10:11:25
2	2	12/02/12	12:10:15
2	2	13/02/12	11:11:18
2	2	14/02/12	12: 12:58

Table No.4: For Tag Id3

Id No.	Class No.	Date	Time
3	3	11/02/12	11:11:11
3	3	12/02/12	01:15:12
3	1	13/02/12	11:12:30

C. Class wise Report

Table No. 5: For Class 1(i.e. Class Room)

Id No.	Class No.	Date	Time
3	3	11/02/12	11:11:11
3	3	12/02/12	01:15:12
1	3	13/02/12	11:10:10

Table No. 6: For Class2 (i.e. Computer Room)

Id No	Class no.	Date	Time
1	1	10/02/12	10: 10:30
3	1	13/02/12	11:12:30

Table No. 7: For Class 3 (Library)

Id No	Class No.	Date	Time
2	2	10/02/12	10:11:25
1	2	11/02/12	11:12:10
2	2	12/02/12	12:10:15
2	2	13/02/12	11:11:18
1	2	14/02/12	12: 12:58
2	2	14/02/12	12: 12:58

V. CONCLUSION

RFID tags will soon be tracking millions of consumer product worldwide. Manufacturers will know the exact location of each product the make from the time it is made until it is used and tossed in the recycle bin or trash can. The crypto transponders will be well suited for future generation vehicle entry systems. The RFID auto ID system can be most effectively employed for the student's attendance in campus management. Thus making the digitization of the old attendance registers will minimize the time required to track & maintain the different types of records.

Multiple tag types and activation options will support a variety of applications for enterprise-wide visibility and enhanced business operations like:
1. Asset Management
2. Personnel & Vehicle Access
3. Production and Process Control

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