ISSN: 2319-5967
ISO 9001:2008 Certified
International Journal of Engineering Science and Innovative Technology (IJESIT)
Volume 2, Issue 4, July 2013

# RFID: A Sophisticated Approach Towards Academic Monitoring

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***Abstract*— *In most of the institutions, student's attendance is one of the major issues, because attendance is an important criteria for evaluating a student's final grade in each semester. This brings the idea of having some tool to monitor and record student's attendance. Therefore, computer-based student attendance management system is required to assist the faculty and the lecturer for this time-consuming process. An attempt is made in this paper to solve student's attendance monitoring problem using RFID technology. This technology facilitates automatic wireless identification using electronic passive tags with its respective readers. For this project, RFID based student's attendance management system can provide a better convenient method to take attendance, also it can be easily accessed by the lecturers by logging onto the system and most importantly, real-time reports can be generated. Thus, this application of RFID is capable of saving the time wasted during manual attendance taking procedure.***

***Index Terms*— Attendance, RFID, RFID based student's attendance management system.**

## I. INTRODUCTION

Taking manual attendance is time consuming as well as heavy on resources. Our project is an attempt at solving these problems by using RFID technology. Radio Frequency Identification (RFID) [1] is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. So the RFID is a wireless identification. An RFID system comprises of two main parts namely an RFID Reader and an RFID Tag. RFID has the following main components as shown in Fig 1.

- RFID Tag / Transponder
- RFID Reader
- RFID Antenna
- PC /Database

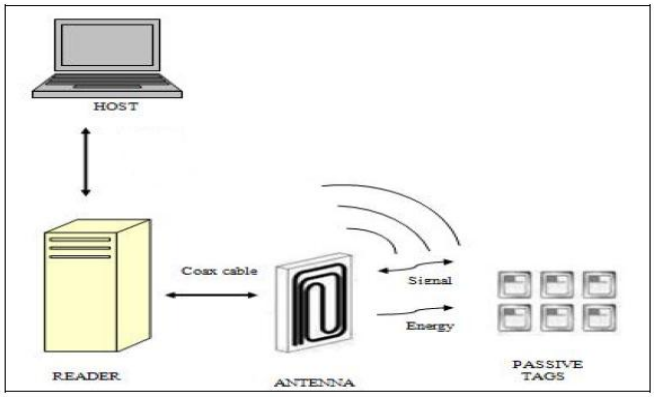


**Fig 1. The basic components of RFID system**

An RFID system consists of a tag, which is made up of a microchip with an antenna, and an interrogator or reader with an antenna. The reader sends out electromagnetic waves. The tag antenna is tuned to receive these waves. FID reader is the device capable of extracting or reading information stored inside RFID tags. Each RFID tag will have unique ID or serial number which makes it suitable for distinguishing among products. FID systems use radio waves to transmit information from an integrated circuit tag through a wireless communication to a host computer. These systems consist of three components that are the tag (transponder), the reader (interrogator) and the host computer (controller). The reader communicates with the tags in its wireless range and collects information about the objects to which tags are attached. Compared to other automatic identification technologies, like optical

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barcode systems, RFID has several advantages, such as tag data can be read automatically without line of sight from a range of several meters.

## II. SYSTEM IMPLEMENTATION

The aim of this section is to describe the overall Implementation of the Radio Frequency Identification, thereby, helping the lecturers to manage their student's attendance systematically. The main objective is to automate the whole system of student's attendance registration using RFID.

The system must have database that contains student information and it must be able to help lecturer to get accurate attendance of every student time to time. Based on the attendance, a normal defaulters list and critical defaulters list will be generated and a mail will be sent to the parents of critical defaulters. The interfaces of the system are made very user friendly. With this system, students' will become more disciplined and punctual, as the time that they come to the class will be recorded.

As shown in Fig 2, the process begins when a student enters a classroom he will place his card near the reader if he intends to register his presence in a particular class. The reader will emit a sound when the card is successfully read. After a successful reading, the RFID reader establishes a communication with the system in order to send the student card identification.

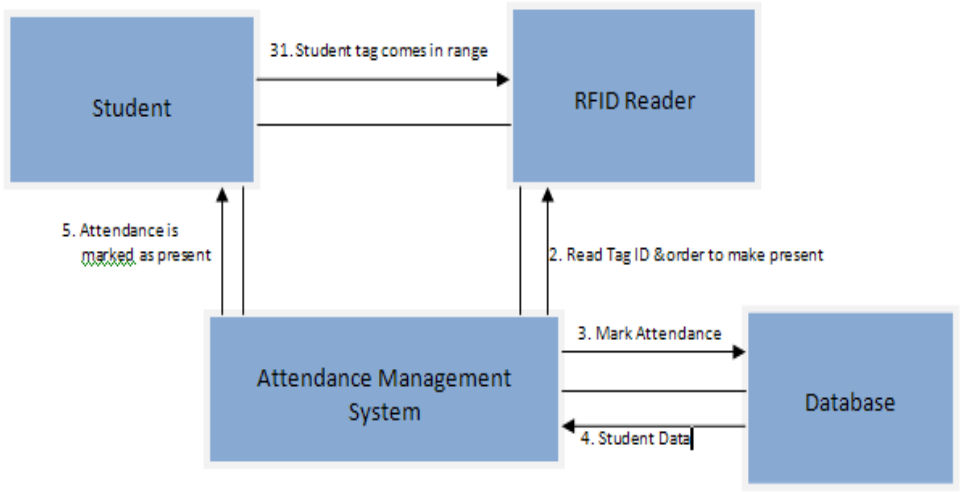


**Fig 2. System's Interaction**

These RFID tags are passive tags [2] thus it has no internal power supply. These tags are activated by radio frequency transmitted by the reader. When the RFID reader receives the data from the tag [4], the data is compared with the information in the database to identify the holder of the tag. If the data is accurate, then the attendance is recorded successfully, otherwise, the system gives an error message. The proposed system comprises of the following components:

### A. *RFID System Device*

The system employs RFID-EM terminals as the readers, which can be installed across all classrooms or laboratories.

### *B. Graphical User Interface (GUI) Design*

A user is allowed to enter the member area by logging in to the system via a login form. This type of authentication is important in order to prevent access by unauthorized users. The system grants access to only one user i.e. namely the Administrator. After logging into the system, the administrator will get access to the record attendance form (shown in Fig 3.)

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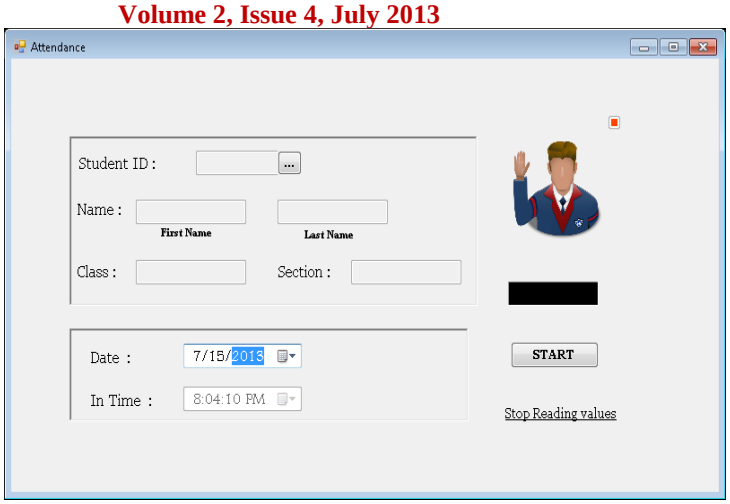


**Fig 3. Form for Recording Attendance**

### C. *SQL Server Database*

Student Attendance system is connected directly to a SQL Server database which keeps the records of each and every student. An example of the database is indicated in Fig 4.

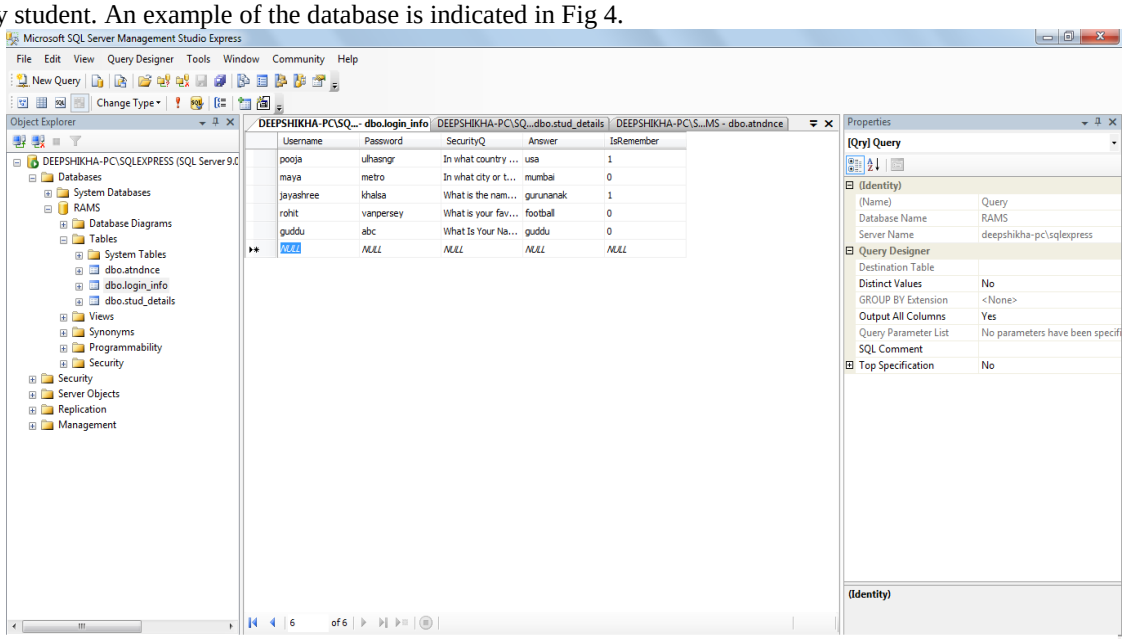


**Fig 4. Database**

A user is allowed to enter the member area by logging in to the system via a login form. This type of authentication is important in order to prevent access by unauthorized users. The system grants access to teachers, with the provision of creating multiple accounts for multiple teachers. Each time the system receives a request from the hardware, it connects to the database using an SQL connection, checks the data to verify whether or not an access granted. At the same time , our application stores all log info in order to provide later on monitoring while the user has the opportunity to track all the requests. All this is happening based on detailed queries created within the application during the development phase. As shown in Fig 5, system also generates reports and black list which will be categorized into two parts mainly defaulters and critical defaulters, these reports can be printed and E-mails can be sent to the parents of the students belonging to the critical defaulter list. Reports can be generated on daily, weekly or monthly basis. Software for data manipulation is written using VB.NET language and it is directly connected to the SQL database. In addition, writing the information on the tags is an essential step for the success of the system. Using this software, all the required information fields are written and the data will be sent to the database where all data is stored.

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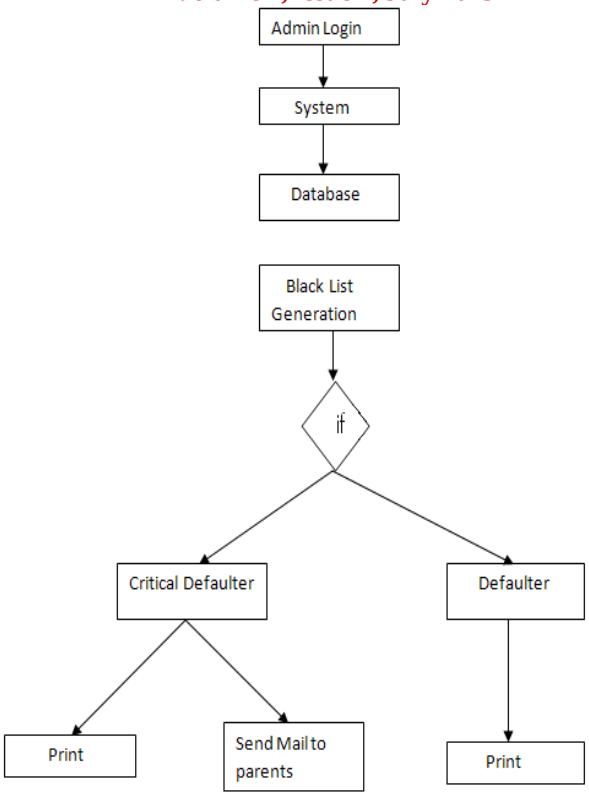


**Fig 5. Flow Chart of System Process**

## III. CONCLUSION

In this paper, an RFID system for monitoring and identifying attendance of the student and a small-scale prototype of the system was successfully implemented. The versatility of RFID is utilized in implementing a functional and automatic student attendance management system that allows students to simply mark their attendance just by swiping or moving their ID cards over the RFID reader, with a considerable degree of success and acceptability of usage. This technology offers reliability, saves time, and is easy to control/upgrade. RFID technology can be used for other applications such as payment systems, access control and quality tracking. This system should shift the paradigm of student's attendance monitoring in the classroom and provide a new, accurate, and less cumbersome way of taking student's attendance.

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