

# **INTEGRATING RADIO FREQUENCY IDENTIFICATION TECHNOLOGY(RFID) IN ACADEMIC MANAGEMENT SYSTEM(AMS)**

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**Abstract :** The purpose of this study is building a windows based intelligent system using Radio Frequency Identification technologies (RFID) to strengthen an Academic Management System (AMS) in a campus for monitoring and improving academic performance of students. A campus mobile phone application will allow guardians to monitor student's movement history at campus, food choices at canteen, class attendance, exam attendance and academic performance on daily basis. Mobile application for students will allow students to view their teacher appointments, warnings or announcements, locate their exam halls, restrict the visitors to some locations and block the defaulters.

## **KEYWORDS**

Radio Frequency Identification (RFID), Defaulters, RFID tags (Transponders), RFID reader, GSM modem

## **1. INTRODUCTION**

Education is always paid more attention for the development of society. Academic administration is very important in education, as accurate and fast data for each student's current academic state and performance is required by guardians, faculty and administration for taking decisions. As academic campuses are expanding quick and strong administration is becoming difficult for which many technologies are available. Radio Frequency Identification is one of the leading edge technologies which can be integrated to existing systems in order to get more accurate data and faster retrieval.

Radio-frequency identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. The technology requires some extent of cooperation of an RFID reader and an RFID tag. An RFID tag is an object that can be applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader. This project proposes an overview of RFID assisted smarter campus systems for students, faculty, management and guardians as well. In proposed system each faculty, staff and

student will be carrying an RFID card while RFID readers will be installed all over the campus. At campus entrance each

person's identification will be confirmed and verified with RFID card. RFID readers will be installed in all campus areas including classrooms, laboratories, cafeteria, and library. Faculty and students RFID cards will be used for class room attendance, access control to the university resources, for borrowing library items and food items at campus cafeteria. Faculty will be able to locate students present but not attending class. Students looking for will be able to track teacher or get an appointment.

Administration offices need not to key in student ID number for student details instead student will place his RFID card over a reader and his information will pop up on screen. Administration will be able to track not only student's activities and academic performance but also monitor teacher's academic performance by monitoring, number of lectures given per subject. No student will be allowed to leave campus during campus hours without seeking permission from their guardian.

## **2. RELATED WORK**

Wahab et al. (2010) [1] report that RFID allows smooth passing in or out of student as multiple tags can be detected at same time, therefore does not require queuing for identification. RFID improve campus security by allowing restricted access to various resources or campus areas at different times for different people according to administration requirements. RFID readers connected all over campus will not need continues monitoring instead if any RFID reader is not working, server will send an auto message to the maintenance department defining RFID problem along with location.

Ansari et al. (2011) [2] report that radio waves are used for communication between RFID tag and reader; therefore no wires or line of sight is required. An RFID chip with an antenna is embedded in any physical object called RFID tag which can be read/write by a RFID reader/writer.

Jiang and Li (2012) [3] outline that implementing RFID technology for identification is cheaper and faster than other contact or non contact attendance technologies. In this study

passive RFID tags will be used as they are comparatively cheaper and have long life than active RFID tags. RFID tags can be read through other materials like from inside a purse, wallet and within in the distance of three inches.

Nainan et al. (2013) [4] discuss that there are two types of RFID tags, passive tags get charged by the reader and active tags send information to reader.

Zainab Rasheed Mirza and M. Nawaz Brohi.(2013) [5] proposed building a web and windows based intelligent system using web technologies and Radio Frequency Identification technologies (RFID) to strengthen an Academic Management System (AMS) in a campus for monitoring and improving academic performance of teachers and students.

### **3. TERMINOLOGIES**

#### **3.1 Radio frequency identification (RFID)**

Radio-frequency identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders.

#### **3.2 Defaulters**

RFID cards for student can be blocked to access campus areas in case of any academic offence. Administration can restrict university attendance of dismissed students or unwanted visitors. Any misconduct by student will result in unsatisfactory academic record.

#### **3.3 RFID tags (transponders)**

An RFID tag is comprised of a microchip containing identifying information and an antenna that transmits this data wirelessly to a reader. An RFID tag is an object that can be applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves.

#### **3.4 RFID reader**

RFID Reader is a system which transmits and receives the data to the tag or key by radio waves.

#### **3.5 GSM modem**

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone.

### **4. PROPOSED METHODOLOGY**

We are proposing an overview of RFID assisted smarter campus systems for students, faculty, management and guardians as well. In proposed system each faculty and student will be carrying an RFID card where RFID readers will be installed all over the campus at campus entrance each person's identification will be confirmed and verified with RFID card. RFID readers will also individual tracking and will also be helpful for reducing unwanted access of university resources. RFID cards for student can be blocked to access campus areas in case of any academic offence. These

cards will be given to visitors temporarily to visit the campus which they can use for specific time of or limited area or services. Administration can restrict university attendance of dismissed students or unwanted visitors.

Algorithm

Input: RFID tag ID

Output: Location or availability

1. [Allow parent to monitor the student location]
  - 1.1 Student punches his RFID card on RFID reader
  - 1.2 RFID reader sends card ID to the database
  - 1.3 This card ID is compared with the ID already stored in the database
  - 1.4 If there is a match, student's location is recorded in database
  - 1.5 If scan status button is clicked, the message will be sent to the parents if their child is present in campus but not present in either classroom, canteen or library
2. [Getting faculty location]
  - 2.1 students can check status of staff through messages
  - 2.2 If staff is available, the corresponding location of the staff will be sent to the student
  - 2.3 If staff is not present in college, then "Not in campus" message is sent to students
3. [check food/book availability]
  - 3.1 students and staff can also check the availability of food in canteen and library books
  - 3.2 If it is available, then "Yes" message is sent to them
  - 3.3 If it is not available, then "No" message is sent to them
  - 3.4 messages, objects identifier, message type, message to & from information in sequential order of messages.

### **5. CONCLUSION**

The design of an intelligent academic management system is proposed which will strengthen daily management and eases supervision of student from when they arrive until when they leave even after campus hours. This system will integrate one of the fastest growing segments of IT, RFID technology and mobile applications to existing academic management system and provide more fast and easy to access to student profiles. In each student profile student complete history of purchases and attendance along with academic performance will be stored. This designed system will reduce manual effort, time consuming and repetitive tasks and human made mistakes and improve the system security.

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