

RFID Based Time Attendance System

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Abstract— RFID is becoming one of the cost-effective technologies for today's time attendance system. In this paper we proposed a methodology to integrate a RFID reader with Desktop/Notebook through software application and applied it for the time attendance solution. The communication between Desktop and RFID reader is by serial port connection. We analysed the serial port communication protocol for RFID reader and interfaced with Desktop. This system provides all types of information regarding students and employees, which are used for attendance tracking, curriculum details, and hence can be used for future reference.

Keywords— RFID reader, RS-232, Time attendance report, Serial port communication protocol

I INTRODUCTION

Radio Frequency Identification (RFID) reader is a flexible Wireless, automatic identification system that transmits the identity (in the form of a unique serial number) of an object or person wirelessly, using radio waves [1]. It can communicate with desktop/Notebook either by RS232 [2], RS485 [3], or Wiegand interface [4]. In our work we used RS232 for the convenient of software implementation, which is the Electronic Industries Association (EIA) standard for the interchange of serial binary data. It is a long established standard that describes the physical interface and protocol for relatively low-speed serial data communication between computers and related devices. RFID reader is the device capable of reading information stored inside RFID tags. Two types of RFID reader available are active and passive reader. Active RFID reader can detect the active RFID tag at few meters while passive RFID reader can detect the passive RFID tag at few centimeters from the reader. It operates at a frequency of 125 kHz, 12V supply. The effective detection range of the reader is about 5cm from the antenna. Each RFID tag will have a unique ID or serial number, which is a distinguishing property between products. Some RFID tags can only be read by RFID reader. There are three types of RFID tags available namely active, semi-passive and passive RFID tag. The main difference between all these is that active and semi-passive tags have internal battery while passive tags do not have [5]. A basic RFID system usually consists of a RFID reader and RFID tag which contain a coil that serves as antenna for transmitting and receiving signals as shown in Fig. All kinds of RFID system operate using similar concept. RFID readers generate radio wave that reaches the RFID tags. Then, RFID tags use backscatter technology to reflect back the radio wave which has been combined with the data through modulation to the reader.

The related works has been mentioned [5, 6, 7]. The paper [5] says about a microcontroller based RFID reader. It uses real time clock capability with which attendance can be taken more accurately since the time of attendance will be recorded. The paper [6] proposes an UHF RFID reader based on the ISO/IEC 18000-6B standard. It describes the hardware and software design of RFID reader. The paper [7] introduces a system design for RFID reader.

II SYSTEM MODEL & DESIGN

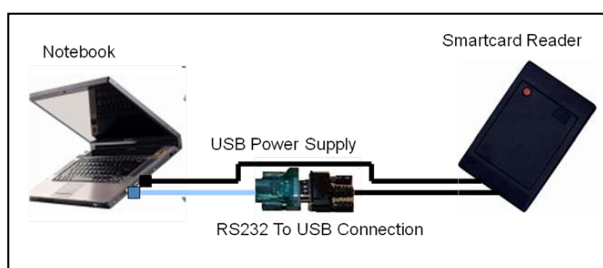


Fig. 1 System Model

The system model has shown in Fig 1. It says about the connection setup of personal computer/Notebook with the RFID Reader through RS232 port. The system using RFID is an automated version of manual student/employee time management System. It provides all details about students and faculties that include institute details, their personnel details, and academic details subject details etc...The manual system involved a lot of time, manpower etc. Our system has got almost all works computerized so that accuracy is maintained and maintaining backup is very easy. It can do within a few minutes. We propose a connection techniques and its implementation. The connection technique is very simple, where a reader will be connected to desktop/Notebook via RS232 cable. In our implementation, we used the serial port communication protocol. We summarize our proposed time recording in flowchart form as shown in Fig 2.

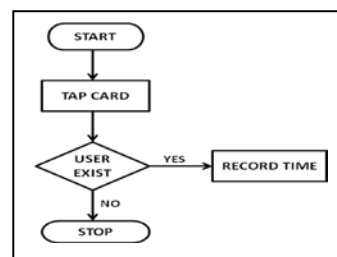


Fig 2 Recording Time

V. SOFTWARE IMPLEMENTATION RESULTS

We implemented the communication protocol using C# programming language with MS Access database. We provided a front-end GUI for user verification, enrolment, view/delete user list etc. and for back-end we used MS Access database, where we created a table in order to store user information. The database has been designed for the application of User registration and various time attendance reports such as daily in/out report, late report, wage report and absent report etc. We implemented various things for our application such as i) Connecting RFID reader, ii) Reading card number, iii) Register user with detailed information , iv) Time keeping during taping of RFID tag on the RFID reader, v) Linking database, and vi) Formatting the time attendance report in excel and pdf format etc. Fig 3 is the main menu where administrator can go for user registration and checking attendance reports etc. Fig 4 says about the user registration form, which can be submitted, deleted and updated. Due to the limitation of paper pages we have shown only the daily in/out report in Fig 5, which also can be taken as a excel and pdf format from the option.

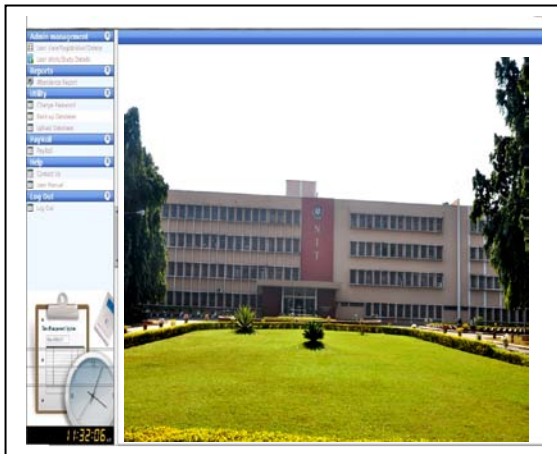


Fig 3 Main Menu

Fig 4 User Registration Form

| Name | Card No. | Date | In Time | Out Time | In/Out |
|--------------|------------|------------|---------|----------|--------|
| SUCHARITA J. | 0005172765 | 16/09/2011 | 18.4.23 | --- | IN |
| SUCHARITA J. | 0005172765 | 16/09/2011 | --- | 18.4.38 | OUT |

Fig 8 Daily In/Out Report

VII CONCLUSION

As per the limitation of the paper pages, we haven't shown enough results for the attendance reports. We also verified the RFID reader performance base on its frequent use for time recording of various users. On the basis of the scanned ID, the attendance will be taken .The passive RFID reader generates radio frequency and transmits to surrounding using antenna of the reader. If there is any passive RFID Tag around, it approaches the reader and a small power will be induced from the radio wave to the tag and allow the modulated electromagnetic wave to be sent back to the reader. The reader receives the modulated signal from the tag and produces an output. The output is sent to the personal computer through the serial communication RS-232 cable. The performance of the RFID based attendance system has been evaluated on different tag positions and distance. A simple detection range test has been conducted to evaluate the maximum detectable distance from the reader for different tag orientation. The main purpose of the test is to evaluate the performance of the system in terms of the detection range. The test proved that the reader has about 5cm detection range if scan from top position.

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