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### **RESEARCH ARTICLE**

# A COST EFFECTIVE MISUSE AVOIDANCE FOR BUS TRANSPORT SYSTEM USING RFID

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*Abstract— Now-a-days many educational institutions are located in the city boundaries, in such cases there is a need of transport facility to the stakeholders like students, faculty, and other staff. Transport facility may get misused by some of the stakeholders, In order to prevent misusing there are so many traditional and advanced methods. Traditional methods like manual preventive policies and advanced technologies like spy cameras. These existing systems are more costly, hard to maintain, doesn't provide more security and not effective. To overcome the vulnerability of the mentioned technologies we are proposing a novel approach using the RFID [1] concept. Using RFID reader to accomplish this task is cost effective and maintenance free. Radio-frequency identification (RFID) is an automatic identification method [2], relying on storing and remotely retrieving data using devices called RFID tags or transponders. There is unique code provided to the each and every tag, with the help of this unique code we can store student data. All the passengers (stakeholders) are given with the RFID ID cards, and then RFID reader reads the data in it when the student came to board the bus and it will compare with the stored data in the aurdino processor[8], which is already defined by the management, if the data is matched then the processor will display the relevant message through LCD [3] Display. Finally it commences that whether the student is eligible to board the bus or not.*

*Keywords— misuse, RFID, aurdino, LCD display, RFID tag*

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## I. INTRODUCTION

This system consists of microcontroller (aurdino 2560), RFID reader, buzzer, and LCD display and visibility module. In this system the RFID reader reads the ID number from passive tag [4] and sends it to the microcontroller. If the ID number is valid then it will access all the student data like student registration number, student name, student branch, mainly fee details. After completion of accessing[5] the information from the RFID card the system will allow the student. If the data doesn't matched with the previous value which was stored inside the RFID card then the system will stop the entire process. If the details are correct and authorized then the microcontroller will display the related information with the help of LCD module and a beep sound was generated with the help of buzzer and light indication[6]

will be shown with the visibility module. If it is green light, the student was allowed to board the bus and if it is red light, the student is not allowed.

In this paper, we proposed a novel authentication[7] protocol called MA-TR (in short form A COST EFFECTIVE MISUSE AVOIDANCE FOR BUS TRANSPORT SYSTEM USING RFID IDENTIFICATION). MA-TR includes a basic scheme of Radio Frequency Identification, or RFID, it is a technology used to identify, track and trace objects using radio waves. RFID enables significant improvements in tracking, authentication, access and data capture, in both existing and new applications.

In this proposed work, RFID reader reads the ID number from passive tag and sends it to the microcontroller, if the ID number is valid then only it gives the access to the student. If the assessed value is matched with value which was stored inside the RFID tag then only the system will be allowed for further process. If the data doesn't matched with the previous data which was stored inside the RFID card then the system will stop the entire process. If the data is matched then it will check for fee details and allow for authentication. If the details are correct and authorized then the microcontroller will display the related information with the help of LCD module and a sound was generated by the help of buzzer and light visibility will be generated. And the student was allowed to board the bus.

### **Advantages of the Proposed Approach**

1. Provide one Form Factor Authentications Which is RFID.
2. Increase The Security Level [9].
3. Convenient and Efficient.
4. Cost Effective and Simple Implementation.
5. Real-time Information Available Immediately
6. Retrieval of Codec's Is Easy And Time Effective [10].
7. Fast Accessing.

## **II. THE PROPOSED APPROACH**

### **Characteristics of Proposed Approach**

#### User Friendly

The proposed system is user friendly because the retrieval and storing of data is fast and data is maintained efficiently. Moreover the graphical user interface is provided in the proposed system, which provides user to deal with the system very easily.

#### Very less paper work

The proposed system requires very less paper work. All the data is feted into the computer immediately and reports can be generated through computers. Moreover work becomes very easy because there is no need to keep data on papers.

#### Computer operator control

Computer operator control will be there so no chance of errors. More over storing and retrieving of information is easy. So work can be done speedily and in time.

### **Objectives of Proposed Approach**

The main aim of this project is to detect the students was authorized to board the bus or not. We conceive an identification approach to monitor the transport system by taking single technology called RFID identification. This system was more effective and more secure compare to previous systems. And also it was cost effective and the processing speed was high compare to previously existed system.

### **Purpose**

The purpose of developing transport monitoring system is to computerized the tradition way of taking the student to board the bus. Another purpose for developing this software is to generate the report automatically at the end of the session or in the between of the session.

### **Scope**

The scope of the project is the system on which the software is installed, i.e. the project is developed as a desktop application, and it will work for a particular institute. But later on the project can be modified to operate it online.

**Overview**

Transport Monitoring System basically has two main modules for proper functioning

- First module is system which has right to check for the authentication.
- Second module is handled by the user which can be help to give authorization to the students.

**III. PROPOSED SYSTEM ARCHITECTURE**

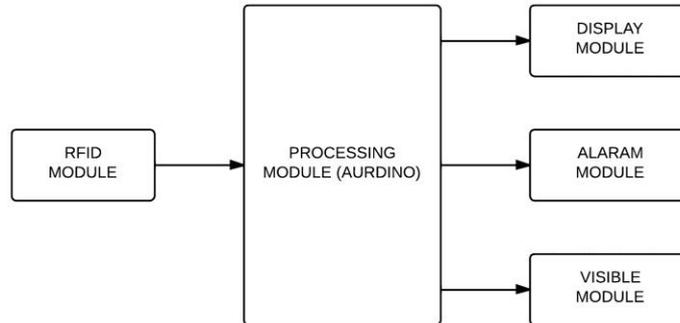


Fig. 1 Overall architecture of proposed system

RFID MODULE

In this module we are going to swipe RFID card on to the RFID reader. The next step is RFID reader will access the student information which was stored inside the RFID Card. after receiving of all the information from the RFID card. The stakeholders will follow further process.

PROCESSING MODULE (ARDUINO 2560)

The Arduino [11][12] Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analogue inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB[13] connection, a power jack, an ICSP header, and a reset button.

DISPLAY MODULE (2\*16 LCD DISPLAY)

The alphanumeric 16character X 2line LCD requires 8data lines and also 3 control signals and they are interfaced to 3664.By using 2 ports, port 0&3 data pins are connected to LCD as data bus. Port0 can be basically used as I/O port i.e. it can be programmed as an input or as an output port.

ALARM MOFULE (BUZZER)

A buzzer is in the mechanical form of a small rectangular or cylindrical housing, with electrical connection for direct mounting on rigid printed circuit, or with electrical connection consisting of flexible electrical son. In the latter case, the buzzer has two small brackets. The loudness of such a component is about 85 dB / cm (note that it does not specify the sound level meter - as for HP, as a business perspective, it would seem probably too little power.

VISIBLE MODULE (VISIBILITY LIGHT)

Visibility is defined as the greatest distance at which an object can be seen and recognized in daylight, or at night could be seen and recognized if the general illumination were raised to a daylight level. The criterion of recognizing an object must be used and not merely the seeing of an object without recognizing what it is. For meteorological purposes it is necessary that visibility observations give a measure of the transparency of the atmosphere. Other factors, however, affect the range at which an object can be seen (e.g. its size, colour, background, etc.). By selection of appropriate objects and when observing in suitable conditions the effect of these extraneous factors can usually be eliminated in daylight.

IV. METHODOLOGY

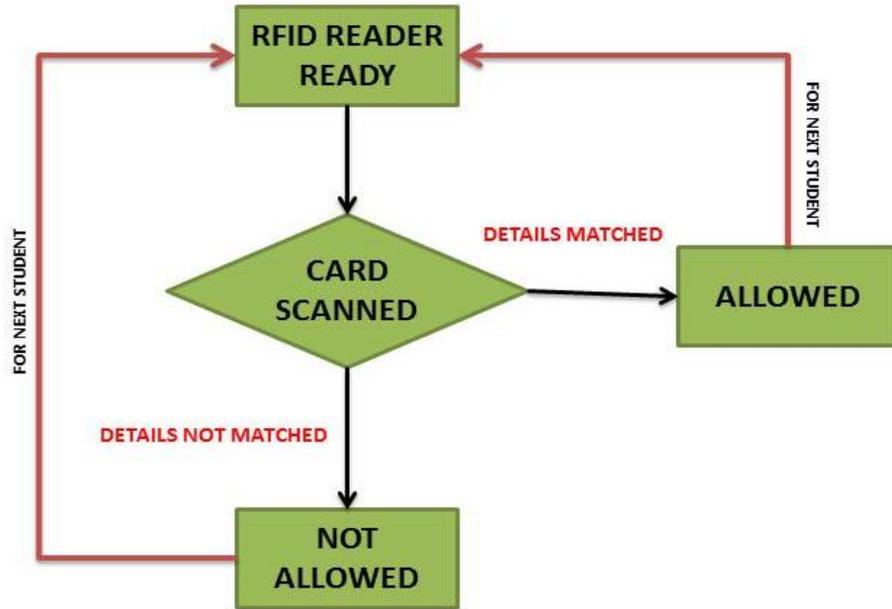


Fig. 2 Flowchart of proposed approach

When the student arrived to board the bus, he will swipe his RFID card in to the system, which is attached to the bus at the entrance gate. If student is eligible to board the bus then green light will be shown, if the student is not eligible to board the bus then red light will be shown.

**TEST STRATEGIES**

MA-TR System is tested in regular cyclic testing approach with the following Test Strategies at its core.

1. Verify the RFID reader: Ensure that RFID reader was working properly and it was accessing all the data accurately from the RFID card. And also ensure that the application is navigated to the next page that is fingerprint module.
2. Verify with more than two: Ensure that the system was generating different outputs.
3. Verify the connections: Ensure that the system connections are done properly.
4. Verify the output modules: Ensure that the output modules are displaying properly or not.

**TEST CASES**

Case 1: if RFID doesn't work.

Case 2: if arduino[14] doesn't work.

Case 1: if RFID doesn't works

This is a bad case because RFID module is the basic working component of our system so the process will stall at the initial stage.

Measures to be taken:

Regular maintenance of RFID reader and its connections to arduino should be done.

Case 2: if arduino doesn't work

This is a worst case because arduino is the mother board of our whole system.

Measures to be taken:

Whole system should be checked for the error and if required it should be replaced

**CIRCUIT MODEL**

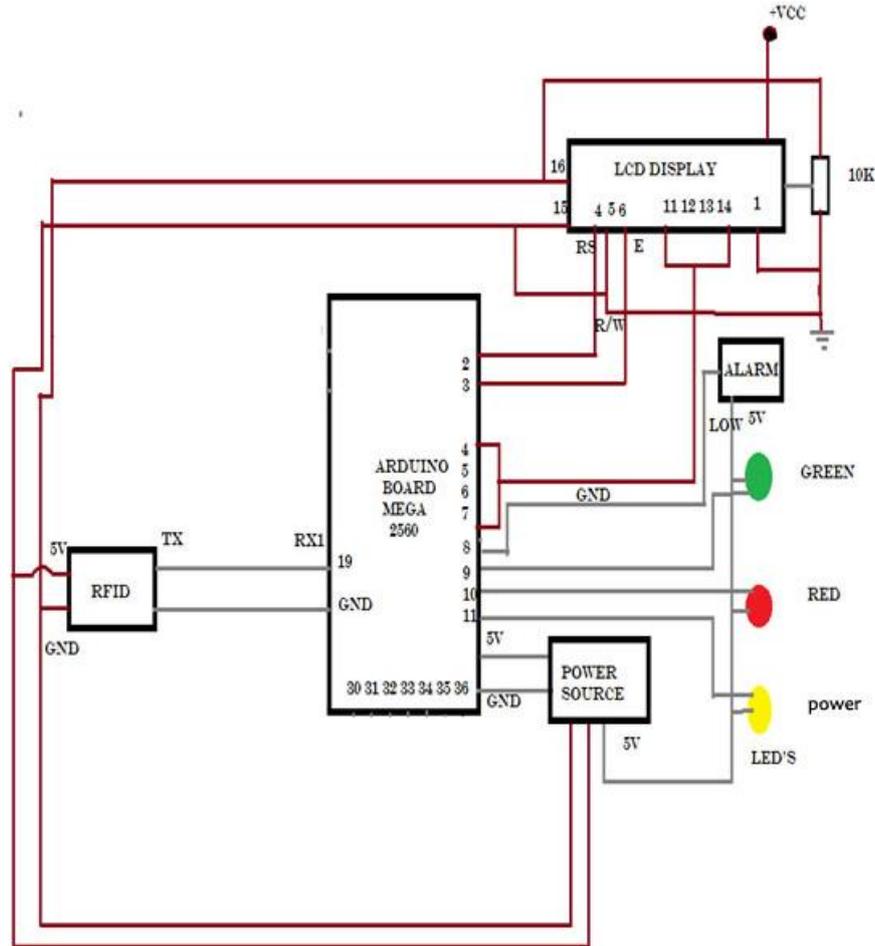


Fig. 3 Circuit design of the system

In the above circuit diagram we are having made the following connections in the following manner. The above figure describes the interconnection between RFID, Arduino board, alarm LCD Display and visibility. The RFID TX pin was connected Rx'1-19.and the RFID GND pin was connected to Arduino GND pin. Arduino 2 pin and LCD Display 4 pin is connected with each other known as reset pins. Arduino 3 pin and LCD Display 6 pin is connected with each other known as Enable pins [15]. Arduino 8 pin is known as GND and its connected to alarm. And ARDUINO power supply pin and GND are connected with power source with the power of 5 v. the pins 9, 10, 11 of Arduino are connected to the Led lights. And the reaming pins of led light and alarm are connected with power supply. The power supply was given to each and every individual module with their GND pins and with the voltage of 5v.

**APPROXIMATE PROTOTYPE OF THE SYSTEM**

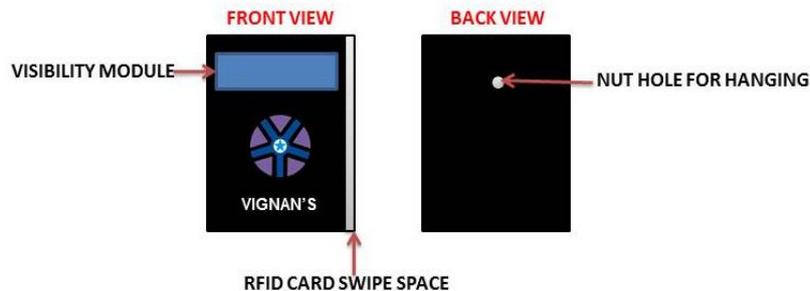


Fig. 4 Expected prototype design

## V. RESULTS

Fig. 5 shows the initial architecture of the system

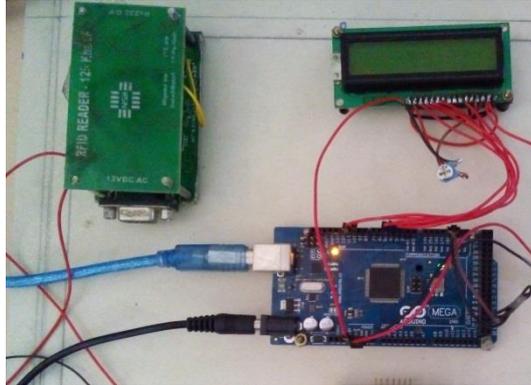


Fig. 5 System on experimental board

Fig. 6 is the LCD display when the system is switched on



Fig. 6 LCD on system initiation

Fig. 7, Fig. 8, Fig. 9 are the results obtained through the LCD display when different cases are arrived to board the bus.



Fig. 7 When student who **didn't** paid fee is arrived



Fig. 8 When student who has **fee due** is arrived



Fig. 9 When student who **paid the fee** completely is arrived

## VI. CONCLUSIONS

RFID technology is emergent technology which can be used in wide range of applications. In this paper by using RFID, generates an approach with wider boundaries and effective solutions. This novel system is an emerging technology which can be used for a variety of applications to provide more security against the unauthorized persons.

- It can be used at various government or non-government associations.
- It can be used to implement authentication at almost all schools, colleges and educational institutes.

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