

RFID Based Transportation Safety Enhancement System for School Children

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Abstract: - This paper is mainly intended to provide an efficient system to monitor pick-up/drop-off of school children and enhance the safety of school children during their everyday travel from and to the school. The system Comprises of three main units, a bus unit, a school unit and Parent unit. Firstly, bus unit is the system used to authenticate when a child gets in/out of the bus. This information is further communicated to the school and their Parents, that identifies which of the children did not board or leave the bus and issues an alert message accordingly. This also has various support features that take care of children's safety while the journey. It also comprises of integrated system that facilities its management and provides useful information about the children to authorized personal. This particular system functionality promises to give good results with respect to the objective laid out for daily transportation safety.

Key Words— *RFID, Transportation, Student safety, School.*

I. INTRODUCTION

With the increased crime rate, security is important for school children. School children safety is given the at most care and significance and is also encouraged to take up research with the aid of advanced technology. The safety system that helps the transportation of school children while their travel to/from the school or home. Hence this system promises to provide an efficient system in this cause.

Negligence of driver leads to road accidents and the children may get hurt and sometimes may lose their life. Various incidents in times have motivated to develop an innovative methodology to provide secure life for children. Parents are not feeling comfortable until their child returned to their home safely. Missing of the students at school premises, anti-social elements kidnappings etc. are increasing in an advance. This results to all insecurities caused in School children transportation.

Considering few previous papers as the reference to understand the existing system, we understand that Amrutha M Sanam et al. [1] published "Safety system for school children transportation", in 2016, IEEE. This paper focused on Safety system for School Children using Raspberry Pi. The advantage is Face recognition of students to Enter and Exit and Recognition Delay was one of the limitations. Katsuyuki Tanaka et al. [2] published "Implementation of cooperative

bus location system with BLE devices and smartphones", in 2016, IEEE. This paper focused on Vehicle Tracking using IOT technology. The advantage is Real Time Vehicle Information. Mr. Dyaneshwar V. Nimse et al. [3] published "Obstacle Detection and Collision Avoidance System", in 2016, IRJET. This paper focused on collision of vehicle using adaptive cruise control (ACC) technology. The advantage is Collision Detection and Avoidance & poor sensitivity is one of the limitations. Dhivya M [4] published "Hybrid Driver Safety Vigilance & Security System for Vehicle", in 2016, IEEE. This paper focused on Driver Safety and Vehicle safety using GSM and virtual instrumentation Technology. The advantage is Drowsiness alert and Alcohol consumption detection. With all this prior knowledge we have laid out few objectives to be achieved, it provides the details of entry and exit of the students from bus, the system provides a facility to track the exact location of the bus, it detects driver's alcohol consumption and reports to the school management, it detects the obstacle to avoid the accidents through Collision Sensors. It also detects fire accidents in case of fire catch in bus and reports to school management or nearest hospitals.

II. SYSTEM DESIGN

As discussed Earlier, this system comprises mainly of three units:

i.e. Bus Unit, School and the parent Unit. Detailed illustrations are further explained.

The Bus unit consist of the following components:

1. RFID TAG
2. RFID Reader
3. LCD Display
4. Biometric Module
5. IR Sensor
6. GAS Sensor
7. GSM & GPS Module
8. Ultrasonic Sensor
9. Microcontroller
10. Power Supply Unit

And, the other end i.e. school unit will receive the various Alerts on the system or Mobile throughout the travel journey, this is further detailed with the aid of the Block diagram shown in the fig.1.

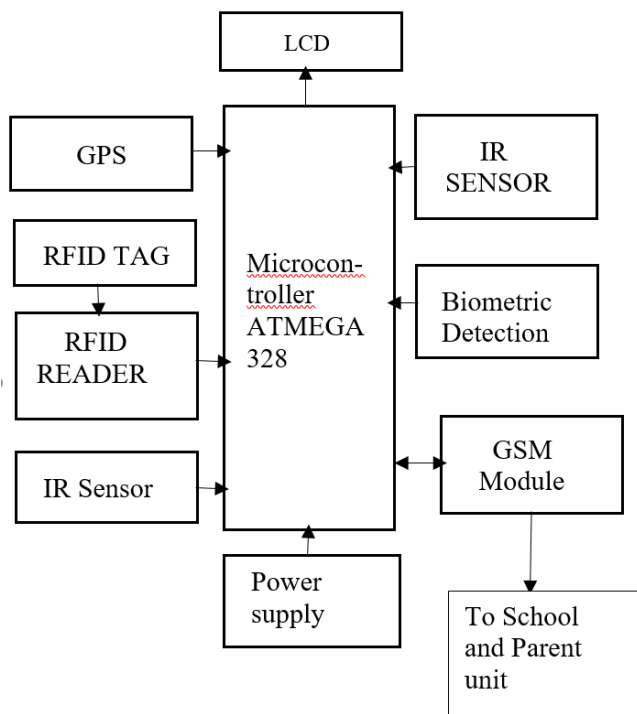


Fig.1 Block Diagram of the Proposed system

The proposed system in fig.1 illustrates the major blocks used in the implementation. It uses the Dual Authentication i.e. the RFID support and along with this it uses the Finger print detection to avoid the misuse of the RFID tag, hence increasing the efficiency of the system. The IR Sensor are used at each of the windows in the Bus to avoid the student putting his/her body parts outside the window. The GPS and the GSM are the support Modules used in the system in order to navigate and send information to the School management

and Parent/Guardian. The GPS support helps the Parents Track the School Bus, this also helps parents by reducing their wait time for the bus arrival. The GSM Conveys the different message alerts accordingly throughout the journey. The Ultrasonic Sensor used in the system is connected to Buzzer, which alerts the driver whenever the bus is very closer to the other vehicles on road. The power supply unit provides constant supply required to all the other components.

III. DUAL AUTHENTICATION

Here, The Paper emphasis on the dual authentication for more efficient system, in order to make sure that the school going children get on/off the bus with proper authentication as their parents always stays tensed about their kids if they are in the bus and have reached safely to either school/home.

If in case we only make use of the RFID , there can be a probability of misusing the system, The reason behind this is ,checking the tags only will not be sufficient and also if the tags are lost then Authentication issue occurs with that particular child, this also make unable for parents to track their children .Hence the use of this dual authentication makes that effective in the system for verification Students may miss out somewhere else and might enter in the bus by providing fingerprint only. Hence RFID is a necessary module here to keep track of them in this situation whether they have entered or not by reading tags automatically. Further, only Fingerprint will not be user friendly as children's have to match finger twice while using RFID just let them come out of the bus without doing anything as their tags will be scanned by default.

There are few steps in proposed system. Following is a flow chart of the Dual authentication system as shown in Figure.2.

Steps involved in this mechanism is given below:

Step 1: Initially Fingerprint will be checked for primary Authentication.

Step 2: If the Biometric doesn't match for a particular student, then it will be considered as invalid attempt.

Step 3: Else If the biometric identification is successfully matched, then RFID will be checked for further level verification. For each fingerprint images, the corresponding RFID record is stored for every student boarding into that bus. Then the system finally comes up with the result once the other part of the authentication is also presented for verification and matched accordingly.

Step 4: If the dual authentication is successful, same will be notified to their parents about the student's arrival.

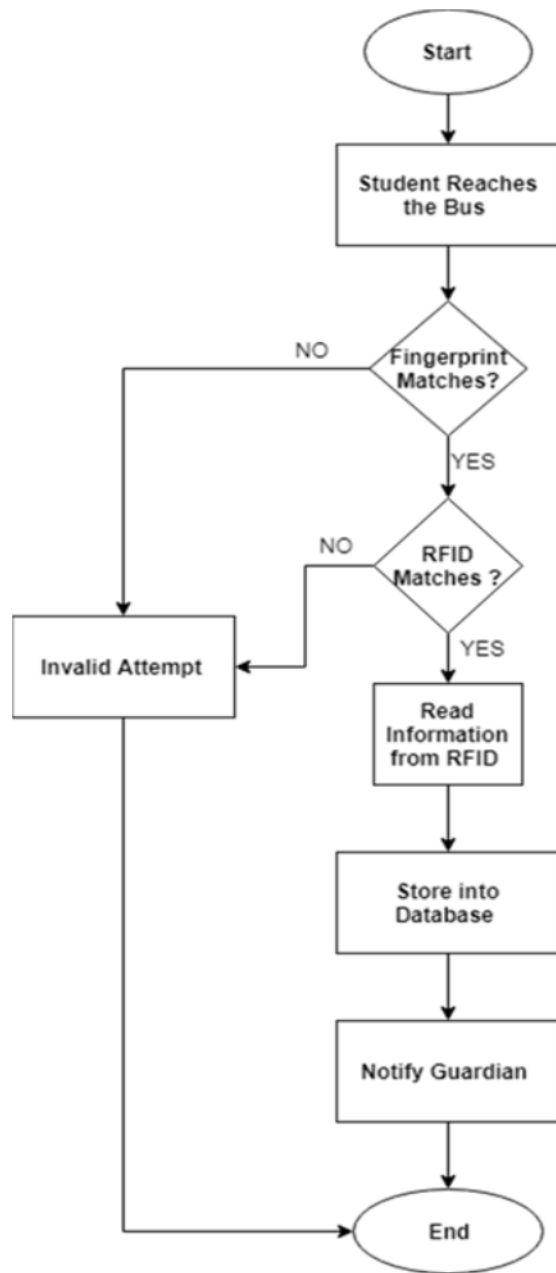


Fig.2. Flow Chart of the Proposed system

Step 5: If in case any one of the authentication method fails, then it will indicate that the student is carrying the invalid ID card other than what was assigned to that student. Hence this will be considered as an invalid attempt.

Step 6: While the student is being dropped off to his or her destination point, the system again checks for dual authentication to be successful. If there is a match, same will

be notified to their parents; so that student can't get out of bus anywhere else other than the specified location or can't be late to get out of the bus when they reach at school.

IV. ENGINEERING REQUIREMENTS OF THE SYSTEM

The system should be efficient enough to authenticate each student while their journey to/away the school. It should sense the information on the real time, hence should have a database to store student's information and take care if there isn't any mismatch of data. It should be easy to re-configure if there is any addition of new student. The communication between the bus unit with School and Parents should be accurate and reliable.

There are a few constraints on which the design should be effective enough to overcome, it should be such that it is not harmful to the society where it is implemented. Also, it should be cost effective so that it can used in almost all the schools.

The system accounts for efficient data base on which it is highly dependent, it bears all the information of all the students and their authentication details. It should have threshold values of all the sensor that is used in the system. It should be efficient enough so that data could be fetched in real time when required.

V. CONCLUSION

In this paper, we have proposed a system that would promise to achieve all the Objectives that are listed in a very accurate and efficient way. This can be implemented in various application as per the requirements and needs. This can further be enhanced to the evolving and upgrading technology as per the requirement and its effectiveness. Hence, we would conclude that, this implementation serves as the best solution to the problem statements mentioned.

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