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"RFID Based Tracking System for Disabled and Aged People While Travelling"

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ABSTRACT

Till date, there have been numerous applications developed based on RFID technology, which have been implemented in various areas viz. agriculture, health-care, transportation etc. In this paper, an attempt is made and implemented to track the physically disabled and aged people while travelling long distances in buses or public transport. The applied RFID technology will provide security to the disabled or aged people to reach their destinations safely. RFID will help the conductor or ticket collector of a bus to check the passenger's entry and exit. An RFID tag having unique ID will be provided per disabled or aged passenger at the ticket counter before the journey starts. When the passenger enters into the bus, this system will display the current location of the passenger. The action of these instructions will be already loaded into the Arduino Uno using Arduino programming. Along with this, the concerned family member of the passenger will be notified each time the passenger enters or exits the bus along with his or her present location, with the help of a GSM module. This will not only help in updating the status of the passenger to the concerned family member, but also will help in identifying the last exit location of the passenger, in case of any emergency case.

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I. INTRODUCTION

In day to day life, we come across disabled people or aged people who are travelling from one place to another. The transportation resources that exist often come with long wait for service and are not always well-suited for the needs of frail and disabled adults who need physical assistance and personal attention. It is seen that the family member accompanies them in order to safeguard them throughout their journey as they may not be able to reach their destination safely. It may not be always possible for the concerned family member of the aged or disabled person to travel along with them in every journey. It is the responsibility of everyone to safeguard these people and help them in their daily lives. These people may also feel insecure, travelling alone from one place to another. Likewise, there are many other common problems which is faced by these people every day. So, in order to overcome these problems, this system is developed to help these people by providing safe and secure transportation. This system uses RFID technology to detect the passengers carrying the tags. Once a valid card is read, it will send SMS, containing the travelling status and the location of the vehicle (in which the person is travelling) to the concerned family member. The family member can thus easily track the vehicle from the SMS.

II. RELATED WORK

There have been a number of studies focused on transportation and vehicle monitoring systems. However, only a few studies have incorporated RFID technology and have integrated communication technologies.

In [1] system integrates RFID with GIS and GPS with Visual Basic and Visual Earth as the software platform to build a real-time vehicle management system.

In [2] system integrates RFID (Radio Frequency Identification) in WSN (Wireless sensor network) to form an intelligent bus tracking system which can monitor bus traffic inside spacious bus stations, and can inform administrators whether the bus is arriving on time, early or late.

[3] Embedded based school children safety enhancement which uses RFID (Radio Frequency Identification), GPS to track the current position of the bus, GSM to send notification to parents regarding student.
[4] Smart school bus for children transportation safety enhancement with IOT which presents an embedded system that monitor and automates pick-up and drop-off of school children to enhance the safety of children during the daily transportation from and to school.

III. PROPOSED SYSTEM

The proposed system will have a hardware unit installed at the entrance of the bus or train. The complete hardware components used are-

1) Arduino Uno
2) EM-18 RFID Reader
3) SIM 900A
4) NEO 6M GPS
5) LCD Display
6) Centre tapped transformer
7) Capacitor filter
8) 2Amp bridge rectifier diode
9) Capacitor filter
10) 10k Potentiometer

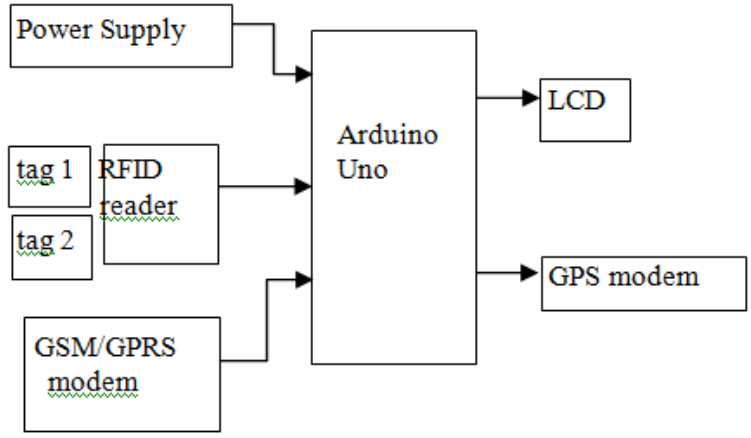

Fig. 1. Block diagram of hardware unit

Arduino Uno is the heart of the system which is interfaced with an EM-18 reader, SIM900A which is a GSM/GPRS module, NEO 6M GPS (used for obtaining the location) and an LCD Module as shown in Fig.1. The programming is done in Arduino IDE software. RFID tags are read by the reader and if it reads a valid tag then it will send SMS to the given mobile number through GSM. The SMS contains the location of the passenger i.e. the latitude, longitude date and time. If the reader detects an invalid card then the LCD will display as INVALID card.

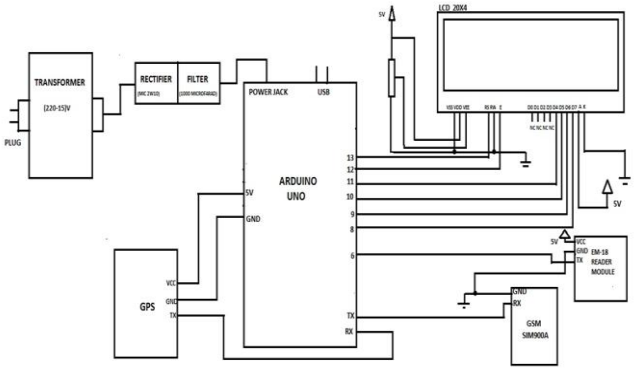

Fig. 2. Circuit diagram of the system

The entire set up of the circuit connection of the controller interfacing with different independent units is shown in Fig.2. The circuit is power with USB 5V DC. The different operations running in the system is shown in the

flowchart as shown in Fig. 3. Only the registered tag of the corresponding passenger will be read and accepted for tracking.

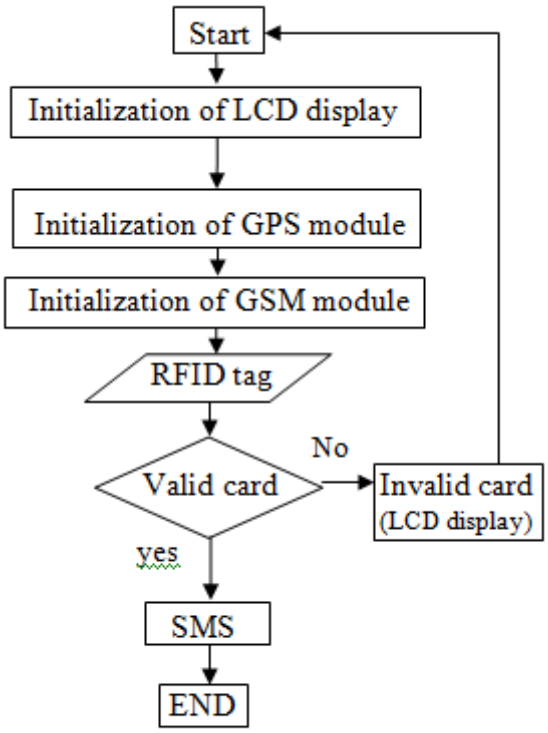

Fig. 3. Flow chart of the program

IV. SYSTEM SETUP WITH RESULTS

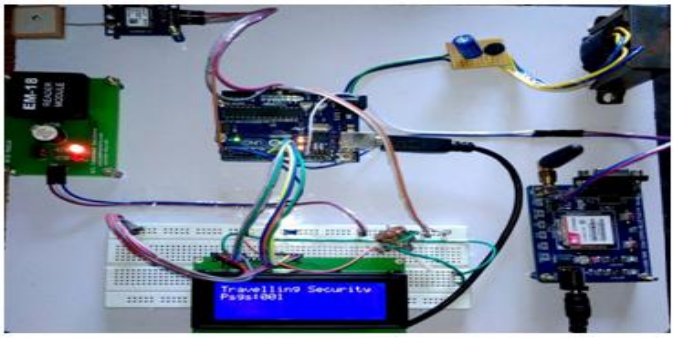

Fig. 4. LCD displaying when valid card is read.

The hardware implementation of the proposed system and its operation showing the reading of valid card and invalid card in the display unit is shown in Fig. 4 and Fig.5 respectively

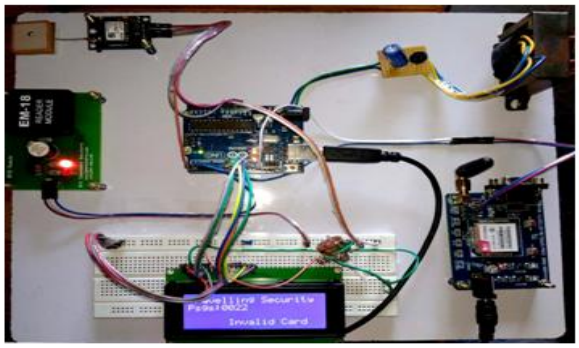

Fig. 5. LCD displaying when an invalid card is read

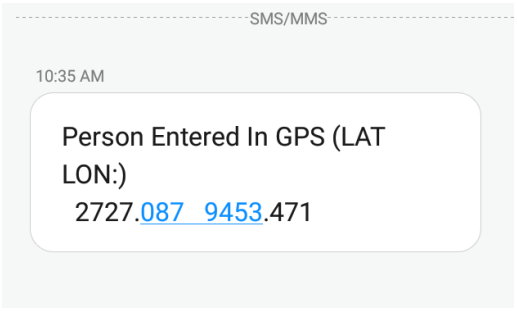

Fig. 6. Status of a passenger while entering the vehicle.

The received SMS will provide the details i.e., the location coordinates, the entry time, the exit time and the date of travelling of the passenger.

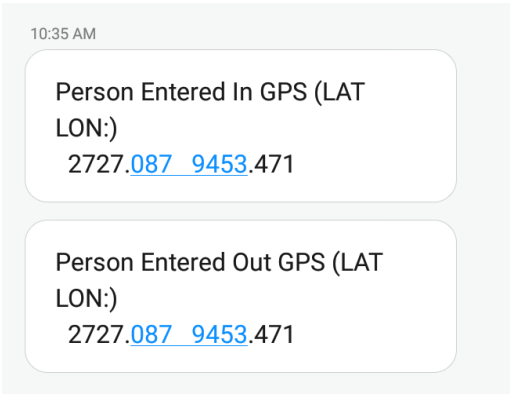

Fig. 7. Status of the passenger while leaving the vehicle

The SMS which is received at the concerned person's number for a valid registered card for both entry and exit is also shown in Fig. 6 and Fig. 7 respectively. The location coordinate is showing same as testing of the proposed module is done at the same time and location.

V. REQUIREMENTS FOR PRACTICAL IMPLEMENTATION

For real life application, the system can be modified with the following requirements-

1) For fast and easy detection of tags, High frequency RFID reader is necessary
2) Hand bands RFID provide more user friendly to the passengers.
3) A database driven application will be required for more number of passengers.

VI. CONCLUSION

This system ensures the passenger's safety by updating their travelling status to their concerned family or relative members. The RFID-based detection unit which is located inside the bus will read the RFID tags worn by the passenger while boarding the vehicle. This will update the status of their entry and exit points along with their location by sending SMS to the concerned family member using GSM network. The concerned family person can thus track the passenger's boarding and exit location through a received SMS.

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