Smart School Bus for Children Transportation Safety Enhancement with IOT

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ABSTRACT: Everyday Millions of children are travelling to school by school bus from their homes. There is always a question in parent's mind that their children reaching school safely and also how safe using school bus for transportation of their children. This project 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. This system consists of two main units, a bus unit and a school unit. The bus unit is used to detect when a child boards or leaves the bus and also location of. This information is communicated to the school unit that identifies which of the children did not board or leave the bus and also to the parent. The bus unit also consists of sensors which will alert the driver before and during journey. The school unit has web-based database-driven application that provides useful information about the children to its management and to authorized personal's.

KEYWORDS: Bus Safety System, RFID, GSM modem, GPS, IOT (Internet of Things);

I. INTRODUCTION

Children are our most precious resource, but as children, they are lack of skills to protect themselves. So it is our responsibility, as parents, teachers and as a person, to safeguard children and to teach them the skills to be safe.

Today, most of students are traveling to school by school buses or school vans. Parents think that their kids are safe when they travel by school bus. But are they really safe? There are many common problems such as students getting kidnapped out of school, bus getting delayed in traffic and your kid is last one to get down in bus and is alone in bus. This project is introduced to overcome these problems.

This system will send a text SMS to the parent containing longitude, latitude of location of school bus, children attendance status and also driver phone number .Once parent receives the SMS, then by using those data and Google maps the user could easily track the bus. School management has web-based database-driven application that provides information about location of boarding and leaving, boarding and leaving status, RFID number, time and date.

II. RELATED WORK

The existing tracking system is based on biometric features such as the Kid track biometric system in which the children scan their palms across a palm reader when they enter the bus. It uses an infrared light to image the palm unique pattern. It uses green and red LEDs to ensure the scan works. Then, the scans are sent for cross-referencing against a secure database of pre-registered users' patterns. Based on this, the administration can find the information of that bus, where and when it tracked the child, and where the bus was at that time. The disadvantage of this approach is that it is not automatic and difficult for young children to place their palms correctly on the scanner. This may lead to inaccurate data if the scanner did not detect a child's palm.

III. **PROPOSED SYSTEM**

The proposed system has two main units namely the Bus unit and the school unit. The bus unit will be fixed at the entrance of the bus where as the Server unit will be in school.
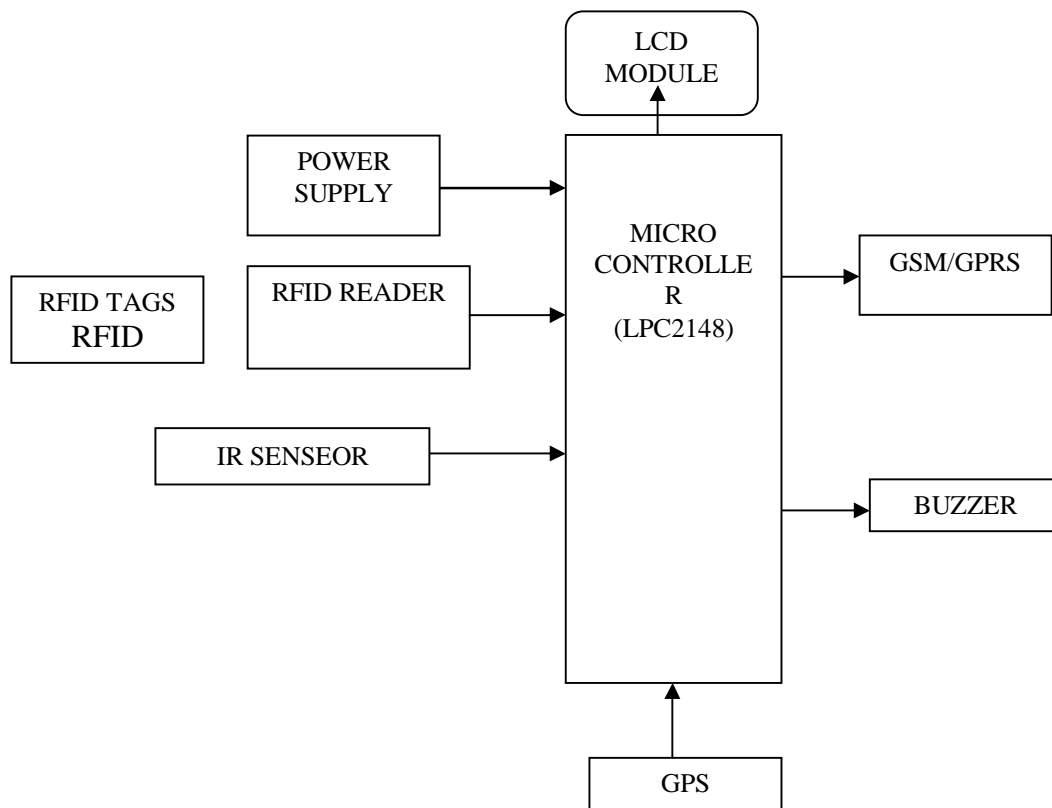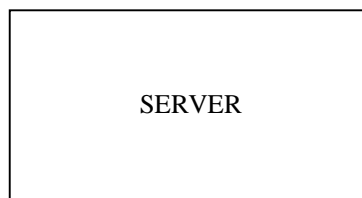

Fig.1.Block Diagram of Bus unit

Fig.2.Block Diagram of School unit

IV. **PROPOSED SYSTEM DESIGN**

System Design Requirements
 Our system is designed with the following engineering requirements:
•The system should recognize each child and detect when every child boards or leaves the bus.
•The system should have a database to store student's information.
•The system should be easy to re-configure.
•The communication should be reliable.

Design Constraints
 The constraints are the restrictions on the design. They are imposed by the environment and the customer. The constraints considered in our system are:
•The system should not be harmful for human beings or the environment.
•The device should not hurt the child in any way.
•The system should provide an option to choose between different Languages.
•Children's information should be available for authorized personal.

Database Of The System
 The database of the system has to meet certain business rules. A business rule is "a brief, precise, and unambiguous description of a policy, procedure, or principle within a specific organization". It helps to determine entities, attributes and relationships of the database. The business rules of the database of our system are:
•A child can be in only one bus, but a bus may have many children.
•A child has one or many relatives.
•A relative may have many children registered at the school.
•A bus may be driven by one or more drivers, but a driver can drive only one bus.
•A child may have many attendance records, but an attendance record has one child

V. **RESULT**

All Children's Are Present and All Are Boarded and Left Bus Correctly

(i) Journey From Bus Stop To School
 when the child boards the bus at bus stop he or she places the RFID tag then a message will be transmitted to child's parent .The message includes "your kid boarded into the bus ",Latitude ,Longitude and driver Mobile number.
At the same time a message will be transmitted to the school server which will display RFID number, Latitude, Longitude ,Boarding or Leaving status ,Time and Date. Google Map provides location of the bus.
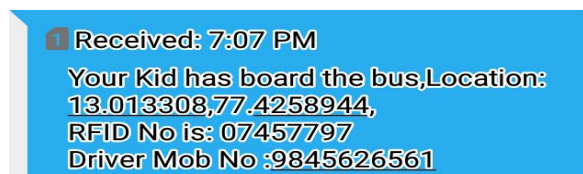

Fig.3.Mobile notification for Bus stands boarding

 When the bus reaches the school, again the child will place the tag while leaving the bus. If any student left in bus Then bus unit will send a message to the child's parent as "your Kid did not reach school" ,Latitude ,Longitude and driver Mobile number. At the same time a message will be transmitted to the school server which will display name of the RFID number, Latitude, Longitude ,Boarding or Leaving status ,Time and Date. Google Map provides location of the bus.
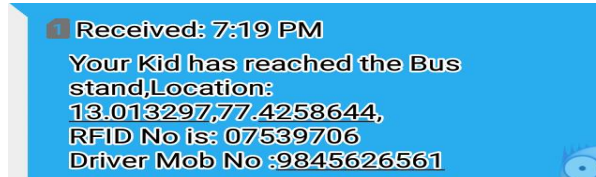
Fig.4.Mobile notification for School reaching

(ii) Journey From Bus Stop To School:

After completion of school again the child will place the tag while boarding into the bus.If any children failed to board the bus then bus unit will send a message to the child's parent as "your Kid not boarded bus in theschool", Latitude ,Longitude and driver Mobile number. At the same time a message will be transmitted to the school server which will display name of the RFID number, Latitude, Longitude ,Boarding or Leaving status ,Time and Date. Google Map provides location of the bus.
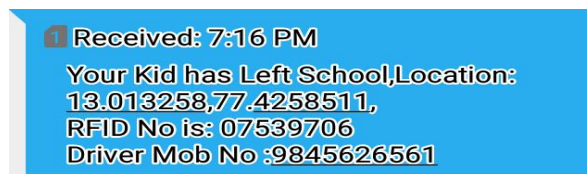

Fig.5.Mobile notification for School boarding

Once bus reaches the children bus stop again the child will place the tag while boarding into the bus. If any children did not get off then the bus unit will send a message to the child's parent as "your Kid has not reached bus stop", Latitude ,Longitude and driver Mobile number. At the same time a message will be transmitted to the school server which will display name of the RFID number, Latitude, Longitude ,Boarding or Leaving status ,Time and Date. Google Map provides location of the bus.
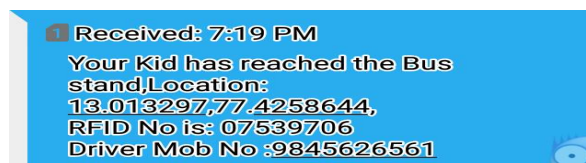

Fig.6.Mobile notification for Bus stand reaching

Some Children's Are Absent And Boarding Or Leaving Not Happened Correctly

(i) Journey From Bus Stop To School

When some of the children's are not boarded into bus at bus stop then automatically the bus unit will send a message to the respective child's parent as "your kid not boarded into the bus", Latitude ,Longitude and driver Mobile number. At the same time a message will be transmitted to the school server which will display name of the RFID number, Latitude, Longitude ,Boarding or Leaving status ,Time and Date. Google Map provides location of the bus.
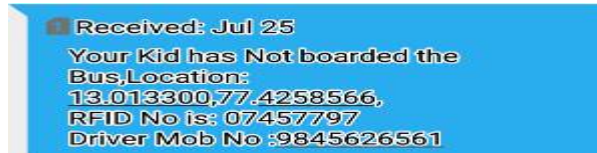
Fig.7.Mobile notification for Bus stands boarding

When the bus reaches the school, again the child will place the tag while leaving the bus.If any student left in bus Then bus unit will send a message to the child's parent as "your Kid did not reach school" ,Latitude ,Longitude and driver Mobile number. At the same time a message will be transmitted to the school server which will display name of the RFID number, Latitude, Longitude ,Boarding or Leaving status ,Time and Date. Google Map provides location of the bus.

Fig.8.Mobile notification for School reaching

(ii) Journey From Bus Stop To School:

After completion of school again the child will place the tag while boarding into the bus.If any children failed to board the bus then bus unit will send a message to the child's parent as "your Kid not boarded bus in theschool", Latitude ,Longitude and driver Mobile number. At the same time a message will be transmitted to the school server which will display name of the RFID number, Latitude, Longitude ,Boarding or Leaving status ,Time and Date. Google Map provides location of the bus.
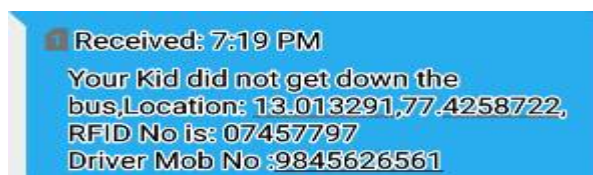

Fig.9.Mobile notification for School boarding

Once bus reaches the children bus stop again the child will place the tag while boarding into the bus. If any children did not get off then the bus unit will send a message to the child's parent as "your Kid has not reached bus stop", Latitude ,Longitude and driver Mobile number. At the same time a message will be transmitted to the school server which will display name of the RFID number, Latitude, Longitude ,Boarding or Leaving status ,Time and Date. Google Map provides location of the bus.

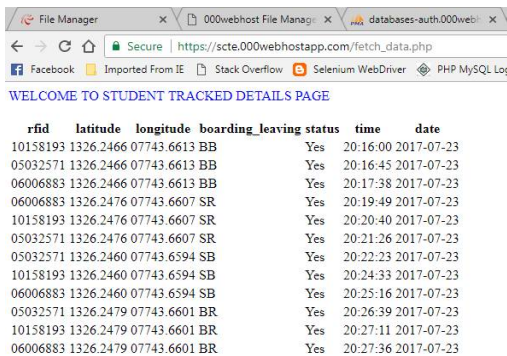Fig.10.Mobile notification for Bus stand reaching
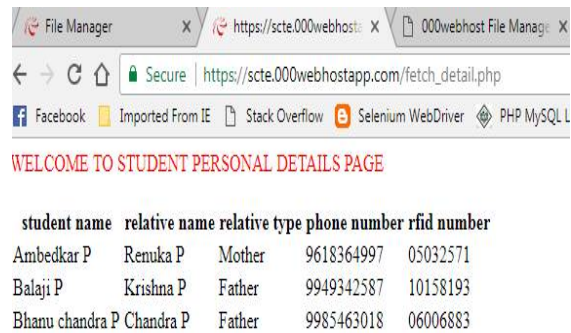
An user ID and password is given to parent of the children so that he or she can login and check the details of his or her children. School management also can check the tracked and personal details of the students. By using latitude and longitude parent or school management can Track the location of bus.

Fig.11.Tracked Details

Fig.12.Student Personal Details

By using latitude and longitude parent or school management can Track the location of bus.The Google Map is included in website itself.

Fig.13.Google Map

Fig.14.Total System

VI. CONCLUSION

The system presented is RFID-based system that aims at enhancing the safety of children during the daily bus trip to and from the school. RFID-based detection unit located inside the bus detects the RFID tags worRn by the children. It then sends, via a GSM modem, the relevant data to the parent and database server. This system also provides a Google map to track location of the Bus. The parents can log into system website and monitor the details of their children.

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BIOGRAPHY

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