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School Bus Tracking and Safety Measures

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Abstract: ***An increased concern for parents is the safety of their children on the way back home from school and the timing of their arrival. Waiting school buses in the morning and then in the afternoon to return kids back is a time wasting daily mission on parents, especially with the increasing traffic jams at these hours. In this paper we present a mobile and web application that is designed to address this issue. The system will help parents, the school and the bus to communicate automatically and easily via the application in order to detect kids' arrival time Furthermore, the system will allow parents to inform the school and hence the bus application side about the absence of their kid. The system has been efficiently and dynamically designed and implemented so it can be hosted and used by any school administration without the need to any major modifications.***

Keywords: child safety, traffic jams, school administration, communication system, parental convenience

1. Introduction

The commute of students from home to school and back has always been a source of concern for parents. Students often get on the wrong buses and get off at the wrong stops. Bus drivers may not be able to identify all the students and will not know in time if a student is missing. Parents have no way of knowing if their ward is safe until the evening when the bus returns.

While some schools have already implemented GPS tracking of buses using GSM and other means, they do not ensure absolute safety. Some of these devices do not give real time information whereas some are too expensive to be a ubiquitous solution. A tracking system that do not identify individual students may also lull the guardians into a false sense of security.

Real time tracking of the bus allows the children to have more time for activities instead of waiting for a delayed bus and the notification system ensures the individual safety of each student. The tracking is achieved by reading the geographic coordinates of the bus from the GPS module and uploading it to a database in the remote server over Wi - Fi using the microcontroller. This information can then be accessed by a user base that includes the parents, bus drivers and school administration through a mobile application which takes the location from the database and plots it on a map.

2. Literature Survey

Majd Ghareeb [1], An increased concern for parents is the safety of their children on the way back home from school and the timing of their arrival. Waiting school buses in the morning and then in the afternoon to return kids back is a time wasting daily mission on parents, especially with the increasing traffic jams at these hours. In this paper we present a mobile and web application that is designed to address this issue. The system will help parents, the school and the bus to communicate automatically and easily via the application in order to detect kids' arrival time. The bus application side will notify parents few minutes before its approaching to their home. Furthermore, the system will allow parents to inform the school and hence the bus application side about the absence of their kid. The system has been efficiently and dynamically designed and implemented so it can be hosted and used by any school administration without the need to any major modifications.
Judy Thyparampil Raj [2] presented in their paper they completed system meets all the specifications and provides all the functionalities identified in the design phase. Using this system, the parents can easily track the school bus and ensure it is moving at safe speeds, hold the school authorities accountable for delays or deviations, be updated on the changes in schedule and contact drivers or authorities if necessary. Working parents can rest at ease knowing when their kids reach safely even though kids aren't allowed phones.

Jisha R. C [3], proposes nowadays, parents are perturbed about school going children because of the increasing number of cases of missing students. On occasion, students need to wait a much longer time for arrival of their school bus. There exist some communication technologies that are used to ensure the safety of students. But these are incapable of providing efficient services to parents. This paper presents the development of a school bus monitoring system, capable of providing productive services through emerging technologies like Internet of Things (IoT). The proposed IoT based system tracks students in a school bus using a combination of RFID/GPS/GSM/GPRS technologies. In addition to the tracking, a prediction algorithm is implemented for computation of the arrival time of a school - bus. Through an Android application, parents can continuously monitor the bus route and forecast arrival time of the bus.

Aiswa rya Jyothindranath, Sajitha Kumary L [4] has developed a school bus tracking device, in collaboration with RFID, GPS and GSM/GPRS technologies. Whenever a child enters/exits the bus, the tracking system is capable of notifying the child's parents, through SMS alerts. An Android application has been developed to display vehicle location on Google maps and, display arrival times of a school bus, at each of its designated bus - stop.

Sridevi. K [5]. Bus tracking is an application that tracks a bus and gathers the distance to each station along its route.

Tracking System involves the installation of an electronic device in a bus, with an installed Android App on any SMART phone to enable the Administrator/User to track the bus location. Based on IoT this project is implemented as android application. There are two applications one for server and the other for the client. Buses carry GPS devices to track their positions. By this positions to server are periodically updated. Client application displays map showing the position of bus. It shows where buses are on a map and provide students. The server will monitor location and will store its data in the database. It is a real - time system as this method automatically sends the information on the GPS system to a system/SMART phone.

3. Methodology and Implementations

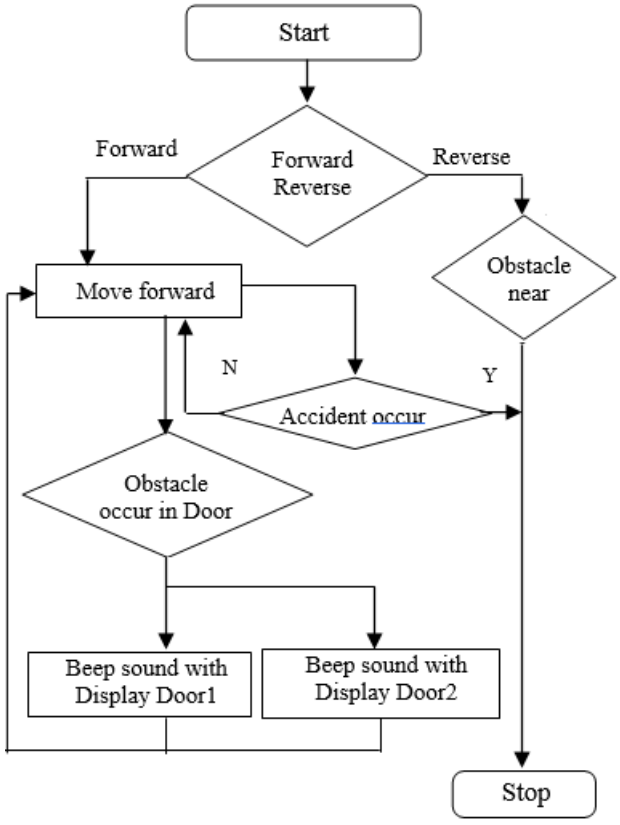

Figure 1: Flowchart

In this section we introduce the skeleton of the web application of our system, starting from the user login and password. Going down through login page to specify which one of the users is trying to log on the web application. The system has the ability of counting how many students are on board and sending the data to the web application Admin Is able to use the web app to get the current information about the school bus. In addition, with this many sensors are used for the safety measures. Firstly, as the bus engine is on, there is a LCD displaying SCHOOL BUS TRACKING SYSTEM. The bus has two doors where in its connected with IR sensors which helps in giving the no. of students entering into the bus, and is displayed both on bus LCD screen and the data is sent to the admin's web app through Wi - Fi. When the bus is moving forward and if there is any obstacle near any entry of the doors. then buzzer gets on and notifies about the obstacle present in the particular door. When the moves backword then there is a beeping sound if there are any obstacles around the bus, as the obstacles gets closer the beeping sound increases continuously and stops completely when the obstacles completely close. To detect if any accidents occurred, an impact sensor is placed to identify if bus is prone to accident. If bus is met with any accident there is a variation in the constant energy that is passing through the impact sensor.

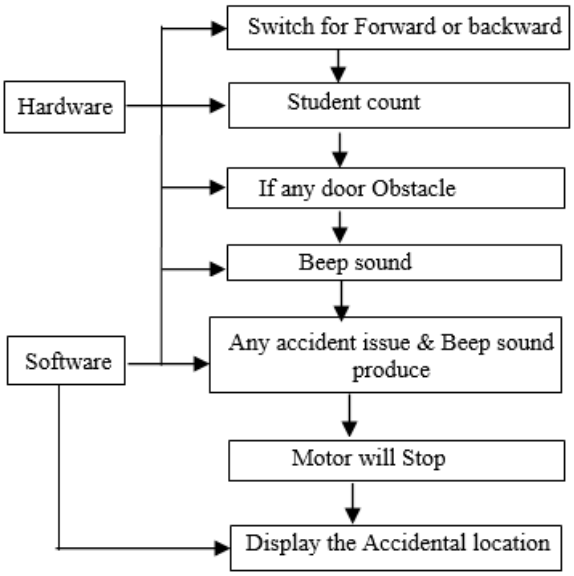

Figure 2: Workflow Diagram

Once the accident is occurred the buzzer gets on. and system gets its current location through the GPS receiver and sends the data to the admins web app. and a text message is sent to an admins phone. . NET language is used to create a graphical user interface to the application. The app basically stores the authorized mobile number to which the alert message will be sent. Which will have the locations link where the coordinates are shown Clicking on that a separate tab will be opened in the browser where the current location of the bus will be found. Once everything comes to normal state the application will clear all the records that are set.

4. Conclusion

Proposed system aims at enhancing the safety of children during the daily transportation to and from school. It sends instant notification with the relevant data to the school database server. By implementing this idea, we can improve the transportation safety and the quality of service to the school buses. The proposed system is more user friendly than existing system.

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