

VEHICLE TRACKING AND STUDENT MONITORING SYSTEM

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Abstract:

Nowadays, school and college bus services have a large usage in schools and colleges. Most of the student's parents are worried about bus services regarding the safety aspect of their wards. Accomplishing this problem, our paper planned to solve this problem. We send an alert message to the student or a parent and at the same time we inform the details to college management too. The message is sent to the parents when their son/daughter enters the bus and after getting out from the bus also. Student alerting system, SMS will be sent to the parent's also, school and college bus before arriving their stop we sent an alert message to the student or a student's parent. The paper aims to solve these problems using a switch, GSM module, RFID reader, and Tag. GSM-based Control System develops the applications and services related to the technology of GSM. The main purpose of the proposed methodology is receiving and sending SMS and the same is utilized to perform further operations. GSM module sends the message to the required system or a user. RFID is used to analyze the school/college student's information before entering into the bus and after getting out of the bus, if we stored the parent's mobile number into the microcontroller programming, sends a message to the student's parent bus before arriving their bus stop and after students entering bus message sent to the parents and college management.

Key Words: GSM, RFID, Arduino, AttendanceSystem,Switch,Parents Alert.

Introduction:

There is an issue of students irregular in school/college buses. This may affect the class attending time and make stress students and their parents also. Here is a problem for parents about their student's existence inside the school/college bus. Students don't know about the bus timing, it varies every day for some minutes. To avoid this problem we notify the student or a student's parent before one bus stop. To enhance the overall safety and reduce the waiting time of the students at their bus stop we use a push button switch near the driver and GSM Module is used to send the messages to the students. In case, if the bus is at stop 1 and the driver presses the button the alert message is sent to the next stop (stop 2) student or a student's parent. Parents and college management don't know about the timing when the student enters the bus. In this System, Each student travels via school/college bus. The bus contains an RFID scanner and school/college students have an RFID Tag. Students take an RFID tag near the RFID scanner, if the information is correctly matched as per the program LCD shows the student name and sends it to the parents and college management. Here Arduino Uno microcontroller is used to control all these processes.

Working Principle:

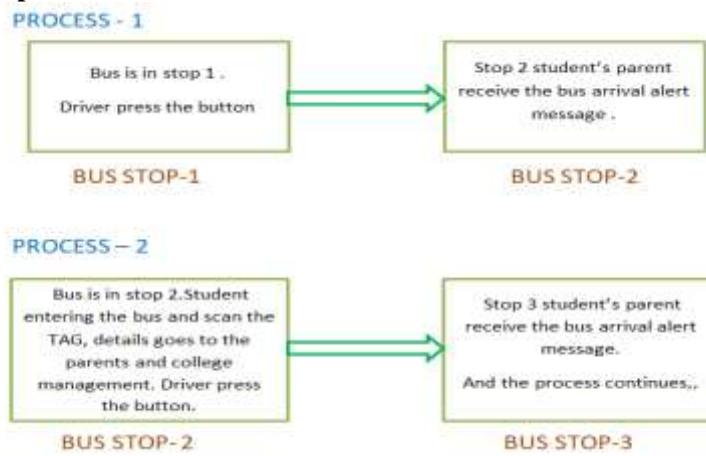


Figure 1: Working Block Diagram

In this paper, we notify the school/college students of daily bus timing before the bus arriving their bus stop and we notify the parents and college management for students. Pick-up and drop-off timing detail student information while they enter the school/college bus.

To enhance the overall safety and reduce the waiting time of the students at their bus stop we use a push and release button near the driver and GSM Module is used to send messages to the students. If the bus is in stop 1 and the driver presses the button the alert message is sent to the next stop (stop 2) student figure(1). While students enter into the bus they scan their Tag to the RFID, the student details and their entering time in the bus is sent to their parents and college management too. In this project we focus on two things, one is we alert the student for their school/college bus arrival before one-stop via message. Two is sent the information of the student's pick-up and drop-off timing details to the parents and college management.

Proposed Methodology:

The components used in this project is detailed explained in this block diagram Figure(2).

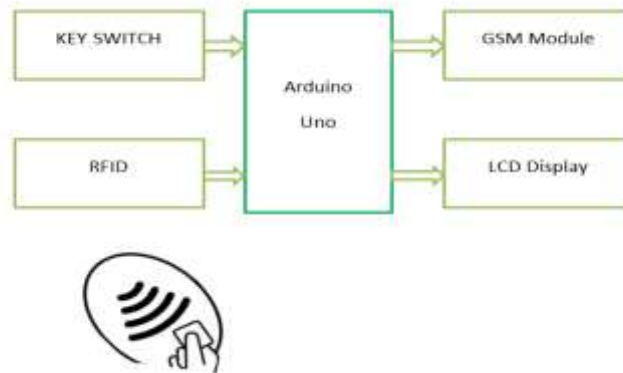


Figure 2: Circuit block diagram

Arduino Uno is a microcontroller that is used to solve problems in the embedded domain. It's a programmable device, we can easily program this microcontroller to react and solve real-world problems. Connecting Arduino Uno to the internet is useful for solving the problem in the real world and virtual world. It is done both things, sending data to the internet and responding to the data on the internet. We can connect almost every sensor to this microcontroller and solve problems in the real world, like light sensors, a temperature sensor for finding the heat of our surroundings, a sound sensor for finding the noise around us, and a smell sensor also. Not only controlling sensors, but Arduino Uno(Figure 3) is also a sensor sometimes, the way we program this microcontroller works that way. Using sound sensors we can open doors while clapping and making small sounds, activate lights and motors in the different ways of making sounds. Here we use an ATMEGA 328shows in Figure (3) controller, it's more effective and less in cost. It contains a flash memory of 32KB ISP with read-while-write potentials. It contains 1KB of EEPROM, 2KB of RAM & 23

input/output portals. Arduino Uno operating voltage is 1.7V – 5.4V. **We can interface this Arduino Uno to the buzzer, LCD& micro SD card through separate ports.**



Figure 3: Arduino

The switch is preferred to ON /OFF the system. The switch is used in electrical and electronic control systems to control and operate the circuit. Here we use a common simple switch shows for controlling our embedded system. But, practically push button switch is better for application purposes. A push-button switch is used to send control signals automatically to the circuit or an appliance.

Every push button switch shows in Figure (4) has two pairs of contacts; those each pair of contact consist of NC and NO contacts. If the push button is enabled, those two pairs contacts togetherly act, the contact NO is closed, NC contact is disconnected. **The purpose of the button in this project is ,it acts as a key** once the driver press the button the display shows the information and the student scan their ID card.The message send to the parents and the college management.

To express the functionality of every button and to avoid desperation different colors of button caps are used as a Red, Green, Blue..wherein Red represents the stop button, Green represents the start button.



Figure 4: Push Button Switch

The push-button is made up of a terminal, static contact, a return spring, a bridge-type moving contact, a pillar connecting rod, shell and a button cap shows in Figure (5). If the button is pressed down, the magnet inside the switch is energized to generate the magnetic power, for the remote control circuit, this circuit is connected by the absorption device to understand the function.

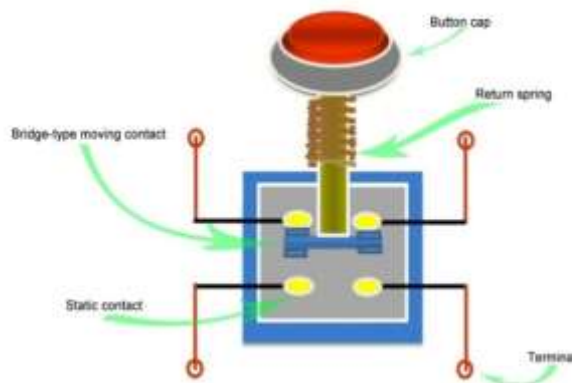


Figure 5: Push Button Switch Inside

RFID(Radio Frequency Identification) states to a wireless system include two factors .those are readers and tags. The reader has an antenna, that's in numbers of one or more, it receives and sends radio wave signals. Tags are used radio waves to transfer or communicate the data to the reader. The two types of RFID tags, Are Active RFID tag and Passive RFID tag. Battery-powered RFID tags are active RFID tags. Without battery power, that's called Passive RFID tags. Passive means no power source contained transponder, it harvests or gets power from the reader antenna RFID tags can store some amount of memory. In the cabinet, room, or building we can assemble the reader system[5]. Here we install the reader system at the entrance of the school/college bus. Various numbers of RFID systems worked in the different radio frequency ranges. Range of (13.55 MHz) is a high-frequency range it read an RFID tag near 1.5 meters. Range of (125-134 kHz) is a low-frequency range.

This range of frequency spectrum is good for not being susceptible to contact from the existence of metals or water. Battery-contained RFID tags are Active, Non-battery RFID tags are passive. These types of tags communicate a signal to the RFID reader which in turn can transmit over large distances. these tags are lesser cost only, and this usage is large scale. We can monitor our high-cost transport goods and vehicles, shipboard containers. Here we use a passive RFID tag, it receives the power from the reader's antenna.

A 4K display contains 3840 x 2160 pixels. Mainly, a pixel is made of three subpixels, called RGB. Those are R-Red, G-Green, B-Blue. When the pixels of sub-pixel changed means, the color combination is changed, it makes different new colors. In-display all the pixels working together can make thousands or millions of different colors. If the pixels of the display are continuously ON and OFF, an image or a picture is created. The control of display varies for different displays. A separate glass filter is fixed both in front and behind all the combined pixels in 90° we fix the front filter.

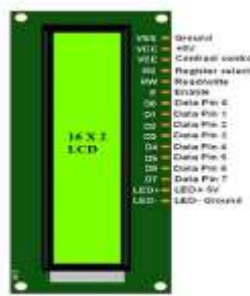


Figure 6: LCD Display

To control the light for any pixel at the time when we need, we sent a current across two conductors. Less current is required for controlling the luminance of a pixel in an active matrix transistor. For improving the screen refresh time. the current is active matrix display can be switched ON and OFF continuously. Passive matrix LCDs have two scanings, Two scanning means they scan twice the grid but, it takes the same time of scanning like an original technology. Active matrix display is good technology out of the two technologies. A 16x2 LCD Module shows in Figure (6).The operating voltage is 4.6V-5.2V in this 16 x2 LCD module.This 16x2 LCD module contains two rows, and those two rows produce 16 – characters.

GSM MODULE:

GSM was developed by the European Telecommunications Standards Institute.GSM is used to describe the second generation (2G) digital cellular networks protocols by cell phones. It's now the world's default acceptance for cell phone communication with over 80% of the market share in the telecommunication sector[6] at the time. Not only cellular mobile devices, and IoT devices are also connected to GSM nowadays.

GSM is mainly developed to demonstrate the protocols of 2G used by cellphones and it's a global standard for mobile communication and is being operated in over 219 countries.

In the market, different cell sizes of GSM Modules shows in Figure (7) are available such as micro, macro, umbrella, and pico. Every cell differs as per the application purpose and the usage of the environment.TDMA method depends on the assignment of different time slots to a different user on the frequency spectrum. TDMA technique can carry the range of 64Kb/s to 120 Mb/s of data rate. A GSM is an external device PCMCIA Card/PC Card, we can connect with microcontrollers also. Generally, an external GSM module like that's connected separately.



Figure 7: GSM Module

This GSM module is connected to a microcontroller or a computer via serial cable or a USB cable. GSM module in the form of PCMCIA (Personal Computer Memory Card International Association) Card/PC Card is separately designed for connecting with the laptop or a computer. Here we use a GSM SIM 800C Module.

Results and Discussion:

The output hardware shows in figure(8) ,it contains the all hardware components we use in our project,



Figure 8: Hardware kit

Output Messages received by users(Student's or Parents,College Management)
Driver press the button: Student receives the message(College bus arrival near your place)
Student scan the RFID Tag: Parents receive the message(Your Son/Daughter Reached College Bus).
College Management Receive the message (Student 1(name) Reached College Bus).
Some users use the same mobile (SIM) for the bus alert message and attendance message receiving purpose.



Figure 9: Output Messages

In Figure (9) shows the output received by the Students ,Parents and a College Management

The aim of this project is, in schools and colleges reduce the students waiting time at their bus stop while coming to the school/college bus. Most of the parents are swear very much on the school and college bus services although they are bothered about their children's safety and existence on the school/college bus. In this project, we inform the student's attendance to their parents. Enhance the overall safety and reduce the waiting time of the students at their bus stop we use a push button switch near the driver and we use a GSM Module to send a message to the students or a student's parent. If the bus is at stop 1 and the driver presses the button the alert message is sent to the next stop (stop 2) student's parent. While students entering into the bus they scan their ID cards and the message sent to the parents and college management.

Conclusion:

In this project, we inform the school/college students or their parents for their bus arriving status before one bus stop. In the bus, near the driver, we put a push-button switch, if the driver press the button means the bus arriving alert message is sent to the next stop student. This process continues until the college arrives. It saves the time there waiting for the bus. While students entering into the school/college bus they scan their RFID card tag to the RFID scanner bus attendance sent to their parents and college management. This attendance method followed morning pick-up and evening drop-off. In this project, we have done and solved these problems.

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Response to Reviewer Comments:

1. Only simulation results are pasted.
Updated the simulated results on the paper.
2. Author advised to highlight research contribution and revise thoroughly.
Paper is revised thoroughly and highlighted the important content on the paper and mentioned those topics on the keywords.
3. Punctuation mistakes in the paper.
Punctuation mistakes are corrected.
4. No keywords.
Keywords are added at the beginning of the paper.
5. No literature survey of existing approaches.
Literature survey of existing methodology is added, they are RFID attendance system, GSM connectivity domains. We are made some more advanced system in attendance system.