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Seamless live updates of geographic location and identification of students and school bus using GLONASS technology

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Abstract:

Despite the strict majors taken for children safety by the authorities the crimes over children are increasing on significant amount. To restrict these crimes it is important to enhance security for children. Children who travel to and from school by themselves without monitor by their parents are exposed to danger. This project focuses on implementing children tracking system for every child attending school. The System consist of main units a bus unit. The bus unit system is used to detect when a child enters/exits from the bus. Children information at entry/exit level will be scanned by the RFID reader. At the same time parents will automatically receive the SMS form the system that inform their children enter/exits from the bus. . For children monitoring system we use two technologies RFID and GLONASS and also cash card for their expenses inside the school campus. This system will benefits to parents, school children and school administrator.Each students possesses an RFID tag on his own smart card which is useful for identifying the student. We also provide speedometer which checks speed of bus.

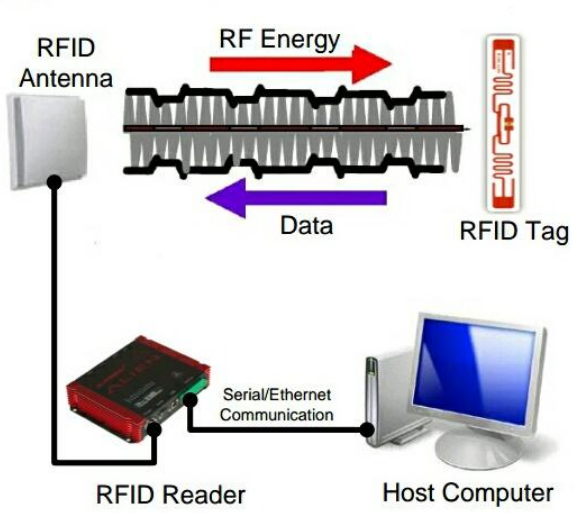
Introduction:

A system is proposed for safety along with entering or exiting of student from bus. It identifies children on basis of information stored in a RFID tag itself, this information is exchanged over radio waves. In case of over speed of school bus buzzer is provided, let driver to know speed should be minimized for safety of children. Along with RFID another elements such as GPS, GSM are used in monitoring system. The combination of GPS and GSM is found effective for various another real time working systems, This paper presents a system to monitor the daily bus pick-up/drop-off of children. The system aims at automatically detecting when a child boards or leaves the bus and issue an alert message when a child does not board or leave the bus to reduce the parents' concerns about using the bus for the daily transport of their children without being lost or forgotten [1].

Related Work:

RFID technology relies on communication between an applied tag and a reader. Two types of RFID tags are in common usage: passive tags, which have no internal power supply and emit a radio frequency signal only in response to a query from a transponder, and active tags which are internally powered and which continuously emit a radio frequency signal. While passive tags are less expensive, active tags have higher reliability and transmission power. Active tags can be read from distances of several tens of meters, while passive tags have a range between tens of centimeters and a few meters. Furthermore, active tags contain more memory and can be integrated with additional sensors, for example, for checking temperature or humidity, and are able to

store the history of sensor data. Passive tags, on the other hand, have longer life time, and its cost is significantly lower. The information contained in the signal of either type of tag can be a unique identifier that is then linked to a database (similar to barcode technology), or can include sample data that is programmed into the tag and then broadcast in the signal [5]-[6]-[7].



Cash card:

Students use cash to purchase lunch, in most cases provided by their parents. Those receiving the free lunch would only be allowed to purchase the standard lunch under either system. For those not receiving the free lunch, parents may give their child just enough cash each school day to purchase the standard lunch. Thus, in order to buy a la carte items, which are often less healthy options, a child must forego purchasing the standard lunch. Spending is limited to the amount of money physically present in hand.

School payment systems with cash options are associated with a lower purchase incidence of less healthy foods and higher purchase incidence of more healthy foods. It should be noted that some debit systems (e.g., NutriKids®) allow parents to set daily limits on spending or to restrict purchases of certain items. Such systems still provide schools with convenience while allowing parents to guide or control student lunch choices. Some schools within the SNDA data may employ such a system (potentially biasing our results downward). However, adoption is not widespread and it is unlikely that such a bias would have a measurable impact on results.

CONTRIBUTION OF PAPER :

In this approach we collect the boarding and deboarding locations of the students using the architecture below. This unit checks the students boarding the bus, getting down from the bus, send information to the parents and school authorities. When the student boards the bus, he places his RFID tag on the reader. This data is then sent to the processor. At the same time the location is identified using GPS. These values are then send to the modem to forward to the parent and the school.

GPS (Global Positioning System):

The boarding and deboarding location of the students are identified using GPS technology. The GPS coordinates are captured and the GSM modem sends it to the parent and the authorities. GPS is a satellite navigation system which gathers accurate information regarding to the location and time. If there is no obstruction of sight between three or more GPS satellites on or near the Earth, the location can be accurately determined. 24 satellites are currently active in the GPS navigation system. Along with these satellites and ground stations, the GPS receiver calculates the location of the students. GPS consists of 3 segments. The space segment, control segment and user segment.

The space segment consists of the 24 space vehicles with the satellites. They orbit the earth in 12 hours and send radio signals.

The control segment consists of the tracking stations. They measure the ephemeris i.e, orbital data and the satellite clock corrections and send them to the satellites which are sent to the receivers.

The user segment consists of the GPS receiver which using the GPS signal calculates position, time, velocity etc.

Every GPS satellite transmits information about the time, and its position. By comparing the signals received from four satellites the receiver deduce how long it has taken for the signals to arrive and from knowledge of the position of the satellites it can calculate its own position.

GSM (Global System for Mobile Communications):

GSM was developed by the European Telecommunications Standards Institute (ETSI) which describes the protocols for 2G cellular networks used in mobile phones. It is operating over 219 countries and territories. GSM is implemented using narrow band time division multiple access (TDMA) and is used in various digital wireless telephony technologies. The data is digitized, compressed and sent through a channel (which may have other users) during its time slot. The frequency band is 900MHz or 1800MHz. As the GSM operators are globally agreed upon, they allow the users to use their same mobile phone in different countries by changing the SIM card.

Radio - Frequency Identification (RFID) :

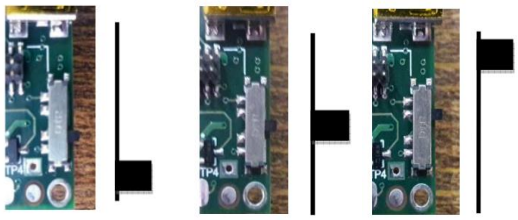
This uses radio waves to read information stored in a tag attached to an object. A tag can be read from several feet away and need not be in direct line-of-sight of the reader. A RFID system has two units: a tag and a reader. RFID tags contain a transmitter and a receiver, a microchip to store and process information, an antenna to receive and transmit a signal. To read the information stored on a tag, a two-way radio transmitter-receiver called an interrogator sends a signal to the tag using an antenna which then replies with the data stored in it. There are 2 types of RFID tags. Active and passive. Active tags has their own power supply hence can be read from several metres away. The passive tag work with the help of the radio waves generated by the reader. Hence they are small in size and have more life. In this paper we use passive RFID tags.

. SLIDE SWITCH –Used for different modes as shown in figure.

a) Configuration mode

b) Monitoring mode

c) Boot mode (Firmware update mode)



a) b) c)

Configuration mode:

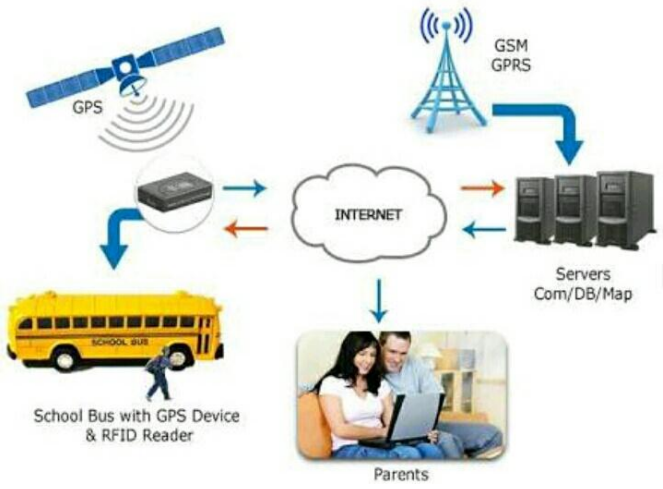
Configure the parameters of the device like device configuration, frequency configuration, GPRS configuration etc. The position of the switch shall be downwards as shown in the figure a

Monitoring mode:

Monitor/debug the device by interfacing with PC, tablet or mobile. The position of the switch shall be in the middle as shown in the figure b

Boot mode (firmware update mode):

Update the firmware of the device using PC. The position of the switch shall be upwards as shown in the figure c



OUTPUT:

When children enters to school bus, through RFID information about children is read by RFID reader and through GPS exact location is detected and through GSM complete information is sent to parent and school authority through SMS

PARAMETER	DISPALY
1.In/Out	1.Abarna present 2.Divya present
2.Parent's Message	1.Abarna entered at hh:mm am/pm 2.Divya entered at hh:mm am/pm
3.School Authority	1.Abarna entered at hh:mm am/pm 2.Divya entered at hh:mm am/pm
4.Speed	Overspeed

CONCLUSION AND FUTURE SCOPE:

In proposed paper we worked on children safety through module kit consisting of RFID, GPS,GLONASS and GSM to get exact location and time of individual children. We also implemented over speed detection of school bus. For installing this system initial cost is high, but maintaince of this system is not of much cost. This system is going to be helpful for the parents as well as school system. Students are keep on tracking and current location of a child can be detected using this system in any case of the mishap or kidnapping case of a child.

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