IOSR Journal of Computer Engineering (IOSR-JCE)
e-ISSN: 2278-0661,p-ISSN: 2278-8727, Volume 20, Issue 2, Ver. IV (Mar. - Apr. 2018), PP 15-18
www.iosrjournals.org

Intelligent Transport System for Real Time School Bus Tracking For Safety and Security of Child Using GPS

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Abstract: *Every school try to provide best transport facility to the student for saving the time to focus on their studies. Parents are as concerned about the safety measures a school has in place as they are about the level of education they expect the school to impart on their child. Here one way available in front of school that is tracking the school bus using GPS tracking system. High end GPS system is installed in the school vehicle all the signals from the vehicle are routed to an integrated central server for real time monitoring Information from the server can be transmitted via message alerts and Emails, or can be checked on the web or using mobile apps. This android app provides some features like application provide estimated arrival time of child to the parent before/after reach the bus on stop. Parent can track the bus using android application. If parent does not have the smart phone, then he receives a text message which informs them of the current location of their child's bus. Traffic jam, natural calamity or any other problem in such case, text message is immediately dispatched to the parent informing the reason for delay. This is the Benefits of GPS Tracking for School Buses. The advantages of using GPS tracking systems in school buses are plenty. The most important benefit is the peace of mind it provides parents as they are continually updated of their child's where about.School management get detail report of distance moved by each vehicle, time of arrival at each stop and reasons of delay bus, etc. School admin also check driver are sticking to planned routes, aren't missing any stop and not over speed.*

Keywords *Computer Communication Network ı.C.2.0 General, Data Communication, Open System Interconnection Reference Model, Security and Protection (e.g. Firewall), Mobility, Network Operations, Public Network, Distributed System, Client Server.*

Date of Submission: 16-04-2018 Date of acceptance: 04-05-2018

I. Introduction

Today most of the parents use school bus to drop children to the school and pick up. Parents think that school transport system is secure for student. But are they really safe? There are many problems like 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. So any parent can't say my child is safe in school transport. These entire problems overcome by school bus tracking system. It gives facility to parents to track bus through android application. If parent's does not have android phone, then this application continuously send text on the parent's number about his child location by using longitude and latitude. GPS, GSM technologies are merged into school bus tracking device and it is a compact unit. Being a single piece of hardware, it is relatively effortless to install this device in quick time. The quality of hardware ensures there would be minimum maintenance required and provides the maximum service to the user.

II. Mathematical Module

System Description:

1. Let S be a system that describes Intelligent Transport System for Real Time School Bus Tracking for Safety and Security of Child Using GPS system. S= School bus tracking for safety and security of child using GPS system (System)
2. Identify I is a system input as S= I... Let I ={ i1, i2, i3,..id....} Input parameter The input will be Username, image, Mobile Number LS ={ls1, ls2, ls3...}
3. Identify output as O S ={I, Ls, O} O= Provide security for exchange data in network
4. Identify the processes as P S ={I, O, P,..} P ={E, D} E= parameter- username D= parameter- image
5. Identify failure cases as F S ={I,O,P,F,.} F=Failure occurs when we not get the correct position of bus.
6. Identify success as s S ={I,O,P,F,s,} s=When user successfully get school bus location.
7. Identify the initial condition as Ic S ={I, O, P, F, s, Ic,} Ic=Internet Connectivity must be required.

III. Algorithm

Here first we calculate longitude (East-West) and latitude (North-South). By using the longitude and latitude value calculate the distance between two points on earth surface.

Formula for calculating distance between two points on spherical surface: -

For any two points on a sphere, the haversine of the central angle between them is given by

$\text{Hav}(d/r) = \text{hav}(\varphi_2 - \varphi_1) + \cos(\varphi_1)\cos(\varphi_1)\,\text{Hav}(\lambda_2 - \lambda_1)$

Notations:

1] hav is haversine function

2] d is distance between two points

3] r is the radius of the sphere

4] φ_1, φ_2: latitude of point 1 and latitude of point 2, in radians

5] λ_1, λ_2: longitude of point 1 and longitude of point 2, in radians

IV. Literature survey

Paper 1

Title: -A Trip-detection Method for Smartphone assisted Travel Data Collection.

Year: -2015

Description: - This paper introduces a new method to automatically detect trips/trip segments based on the instantaneous movement attributes of individuals that can be collected automatically by smartphone sensors. The goal is to enhance the accuracy of collected data by better identifying single mode trips/trip segments, while minimizing participant's involvement and preserving battery life. The proposed system works independent of external databases and can be implemented in smartphone applications to enhance the accuracy of collected data and minimize the required data transfer. The implementation of the model increased data accuracy, in terms of the duration and length of recorded trips. Such as the GIS database of the study area, as well as the history of participant's travel activities. However, this enhancement is subject to the availability of these external data sets for a specific study area.

Paper 2

Title: -Tracking and Behavior Reasoning of Moving Vehicles Based on Roadway Geometry Constraints.

Year: -2017

Description: - The paper presents unied frameworks to simultaneously track the vehicle motion and infer the behavior of vehicles. The IMM lter was used as a basis of unied tracking and behavior reasoning because the IMM lter can simultaneously infer the vehicle behavior by ending the appropriate behavior model based on the model probabilities and estimate the vehicle motion by weighing the ltering result of the selected behavior model The experimental results show that the heading accuracy improved compared to the tracking algorithm within the Cartesian coordinate system. This accuracy improvement can enhance the performance of the vehicle motion prediction for the motion planning system. Furthermore, the behavior reasoning results can also be used to improve the motion and behavior prediction.

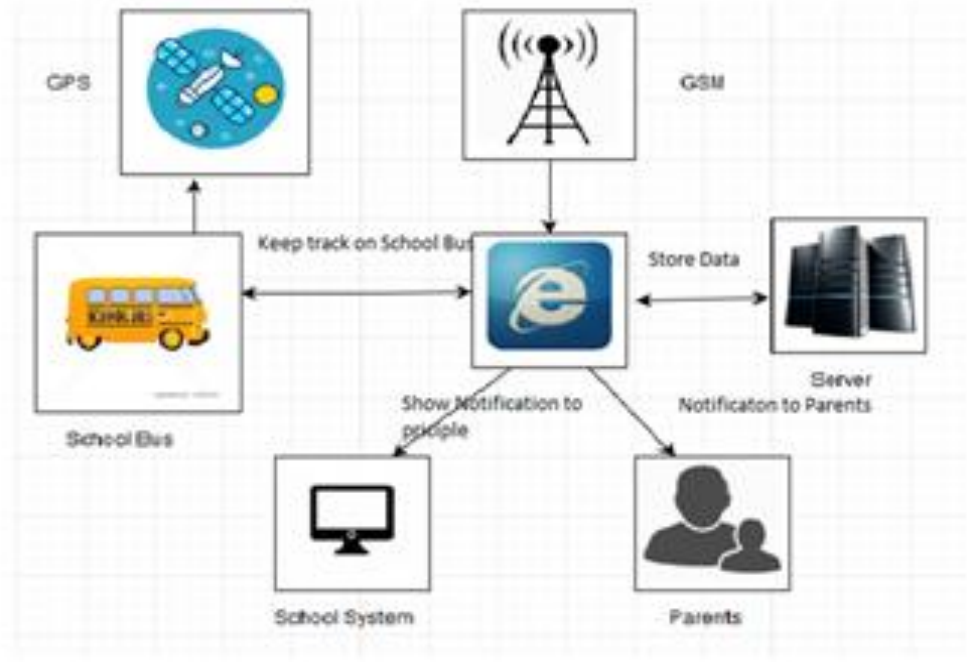
Paper 3

Title: -A Data-Driven Method for Trip Ends Identification Using Large-Scale Smartphone Based GPS Tracking Data.

Year: -2016

Description: - Global Positioning System (GPS) is widely applied for survey in the transportation eld. The vehicular GPS equipment or smartphone-based GPS applications record traveler's trajectory. At the same time, these travelers are prompted through Internet, telephone interview, email, paper-and-pencil based questionnaire, etc.to collect information about their socio-demographics, as well as verify the travel records.

V. System Architecture



Our proposed system uses for child's safety. By using the android application school admin or parents gets the current location of child and bus status. Our proposed system continuously analyses the data and send notification on parent's mobile or school admin system. By using GPS and GSM data we can track the bus location.

Module Wise Explanation:
Administrator module
Functionalities provided:

- Create usernames and passwords
- View/ edit / delete user accounts
- See Bus status

Parents Module
Functionalities provided:

- Register/ Login
- See Bus status

Driver module
Functionalities provided:

- Register/ Login
- Update Bus status
- Write Comment

VI. Conclusion

Using GPS system, we can do real time tracking of school bus. This system improves child security and safety and provides relative information to the parents. Our system is composed of smart phones and server. This system doesn't require external hardware device for tracking. It provides the facility of tracking so that his/her child won't get late or won't arrive at the stop too early also it provides driver details, numbers and bus details. The application also estimates the time required to reach a particular stop on its route. The application uses client-server technology.

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IOSR Journal of Computer Engineering (IOSR-JCE) is UGC approved Journal with Sl. No. 5019, Journal no. 49102.

Ruturaj Shelake "Intelligent Transport System for Real Time School Bus Tracking For Safety and Security of Child Using GPS." IOSR Journal of Computer Engineering (IOSR-JCE) 20.2 (2018): 15-18.