

SMART ASSISTANCE PUBLIC TRANSPORT SYSTEM

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ABSTRACT:

In this paper, we introduced the 'Smart Assistance for Public Transport System'. The public transport selected is Public Bus. The issues related with public transport are bus arrival time prediction, no. of passengers, accident detection and safety, alcohol detection for driver, bus report to public through online/offline options are available. The main aim of the project will be collecting the data from field and delivers it to server from where it will be fetched by android application

KEYWORDS: Microcontroller; Mobile Phone; Tracking systems; GPS Modem; GSM Modem

I. INTRODUCTION:

Transportation plays an important part in our life, it is the transportation only which make the people connected from one another.

This system will make use of GSM and GPS module to give real time location of vehicle for that we are using a microcontroller along with GSM and GPS module. The GSM module will be provided with a SIM card for communication purpose. GPS will give the longitude and latitude values. That values are been transmitted to the server with the help of Global Service for mobile (GSM module). Once the longitude and latitude value will uploaded on the server the user with the help of android application and get the real time location of the vehicle. The PIR sensors are to be used at front and rear door of the bus for person counting of in/out from the bus. Also, MQ3 alcohol detection sensor is used to detect alcohol level of the driver and if alcohol is detected then bus will not start and a message will be given to PMT through GSM system requesting for change of driver. Then an accelerometer is used to detect accidents and simultaneously message is sent to PMT, registered hospital and registered police station so that they can give proper assistance to the bus at the time of accident. When the switch is been pressed, a message will be sent to registered police station containing the data about bus and its location.

The following fig. represents the basic idea for the system.

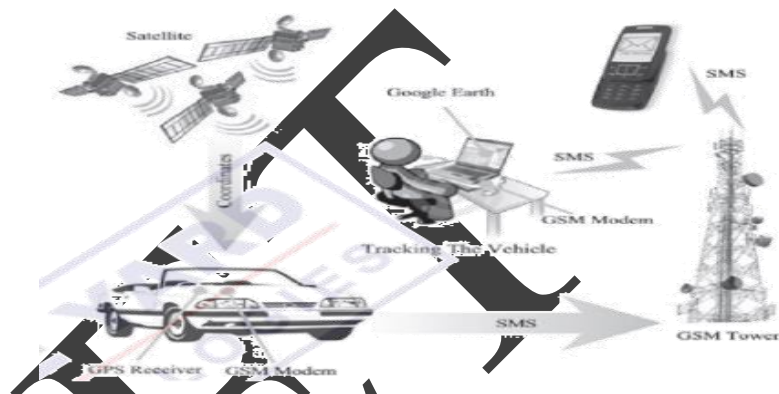


Fig 1: Basic idea for system

II. HIGHLIGHTS OF SYSTEM:

The following fig. represents general block diagram for the system.

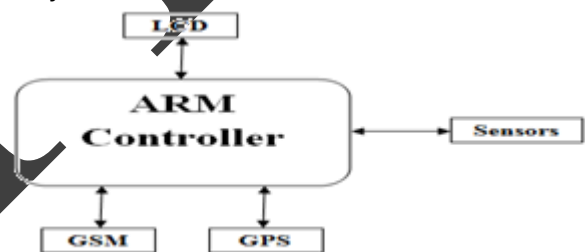


Fig.2: General block diagram of the system.

The proposed system has various advantages over conventional system;

[1] ONLINE/OFFLINE TRACKING: Both online/offline tracking can be achieved simultaneously. For online tracking GPS technology is used, whereas, GSM/GPRS technology is used for offline.

[2] ALCOHOL DETECTION: To prevent accidents caused due to drinking of driver this application is added in the system. An alcohol is used to detect the driver's alcohol level in the breadth. The sensor used is MQ3 which is alcohol sensitive at different levels of concentration at low cost.

[3] ACCIDENT DETECTION: To detect the accident at instant of occurrence this technology is also implemented as per safety point of view. The accident sensor used is ADXL335 which operates at 3-axis namely; X, Y Z at different frequencies. This is monitored by GSM/GPRS technology.

[4] NO. OF SEAT AVAILABILITY: To pre detect availability of no. of seats available in the bus, PIR sensor is used. It is

to be used at front and rear door to sense no. of persons entering and exiting from the bus. This can be monitored by GPS, GSM/GPRS technology.

[5] WOMEN SAFETY AND BUS FAIL SWITCH: These switches are used for safety purpose. At every seat at left-hand where seats are reserved for women, this women safety switch is to be mounted. Whereas, bus fail switch is mounted to know or monitor bus fail condition at any instant of bus fail through GSM/GPRS technology.

III. LITERATURE SURVEY:

Following IEEE papers are referred and their reviews are as follows;

1. They have implemented bus vehicle tracking for UCSI university, Kuala Lumpur, Malaysia. It is implemented for fixed route, providing students with status of bus after specified time interval using LED panel smart phone application. Technology used is Arduino microcontroller Atmega328 based Arduino UNOR3 microcontroller. Also, for GPS, GSM/GPRS module the same controller is used. Software program to control them is written in C programming language, compiled and then saved in microcontroller's flash memory. The testing results in this paper provide; testing in-vehicle device, testing web server and database, testing smart phone application.
2. Predicting bus arrival time with mobile phones is given. Technology used is participatory sensing of user. This prototype system with different types of Android based mobile phones and comprehensively experiment with the NTU campus shuttle buses as well as Singapore buses over a 7-week period, then followed by London in 4-weeks. The proposed system is solution is more generally available and is energy friendly. The evaluation results suggest that the proposed system achieves outstanding prediction accuracy compared with those operator initiated and GPS support solutions. The prototype system predicts bus arrival time with average error of 80 sec.
3. Mobile tracking system is used to monitor vehicles position and in special cases there are much useful information can be monitored such as speed, cabin temperature and no. of passenger. This monitoring process is done using GPS device, and sending the data to a server through GSM modem. It is proposed machine-to-machine (M2M) communication from which Open Machine Type Communication (Open MTC) as communication platform for aggregating and processing location data. The location is displayed on Google map. The Open MTC platform that is developed by Fraunhofer FOKUS based on ETSI M2M Rel.1 specification.

4. The vehicle tracking system presented in this paper can be used for positioning and navigating the vehicle with an accuracy of 10 m. The positioning is done in the form of latitude and longitude along with the exact location of the place, by making use of Google maps. The system tracks the location of a particular vehicle on the user's request and responds to the user via SMS. The received SMS contains longitude and latitude that is used to locate the vehicle on the Google maps. The vehicle tracking system allows a user to: remotely switch ON the vehicle's ignition system, remotely switch OFF the vehicle's ignition system, remotely lock the doors of the vehicle, remotely unlock the doors of the vehicle, and remotely track a vehicle's location. The vehicle tracking system was built successfully. However, the vehicle tracking system could be made more robust by using more accurate GPS unit.
5. This paper presents vehicle accident detection and alert system with SMS to the user defined mobile numbers. The GPS tracking and GSM alert based algorithm is designed and implemented with LPC2148 MCU in embedded system domain. The proposed Vehicle accident detection system can track geographical information automatically and sends an alert SMS regarding accident. Experimental work has been carried out carefully.
6. This paper provides the design which has the advantages of low cost, portability, small size and easy expansibility. The platform of the system is ARM along with MEMS, Vibration sensor; GPS and GSM, interfacing which shortens the alarm time to a large extent and locate the site of accident accurately. This system can overcome the problems of lack of automated system for accident location detection.

IV. METHODOLOGY:

- For hardware basic technology to be used is GPS/GSM technology for bus tracking and monitoring.
- Accident detection technology for vehicles is to be used for accident detection and GSM technology to be used for its monitoring.
- PIR sensors are to be used for counting of public that travelled in the bus at front and rear door. Safety switches along with SMS acknowledgment to registered police station are used as indicators for rash driving, bus fail and emergency case.
- Android application is to be developed for smart phones to make the bus tracking and monitoring easy and fast.
- For on-line tracking and monitoring of bus GPS system and for off-line and reporting at every registered office

GSM technology is used. for tracking and no. of passengers availability smart mobile app is used.

A. ALGORITHMIC STEPS : (HARDWARE)

- a. Initialization of the hardware LCD and sensors.
- b. LCD displays the Value of Alcohol sensor and PIR sensor count.
- c. When the value of MQ3 sensor changes i.e. if the value of alcohol content changes, the GSM system sends a SMS acknowledgement to the registered no. that the driver is drunk and real-time co-ordinates of the location.
- d. When an accelerometer is been vibrated or shocked, it detects accident when the X-axis and Y-axis changes above 300gravity and 700gravity respectively.
- e. If location tracking switch is pressed, then it tracks real-time location and displays on smart app.
- f. Entry and exit gate of the system PIR sensor are mounting for person count and sum of increment and decrement is display on smart app.
- g. When emergency and rash driving switch is pressed, they acknowledge SMS through GSM unit with GPS co-ordinates to the registered.

B. Algorithmic steps: (Software)

- a. Open the Eclipse Luna (Java IDE).
- b. Setting of all the properties i.e. baud rate, parity bits, start and stop bits accordingly.
- c. Properties are set, it displays no. of passengers and when location tracking switch pressed, it gets the location as latitude and longitude values on the main page.
- d. Then, run the main project on run on server and then finish by selecting Tomcatv8.0 Server at local host and opens the application page on browser.
- e. At home page, searching options are provide for bus and Google map displays the bus details.

V. CONCLUSION:

The system will be designed is secure and smart assisted public system. The implementation of the system is to be done for bus. A system prototype is developed for testing of three sensors i.e. accelerometer, bus fail switch and PIR sensors. As emergency switch, bus fail switch and accident detection is added the system becomes secure. The system is smart and advanced as it has various features of alcohol detection, GPS tracking etc.

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