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A Seminar Report On

**“An Android Application for School Bus Tracking and
Student Monitoring System”**

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Certificate

Certifies that the seminar work titled “**An Android Application for School Bus Tracking and Student Monitoring System**” is a work carried out by **Shriesha Shridhar Nasik** bearing **4NI17IS077** in partial fulfilment for the requirements of the sixth semester BE in Information Science & Engineering prescribed by The National Institute Of Engineering, Autonomous Institution under Vishvesvaraya Technological University, Belagavi, It is certified that all correction / suggestions indicated for Internal Assessment have been incorporated. The Seminar report has been approved as it satisfies the academic requirements in respect of the seminar work prescribed for the sixth semester.

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(Ms. Monika Nag K J)

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(Dr. P Devaki)

Signature of Principal
(Dr. Rohini Nagapadma)

ABSTRACT

Application Development and Usage has been Important now a days. For Using any Smart Phones we require an Application that handles Operations. The BUS TRACKING AND STUDENT MONITORING SYSTEM is a mobile application that ensure security to the students. The main objective of this application is to build a vehicle monitoring system for school children. Nowadays, parents are perturbed about children going to school because of the increasing number of cases of missing students. On certain occasions, students need to wait a much longer time for arrival of their school bus; our proposed system provides a technical solution for the above scenario. The system consists of an Internet enabled android application which will interact with a server. Authentication, attendance monitoring, vehicle tracking are the other features provided by the system. Driver, Faculty/Teachers, Parents, and Administrators are the end users of the application. The application uses wireless technologies like GPS, GPRS and GSM. With this Android application parents can watch all the movements of the bus and monitor their child's presence.

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CHAPTER 1

INTRODUCTION

Today, the area of Android Development is getting its immense Important. They area Developing at a faster rate and it is widely used. So by the usage of Technology we may provide solutions to some problems. Nowadays parents are worried about the safety of their children. There are a lot of issues like kidnapping children on their way home, or from home when they are sleeping or any other scenarios. Recent studies show that India is in 4th place in the number of child missing case. Nowadays, even the bus getting delayed due to a small reason makes the parents bothered about it. But today's technology can provide a much better solution to ensure the children's safety. To track and monitor their children.

The proposed system provides an Android based bus tracking system. Which uses different technologies to develop the System . Inside the vehicle there would be a teacher/faculty who would be in charge of the vehicle and he/she would also be in charge of taking the student's attendance. As soon as it is taken, parents would be notified if their child has boarded the bus or not. The GPS in the driver's mobile is used to track the vehicle. Once the vehicle starts to move the parents can view the live feed in their application with the help of Google Maps. This helps them keep updated about all the issues on the way and plan their work accordingly. Each and every updates are notified to the parents as soon as possible.

So by developing this Application we may overcome issues that Parents are facing and helps to keep their children safe

CHAPTER 2

LITERATURE SURVEY

- Leeza Singla and Parteek Bhatia have explained about the normal Bus tracking system using GPS , GPRS,LED and RFID.
- Sumit S. Dukare, Dattatray A. Patil and Kantilal P. Rane have Discussed about Vehicle tracking, Monitoring and Alerting using GSM and RFID.
- Jisha R.C, Aiswarya Jyothindranath, and Sajitha Kumary L have explained about IOT based School Bus tracking and arrival time prediction.

CHAPTER 3

RELATED WORK

In this section different techniques and different technologies being used to build Application is discussed over here.

- This Application uses Radio-frequency identification(RFID) method that uses Transponder like transmitter and receiver to get location details. But here we are using GPS connection and Mobile devices will be acting as transmitter and receiver.
- For predicting the arrival time we are using Kalmann filtering method which uses linear quadratic estimation.
- It uses GPS and GPRS which makes System cost effective.
- The system allows a user to view the present and the past positions recorded of a target object on Google Map through the internet.
- Here Expectation Maximization algorithm is used to resolve traffic anomalies and it uses Hadoop map reduce method. Traffic anomalies like deviation from normal traffic and flooding of UDP packets.

CHAPTER 4

PROPOSED WORK

In this section we will be discussing about working of the Application, Who all are the users, storing and accessing of data establishment of communication between the devices and finally tracking and monitoring.

Here working is divided into three set of layers as shown in the below figure

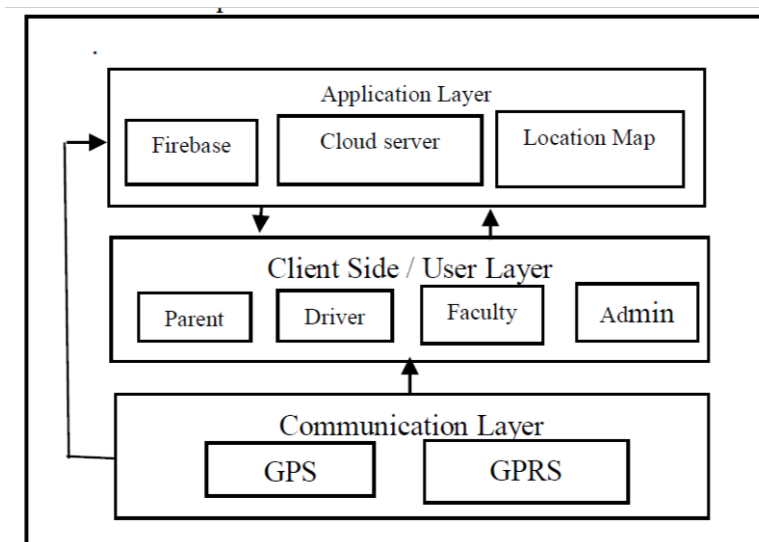


Fig 1

- **Communication Layer:** This layer has two things ie GPS and GPRS. This layer is mainly used to establish connection between Client side/User layer and Application layer.
 - **GPS:** Global Positioning System is used to locate or track the devices. It is the most efficient and accurate method for tracking devices
 - **GPRS:** General Packet Radio Service is a wireless service. It is being used for exchange of data between different devices and it makes sure that mobile will be connected to the internet.

- **Client / User Layer :** This layer involves around exchanging and collecting of information data from the different users.
 - **Faculty:** They are the one who will be taking the responsibility inside the bus. Once student has boarded they will take the Attendance of to and fro Journey. After taking attendance it is been sent to cloud server and it is stored there.
 - **Driver:** He is the one who initiates the system. Once he starts the bus the location starts transmitting from his device. It is sent to Firebase and it is stored.
 - **Parents:** He/she can constantly watch over his child on his/her way to school and back home. They can watch all the small moves that the bus makes and can check if their child has boarded the bus or has gone missing or did he/she bunked the bus. They can access the database that is stored in cloud server.
 - **Administrator:** He/she is the responsible for the management of all users, vehicles and routes in the system. They are the one who overseas the operation of the system.
- **Application Layer:** This layer consists of back end operations. Basically Storing of Data and information in a Database.
 - **Firebase:** It is the platform developed by Google. It is used to integrate with Android Applications. It is being used for many purposes like Analytics, Authentication, Database, Storage etc. In this System we are using it for Storing GPS location in a real time Database.
 - **Cloud Server:** A server is used to store the details of the users and all the information about the buses, routes and attendance of the children. So that parents can access these Information.
 - **Location Map:** It is shown in parent's device using Google Maps API. Once a change in location, data is found in the Firebase the same will be updated in the Map

CHAPTER 5

ALGORITHMS

This section contains the various algorithms in different user's / server Devices. The code will capture vehicles position and send it to Firebase cloud database. There are four different modules or steps been discussed here.

A. Starting Journey in the Driver Module

Input: Login Credentials of the Driver.

Output: Live GPS location of the vehicle

1. Login to Driver Portal
2. Click on "Start Journey" once it is time to leave the school.
3. Read Latitude and Longitude of the device from GPS.
4. Google Map loads showing the vehicle's location.
5. Start sending the location data to Firebase until the destination is reached.

The driver is responsible to enable this System using his login credentials. Once he is logged in, GPS connection will start and stores the location at every time in the Firebase.

B. Taking Attendance in the Faculty Module

Input: Login Credentials of the Faculty.

Output: Attendance list of the children in the vehicle.

1. Login to Faculty Portal.
2. Click on "Take Attendance" once the vehicle leaves the school.
3. Mark the set of students that are present in the bus.
4. The final data is sent to the cloud server.

The attendance module will capture the attendance of the students in the bus with time and send to the cloud server for further processing. Faculties are the one who are responsible for this. Their credentials are required for this module. The below figure shows the GUI of Attendance Page.

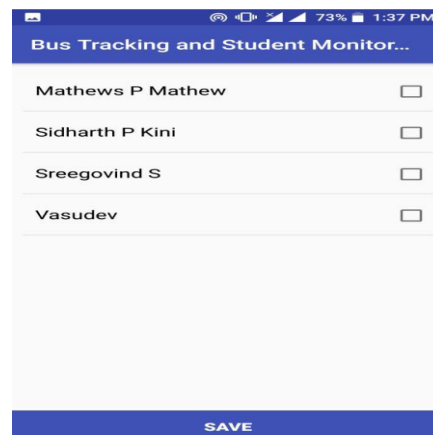


Fig 2

C. Tracking Bus in the Parent Module

Input: Login Credentials of the Parent.

Output: Live location of the vehicle.

1. Login to Parent Portal.
2. Click on “Track bus” to see the current location of the bus.
3. Fetch data from Firebase for every changes that occurs.
4. Plot the data in Google Map.

Here login credentials of the Parents are required as they are the one who will be tracking. The above module or step is used to track the bus by parents. Whenever a route changes or delay in reaching, the intermediate stops will be recorded and it is stored in the firebase cloud server and plotting of the data is done on Google Map.

The below figure shows the location in the Google Map.



Fig 3

D. Viewing Attendance in the Parent Module

Input: Login Credentials of the Parent.

Output: Status of their child.

1. Login to Parent Portal.
2. Click on “View Attendance” to see if the child has boarded the bus.
3. Fetch data from server.
4. View/Show the attendance status.

Here also credentials of parents are required. The above Module or step will allow the parents to view the attendance of their ward and hence they can ensure the security of their child.

CHAPTER 6

RESULTS

With using of four different modules we were able to develop Android Application that can be used for children safety. Opening GUI of the Parents Application is shown in the below figure.



Fig 4

- The Programming and XML code is Developed using Android Studio which is developed by the Google.
- The Webserver being used here is XAMPP. The below figure shows the Control Panel for XAMPP server.

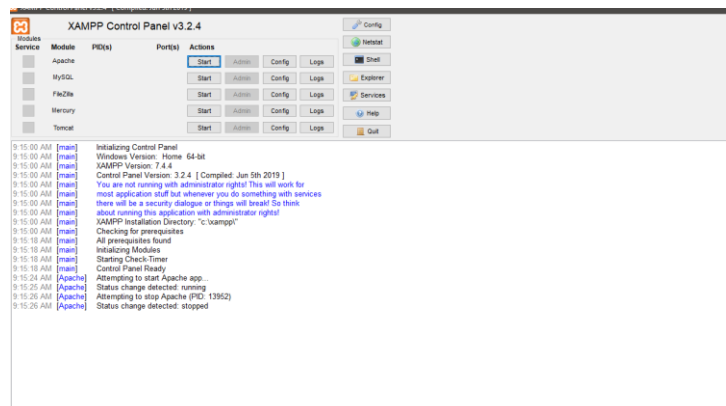


Fig 5

- For storing of Data and Information the Databases used here are phpmyadmin and Firebase. Below figure shows the working window of phpmyadmin.

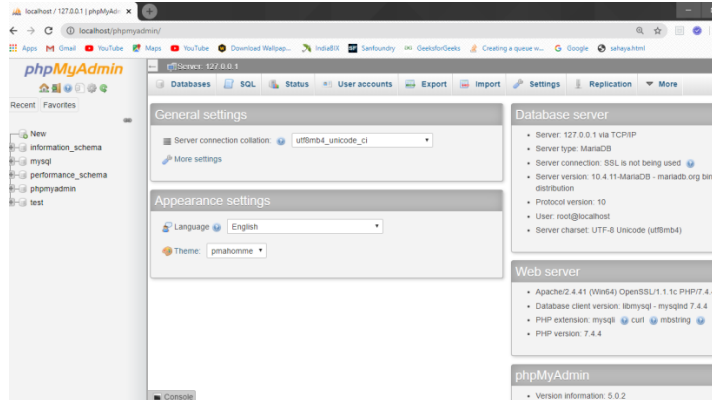


Fig 6

As said earlier the development of this system contains two phases one is Attendance Monitoring and the other is Vehicle tracking both the phases will be working while using and providing safety for children.

CONCLUSION

Finally Android application for school bus tracking and to monitor children will be developed using all modules which are specified. Here we have opted for cost effective way ie by the usage of GPS, GPRS, Firebase and Smartphone. But nowadays there is no problem related to Smartphone usage as they are common in day to day life. This may not be more efficient as it depends on the speed of the mobile and the connectivity of the GPS. But today everybody is having high speed internet connection and almost all are having latest Smartphones hence it may not be any problem. With the help of this application parents need not worry about their child. This would be a great relief for the parents who are really worried about their child's safety. This idea can further be enhanced using IOT(Internet of Things) and Image Recognition Techniques.

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