

SMART ASSISTANCE PUBLIC TRANSPORT SYSTEM

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ABSTRACT

Present paper is an attempt to provide research knowledge found during experimentation on public city bus transportation system in India. The paper discusses and reviews the major transportation problems associated with city bus transportation in various cities of India. A special hardware and software has been designed to solve these problems. The motto behind this research was to create a system that is easy to assist the transportation system and that can be adaptable to user-friendly smart phones. The solution provided here is cost-effective as per the data obtained states.

INTRODUCTION

India is a developing country and the transportation plays an important role in the development of any nation. Indian transportation system is a mammoth as per its size is concerned. The public transportation system in particular is always very much under pressure due to population and other factors associated with it. Basic methodology of GPS/GSM is used. That can be better understood with the help of following diagram.

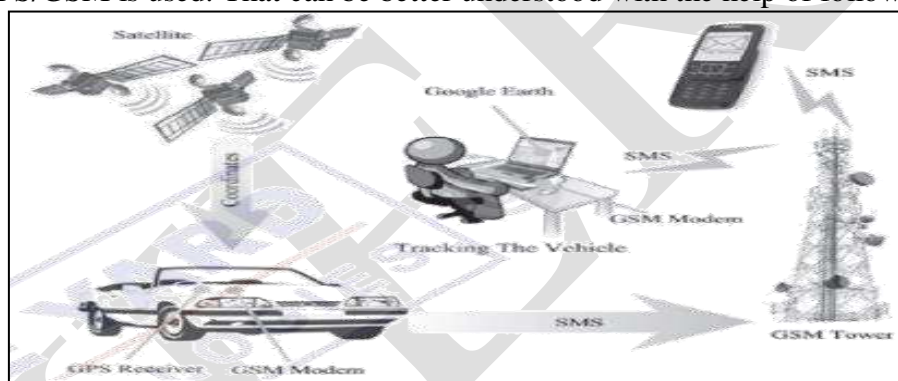


Figure 1: Basic idea for system

LITERATURE SURVEY

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

1. Vehicle terminal system to obtain continuous monitoring of logistics. Experimental results indicated that the integration of wireless technologies can enhance the reliability of the system, which further improve the accuracy and efficiency of logistics management. Implementation proved to be very effective in providing security for the goods and also ensures the safety and delivery of goods to respective enterprises.
2. Developed an experimental setup for the prototype implementation using RFID. The results showed that the choice of integrated technologies used in the system is suitable to monitor and manage a vehicle transportation system. The intelligence implemented in the bus monitoring system can be achieved by compiling and feeding all the proposed theories and algorithms for RFID and other sensing technologies into the system. Results also showed that the system is intelligent enough and able to provide important information to the authorities for monitoring and management of the bus system.
5. The driver's condition in real time environment and proposed the detection of alcohol using alcohol detector connected to Arduino such that when the level of alcohol crosses a permissible limit, the vehicle ignition system will turn off and the GPS module will capture the present location of the vehicle. Also the GSM module will automatically send distress message to police.
8. Demonstrated that by using a real-life test deployment in an office building, we obtained performance figures for our sensor prototypes. The results confirmed our approach to direction detection and thus the

potential for people counting per office space. Subsequently we used empirically obtained PIR sensor characteristics to explore the performance of two people count estimation algorithms in an office floor simulation. Our simulations confirmed that the probabilistic distance-based algorithm can outperform a more simple direction-based counting. Our people counting approach could be applied in any (office) building including larger open office spaces, where subspaces can be defined using virtual gateways. The estimated people count per building space is a key information to dynamically control building systems related to HVAC and lighting.

DEVELOPMENT OF NEW SYSTEM

This system is designed for single vehicle as shown in Figure.1. This system consist of ARM cortex, GPS/GSM modem, DC motor, Switches, PIR sensor and a smart phone. The microprocessor based embedded system gives many different features such as high performance, cost sensitive, architectural simplicity and low power consumption.

BASIC BLOCK DIAGRAM FOR SYSTEM

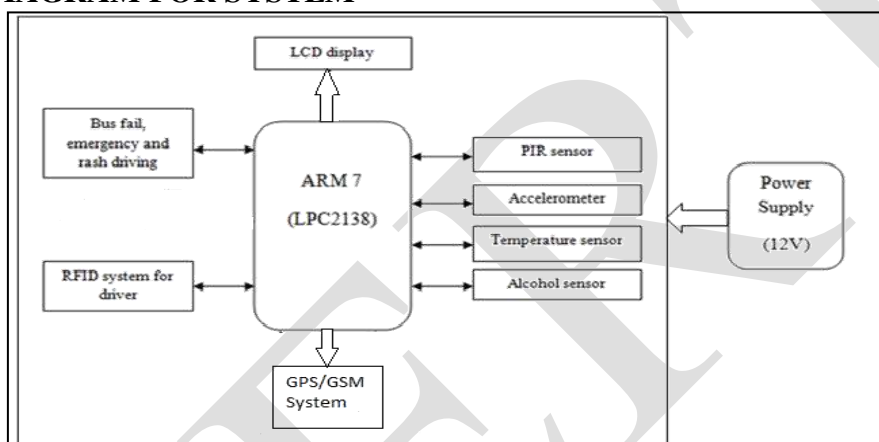


Figure 1 Functional diagram for Smart Public Transport System

3.1 HARDWARE AND SOFTWARE DESIGN PCB DESIGNING

- Dip trace complete PCB design system
 - PCB Layout - PCB design with easy to use manual routing tools and auto router.
 - Schematic - creates schematic and exports net list to PCB.
 - COM Edit - pattern editor.
 - Schematic Editor - component editor. Draw parts and attach patterns to them.

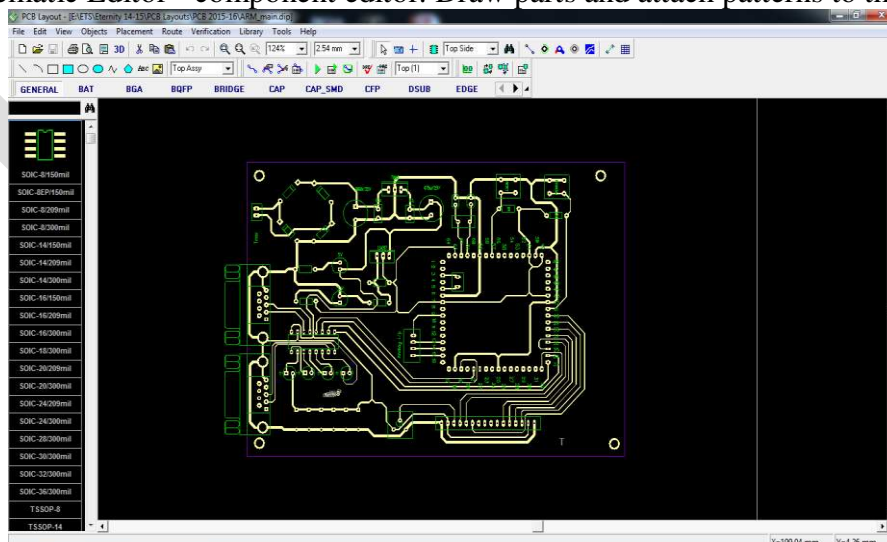


Figure 2 ARM PCB design for the system on dip trace

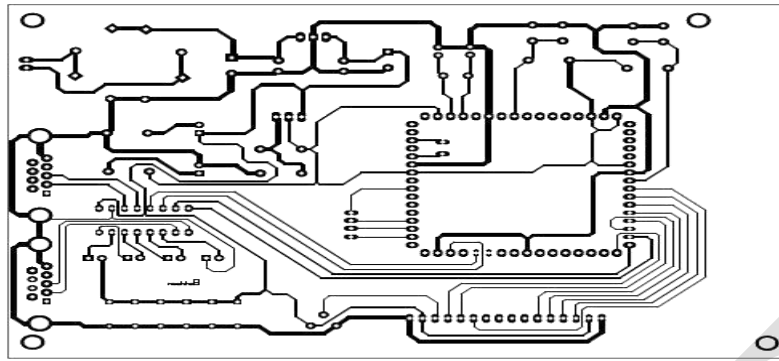


Figure 3 PCB design layout of system

• **Dip Trace provides the following features:**

- **Easy to learn user interface**

To design a schematic, simply select and place components onto your document and connect them together using the wire and bus tools. Multisheet design is supported. Then select the menu option 'Switch to Board' to convert the schematic to PCB. Layout can be updated from Schematic in a few clicks at any time. When you create or edit design objects they are highlighted to improve your work. Step-by-step tutorial available from web-site guides you through the design process and allows to get started with ease.

- **Easy to use manual and powerful automatic routing**

Dip Trace PCB software includes an advanced automatic router that is able to route single-layer and multi-layer boards. It is available with a 'rip-up and retry' algorithm. Auto router achieves high completion rates by going back and re-routing nets to make space for connections that could not be routed on a previous pass. Intelligent manual routing tools allow you to create and edit traces by 90, 45 degree or without any limitations. Through, blind or buried wires can be used in automatic and manual routing. Unlimited board size is supported.

HARDWARE DEVELOPMENT

• **Schematic Design**

The design is been developed in Dip trace 3.0.

- Schematic design: By using Dip trace 3.0. Schematic for system is been developed and it's the first step for circuit diagram evolution.

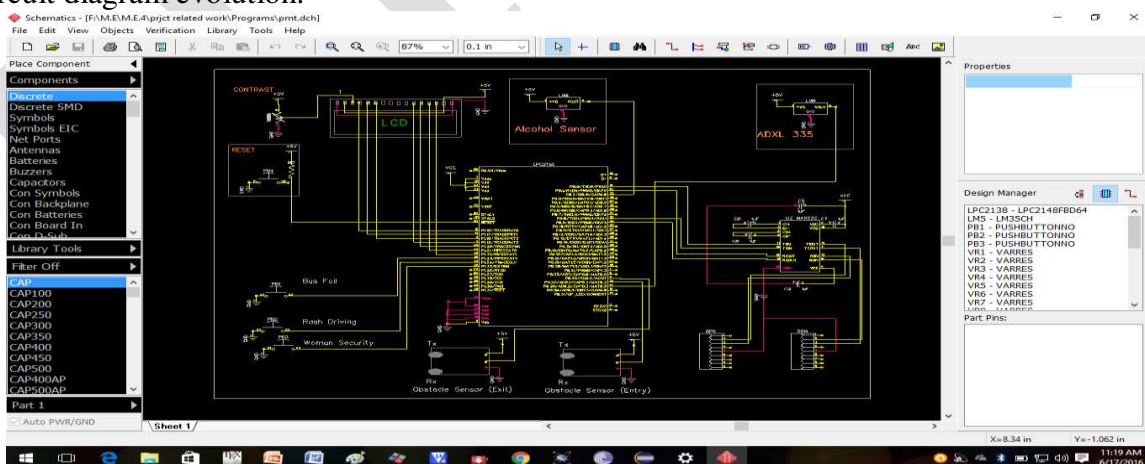


Figure 4 Dip trace environment for circuit diagram.

SYSTEM FLOW

ALGORITHM FOR SYSTEM EXECUTION

- Setup for prototype:
 1. Hardware prototype to be connected with adapter.
 2. Antenna to be connected with GPS unit and free the antenna in free sky.

3. Connect the prototype with laptop.
4. Open the Java IDE setup.

4.2 SOFTWARE DEVELOPMENT

JAVA IDE: Eclipse (Luna): This platform is used to develop the Main Page for serial port interference between the system and the smart app. The language used to develop the code is Core Java and then the Web Page contents are developed using Advanced Java.

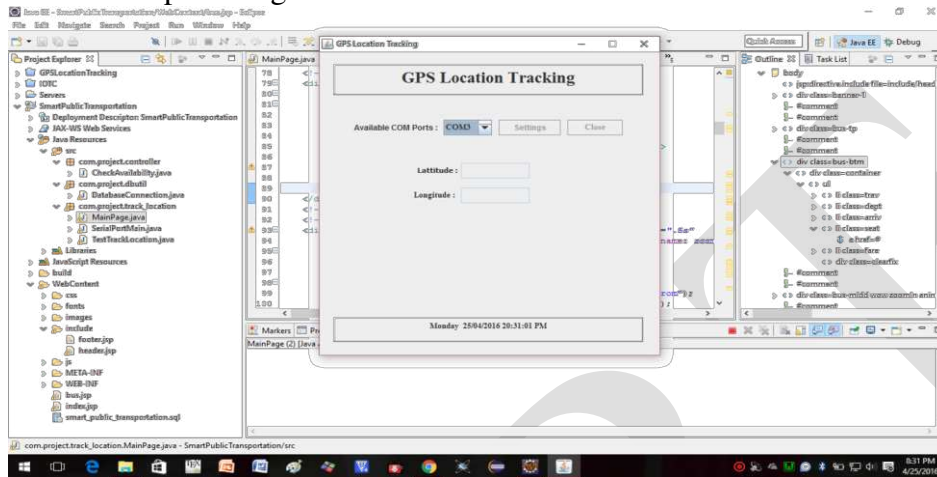


Figure 7 Serial port interference and setting on JAVA IDE.

- **MySQL v1.2.17:** This platform is used to develop database for the system. All the bus details and bus related data is created and edited using MySQL. The language used for database creation is SQL.

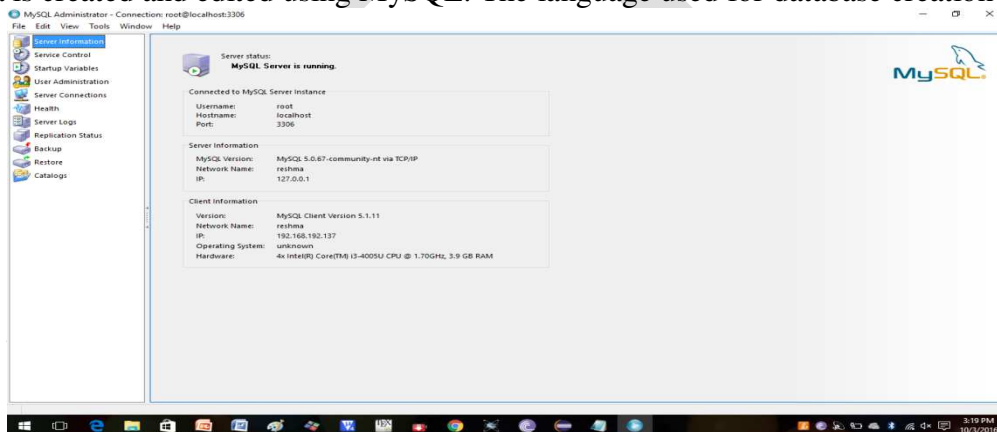


Figure 8 Data base creation on MySQL

4.3 SOFTWARE SYSTEM FLOW

Algorithm for software demonstration:

1. Open the Eclipse Luna (Java IDE).
2. Select the main page and run as java application. Then, select com port to which system is connected through USB port.
3. set all the properties i.e. baud rate, parity bits, start and stop bits accordingly.
4. As soon as properties are set, it displays no. of persons available and when location tracking switch pressed, it gets the location as latitude and longitude values on the main page.
5. Then, run the main project on run on server and then finish by selecting Tomcat v8.0 Server at local host.
6. Then, the application page on browser opens.
7. At homepage, search options are provided for bus searching.
8. When searched for bus, it displays the bus details and location to track the bus.
9. If track pressed, then on Google map displays the current real-time location of the bus.

HARDWARE AND SOFTWARE SET UP WITH RESULTS

Top view of system prototype module is as shown in Figure. Here some results of system are shown below. The other safety messages like bus fail, rash driving, alcohol detection, etc are displayed on LCD and SMS acknowledgement is sent via GPS/GSM system as shown below. Also, result of online app designed for system is also shown.



Figure 10 Top view of hardware set up

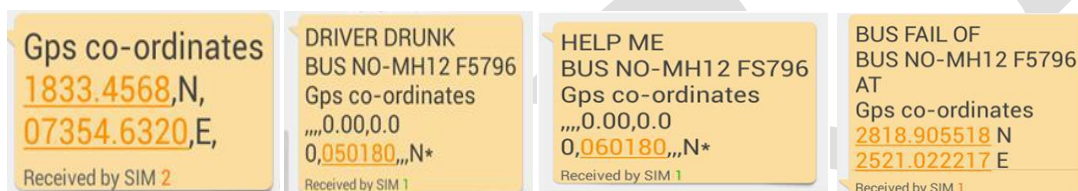


Figure 11 GSM results of the system through message on registered number

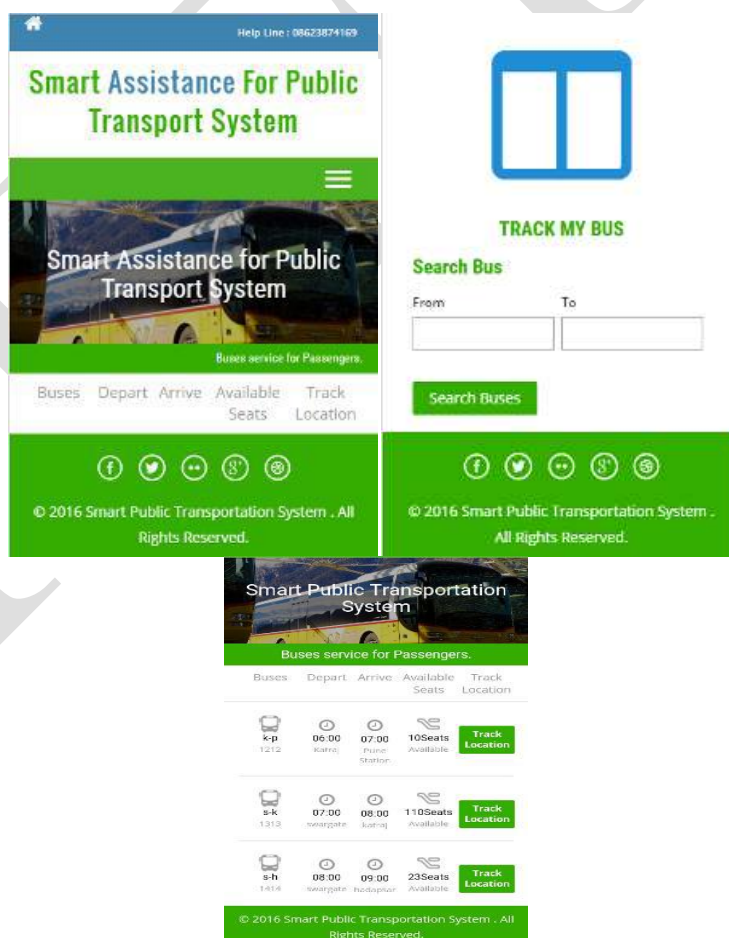


Figure 12 GUI of user application for system.



Figure 13. Location tracking of system on smart app designed for Public.

CONCLUSION

The system designed is here in this particular project is secure and smartly assisted for public. The results for tracking of the system through GPS/GSM acknowledgement are taken at real-time.

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