

# Advanced Transport Management System

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**Abstract:** Many people go to their workplace by bus, train (public transportation), etc. While travelling from public transportation the problem of heavy traffic or waiting time for the bus for a longer time may occur. Even though the bus's arrival and departure time are schedule, but we can't assure that the bus will always come on time. Hence to overcome the problem of time loss because of waiting at the bus stops, we implemented the smart tracking system. In this project, any passenger who is having Android app can have access to the bus. The passenger can register and sign up to receive information about desired bus arrival times for the interested buses and related routes via SMS/map. Even passenger can book the ticket as well as seat through Android app.

**Keyword:** *Arduino mega, Mobile App, GSM, GPS.*

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## I. INTRODUCTION

Public transportation has become a very important aspect now a days. Most of the people use public transport to go to their school, colleges, clinic, offices, etc. [1]Public transport is very economical way of travelling. Public transportation is cheaper than travelling through private car. But as population is increasing day by day, the problem of travelling from public transportation has become a sever problem. The problems of travelling is not only the population but also the crowd, huge traffic and hence delay in arrival time of buses, trains, etc. So passengers have to waste their time while waiting for the bus on the bus stops because they don't know the exact arrival time of the bus. Even though there is fix schedule of bus arrival times, buses may get late due to heavy traffic.

So to avoid the waiting time for the bus, there is a solution that real time tracking of bus. [2]So a systematic tracking system is required to find out the current location of a bus and the dynamic arrival time. For best tracking result, GPS and GSM technology can be used. The GPS and GSM based system can provide all specifications that are necessary for tracking a vehicle. The waiting time of the user can be reduced.[3]Furthermore, public transportation has good accessibility in big cities, making it easier to travel to anywhereof the city, making buses a favorable option to opt for. It provides personal mobility and freedom for people from every walk of life.

Most major transport systems now present route and schedule information through Google Transit, and small transit systems are also moving in this direction. Many transport systems are also now making their Google Transit available for use in the development of third party smart phone applications [4].

If we look in terms of delivering service information, our study is included in the last way. Real-time vehicle tracking and management system has been the focus of many researchers, and several studies have been done in this area. Verma and Bhatia [5] stated in their study that GPS could be used in many applications and it is possible to follow routes and locations driven a vehicle by means of GPS. They develop a web based system presenting vehicles' locations to the user.

Gong et al. [6] improved approach to predict the public bus arrival time based on historical and real-time GPS data. After analyzing the components of bus arrival time systematically, the bus arrival time and dwell time at previous stops are chosen as the main input variables of the prediction model. They concluded that their model outperforms the historical data based model in terms of prediction accuracy.

Guo et al. [7] integrated the Victoria Regional Transit System with appropriate communication technologies to develop a corresponding Smartphone application. In this smart bus system, users can access real-time passenger information such as schedules, trip planners, bus capacity estimates, bike rack availability and bus stop locations, via Smartphone, on computers and at bus stops.

El-Medany et al. [8] supposed cost effective real time tracking system that provides accurate localizations of the tracked vehicle by using GPS and GPRS modules. By means of GPS receiver, proposed system has ability of tracking current position of the vehicle in any specific time. They tested efficiency of the system in different areas on Kingdom of Bahrain using Google maps. There are relevant works not only highway transit systems, but also other tracking systems for ships, flights trains, and etc.

The National Rail Enquiries train timetable site [9] shows all trains currently on approach to a particular station. Trains and

stations are shown in different colours. Trains move in approximately real time, or rather quicker if user checks the speed-up box.

In this project, we proposed a location-aware smart bus stop system that any passenger with a smart phone or mobile device can catch bus at bus stops to view bus arrival times, and buses current locations on the app. GPS is used for displaying current locations of buses on the maps, together with the related route information.

## II. PROBLEM STATEMENT

To implement wireless technology for buses & users, also to have proper and systematic seating arrangement.

## III. WORKING PRINCIPLE OF GSM

GSM module is used to establish communication between a computer and a GSM-system. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. GSM module consists of a GSM modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer. GSM MODEM is a class of wireless MODEM devices that are designed for communication of a computer with the GSM and GPRS network. It requires a SIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network. Also they have IMEI (International Mobile Equipment Identity) number similar to mobile phones for their identification. A GSM/GPRS MODEM can perform the following operations:

1. Receive, send or delete SMS messages in a SIM.
2. Read, add, search phonebook entries of the SIM.
3. Make, Receive, or reject a voice call.

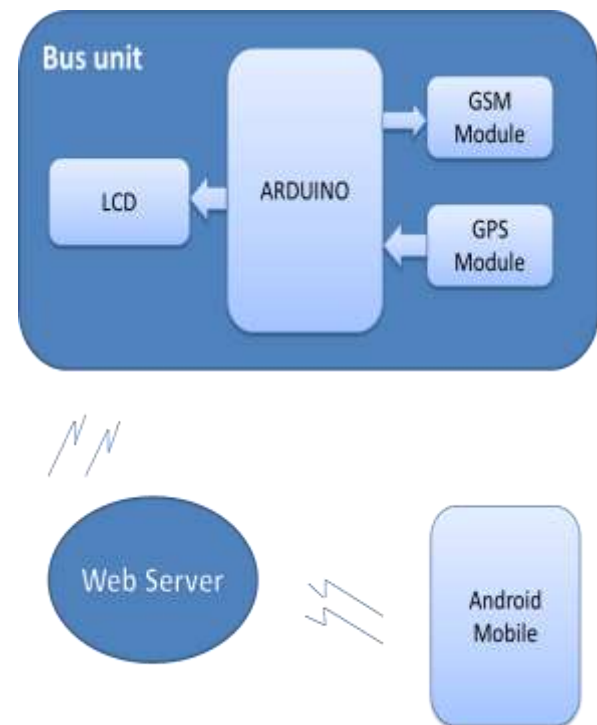
The MODEM needs AT commands, for interacting with processor or controller, which are communicated through serial communication. These commands are sent by the controller/processor. The MODEM sends back a result after it receives a command. Different AT commands supported by the MODEM can be sent by the processor/controller/computer to interact with the GSM and GPRS cellular network.

## IV. WORKING PRINCIPLE OF GPS

The users can get flexibility of planning travel using the app, to decide on which bus to take or when to catch the bus. The waiting time of the user can be reduced. Simple mode of communication is the key feature of the Bus Tracking

system. This application can be easily extended for central tracking system to keep track of all the public vehicles. The different queries and efficient route management can be easily done through central server system.

## V. BLOCK DIAGRAM



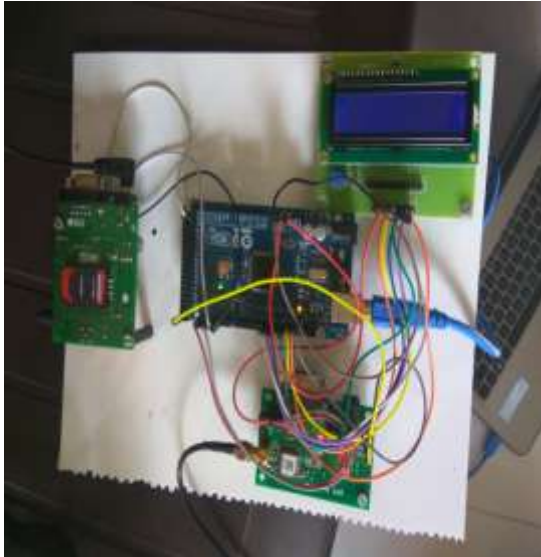
## VI. METHODOLOGY

The block diagram of the Advanced Transport Management System is shown in the above figure. The bus unit contains Arduino microcontroller, GPS, GSM and LCD. By using these components, requesting user gets the current location of bus. By using GPS Module microcontroller receives the longitude and latitude of bus unit. Then by using GSM Module Arduino sends the current location of the bus to user. Also bus location will be shown on the LCD Display. User with the designed android application register and login to the application. Request the server for particular bus by entering the source and destination. According to that source and destination user will get current location of that particular bus on GPS map. Also this information will be saved in SQL database.

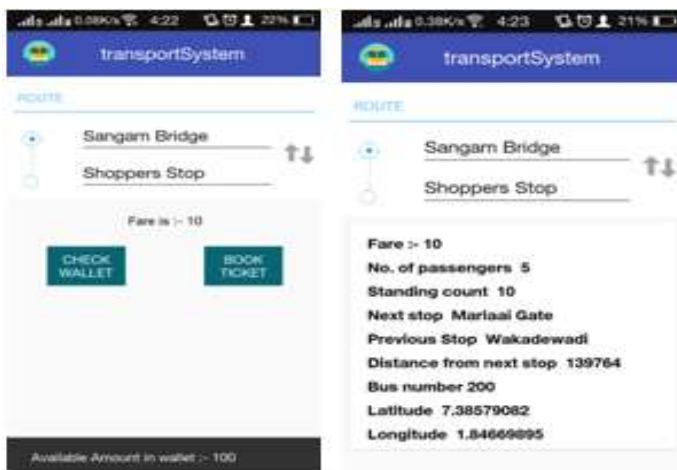
Now as user get the current location of bus it checks the user wallet, where user have saved the money in account that is user wallet. Then if user having balance it will book ticket otherwise user have to refill the wallet then book ticket. At the time of ticket booking user will have one more facility that is to select the seat number where user is interested to

seat. Then as user latitude and longitude matches with the bus's latitude and longitude then only the booked seat get free. So that another user can apply for the same seat.

## VII. RESULTS:



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