



## Internet of Things(IoT)Based Real Time Bus Monitoring and Passenger Information System

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**Abstract** —Term IOT was introduced way back in 1996 and it has become popular at present. IOT refers as system of omnipresent sensors connecting the physical world to the internet. Core components of IOT are things, Internet, and connectivity. It is a self-reinforcing system which fills the gap between physical and digital world. The research on IOT has become immense in field such as Home automation, Healthcare, Insurance. The aim of the project is to implement IOT in Bus transporting system. Based on IOT System will be implemented in two parts-web and android. There will be two Android application one for Passenger and other for Conductor/Driver. Web part will be handled by Administrator. Our research has helped us to implement an app which will provide exact arrival time of bus, count of passengers in the bus. Passenger will be able to issue the tickets and physically challenged people can make request for the seats. Using this app Passenger will have the flexibility of planning travel, to decide whether to catch bus or not. This research has also helped us to gain the knowledge in IOT field and helped us to understand the various features that can be implemented in existing system. There is a lot of future scope for it to be built upon when limitation will be realized.

**Keywords-** Android; Internet of Things IoT; Application; Ticket; GPS; Chat; Notification; Passenger; Driver; Conductor

### I. INTRODUCTION

In our day-to day life we make use of the public transport one of this is BEST buses but the problems which we face during traveling using public transport is the arrival time of the buses, availability of the seat in the bus and also we should have the change along with us for ticket. All of this problem which is been faced by the people during traveling can be solved by using the single application which will solve all the problems in public transport. With the help of the Global Positioning Technology (GPS) and Estimated Time Arrival (ETA) algorithm we can locate the position of the bus and estimated arrival time of the bus. By knowing the arrival time of the bus and location of the bus the user can decide his/her further journey based on the availability of the time with them. Providing the ticketing facility will help the user to go cashless and the issues of having change for ticket will be solved. Our goal is to make the public transport more convenient and increase the number of people using the public transport this will indirectly make the pollution less because there will be less number of people using the individual vehicle for traveling. If people are facing any problem during traveling such as traffic, accident etc then they can post about this information in the chatting interface and inform other traveler about the issue.

### II. EXISTING SYSTEM

Most of the countries use public transportation for traveling and people want that public transportation must be scheduled properly and timely and the frequency should be increased to make the transportation easier for the user there have been lots of efforts being taken in this area by making use of the RFID technology for tracking the passengers. In addition to this using GPS for tracking the bus is also researched and displaying the arrival time of the bus and current location of the bus on each bus stop on the LCD screens. There is mobile bus tracking system for the Jamaican Urban Transport Corporation as proposed system which allows users for tracking the bus of their choice and also knowing their estimated arrival time. In addition, the existing system also notifies the passengers on their mobile towards topping up of credit in their RFID enabled smart tickets for traveling. The system has been decided to be working on the android mobile handset which will provide the location and estimated arrival time on the screen of the android phones. Along with that user been reminded on their Android mobile handset towards topping their credit on their ticket towards travelling. The above

two features of the system will reduce the challenges faced by user in respect of referring to the static bus timetable or looking into LCD display screen which would inform the expected arrival time of the next bus. The implementation of the system has been carried out using Android emulator and Java and the mobile application is developed.

### **III. PROPOSED SYSTEM**

Our system provides the relevant information regarding all the bus numbers going from users source & destination along with the route details , real time location ,ticket and pass issuing/renewal and count of passenger travelling in the bus . Generally our system is operated by GPS enabled mobile device which is situated within the bus. Firstly GPS receives the satellite signals and then the position co-ordinates with latitude and longitude are determined by it. The location is determined with the help of GPS and transmission mechanism. After receiving the data the tracking data can be transmitted using any wireless communications systems to the central unit. GSM/GPRS is used generally to transmit the data. Generally remote user can access this information of a bus based on users source and destination. our proposed system gives the real time location of bus using Google Maps. Bus tracking technology is advantageous for tracking and monitoring a bus. If there is any vehicle breakdown or accidental event then user will be notified through the admin broadcasting procedure in the chatting interface.

Our System Aims to provide following functionality:

- To show the information of all the nearby buses by using current location of the users.
- To provide the facility where the physically challenged person can request for the seat in the bus if there is availability of the seat
- To make more accurate and constantly updated bus information to passenger.
- To create a system which consist of an application which will provide online ticketing facilities which will help the user to go cashless.

### **IV. DESIGN/ARCHITECTURE**

A. Architecture of the proposed system The proposed system has 3 modules

1. Driver module
2. Central control unit (Admin module)
3. Client -side application (User module)

#### **4.1. Driver module**

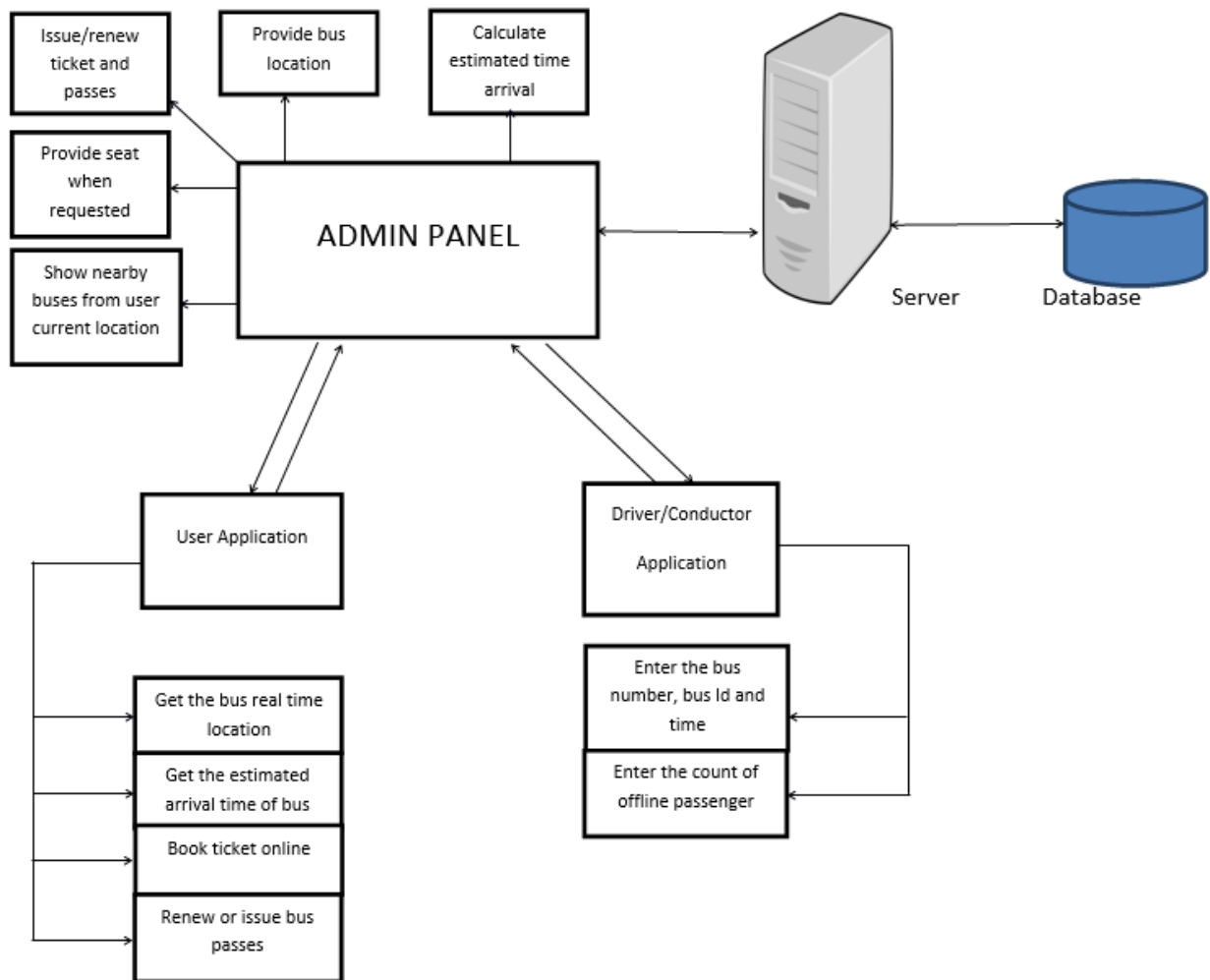
The bus is tracked by installing an application on location and internet service enabled mobile device located inside the bus by using Google maps and GPS we can locate the bus. GPS is one of the technologies that continuous to work in any weather of the year, anywhere in the world, 24\*7 hours of a day. For using the GPS technology there is no additional charges or set up required, one have to just have a GPS enabled device along with them to use the technology. Conductor has to enter and update the count of no. of passenger travelling offline at regular intervals Server is the intermediate between bus module and user module. This database consists of real time information about bus it includes bus routes, actual arrival time and real time location of bus. Server provides service to the client-side application by transmitting the information the admin module and it will provide required information to User module.

#### **4.2. Central control unit (Admin Module)**

Central control unit is nothing but admin module whose task is to upload all static information about bus i.e. to add stops, add routes, estimated arrival time of the bus, count of the passenger travelling etc to the database. Another task of the admin is to issue ticket and passes and renewing the passes. Whenever the user sends the request for a particular bus number to the Admin it will provide real time location of the bus on Google maps, count of the passenger traveling and arrival time of the bus. This part of the proposed system will also do the authentication and authorization process of the user.

#### 4. 3. Client -side application (User Module)

The user side module is nothing but an interactive web based application which services the various function of system to remote users. The user side module takes two inputs i.e. one is source which indicates where the remote user is now and second is destination which indicate where he/she wish to go. When user send a request the application fires a query to the server where the admin module comes into picture for accessing the information stored with the help of the driver and admin module in server database and gives the list of available buses according to remote users source and destination. Now it's user's task to select or choose particular bus number to know the real time location of bus or other information. After entering a particular bus number the application shows the real time location of that bus on Google map. This proposed system provides supports and interaction with various commuters to provide service to the user's requests. The system facilitates the real time tracking of bus. It will also provide the information of the all the nearby buses from the user current location so that it can decide its journey efficiently. When the user wants to book online ticket the user side module takes two inputs i.e. one is source and the second is destination. When user send a request the application fires a query to the admin module and it will calculate the fare and issue the ticket .Similar procedure is being followed for pass issuing and renewal.

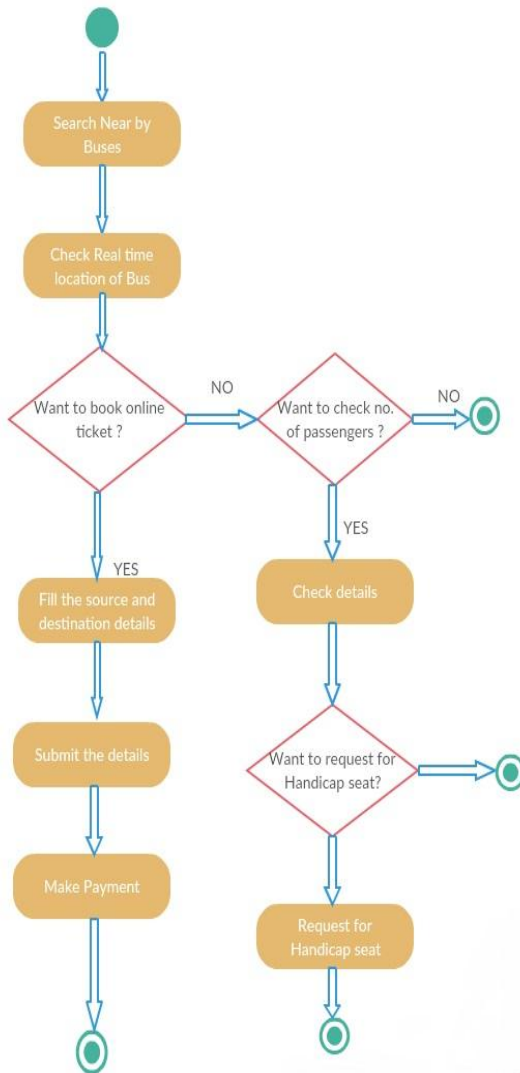


**Figure 1: Block Diagram of System**

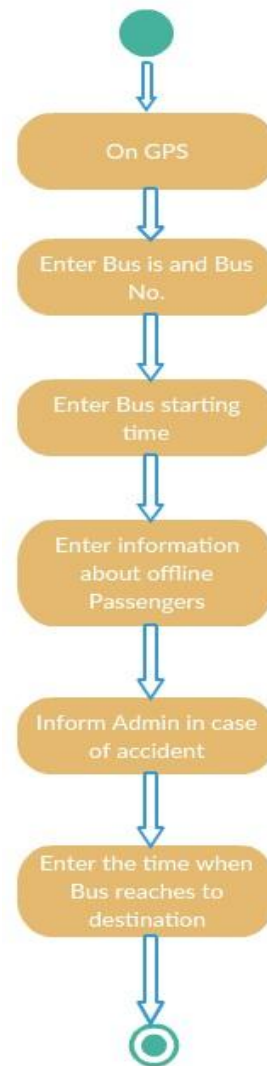
#### V. WORKING

Passenger will check nearby Buses and they will get the location of buses on google map API. The details of source and destination should be entered by the user in user application. Once all the correct details are submitted by the user ticket will be issued. Physically challenged person need to make request in order to get a seat. Once the request is made he/she will get a message as acknowledgement. He/she need to show this message to the conductor for getting intended seat. Passes can be issued and renewed through user application. Admin will receive all the information and request from

passengers and will function accordingly. In case of any emergency or accident people will be notified through the broadcast messages from admin.



**Figure 2:Flowchart of actions taken by user driver/conductor**

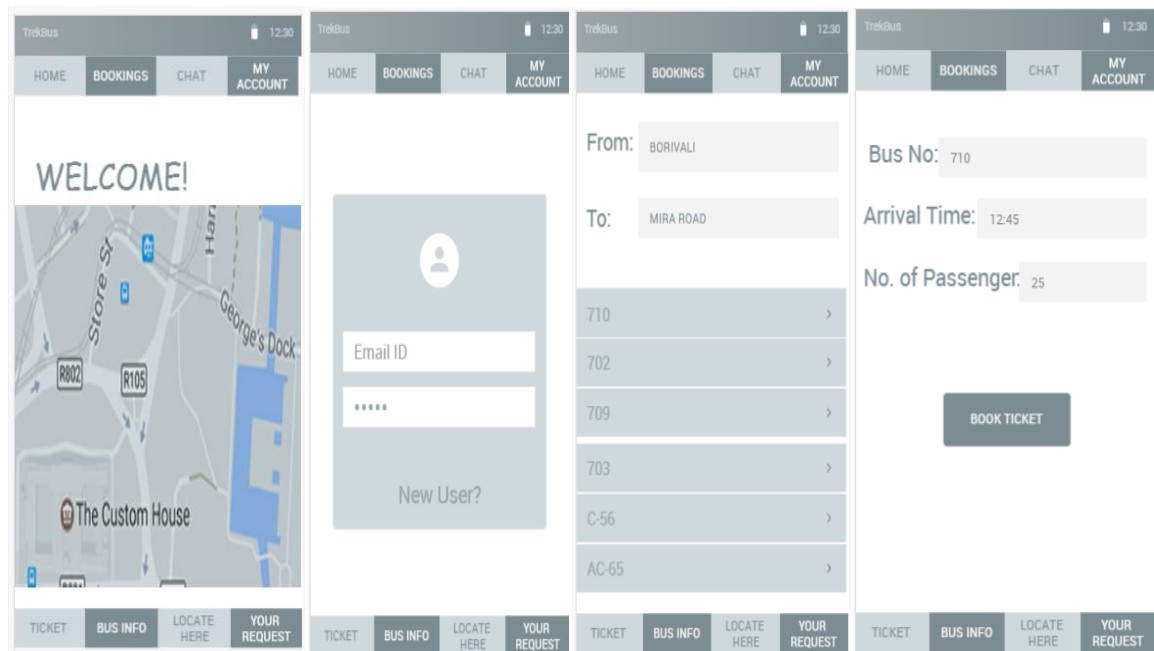


**Figure 3: Flowchart of actions taken by driver/conductor**

Second application will belong to Bus Driver/Conductor. Every driver need to login to system using unique Id provided him. As soon as he starts driving he need to turn on GPS and enter Bus Id, Bus no. and bus starting time. This information will be sent to the Admin. Driver/conductor should update the count of offline passengers. Using this count information and online ticket issued he will provide the total no. passengers traveling in bus to the user. Accidents will be reported to the admin and once Bus reaches destination Driver should enter the time in application.

## **VI. EXPERIMENTAL RESULT**

We tested our system by choosing the desired bus no. it is showing the location of buses on Google map. We checked the functionality of issuing ticket as shown in below snapshots from source Borivali to Mira Road and system is successful in issuing tickets. While clicking on a particular Bus no. it is showing arrival time and No. of Passengers travelling in Bus. The system worked well and keeping in mind various parameter, the passenger application, Driver Application and Admin module was successfully tried and tested. Also Admin is able to broadcast messages.



**Figure 4: Snapshots of the app**

## VII. CONCLUSION

With “IoT based Real Time Bus Location and Passenger Information System” we tried to make a system which integrates various functionality such as location of bus, Arrival time, Ticket issue, Pass issue and renew, Count of passengers which indirectly indicates availability of seats in the bus. This application is beneficial for physically challenged person. Using this application passenger can decide whether they should board the bus or not based on its arrival time and availability of seats.

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