

DESIGN AND IMPLEMENTATION OF BUS TRANSPORTATION SYSTEM WITHOUT USING GPS

Subtitle : India_Statebus.com website for Bus Transportation System

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Abstract: The transportation in India fails to follow the scheduled timetable and puts the common man in to trouble. A person sitting inside a bus stop is unable to get the information where the bus has reached. These passengers often faces difficulty in taking the decision of whether it would be quicker to wait for the next bus or to walk or to hire a cab/rickshaw to reach his/her destination. Every day we see people going late to work, students late to their classes, just because they decide to wait for the bus instead of just using an alternate transportation .If passengers had an easy way to see which bus is near to their location and approximate time at what time bus reached the location, in real-time, they could make a more accurate, informed decision of whether or not to wait at a stop. The scope of this proposed web application is to build a system where a person inside the bus station or at any bus stop can get the information of the buses current position.

This web application provide a easy way to passenger to see which bus is near to their location and the location of bus which the passenger have selected. This proposed web application give real time bus location information to passenger or people who are waiting for bus ,in bus stand or in any bus stop without installing GPS device in bus. The bus real time location information is manually inserted and updated by bus conductor by using this web application.

IndexTerms – GIS,GPS, real-time,stochastic nature,Traffic Congestion,Transit attributes.

I. Introduction

In the daily operation of public bus transport systems, mainly that of buses, the movement of vehicles is affected by different uncertain conditions as the day progresses, such as traffic congestion, unexpected delays, randomness in passenger demand, irregular vehicle-dispatching times, and incidents. A variable message sign showing the showing the bus arrival time at bus stops could reduce the anxiety of passengers waiting for the bus. Disseminating arrival time information through other interfaces such as smart phone could make the public transit system more user-friendly and thus increase its competitiveness among various transportation modes[1].

The transportation in India fails to follow the scheduled timetable and puts the common man in to trouble. Persons who were sitting inside a bus stop waiting for bus were faced difficulty to get the information where the bus has reached and it at which location and when it will come to them. These passengers also faces difficulty in taking the decision of whether it would be quicker to wait for the next bus or to walk or to hire a cab/auto-rickshaw to reach his/her destination. Every day users can see people going late to work, students late to their classes, just because they decide to wait for the bus instead of just using an alternate transportation. If passengers will get an easy way to see which bus is near to their location and approximate time it would take to reach their stop, in real-time, they could make a more accurate, informed decision of whether or not to wait at a bus stop.

Now a days in most of the private bus transportation peoples were using GPS device which provides the real time bus location information to the passenger who were waiting for the bus. But most of the public bus transportation system or state buses not install the GPS device on their buses because of which the passenger who were waiting for the bus not get the information about the real time location of bus. In most state bus government not install GPS device because need to purchase GPS hardware and software, and need of expert to install GPS hardware & software,also the cost has to be incurred by them to have the device. So ,in this paper,the web based application is proposed to provide real time bus location to passenger without using or installing GPS device. The proposed web application is based on Database Management System(DBMS).

The proposed web application consisting of three modules, they are user module, conductor module, depot module (Admin module).

II. Objective

To reduce and remove the problem or difficulties which many passengers are facing that is often late to work, students are late for classes because they decide to wait for the bus instead of just simply using an alternate transportation.

To provide the information about bus failure or breakdown to Bus Depot (Admin) if the bus failed or breakdown when bus is on the way, and to save the money of government by not purchasing GPS hardware and software.

The main objective behind the proposed web application is to provide facility to people to know in which city or place the bus currently is, and to provide the bus real time location without installing & using GPS. Also the proposed application makes an attempt to eliminate the cost spent for purchasing GPS hardware and software and its maintenance.

III. Literature Survey

India's transport sector is large and diverse; it caters to the needs of 1.1 billion people. According to a World Bank report (2007), the transport sector contributed about 5.5 percent to India's GDP, with road transportation contributing the lion's share. Since the early 1990s, India's growing economy has witnessed a rise in demand for transport infrastructure and services. However, the sector has not been able to meet this growing demand. There is therefore, a need for alternative solutions to manage this demand [3].

India has traditionally boasted an extensive public transportation system, being the second largest producer of buses, accounting for 16 percent of world's total bus production. However, the share of public transportation in Indian cities has been on a steady decline over the last few decades due to, among other reasons, poor management of services [3].

In today's world public transport systems play an important role in the development of the country. Many factors such as mobility, environmental and energy objectives place demands on public transport systems. Current systems which are old and in need of upgrading, must expand service area, improve efficiency and increase service frequency to serve these demands of the public traveling through the improved transportation system [4].

In the way people move around their communities public transportation systems is the main problem which play an increasingly important role. It is a very cost effective mode of transport. Due to cause of heavy traffic and roadwork etc., most of the buses are delayed in time. At the bus terminus people have to wait for long time without even knowing when the bus will arrive. Anybody who want to use the public transportation system, can't find the time of arrival of particular bus at the particular destination even at their homes and plan their departure from home accordingly. But due to unexpected delays in traffic congestion the bus arrival time cannot be guaranteed [5].

For bus tracking many designs that have been proposed and implemented. In the case of implementation or in the case of the system design all proposed methods and implementations are unique. The real time bus monitoring system GPS module is installed on the buses for transmission of the real time location of bus to receiver boards which is installed on the bus stops. The centralized control unit gets the GPS data of the bus location and it activates LEDs in the approximate geographic positions of buses on the route [5].

An important reason for the non-preference of public transportation over private transport is the lack of information on actual bus arrival times. The stochastic nature of public transit attributes such as travel time, dwell time, demand, etc., often results in unpredictable waiting and ride times. Reports show that the passengers value information about the next bus arrival time as the highest (around 79.4%) followed by the schedule adherence (around 72%) [3].

Prediction of travel times is an important route to improve the reliability and utility of public transit information. Travel time prediction involves development and use of technologies such as automatic vehicle location (AVL), special prediction algorithms and tools of communication [3].

Automatic vehicle location enables to remotely track the location of a vehicle with the use of mobile radio receiver, GPS receiver, GPS modem, GPS antenna, GIS (Geographic Information Systems) etc [3].

There have been many algorithms and methods reported in literature for prediction of travel times. Some of these include machine learning techniques (Artificial Neural Networks, Support Vector Machines), model based approaches (Kalman filtering) and statistical methods (regression analysis, time-series analysis) for the prediction of travel time. This section briefly describes existing research in the area of travel time prediction, with special reference to public transportation [3].

Most real time arrival systems, currently in use, are completely web based applications. For example, 'Next Bus' a popular bus tracking service in United States provides the passenger with a website where he/she can login to find out the location of the buses and textual time estimates projecting the next bus arrival at a particular stop. These displays are often misleading since there is no

clear indication of where the bus is actually located and whether there are potential delays. Moreover, the technologies used require GPRS [5].

IV. Proposed Approach

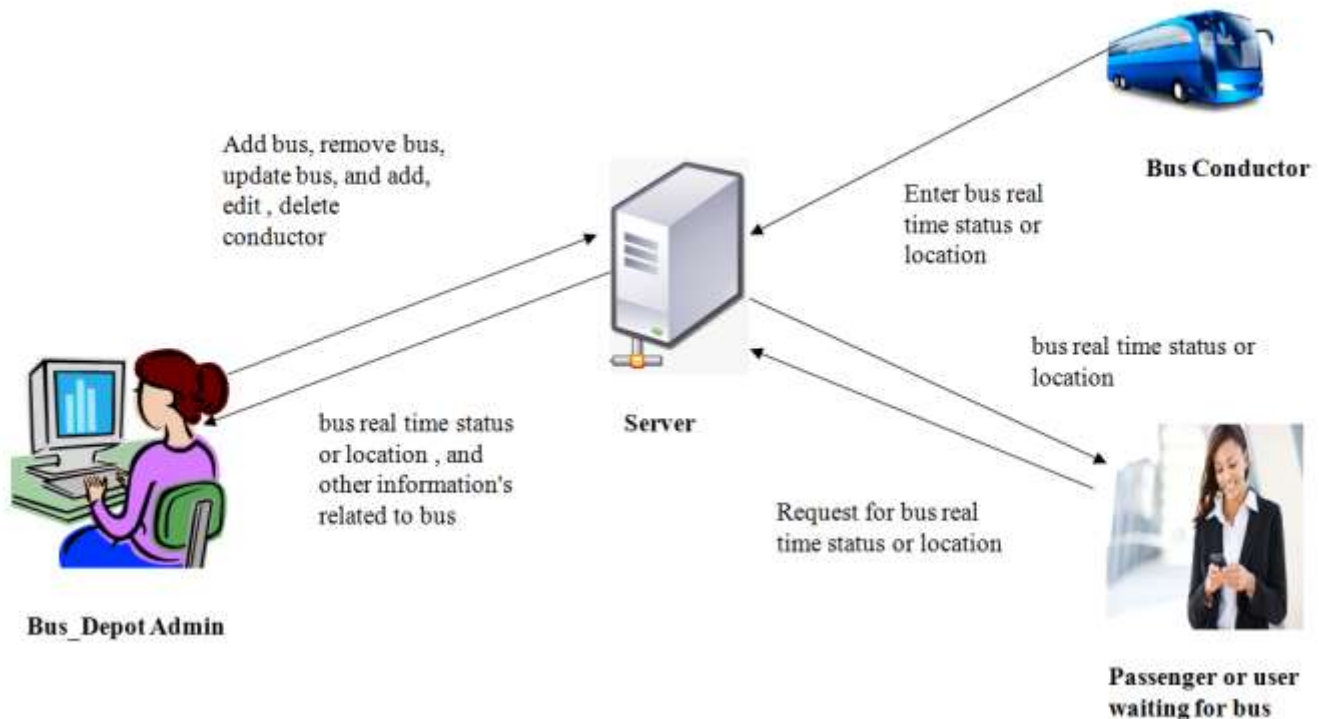
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In this proposed approach I am not using GPS device for providing current location or real time location of the bus, This proposed web application will provide the bus real time location without using GPS. In this proposed web application the bus conductor manually enter the location of the bus in the web page by selecting any one place name or bus stand name from the list of places name or bus stand names come in-between source and destination place are given in the dropdown box, and when the bus conductor click on submit button the information related to the bus real time location go to database, and saved on the database of admin, and when the passenger or a person who is waiting for bus what to check the real time bus location this proposed web application show it.

This web application also provide a facility that if the bus break down, or bus was in heavy traffic and getting late to reach its destination place ,etc. Then through this web application the bus conductor can give the information about the bus failure to bus depot(admin). So, because of this they provide some alterative solution for it to overcome this bus like for example, The bus depot will send some other bus in place of failed bus, send technician of bus to repair the bus if the bus was in breakdown condition, etc.

V. Bus Transportation System



Sys

tem structure of Building an web application for real time bus navigation without installing GPS.

As one is known from the name of this proposed application that it is a web based application. And this web based application is not using GPS for real time bus navigation. This web application contains many web pages:-

- Home web page
- User or Passenger web page
- Bus conductor web page
- Bus_Depot (Bus Admin) web page
- Bus conductor login page
- Bus_depot (Bus Admin) login page
- Bus_status web page

A. Home web page

The home web page is the first web page which user see first when open this web application. This web page contain the some information related to this web application, this web page also contain a area where user or passenger can search the bus real time location by entering source and destination place name or by entering Bus number, this web page also contain some automatically scrolling text are or field advertisement and some YouTube video advertisement area, and it also contain a menu bar or header at the top of this web page it contain hyper link through which we can go to Bus conductor login web page, Bus_depot (Bus Admin) login web page, User or Passenger web page, etc. by clicking the text or hyper text which is an hyper link in the menu bar of home page, and other web page also contain the same menu bar like Home page.

B. User or passenger web page

User or passenger web page is for passenger (who are waiting for bus) to search bus real time location. This web page contain also some advertisement text area, and video area for advertisements, and the main area of this web page is where the user enter the source and destination place or Bus number to search the bus real time location information.

C. Bus conductor login web page

Bus conductor login web page is an important page through this web page the bus conductor get login. For login the conductor need to enter his user name and password in the Bus conductor login page. This page is linked with another web page that web page where Bus conductor insert or enter the bus real time location or in which city or town the bus is now and other information also like if the bus failure occur the bus failure information is enter by the bus conductor which ,and goes to Bus_Depot database table. The bus conductor will click on logout but to get logout or exit from Bus conductor web page and to end the session of the conductor.

D. Bus_Depot (Bus Admin) login web page

Bus_Depot (Bus Admin) login web page is for Bus_Depot Admin. In this web page the Bus_Depot admin need to enter his/her username and password to get login into Bus_Depot (Bus Admin page) where the Bus admin can add buses, remove buses, update buses information and see the information related to the bus current location is inserted or updated by Bus conductor.

VI. Implementation Description / Functional Requirement (Modules Description)

There are three modules designed under the proposed web application:-

6.1 User module

User module consists of three text fields. One text field is for source location, and the second text field is for destination location and the third field is optional text field that is Bus number, and it consist of submit button.

In source location text field the user will enter the name of current place where the user is now or that bus stop location name where the user want to catch the bus, and in destination place text field the user will enter the destination bus stop name.

The third text field is Bus number which is optional field that means in place of source and destination location text field user can use the Bus number field to get the current location information of bus.

In the source location text field and destination location text field user enter the source and destination place name then click on submit button. If the user knew the bus number then user can use the Bus number field in place of source location and destination location text field, for this the user only need to enter the bus number in Bus number field and click search button, then a welcome_userpage.php webpage well get open which contain a table, this table containing the a list of bus's which source location, and destination location, or bus number match with the user entered source location, and destination location, or bus number. Each row of table have some bus information's and a button show_bus_location, when user click on this show_bus_location button another web page will get open which contain a table with this following column name that are bus current location information, bus number, bus departure time, arriving time, bus type, source location, destination location, and arrived at destination.

6.2 Bus conductor module

Bus conductor module is very important module of this proposed web application. In Bus conductor module the conductor first need to login and after that the bus conductor can insert the bus current location information.

In this module for bus conductor login there are two text fields, and a submit button, where first text field is for username and the second text field is for password. In the first text field the bus conductor will enter his/her username and in second text field the bus conductor will enter the password and then the bus conductor will click on login button. If the bus conductor entered username and password get matched with the username, and password in the conductorlogin table of database (statebus), then the particular bus conductor can access or enter bus current location information.

If bus conductor forgets his/her password then the bus conductor can change the password by clicking on the 'forget password' text in the login web page of conductor module.

After the bus conductor get login another web page will get opened and here bus conductor have to enter the bus number in the text field and then the conductor have to click on search button, when the conductor clicked on search button if the bus number entered by the conductor is existing in the database then which bus number conductor has entered its bus stops name list will come on dynamic dropdown box and the bus all information like bus number, bus type, to, from, departure_time, and arrival_time will display on a table. The conductor will select the current location of the bus (that means the bus is in which city or bus-stand now) by selecting any one bus stop name from the list of bus stops names in the drop down box, then click on submit button which is below the dropdown box. When the conductor click on submit button whatever bus stop name the conductor selected from dropdown box of bus stop that bus stop name is updated and saved in the table(bus) of database (statebus).

6.3 Bus Depot module (Admin module)

The Bus Depot module is also known as Admin Module. The Bus_depot module is the main module of this web application. In this module the Bus_depot (admin) have to signup first if the admin not signup earlier, and if the admin is already signup then the admin can directly go for login webpage, this login page contain two text field and two buttons, one button is for login and another button is for go to signup page. when the admin enter the email address and password in to the two fields of login webpage and then click on login button after that the if the admin entered email address and password matched with the email address and password in the table(depotlogin) of database (statebus), then provide session to the id and a welcome_busdepotpage.php webpage get opened.

This welcome_busdepotpage.php webpage contain navigation bar or menu bar, a table. The navigation bar having three items that Home, Add bus, Add conductor. Home item of menu bar contain a table which having all the details about bus like bus number, bus type, source location, etc. We can perform two Action that is edit and delete action on the list of bus's on the table in welcome_busdepotpage.php webpage. Add bus item in the menu bar is for adding new bus information to the database. Add conductor item in the menu bar is for making new conductor account for conductor. to the database module also contain same field which the bus conductor module contains. After the bus_depot (admin) get login then the admin can see the all information related to the bus current location, and other information also like bus number, Bus RC number, bus arrival time, and departure time, bus problem, bus source & destination place name.

The Bus_depot module is also responsible for managing, and doing updating, modifying in user and Bus conductor module database.

For implementation of above all three modules the Dreamviewer Back End Development environment and XAMPP (MySQL) is used.

VII. RESULT AND DISCUSSION

4.1 Modules and web pages related to Bus Transportation System

The home page will appear as shown below to enter to have an access to the implemented system:-



Figure 1: Bus Transportation System Home page

There is conductor login page to store the information about the bus handle by him and to track the current location of the bus, and also the status of bus where it in good condition or required any repair in case of tire puncture.

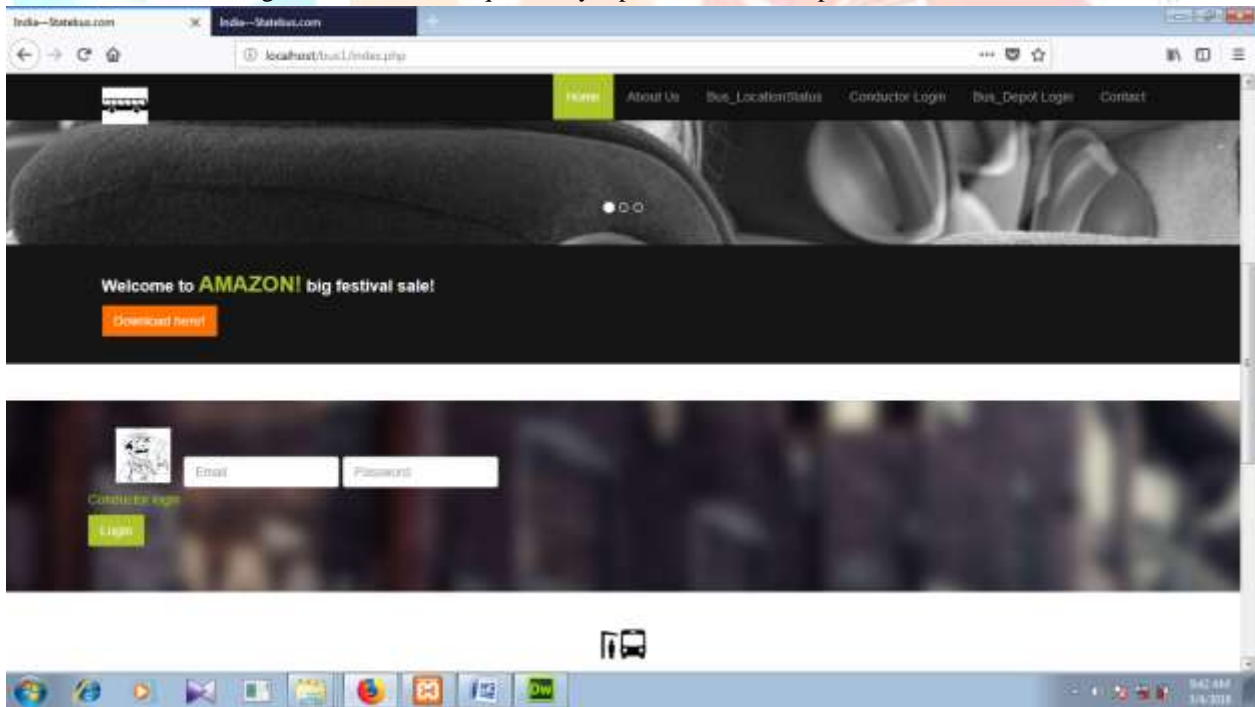


Figure 2: conductor login form area on Home page



Figure 3: Search bus location form area on Home page

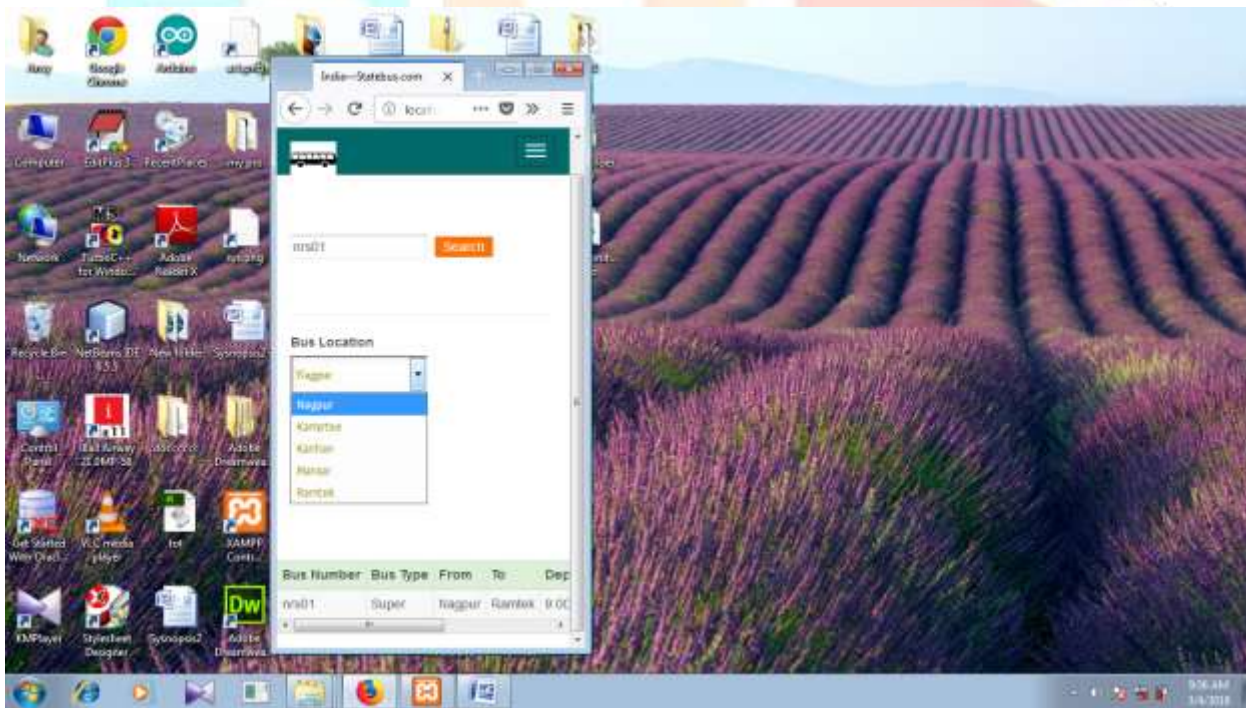


Figure 4: Viewing home page as a mobile view of the welcome_conductor web page

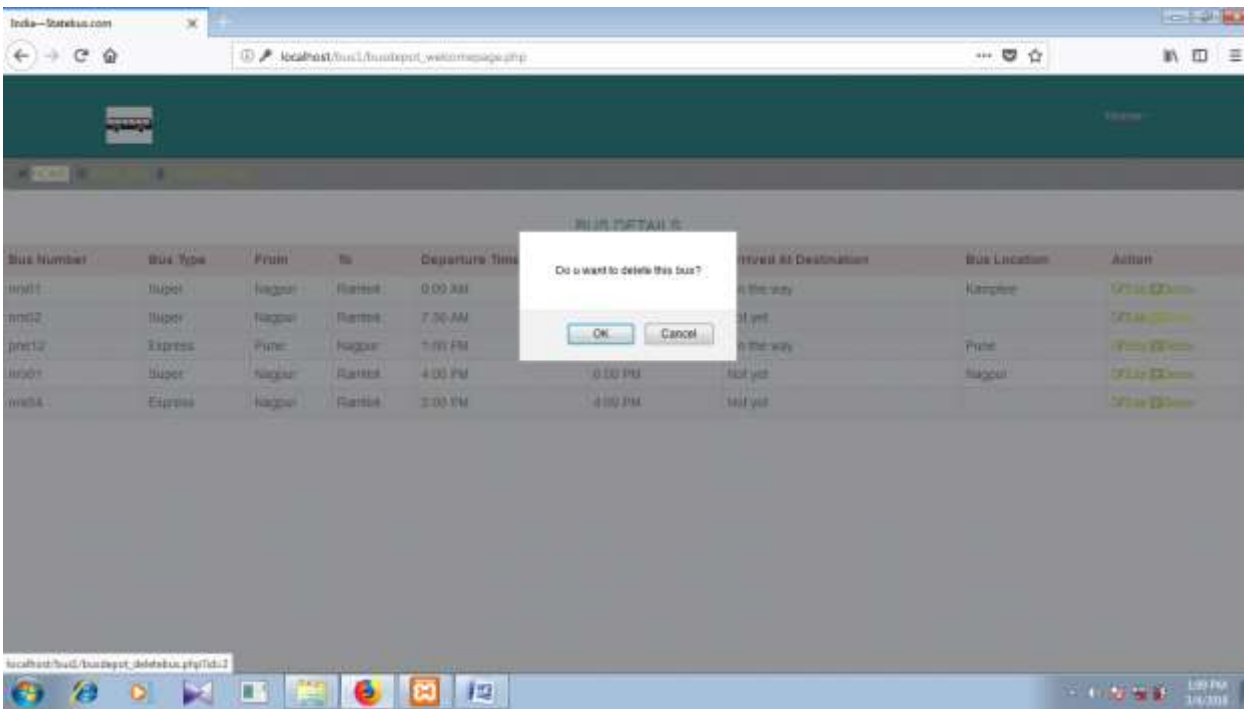


Figure 5: Dialog box which come on screen when the Bus depot admin click on the delete button in Action column

VIII. ACKNOWLEDGMENT

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