Real Time Web Based Bus Tracking System

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Abstract - *Due to rapid increase in population, there is need for efficient public transportation system. There is increased burden on public transportation like bus just because of population. Therefore remote user needs a smart system which provides real time information of bus. So we proposed a new system which solves the drawback of current public transportation system. So our system handle all the data like current location of bus , management of buses and its schedule. The real time tracking of bus can be done by our proposed system and this information is then given to remote user who want to know the real time bus information. Some technologies like GPS (Global Positioning System), Google maps and GPRS (General Packet Radio Service) are used for development purpose. Our system provides web based application, which gives real time location of bus on Google Maps to remote user.*

***Key Words*: GPS , GPRS , Google map.**

1.INTRODUCTION

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 . Our main focus is to provide such a system to remote user which will reduce waiting time for bus and will provide him with all necessary details regarding the arrival/departure time of the bus, its real location and expected waiting time. So to find out the current location of a bus and the dynamic arrival time a systematic tracking system is required . For best tracking result, GPS and GSM technology can be used. For tracking a vehicle the GPS and GSM based system can provide all specifications that are necessary. Our proposed system can find the location of the bus and inform the central controller at the bus terminal. Once this information is uploaded in the server and then the commuter can access the information via the web based application using internet even at their homes or any work place. Additionally, our system also provides a web based application which is interfaced with Google Maps which displays all transmitted information to the end user along with location of the bus on the map. A web application has an internal global timer which refreshes the tracking application after every forty seconds and collects the latest location and other customized vehicle parameters and updates the end user with the latest information of the bus. By helping travelers move from single occupancy vehicles to public transportation systems, it can reduce traffic congestion as well as environmental impact. Our goal is to increase the public transportation and satisfaction of current public transportation users and help to motivate more people to ride. If remote users who wish to use public transportation had an easy way to see which bus is near to their location and approximate time it will take to reach the particular stop, in real time, then they can make a more accurate decision of whether or not to wait at a stop. Our proposed system will provide pedestrians with this convenience. The location of bus is determined by using GPS and then the information is transmitted. The transmission can be terrestrial radio or cellular connection , satellite from the bus to a radio receiver, satellite or nearby cell tower. once the location data along with other custom data is collected a wireless communication system is used for transmission purpose.

2. LITERATURE SURVEY

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 get the GPS data of the bus location and it activating LEDs in the approximate geographic positions of buses on the route. The device will not require an external power source , it will be portable and sustainable and eliminate energy costs [1]. Abid Khan and Ravi Mishra proposed the embedded system which is a single board system having GPS and GSM modems and ARM processor to track vehicle. This system has large capability, low operation cost, strong expansibility [2]. Swati Chandurkar, Sneha Mugade, et al. proposed real time bus monitoring and passenger information system. The system gives current location of buses and estimated arrival time at different stops in their respective routes. The link updater is used to locate the bus position and the current route of the bus. The estimated arrival time is updated at control unit and shares this information to passengers using display board at bus stops [3]. S. P. Manikandan, P. Balakrishnan proposed the real time query system for public transport service using Zigbee and RFID is suitable to passengers demand and and provide information such as bus location, bus number and number of persons inside the bus in real time. This system provides efficient as well as low cost public transport system [4]. Madhu Kumar, K. Rajashekhar, et al. proposed, Design of punctuality enhanced bus transportation system using GSM and zigbee. In this way service quality of operational efficiency is improved and passenger is also able to get the information about the respective bus [5]. The tracking system can inform the location and route travelled by vehicle and that information can be observed from any other remote location. The system also includes the web application that provides exact location of target. This system enables to track target in any weather conditions [6]. V. Yamuna, G. Rupavani, et al. proposed GNSS based bus monitoring system. The main objective of this system is to reduce the waiting time of passenger in bus stop by sending information about the location of buses to the passenger through SMS. GNSS based web application is developed which provide which provide real time location of bus on Google Maps along with speed [7]. R. Manikandan and S.Niranjani implement real time public transportation information using GSM query response system. The system is capable of a tracking large number of buses simultaneously, detect their service routes and predict arrival time to down station with an acceptable accuracy. The microcontroller acquires data from the GPS module and sends to the control point by using the GSM module [8]. G. Raja, G. V. Karthik, et al. proposed bus position monitoring system to facilitate the passenger. The wireless communication technologies like GSM & GPS are used to send the information about number of seats available in the bus to bus station and current location of bus on the route respectively. Real time passenger information system uses variety of technologies to track the location of bus in real time and generate the prediction of bus arrival at stops along the routes [9]. In this paper, they have presented a smart bus tracking system which is based on GPS, GSM, QR coding and Google's map. The proposed system, estimates the arrival times at specific bus stops by tracking buses and informs the users through e -mails and SMSs. The system helps to passengers from unnecessarily waiting at bus stops and enables them to use their time more efficiently.

3. OVERVIEW OF PROPOSED SYSTEM

3.1 Problem statement

Management of buses of public transportation system is the main problem now a day.Based on to the current system there is no such system which provides information about the bus,its expected arrival time, the expected waiting time and what is the current location of the bus.

3.2 Solution

Our system provides the relevant information regarding all the bus numbers going from users source & destination along with the route details , real time location. Generally our system is operated by GPS which is attached with 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. 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. Bus tracking technology is advantageous for tracking and monitoring a bus.

3.3 Architecture of the proposed system

The proposed system has 3 modules
1.Bus module
2.Central control unit (admin module)
3.Client side application (User module)

1.Bus module :
The bus is tracked by installing a special device or GPS transceivers in the bus. GPS works in any weather

conditions, anywhere in the world, 24 hours a day. To use GPS there are no subscription fees or setup charges. To calculate the position GPS receiver is capable of receiving signals from at least three satellites. Depending on the type of application the GPS transceivers can be a Data Loggers, Data Pullers or Data Pushers. This device receives the GPS data and sends the data at regular intervals to the server. Then the server analyses the data. To receive signals in the appropriate place the GPS antenna is connected to the right jack and fixes the antennas. One slot is allocated for SIM card and it receives the signals from the GSM towers to respond to the users. The positive and negative wire is connected with 12V or 24V vehicle power system. Then to receive the signals from the satellite the tracker device is turned on. Now the device is capable of receiving the latitude and longitude values of the location of the bus. At any point of time the GPS receiver gives the location values. Now the bus unit has the coordinates with timestamp which is then compared with the previous coordinates and if there is any difference then the coordinates are updated and sent to server over GPRS network (internet). The location details are stored in server in the format such as ID (bus no) , longitude, latitude, timestamp etc. To identify each bus uniquely among the various buses here SIM number is used for identification. Each bus has its own GPS device with unique SIM card. Server is the most important module in this system which acts as central repository of system.In this system the whole information is stored and maintained by server. 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/departure time and real time location of bus. Server provides service to the user module by providing required information to it.

Fig -1: Architecture of proposed system.

2.Central control unit :
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 etc to the database.

3.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 for accessing the information stored in server database and gives the list of available buses according to remote users source and destination. Now it's users task to select or choose particular bus number to know the real time location of bus or other information.After selecting a particular bus number the application shows the real time location of that bus on Google map. This application gives support and interact with various clients to provide service to users requests. The system facilitate the real time tracking of bus.

3.4 Experimental setup

3.4.1 Hardware part inside the bus.

Fig -1: GPS device

3.4.2 Software part

This application is designed and developed so as to provide the remote user with all the necessary information as to which buses from the source will go to his destination along with their routes and exact location. The user side module and admin module is implemented using visual studio 13 & c# with MYSQL as a database for storing the necessary details.

3.5 Result Analysis

The proposed system is more user friendly than existing system. And it also gives greater performance.
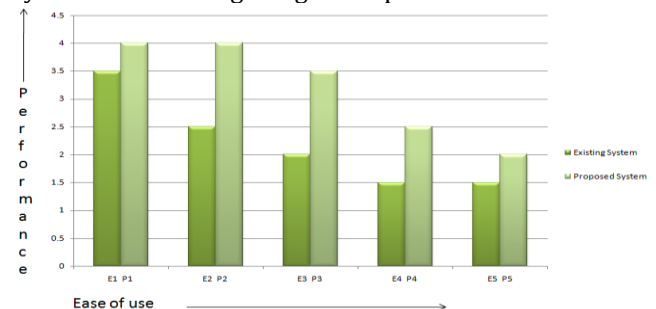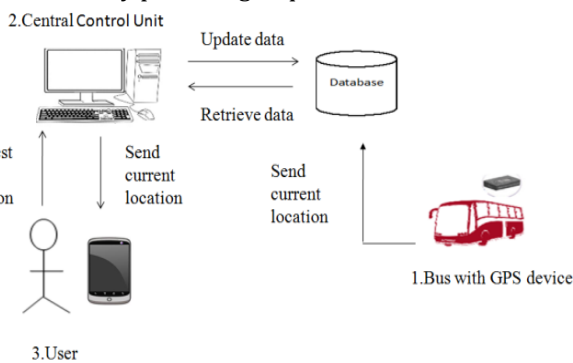

Chart -1: Graph

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4. CONCLUSIONS

The proposed system is successfully designed, implemented and tested and the following conclusions are made. Our system reduces the waiting time of remote users for bus. The system the tracks the bus at any location at any time. All the current information is stored to the server and it is retrieved to remote users via web based application. This system is more user friendly for users to get information visually shown on Google Map. User can freely get this web based application for real time tracking of bus which provide interactive interface environment. So by using this application remote user can just wait or they may reschedule their journey according to the availability of bus. . So this paper presents a system which provides high practical value in the modern fast era. The system has high practical value and cost efficient.

5. FUTURE SCOPE

This project is having a wide scope. A web based application which can be further modified using cloud. Use of video camera to this system would take this system to the next level in the field of security. It will help to monitor the crimes that happen now a days which is witnessed by common people every day. This would prove a major breakthrough in reducing the crime rates. Also, with use of motion sensors the speed of the bus can be calculated.

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