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REAL TIME BUS TRACKING SYSTEM

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ABSTRACT

When it comes to taking the public transportation, time and patience are of essence. In other words, many people using public transport buses have experienced time loss because of waiting at the bus stops. So, we require one tracking system to track the Complete Transport System. Every GPS tracking system is a common approach to get vehicle location information in real- time. The system includes a GPS/GPRS module for location acquisition and message transmission, AT&T's cellular data service to transfer of location information. It will show the correct position of the vehicle to the user on the basis of the location information sent by the GPS Device.

Keywords: GPS, AT&T, AVL Database, AVL, EAT, LED, LCD, Vehicle Tracking.

1. INTRODUCTION

Real-time vehicle tracking and management system has been the focus of many researchers, and several studies have been done in this area. In this project, the main area of concentration is tracking buses for which people were waiting for a long time. People have to know where the bus is at present and the time of the bus to reach bus stop. It will help the passengers to track the vehicles, to get real time position of the vehicles, changed routes (If any); it can also act as an anti- theft application by detecting the exact position of the vehicles[1].

Real time tracking is becoming more and more popular as devices utilizing the Global Positioning System (GPS) become more readily available. In this system, using AT&T's cellular data service the data will be sent by the buses with their coordinates among other data. This data allows the dispatcher to know where all the buses are at any given time[2][3].

The proposed system will show user the real time location of the vehicle on the Google Map by using GPS (Global Positioning System) & AT&T.

The application will ask the user (Passenger) to enter the bus number in which he/she wishes to travel. Then the user will enter the source and the destination of their journey. After entering all the necessary information, the user will click on the locate button. Upon clicking the locate button, the user will get all the detailed information about the location of the bus. By using this project passengers will be able to easily access data related to the bus that they are interested.

2. PROPOSED APPLICATION

The system involves many different parts that worked together to accomplish the requirements. The source of all the data that is presented originates in the AVL Database. This database is where the buses send data every 30 seconds. The buses send information such as longitude, latitude, heading, route, and speed. From there the data is accessed on two different web servers. The estimated arrival time server grabs the data and does calculations on each bus and outputs a comma separated string. The AVL data is mapped to the buses on a real time Google map by the second server.

[4]The second server also communicates with the estimated arrival time server to request the ETA string and parse it to display in a table

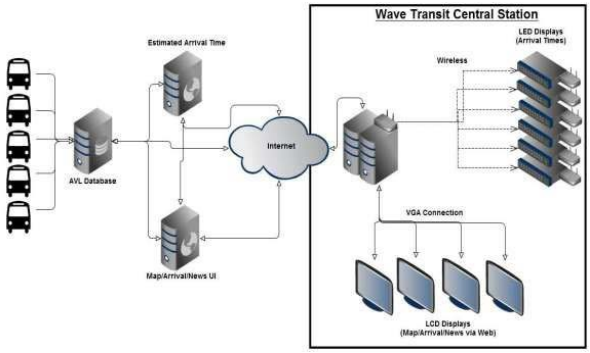

Fig 1:Architecture Diagram

that is presented to the user. There is a Java application running on the inside
Server that makes a request for the ETA string, parse it, and sends the times to each specific LED display, mounted above each bus stop. The arrival time will be sent by the Java application's sockets to each LED display individually. The communication uses

the wireless local area network at the station. Two PCs control two of the liquid crystal displays (LCD) via dual video graphics array (VGA) ports.

The mobile friendly version has a very simple user interface to cut down on load times. It has the option to view a table which is a text based display of a specific route or view a map of a specific route. A map with all buses was left out of the mobile version because it was unusable on a small screen, due to the large number of buses to display. Along with all these improvements a simple implementation of Google's direction service was used to give the user an ETA for the bus to arrive at its next stop. This information includes with the route name, heading, speed, and next stop on all versions of the map along with the table display[3].

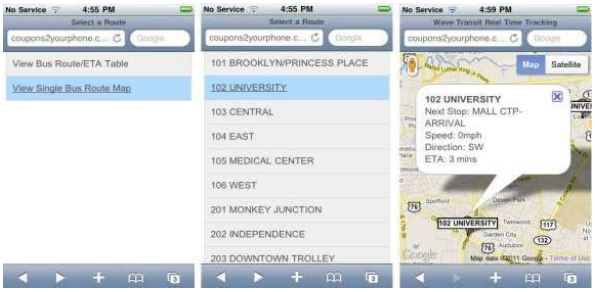

Fig 2. Final Mobile Implementation

3.LED PROGRAM

The Java program will be called every twice minute by the LED Java code that resulted in a shell program which is done in the final implementation. CRON must call the Java program as it has a minimum scheduling resolution of 1 minute for every 30 seconds[4].The ETA values will be called with the help of Mobile Education's server for every sixth route which sends a command to the display to show that routes name and ETA. Each bus has a specific LED sign that it stops under which has a static IP address. The Java program the IP addresses are hardcoded to display appropriate information on the correct LED sign[4][5].

Fig3. Countdown Sign

4. DESIGN

There were few issues that arose when going over the project requirements[6]. The first issue to overcome was the programming language; lack experience in Java Server Pages presented issues that slowed down the projected implementation of this project. This was a requirement so that the system can be maintained in the future by Dr. Vetter. JSP was released in 1999 by Sun as a direct competitor to ASP and PHP. JSP helps to bridge the gap between java and the web. Throughout the project the syntax and integration with java presented a steep learning curve. I was able to become proficient in JSP by learning the best practices, so now it can be used in future.

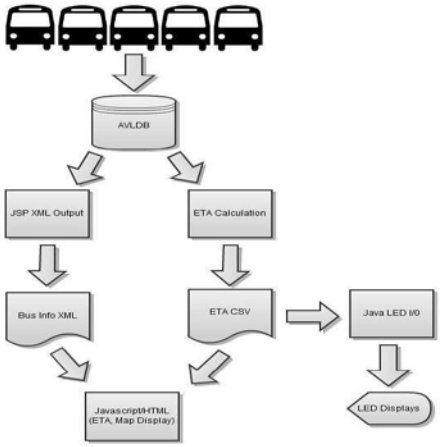

Fig 4: Data Flow Diagram

The major issue was to present the data to the user. At the bus station the data on the page changes without refreshing the entire page. Previously a meta refresh was used to update the information. That wasn't acceptable because it would cause a noticeable blink of the user interface.[5]The only possible way around this was to change the data using a client side language like JavaScript as JSP is server side. Also, the displays are all 1o8op so all of the interfaces needed to be optimized for that resolution. The public site should be accessible to all resolutions which means it cannot be optimized for the more common resolution. The news page to arrive at its next stop. This information is available along with route name, heading, speed, and next stop on all. was merged with the arrivals display in prototype 3 so, this concern was eliminated.

6.SOFTWARE AND SYSTEM QUALITY METRICS

The international Organization or Standardization defines quality as "the totality of characteristics of an entity to bear on its ability to satisfy state or implied needs". This definition itself is very vague, but in essence the quality will be measured by how well it conforms to the requirements and that it can be used as it was intended[3]. In other words this protect would be considered successful if it meets the scope in the allotted time, satisfies the customer and reaches the ultimate goal of providing a benefit to the passengers of Wave Transit. Meeting these big goals the system must be ensured to met the requirements set forth by Wave Transit.

The software was developed with good quality that includes readability, maintainability, low complexity and robust error handling because readability and maintainability go hand in hand, the software was written in a way that another individual can easily understand and update it if necessary[2]. The software was tested module by module each focused on a particular task to have the least complexity possible. The robust error handling system was enforced which was capable of running the entire life time that provides the user with a system and the tools which operates successfully.

5. FUTURE SCOPE

In this system, there is a possibility of the overall system malfunction due to a particular type of attack, it is termed as Denial of Service (DoS) attack by malicious agents who might try to disrupt the function of the system. A Distributed Security Scheme for AdHoc Networks can be used and to prevent this kind of attack. Such methodology will be analyzed to make this Real Time Passenger Information System more robust. A novel data hiding technique, based on Steganographic mechanism can also be used for security purposes. Here, the advantage lies in the fact that computationally costly encryption-decryption mechanism is avoided, thus making it suitable for a heterogeneous combination of processing elements, which are being used in present system. Here, many processing elements e.g. Mobile phone etc. lacks the processing
power and battery power, which is required for traditional encryption-decryption system.

7. CONCLUSION

In this paper, the partial implementation detail of Real Time Bus Tracking was stated. This system tracks the current location of all the buses and estimates their arrival time at different stops in their respective routes. Estimates are updated every time the bus sends an update and the information is passed to the passengers by display terminals at bus stops, web based GUI and smart phone application which is android based. This research serves the needs of passengers, vehicle drivers and administrators of the transport-system. With the help of GPS and the ubiquitous cellular network, real time vehicle tracking for better transport management has become possible.

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