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Scalable Tracking System

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ABSTRACT

Because of its numerous uses, the bus tracking system is critical in today's technology. Today, the dependability of public transportation is critical. People who utilise public transportation may squander a significant amount of time waiting for a certain bus at a specific bus stop. The movement of buses in the bus system is impacted by unforeseen variables such as arrival of buses at irregular times of transportation or deployment from the bus depot on a daily basis. People commuting by bus will have more faith in public transportation if they know the actual bus location, the estimated arrival time based on normal traffic circumstances, and the number of passengers aboard a specific bus. The public may track the whereabouts of buses using this online application. The online application will also provide information about all of the buses, such as bus number, routes, stops, timings, and frequency. There is a need for an effective public transit system due to overcrowding. Then there is an increasing pressure on public transportation, such as buses, due to population growth. As a result, the distant users need a smart system that gives real-time bus information. As a result, we developed a new system that addresses the shortcomings of the current public transit system. As a result, our system handles all data such as the current position of buses and bus management. It shows the remote user the current location of the bus on Google Maps.

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INTRODUCTION

Vehicle tracking systems are becoming increasingly popular and widely employed in a variety of nations throughout the world. It provides several benefits to users, particularly car owners, by making it easier for them to track their vehicles. Nowadays, no one can live without their smartphone. Time magazine conducted a study in which thousands of people from the United States, the United Kingdom, South Korea, India, China, South Africa, Indonesia, and Brazil participated. The results showed that the majority of them are inseparable from their cellphones, with 84% claiming that they could not survive without them. According to another report, smartphones account for 75% of the market and a total of 106 million smartphones were shipped in the second half of 2012. Smartphones have risen to the top of the telecommunications industry in the current era, and they have become the most widely used telecommunications medium known to man. As a result of the aforementioned poll, it is apparent that smartphones have become an important and fundamental part of our modern day lives, which is why this vehicle monitoring system is text message oriented so that we may take care of our own vehicle with a single touch of our Hand. With the aid of an Internet connection, we may track the real-time location of our vehicle using a smart phone. This tracking system is created in such a way that consumers may have a simple and user-friendly interface to retrieve their car.

PROBLEM STATEMENT

Vehicle monitoring is becoming increasingly important in today's world for the aim of enhancing our quality of life. Home vehicle monitoring provides convenience and ease of use for vehicles. Car tracking provides a futuristic way of living in which a person may operate his vehicle using a smart phone, from tracking a vehicle to detecting an unexpected location of a vehicle; it also provides an effective use of technology. However, getting or acquiring such a

system installed would cost a lot of money, which is one of the main reasons why vehicle monitoring has not garnered much demand and attention, not to mention the complexity of installing and configuring it.

OBJECTIVE OF THE STUDY

People wanted to know where each truck was at any given moment, therefore vehicle tracking systems were originally deployed for the shipping business. However, as technology advances, automated vehicle monitoring systems are being employed in a number of ways to track and show vehicle positions in real-time. However, today's bus transit service has a very weak transportation information system. Bus passengers do not know the precise arrival time of a bus, just its planned estimated arrival time. The bus transportation service lacks a proper mechanism for tracking all buses' whereabouts and precise arrival times at each bus stop. These issues arise because the present bus service system does not employ real-time tracking technology to follow each bus on the road, and there is also a lack of a platform to provide bus users with the most up-to-date bus traffic information. To address these issues and improve the present bus service system, a real-time bus tracking system must be developed and implemented. With a real-time bus tracking system, bus position data is transferred in real time to a central server for processing and extraction of transit information. API is the primary technology employed in the development of this system.

SYSTEM ANALYSIS AND DESIGN

The design phase begins with the requirements specification for the software to be developed. Design is the first step to moving from the problem domain towards the solution domain. Design is essentially the bridge between requirement specification and the final solution for satisfying the requirements. It is the most critical factor effecting the quality of the software. The design process for software system has two levels.

- System Design or Top level design
- Detailed Design or Logical Design

SYSTEM DESIGN:

In the system design the focus on the deciding which modules are needed for the system, the specification of these modules and how these modules should be interconnected.

DETAILED DESIGN:

In detailed design the interconnection of the modules or how the specifications of the modules can be satisfied is decided. Some properties for a software system design are:

- Verifiability
- Completeness
- Consistency
- Traceability

SDLC Activities:

SDLC provides a series of steps to be followed to design and develop a software product efficiently. SDLC framework includes the following steps:

Communication:

This is the first step where the user initiates the request for a desired software product. He contacts the service provider and tries to negotiate the terms. He submits his request to the service providing organization in writing.

Requirement Gathering:

This step onwards the software development team works to carry on the project. The team holds discussions with various stakeholders from problem domain and tries to bring out as much information as possible on their requirements. The requirements are contemplated and segregated into user requirements, system requirements and functional requirements.

The requirements are collected using a number of practices as given –

- Studying the existing or obsolete system and software,
- Conducting interviews of users and developers,
- Referring to the database or
- Collecting answers from the questionnaires.

System Analysis:

At this step the developers decide a roadmap of their plan and try to bring up the best software model suitable for the project. System analysis includes Understanding of software product limitations, learning system related problems or changes to be done in existing systems beforehand, identifying and addressing the impact of project on organisation and personnel etc. The project team analyses the scope of

the project and plans the schedule and resources accordingly.

Software Analysis:
Next step is to bring down whole knowledge of requirements and analysis on the desk and design the software product. The inputs from users and information gathered in requirement gathering phase are the inputs of this step. The output of this step comes in the form of two designs; logical design and physical design.

Coding:
This step is also known as programming phase. The implementation of software design starts in terms of writing program code in the suitable programming language and developing error-free executable programs efficiently.

Testing:
An estimate says that 50% of whole software development process should be tested. Errors may ruin the software from critical level to its own removal. Software testing is done while coding by the developers and thorough testing is conducted by testing experts at various levels of code such as module testing, program testing, product testing, in-house testing and testing the product at user's end. Early discovery of errors and their remedy is the key to reliable software.

Integration:
Software may need to be integrated with the libraries, databases and other program(s). This stage of SDLC is involved in the integration of software with outer world entities.

Implementation:
This means installing the software on user machines. At times, software needs post installation configurations at user end. Software is tested for portability and adaptability and integration related issues are solved during implementation.

Operation and Maintenance:
This phase confirms the software operation in terms of more efficiency and less errors. If required, the users are trained on, or aided with the documentation on how to operate the software and how to keep the software operational. The software is maintained timely by updating the code according to the changes taking place in user end environment or technology. This phase may face challenges from hidden bugs and real- world unidentified problems.

Testing
Testing is a process to show the correctness of the program. Testing is needed to show completeness, it

improve the quality of the software and to provide the maintenance aid. Some testing standards are therefore necessary reduce the testing costs and operation time. Testing software extends throughout the coding phase and it represents the ultimate review of configurations, design and coding. Based on the way the software reacts to these testing, we can decide whether the configuration that has been built is study or not. All components of an application are tested, as the failure to do so many results in a series of bugs after the software is put to use.

Black Box Testing: Black box testing, also called behavioral testing, focuses on the functional requirements of software. This testing approach enables the software engineer to derive the input conditions that will fully exercise all requirements for a program. Black box testing attempts to find the errors like

- Incorrect or missing functions
- Interface errors
- Errors in data structures or external database access
- Behavior or performance errors
- Initialization and termination errors

White Box Testing: White box testing is also called Glass box testing is a test case design control; structure of the procedural design to derive test cases using White box testing method, the software engineer can derive the test cases that guarantee that all independent paths within the module have been exercised at least once. Exercise all logic decisions on their true or false sides. Execute all loops at their boundaries and within their operational bounds. Exercise internal data structure to ensure their validity.

RESULTS

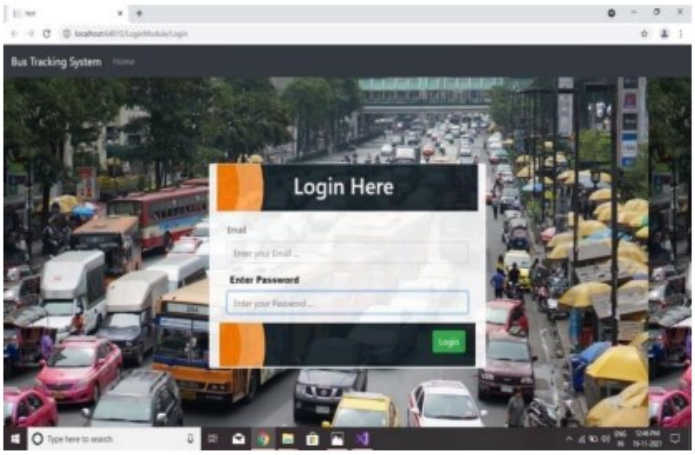

Figure 1: LOGIN page

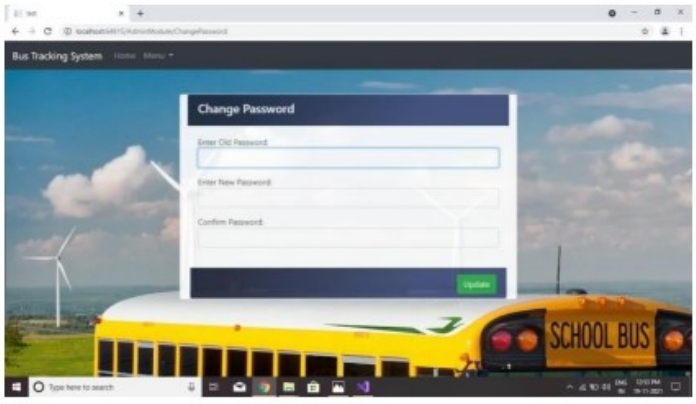

Figure 2: Change password page

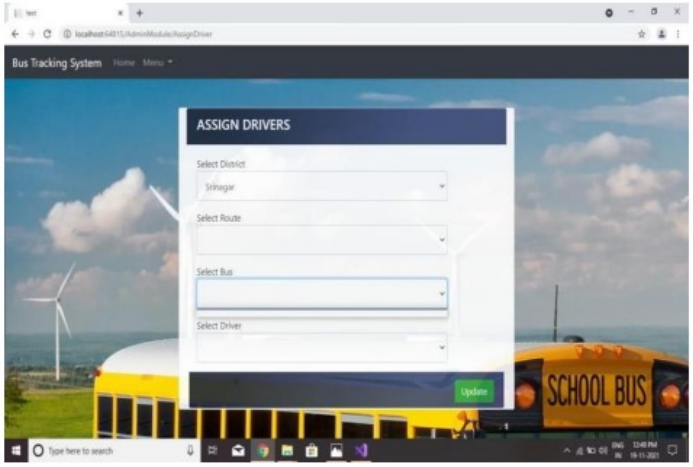

Figure 3: Assign driver

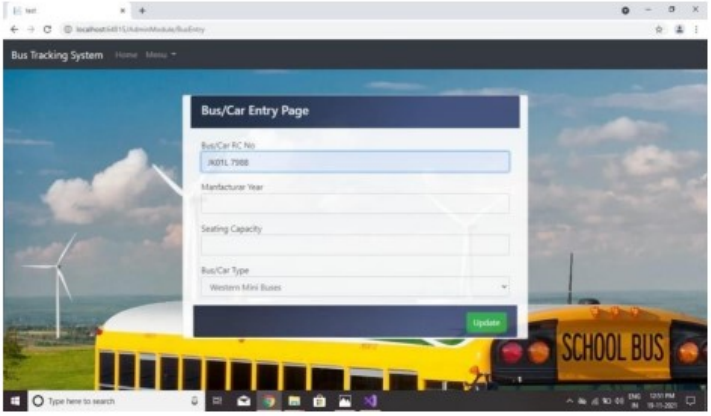

Figure 4: BUS/SUMO entry

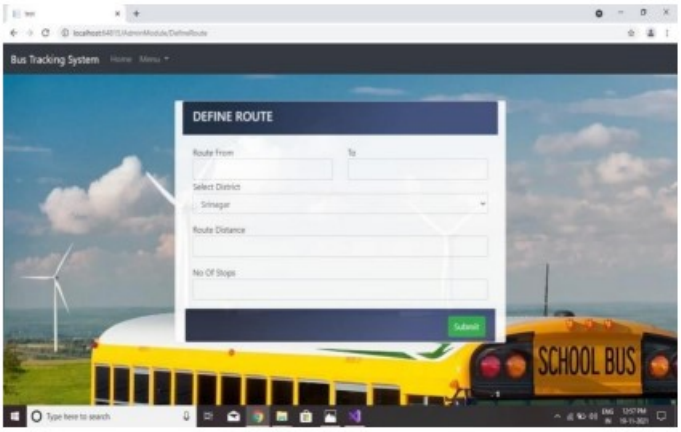

Figure 5: Define route

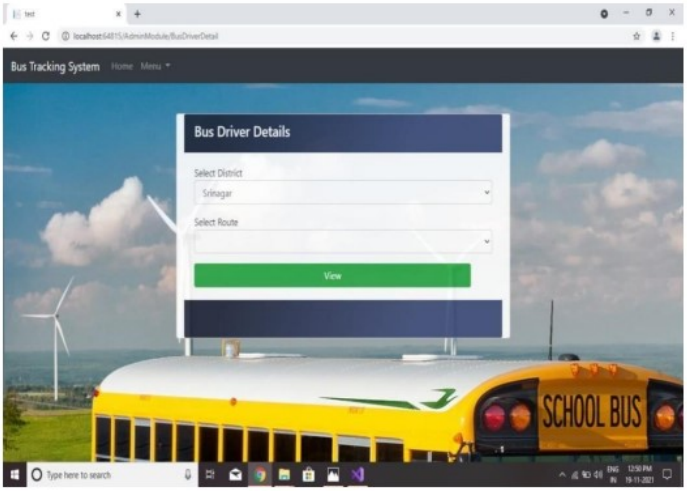

Figure 6: Bus/Driver details

CONCLUSION

With the implementation of the project, a complete track can be kept of buses. The display at the passenger's end acts as a time saver. By implementing our system, a passenger can plan their journey more efficiently before time as the waiting time at the bus stops is reduced. This system also throws a light on the frequency of the buses on the same route. The main features of this systems are the efficient usage of time, real time information on the availability of buses, traffic acknowledgment, and commuter satisfaction. Thus in this system, we have shown that transit information collected in real time can be shown on the server for tracking and monitoring. Internet enabled mobile phones can receive real-time transit information and will help the passenger to monitor their time more effectively and precisely.

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