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PUBLIC TRANSPORTATION PORTAL FOR COMMUTERS

Dr. G. N. R. Prasad
Sr. Asst. Professor, Dept. of MCA, CBIT(A), Gandipet, Hyderabad, India

Abstract: **Public transportation saves money, makes travel easier, and so enhances opportunities and property value. It also minimizes air pollution, relieves traffic congestion, and provides job opportunities for millions of people. Trains, buses, and other forms of public transportation that operate on regular routes and charge predetermined prices are referred to as public transportation. This mode of transportation is an important aspect of every society because of the role it plays. That is why most municipal governments offer incentives for residents to use public transportation and leave their personal vehicles at home. Apart from being cost-effective, public transportation can alleviate a number of issues that cities confront, particularly those with heavy car dependency. Crude oil prices, which rose well beyond $100 per barrel as a result of the demand-supply gap and the Russia-Ukraine conflict, may also come back faster than they climbed. The main objective of this system is to provide an application that allows residents and visitors of a city to find out more about transportation-related aspects of the city. Aspects include information about public transportation options, schedules, fares, and so forth (education). The site might also provide real-time information about buses and other public transportation information. This application software has been computed successfully and was also tested successfully by taking "test cases". It is user-friendly and has the required options, which can be utilized by the user to perform the desired operations. The software is developed using Java as the front end and Oracle as the back end in a Windows environment. The goals that are achieved by the software are: Optimum utilization of resources, Efficient management of records, Simplification of the operations, Less processing time and getting required information, User friendly, and Portable and flexible for further enhancement.**

Index Terms: **Public Transport; Utilization; Efficient Management; Crude oil; India.**

I. INTRODUCTION

Public transportation is a critical component of urban sustainability. Effective transportation networks that include public transportation help communities reduce their per capita carbon footprint while also making them more livable by alleviating commute and transportation needs and enhancing accessibility. However, the availability of public transportation—the number of buses, trains, trolleys, and trams—does not provide a complete picture. The Sustainable Cities Institute identifies five principles of municipal transportation sustainability: accessibility, affordability, connection, holistic transportation, and land use planning, and environmental planning.

Urban transportation systems that improve cost, accessibility, and connection while also taking appropriate land use planning and environmental factors into account play a vital role in urban sustainability. As Arctic communities deal with rising urbanization, migration, climate change, and economic issues, sustainable transportation solutions can help reduce environmental impact while also boosting social and economic sustainability.

However, the current fact is that most emerging city transportation networks are far from perfect. Traffic congestion is the most obvious and commonly cited transportation problem in a city, and it is generally known that excessive levels of congestion have a major impact on local and national GDP. Most developing country cities lack accessible and inexpensive public transportation as well as safe facilities for non-motorized transportation such as cycling and walking.

II. LITERATURE COLLECTION

Intelligent transportation system (ITS) is a sophisticated application that strives to provide novel services related to various modes of transportation and traffic management, allowing users to be better informed and make safer, more coordinated, and's marter' use of transportation networks.

A smart city is an urban development that integrates Information and Communication Technologies and the Internet of Things (IoT) technology in a secure fashion to manage a city's assets. The smart city can be defined as a city that uses information and communication technologies to improve the critical infrastructure of the city and also to make the public services for citizens more efficient [1].

The research work of Edison [2] presents a case study that addresses the perception of the waiting time of the passengers that use a system in real time versus those that do not use any system in real time. The authors proposed the OneBusAway transit traveler information system, which

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provides real-time next-bus countdown information for King County Metro users in Seattle via a portal, telephone, text-messaging, and smart phone applications. The objective of that research work was to know the perception of people using the system compared to the actual time they have waited. In the research work of Anudeep [3], an IoT system is presented to provide intelligent real-time passenger information. The system keeps the passenger updated with information about the current location of buses, estimated arrival time, and vacant seats. To provide this information, a hardware prototype was developed using NodeMCU with a GPS module, which is the tracker device that is responsible for communicating the bus location. The data coming from the electronic device is sent to the Cloud using MQTT protocol. Additionally, an Android application was developed to obtain data from the cloud and show it to the final user.

III. MATERIALS AND METHODS

3.1 Architecture

Software architecture is the foundation of a software system. A variety of considerations make up software architecture. Some of the early decisions are made when developing the architecture, and these are significant since they influence subsequent ones. The larger and more complicated a software system becomes, the more you'll require a well-thought-out architecture to succeed. When done correctly, software architecture provides a variety of advantages that considerably boost the likelihood of a successful software system.

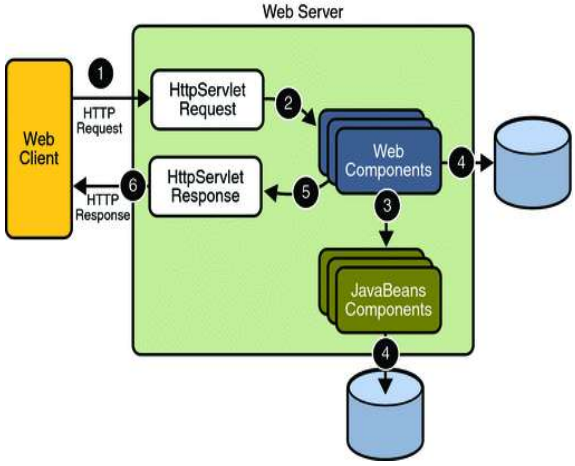


Fig : Architecture of the System

3.1.1the Presentation Layer

This layer is called the client layer. This layer contains components that are responsible for displaying data to the user. For example the user interface consists of buttons, edit boxes, Text boxes, labels, grids, etc.

3.1.2 The Business Rules Layer:

This layer wraps the encapsulations' business rules or business logic. Having a distinct layer for business logic is quite beneficial. This is due to the fact that any changes to Business Rules may be handled easily in this layer. Any modifications to the functionality/processing logic of this layer can be changed without affecting the others as long as the interface between the levels remains the same. Many client-server apps were unsuccessful because altering the business logic was a time-consuming procedure.

3.1.3 The Data Access Layer

This layer contains components that aid with database access. This layer provides a level of abstraction for database structures when applied correctly. Because of the Data Access layer, changes to the database, tables, and other parts of the program have no impact on the remainder of the application. The data requests are sent to this layer by the various application levels, and the response is received by this layer.

3.1.3 The Database Layer

Database Components, such as DB Files, Tables, and Views, are included in this tier. SQL Server, Oracle, Flat files, and other databases could be used to generate the actual database.

The entire application can be implemented in such a way that it is independent of the actual Database in an n-tier application. You could, for example, alter the Database Location with just minor changes to the Data Access Layer. The rest of the application should be unaffected by this change.

3.2 Modules

This system consists of the Registered Users, City Employees, Administrator, Visitors and Security, and Authentication as the modules.

3.2.1 Registered Users

Registered user are nothing but city residents, they can register into site and they can access the system. Registered user can view all City bus routes of resident city. Registered user can view Schedules of available bus timing along with routes. Registered user can view MMTS scheduling based on selected source and destination of resident city. They can view Google Map through this web site also.

This portal allows city residents to give their feedback and suggestion regards to roads and city transportation. Registered user can view their profile and update their profile.

This portal provides different types of information related to resident City.

- Road Works
- Fares

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- Cargo Services
- Educational Institutes Information
- Signals, flyovers and routes information.

3.2.2 City Employees

City employees can add public transportation-related information into the database. In this portal two types of city employees have been provided. First one Traffic department officer, he/she can add city bus route information and view that information. Traffic officers can add and view city bus schedule information. Officer can add cargo transport services details and different types of transportation fares. Officer can add Educational institutes location-related information. Officer can add road works related information and the information which is useful to analyze traffic conditions. Second one is Railway Officer who provides city train-related information. Officer can add MMTS route and stations of a particular city. Officer can add MMTS schedules also and view Schedules. Officers can view feedbacks and suggestion of their city residents.

3.2.3 Administrator

The administrator is able to add States and Cities. And can view it also. Administrators can add City Employees to added cities. Administrators can view all feedback and suggestion and can delete them also.

3.2.4 Visitors

Visitors of this system, can access city bus routes and stops related information based on the selected city. Visitors can view Cargo services of different cities. Visitors can view some traffic rules also.

IV. RESULTS AND DISCUSSIONS

This system is developed under Windows 10 operating system. The front end is used as a Java and Oracle as a backend tool. The various testing strategies have been followed while at the development stage. Here, the following the output screens of the system.



Fig :Visitor's window: Visitors can access city bus routes and stops related information, Cargo services of different cities, and traffic rules.

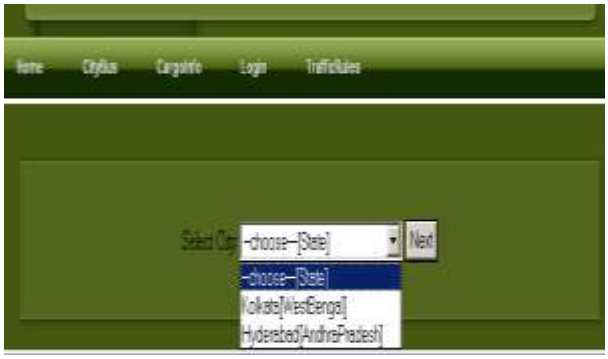


Fig :Visitors can select cities as per requirement like Kolkata, Hyderabad etc.



Fig :This is the login page. Enter login information.



Fig :View traffic information.Provides basic traffic rules



Fig :Administrator is able to add State and Cities,

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Fig :Administrator can add City Employees of added cities



Fig :City employees can add public transportation related information into database.



Fig :Select the bus route and get the information



Fig :According to the bus route it will show the bus route information



Fig :Select your destination point and get the bus schedule information.

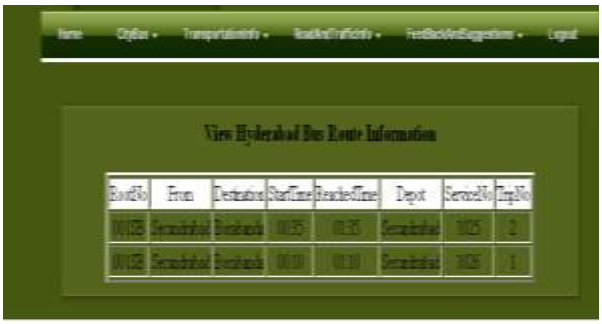


Fig :Based on your requirement/queries it will display the bus route information.

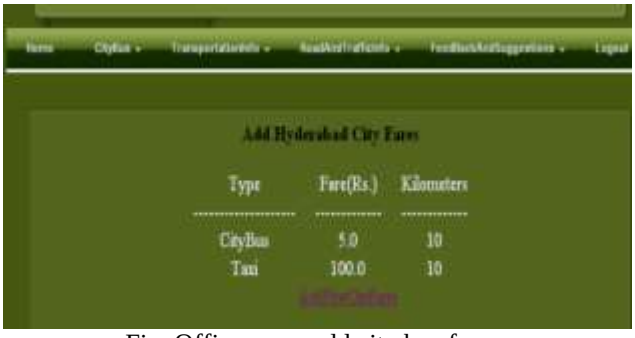


Fig :Officers can add city bus fares.

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Fig :Officers can add road work information.
Registeredusers can access road works details.



Fig : The City Hyderabad traffic analyzer information screen



Fig :Hyderabad MMTS schedule.

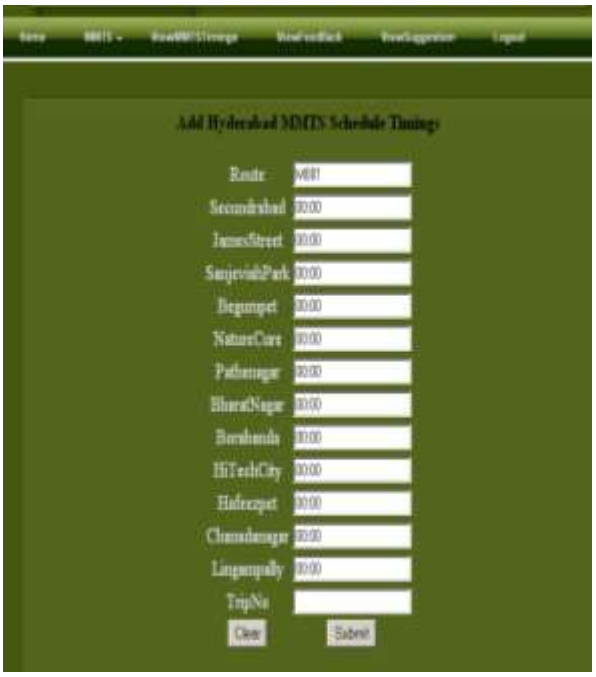


Fig :MMTS schedule timing

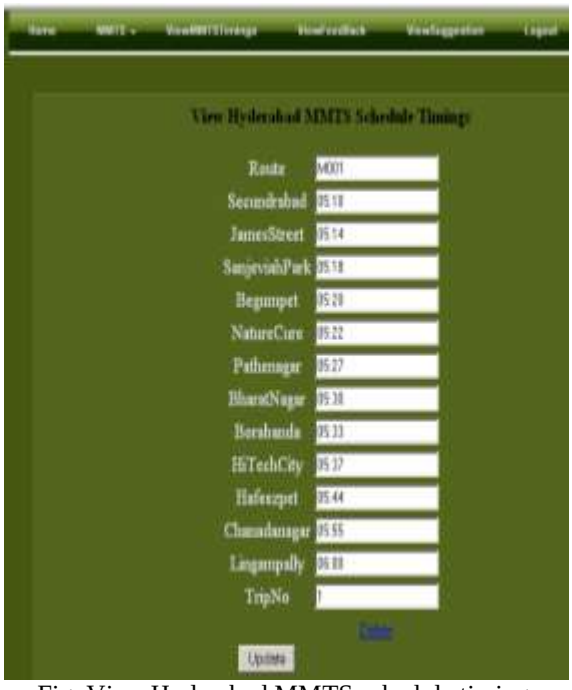


Fig :View Hyderabad MMTS schedule timing.

V. CONCLUSION

The public transportation portal for commuters was successfully designed and is tested for accuracy and quality. During this portal implementation, we have accomplished all the objectives and this project meets the needs of the organization. The development will be used in searching, retrieving, and generating information for the concerned



requests. The goals achieved in this portal are easy retrieval of information, User-friendly screens to enter the data, Portable and flexible for further enhancement, Web-enabled and it finds fast information related to public transport according to the user choice. There are some future Enhancements can be possible like as the technology emerges, it is possible to upgrade the system and can be adaptable to desired environment. Based on the future security issues, security can be improved using emerging technologies and an App can be developed using the same features. The impacts of environmental alter are on everybody's perspectives with governments and world pioneers attempting to think of economical recommendations [7]

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AUTHORS

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