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Design of an Electronic Web-Based Reservation System for Nigeria Railway Corporation

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ABSTRACT

Nigeria has witnessed a new face shift in railway system which is believed it would improve our transportation system. Despite this returns, passengers are poised with challenge of getting to the terminus before booking for ticket to their various destinations. This traditional method system is seen to be deficient because it is not economical and efficient. Considering these deficiencies and many others problems associated with this method of reservation in railway system, this research work therefore developed a web based reservation system which will eliminate the tedious experience of reaching the terminus before booking for reservation. The overall aim of this research work is to design railway customer's satisfaction by implementing a web based application system in order for passengers to make reservation for railway. This will likewise enhance the services provided by the railway station to passengers from Lagos to Ibadan. The project provides new methods, processes and algorithms that will enable railway undertakings and their services to significantly increase and be more readily available to passengers at all time. The system developed is believed to improve management of the flow of traffic through bottlenecks by minimizing track occupancy times. This will be addressed through improved timetabling techniques and real-time traffic management. Also this will reduce overall delays through improved planning techniques that provide robust and resilient timetables capable of coping with normal statistical variations in operations and minor perturbations.

Keywords: Railway, booking, route, passenger, cost, reservation, ticketing, management, rail line

1. INTRODUCTION

Rail route framework assumes a critical part in the turn of events and generally development of any economy. It is regularly viewed as the wheels of monetary movement on account of the urgent job it play in giving the rampart whereupon creation and appropriation stand. It opens up districts, hinterlands and provincial regions by working with rural improvement as well as the development of cabin and huge scope ventures. It additionally draws in private, business, instructive and sporting settlements and advancements around its hall. Because of the job it acts in development and advancement process, rail transport is viewed as the centralized computer around which a coordinated public vehicle framework is assembled. Its ability, which is additionally complemented by its wellbeing and security factors, combined with its capacity to travel longer distance easily and lower unit costs, places it in great stead to fill in as the center of a vehicle arrangement of a country (Nwanze, 2002).

Rail transport affects the advancement of the nations where they exist (Kolars and Malin, 1970). Rowstow (1960) portrayed rail transport as generally the most impressive single initiators of financial take off, being a primary power in the enlarging of business sectors and an essential to growing the product area. Hilling (1996) additionally saw that rail transport gives the main option in contrast to human doorman age and carried with them some financial benefit.

Early rail lines were basic to the advancement of business, the extension of business horticulture and the excitement of settlement development. The rail lines turned into the zone of monetary movement, and the rail heads were the central focuses for the development of repayments and financial information and result (O'Connor, 1965). In spite of this noticed turn of events and commitments which rail line has brought to the financial advancement of Nigeria and the world overall, it is as yet wasteful in the means by which trip reservation are made. That is, all data with respect to trip reservation, trip cost, trip planning and so forth are just accessible at the rail line station and travelers should observe their course to the station before they can acquire any data as respect reservation. This demonstrates that Nigeria as a non-industrial nation is as yet lingering behind a result of this manual strategy for getting data as respects travelers' outing. This noticed shortcoming requires and was the thought process behind this review.

Rail line transport is a method of transportation of travelers and products, via wheeled vehicles running on rails. It is additionally normally alluded to as prepare transport. Rather than street transport, where vehicles just sudden spike in demand for a pre-arranged surface, rail vehicles are additionally directionally directed by the tracks on which they run. Track as a rule comprises of steel rails introduced on sleepers/ties and counterbalance, on which the moving stock, generally fitted with metal wheels, moves. Notwithstanding, different varieties are likewise conceivable, for example, section track where the rails are attached to a substantial groundwork laying on an arranged subsurface.

Moving stock in rail route reservation frameworks for the most part has lower frictional obstruction when contrasted and thruway vehicles and the traveler and cargo vehicles (carriages and carts) can be coupled into longer trains. The activity is done by a rail line organization, giving vehicle between train stations or cargo client offices. Power is given by trains which either draw electrical power from a rail route zap framework or produce their own power, for the most part by diesel motors. Most tracks are joined by a flagging framework. Rail routes are a protected land transport framework when contrasted with different types of transport. Rail line transport is able to do elevated degrees of traveler and freight use and energy productivity, yet is frequently not so much adaptable but rather more capital-serious than thruway transport is, when lower traffic levels are thought of.

Railroad frameworks are seen decidedly by residents and policymakers all over the planet due to their effect on portability, their capability to further develop land use and improvement in metropolitan communities (for example less land dispensed to stopping and prospects for travel situated advancement around rail route stations), and due to rail's somewhat low natural impression when contrasted with other vehicle modes. Because of these apparent advantages and others, state run administrations are regularly exceptionally involved and monetarily drew in partners of rail lines. Notwithstanding, this undertaking was planned in a bid to change the manual reservation technique into an electronic online reservation framework (e-WEBRESY). In addition the planned situation will likewise kill the thoroughness of going to the railroad terminal before trip reservation is made. This e-electronic reservation is strong, give travelers the potential chance to reschedule trip reservation and too save time.

2. LITERATURE REVIEW

2.1 Verifiable Background of Railway

The earliest proof of a railroad was a 6-kilometer (3.7 mi) Diolkos wagon way, which moved boats across the Corinth isthmus in Greece during the sixth century BC. Trucks moved by slaves ran in grooves in limestone, which gave the track component. The Diolkos ran for more than 600 years. Railroads started returning in Europe after the Dark Ages. The earliest known record of a railroad in Europe from this period is a stained-glass window in the Minster of Freiburg in Breisgau in Germany, dating from around 1350. In 1515, Cardinal Matthäus Lang composed a portrayal of the Reisszug, a funicular rail route at the Hohensalzburg Castle in Austria. The line initially utilized wooden rails and a hemp haulage rope, and was worked by human or creature power. The line actually exists, though in refreshed structure, and is probably the most seasoned railroad still to operate.

By 1550; restricted measure rail lines with wooden rails were normal in mines in Europe. By the seventeenth century, wooden wagonways were normal in the United Kingdom for moving coal from mines to channel wharfs for parcel to boats. The world's most seasoned working railroad, worked in 1758, is the Middleton Railway in Leeds. In 1764, the principal gravity railroad in the United States was underlying Lewiston, New York. The primary extremely durable tramway was the Leiper Railroad in 1810. The first iron plate rail route made with fashioned iron plates on top of wooden rails, was taken into utilization in 1768. This permitted a variety of check to be utilized. At first just inflatable circles could be utilized for turning, yet later, mobile focuses were taken into utilization that considered exchanging. From the 1790s, iron edge rails started to show up in the United Kingdom.

In 1803, William Jessop opened the Surrey Iron Railway in south London, ostensibly the world's first pony drawn public railroad. The innovation of the fashioned iron rail by John Birkinshaw in 1820 permitted the short, fragile, and frequently lopsided, cast iron rails to be reached out to 15 feet (4.6 m) lengths. These were prevailed by steel in 1857. The improvement of the steam train during the Industrial Revolution in the United Kingdom prodded thoughts for portable steam trains that could pull trains on tracks. James Watt's licensed steam motors of 1769 (overhauled in 1782) were weighty low-pressure motors which were not reasonable for use in trains. Be that as it may, in 1804, utilizing high-pressure steam, Richard Trevithick showed the principal train pulled train in Merthyr Tydfil, United Kingdom. Went with Andrew Vivian, it ran with blended achievement, breaking a portion of the fragile cast-iron plates. After two years, the main traveler horse-drawn rail route was opened close by among Swansea and Mumbles.

In 1811, John Blenkinsopp planned the main effective and useful rail line train a rack railroad worked by a steam train between Middleton Colliery and Leeds on the Middleton Railway. The train, Salamanca, was constructed the next year. In 1825, George Stephenson constructed the Locomotion for the Stockton and Darlington Railway, north east England, which was the main public steam rail route on the planet. In 1829, he fabricated The Rocket which was placed in and won the Rain slope Trials. This achievement prompted Stephenson laying out his organization as the pre-famous developer of steam trains utilized on railroads in the United Kingdom, the United States and quite a bit of Europe. In 1830, the principal intercity rail line, the Liverpool and Manchester Railway, opened. The measure was that utilized for the early wagonways and had been embraced for the Stockton and Darlington Railway. The 1,435 mm (4 ft 8 1/2 in) width became known as the worldwide standard measure, utilized by around 60% of the world's railroads. This prodded the spread of rail transport outside the UK.

By the mid 1850s Britain had more than 7,000 miles of rail route, a dazzling accomplishment given that main twenty years had passed since the launch of the Liverpool and Manchester Railway. Railways (as they are known in the US) were based on a far bigger scope than those in Continental Europe, both as far as the distances canvassed and furthermore in the stacking measure took on, which considered heavier trains and twofold deck trains. The railroad time in the United States started in 1830 when Peter Cooper's train, Tom Thumb, first steamed along 13 miles (21 km) of Baltimore and Ohio railroad track. In 1833, the country's subsequent railroad ran 136 miles (219 km) from Charleston to Hamburg in South Carolina. Not until the 1850s, however, did railways offer significant distance administration at sensible rates. An excursion from Philadelphia to Charleston included eight distinct checks, which implied that travelers and cargo needed to change trains multiple times. Just at places like Bowling Green, Kentucky, the rail lines were associated with each other.

The Baltimore and Ohio Railroad that opened in 1830 was quick to develop from a solitary line to an organization in the United States. By 1831, a steam railroad associated Albany and Schenectady, New York, a distance of 16 miles, which was canvassed in a short time. The years somewhere in the range of 1850 and 1890 saw amazing development in the US railroad framework, which at its pinnacle comprised 33% of the world's absolute mileage. Albeit the American Civil War set a brief end to major new turns of events, the contention showed the tremendous vital significance of rail routes now and again of war. After the conflict, significant advancements incorporate the principal raised rail route worked in New York in 1867 as well as the emblematically significant first cross-country railroad finished in 1869.

2.2 Outline of Components of Railway Transportation

A rail route can be separated into two significant parts. Fundamentally these are the things which "move", the moving stock, that is the trains, traveler conveying vehicles (mentors), cargo conveying vehicles (products carts/cargo vehicles) and those which are "fixed", as a rule alluded to as its framework. This classification incorporates the super durable way (tracks) and structures (stations, cargo offices, viaducts and passages) (Wikipedia Foundation, 2009). The activity of the railroad is through an arrangement of control, initially by mechanical means, yet these days all the more generally electronic and modernized. Flagging frameworks used to control the development of traffic might be both of fixed block or moving square assortment. Most squares are 'fixed' blocks, that is to say, they depict a segment of track between two characterized places. On plan, train request, and token based frameworks, hinders generally start and end at chosen stations. On flagging based frameworks, impedes normally start and end at signals. Then again, taxi flagging might be being used. The lengths of squares are intended to permit trains to work as oftentimes as the need should arise. A daintily utilized branch line could have blocks numerous kilometers long, while a bustling suburbanite rail route could have blocks a couple hundred meters in length.

Hindrance of fixed blocks is that the quicker prepares are allowed to run, the more drawn out the halting distance, and subsequently the more extended the squares should be. This diminishes a line's ability. With moving square, PCs are utilized to work out a 'protected zone', behind each moving train, which no other train might enter. The framework relies upon exact information on where each train is and the way in which quick it is moving. With moving square, lineside signals are not given, and guidelines are passed direct to the trains. It enjoys the benefit of expanding track limit by permitting trains to run a lot nearer together. Most rail frameworks serve various capacities on a similar track, conveying neighborhood, significant distance and suburbanite traveler trains, and cargo trains.

The accentuation on each fluctuates by country. Some metropolitan rail travel, quick travel and light rail frameworks are disconnected from the public framework in the urban communities they serve. Some cargo lines serving mines are additionally confined, and these are generally possessed by the mine organization. A modern rail line is a particular rail framework utilized inside plants or mines. Mountain rail routes are typically confined, with exceptional wellbeing frameworks (Wikipedia Foundation, 2009).

Cargo or freight trains are stacked and dumped in multi-purpose terminals (additionally called compartment cargo stations or cargo terminals), and at client areas (for example mines, grain lifts, manufacturing plants). Multi-purpose cargo transport uses normalized holders which are dealt with by cranes. Along their courses, cargo trains are steered through rail yards to sort vehicles and gather trains for their last objections, as well with respect to gear support, refueling, and team changes (Wikipedia Foundation, 2009). Inside a cargo yard, trains are made in an order yard. A unit train (additionally called a square train), which conveys a square of vehicles the entirety of a similar beginning and objective, doesn't get arranged in an order yard, yet may stop in a cargo yard for review, motor overhauling or potentially group changes.

2.3 The Importance of Railway Transport to National Development

Rail transport has keeps on assuming a synergist part in achieving financial improvement in such countless nations of the world. It has contributes massively to the portability of travelers and cargo. To be sure, railroads can give the most savvy, reasonable, energy saving and harmless to the ecosystem type of transport, when traffic densities are high. When appropriately incorporated with different methods of transport, monetary degrees of traffic can be merged to empower the rail route to offer proficient types of assistance for high thickness streams of homogenous traffic persisted somewhat significant distances, including high volumes of containerized freight or mass cargo like oil, coal, steel or agrarian produce. Railroad transport could be energy adaptable and energy effective, when electric foothold is utilized.

Rail transport is additionally a significant mode for traveler transport. Suburbanite traffic by rail for instance is vital for keep urban areas available. Consequently, numerous urban areas, especially in the created world keep on creating different types of rail transport (metros, Light rail travel, transport) to redirect traffic to the rail and somewhat lessen blockage on city streets, etc.

2.4 Related Works

A few examinations were made by various specialists presenting different planned model and applications to insist the effect of railroads transportation to economy improvement. According to Abubakar et al. (2020) Transportation can be alluded to as the development of individuals, merchandise, and administrations from one area to another. This can be accomplished through the different methods of transportation for example by water, air, street, rail and so on. These days, Passenger reservations are completed with the utilization of tickets. This study is focused on creating programming which automates the cycles of getting travel ticket at the Nigerian rail line enterprise. The product is intended to be online and has both frontend and backend; the frontend was worked with User Interface improvement structures (Bootfaces, Primefaces, and Facelet), the backend was designed with MySQL server (Xampp). Java Programming Language was utilized to compose the hidden codes for conveying between the frontend and the backend.

In this review, Document Review and Interview were utilized as the strategy for information assortment, Waterfall Model was utilized as the product improvement model, Data gathered were dissected to plan the proposed framework lastly, useful programming is created. The product created was tried with adequate test information and viewed as exact and steady. As indicated by Herranz-Loncán (2011) talked about the job of railroads in trade drove development of Uruguayan economy somewhere in the range of 1870 and 1913. The outcomes showed that Uruguayan rail routes created a few positive results. They assisted with coordinating the public market while additionally advancing the political and managerial unification of the country.

As indicated by Atack et. al. (2009) researched whether railroad initiated or followed monetary development in the American Midwest for the period 1850-1860. Utilizing a recently evolved GIS transportation data set, the review inspected the topic, zeroing in on two signs of more extensive monetary change, populace thickness and the small part of populace living in metropolitan regions. The distinction in contrasts gauges (upheld by IV vigor checks) unequivocally propose that the approaching of the railroad had next to zero effect upon populace densities similarly as Albert Fishlow finished up around 40 years prior. Nonetheless, the outcomes likewise infer that the railroad was the justification for Midwestern urbanization, representing the greater part of the expansion in the negligible portion of populace living in metropolitan regions during the 1850s.

Bollinger and Ihlanfeldt (1997) likewise confirm the effect of rail transport on monetary improvement by utilizing a synchronous model of evaluation plot populace and work to concentrate on the financial effects of Atlanta's MARTA rail travel framework for the period 1980-1990. The outcomes demonstrated that MARTA perceivably affects all out populace or work in station regions, however it has modified the arrangement of work there for the public area.

3. METHODOLOGY

3.1 Research Tools:

This includes having a dynamic website with a good computer system and required configuration in order to deploy the developed web application system. Therefore, for this research work, the following software tools were employed;

(a) Webserver

The Web server is the software product that conveys Web pages to the world. Whenever texts are typed in a URL of a Web program, the user is making an impression on the Web server at that URL, requesting that it send an HTML document. The Web server answers by sending the mentioned record. The program peruses the HTML record and shows the Web page. In addition, there is a demand that Web server to send a document when a click is made to a connection in a Web page. Also, the Web server processes a record when click a Web page button that presents a structure. The PHP programming works with the Web server. Whenever PHP is introduced, the Web server is designed to anticipate that specific document expansions should contain PHP language proclamations. Regularly the extension is .php or .phtml. However any augmentation can be utilized. At the point when the Web server gets a solicitation for a record with the assigned expansion, it sends the HTML articulations with no guarantees; however PHP proclamations are handled by the PHP programming before they're shipped off the requester.

At the point when PHP language explanations are handled, just the result is sent by the Web server to the Web program. The PHP language explanations are excluded from the result shipped off the program, so the PHP code is secure and straightforward to the client. PHP isn't coordinated with all Web servers yet takes care of business with a significant number of the well-known Web servers.

(b) MySQL

The RDBMS (Relational Database Management System) that will store information for the Web database application and

(c) PHP

The scripting language that was used to write the programs that provide the dynamic functionality the developed Website. PHP stands for PHP: HyperText Preprocessor and it is a scripting language designed specifically for use on the Web, is your tool for creating dynamic Web pages. Rich in features that make Web design and programming easier, PHP is in use on more than 20 million domains (according to the Netcraft survey at www.php.net/usage.php). Its popularity continues to grow, so it must be fulfilling its function pretty well.

3.2 Framework Of The Developed Web-Based Reservation System

We present below a framework for the web-based reservation system

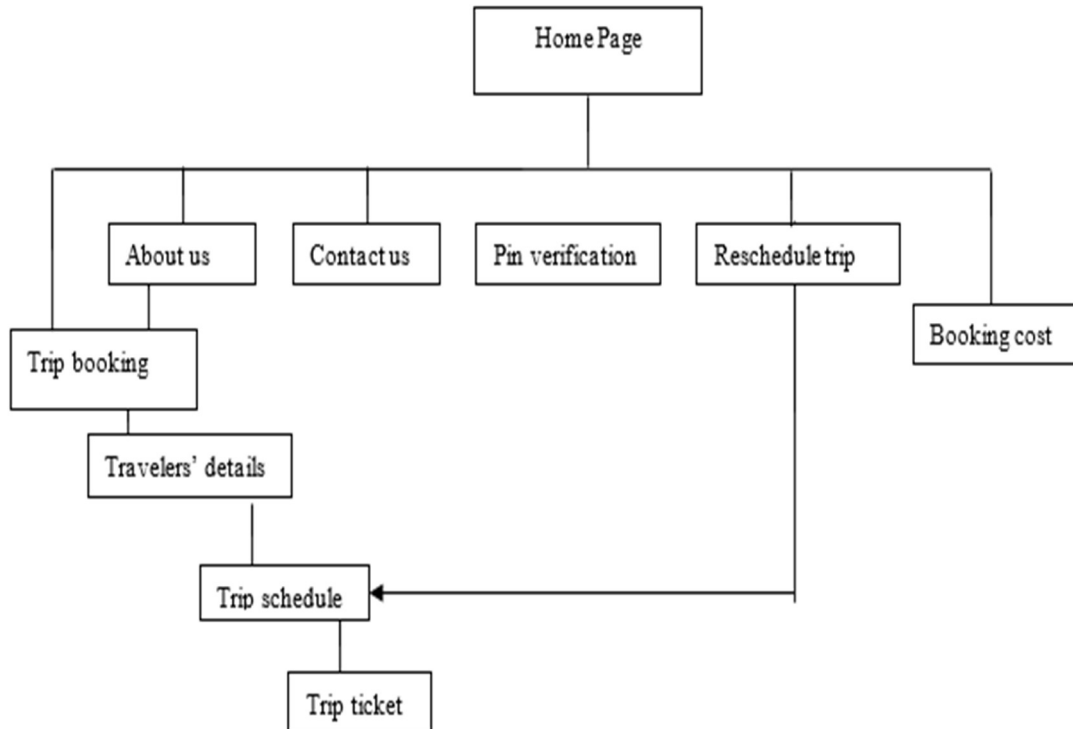
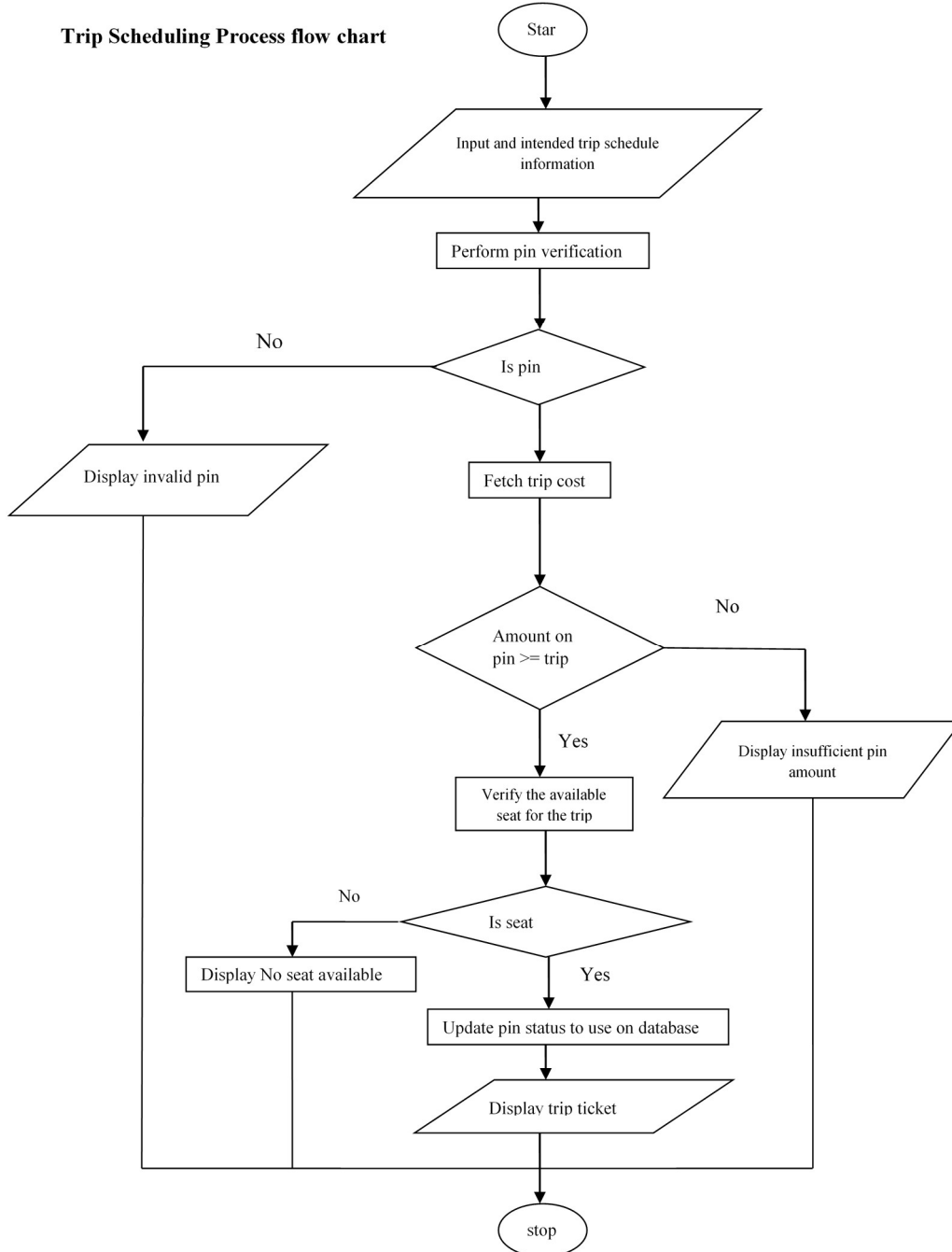


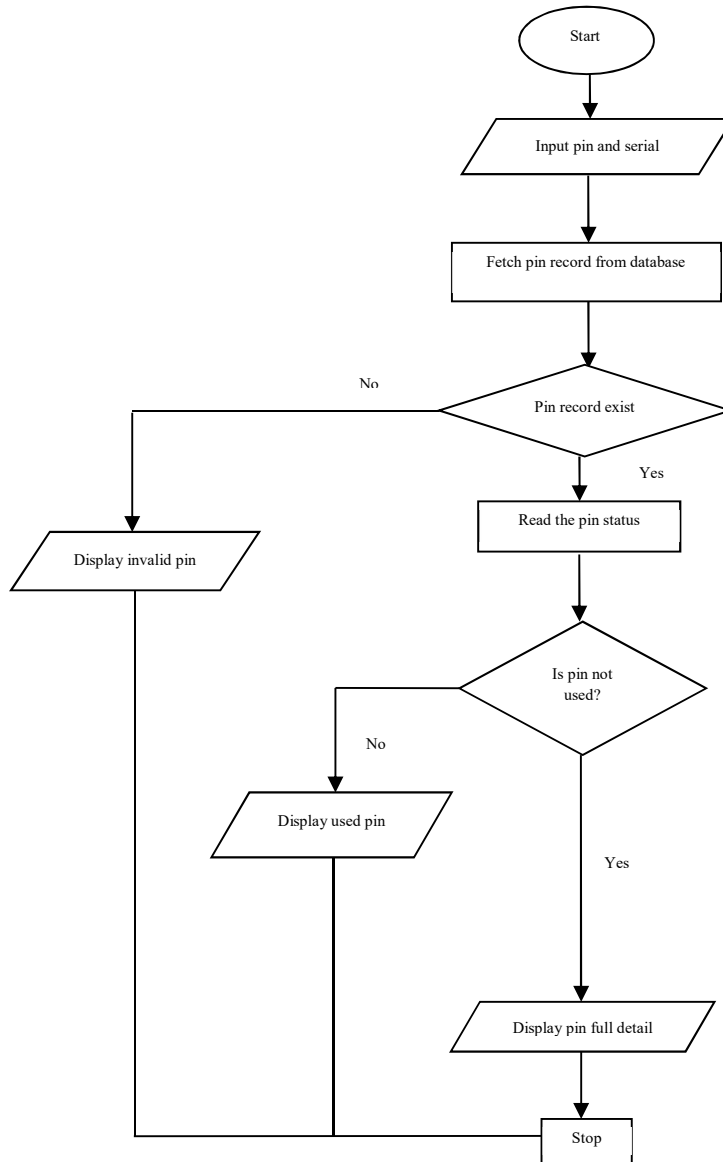
Fig 1: Framework of The Developed Web-Based Reservation System

3.3 Flowchart of the Developed Web based Reservation System

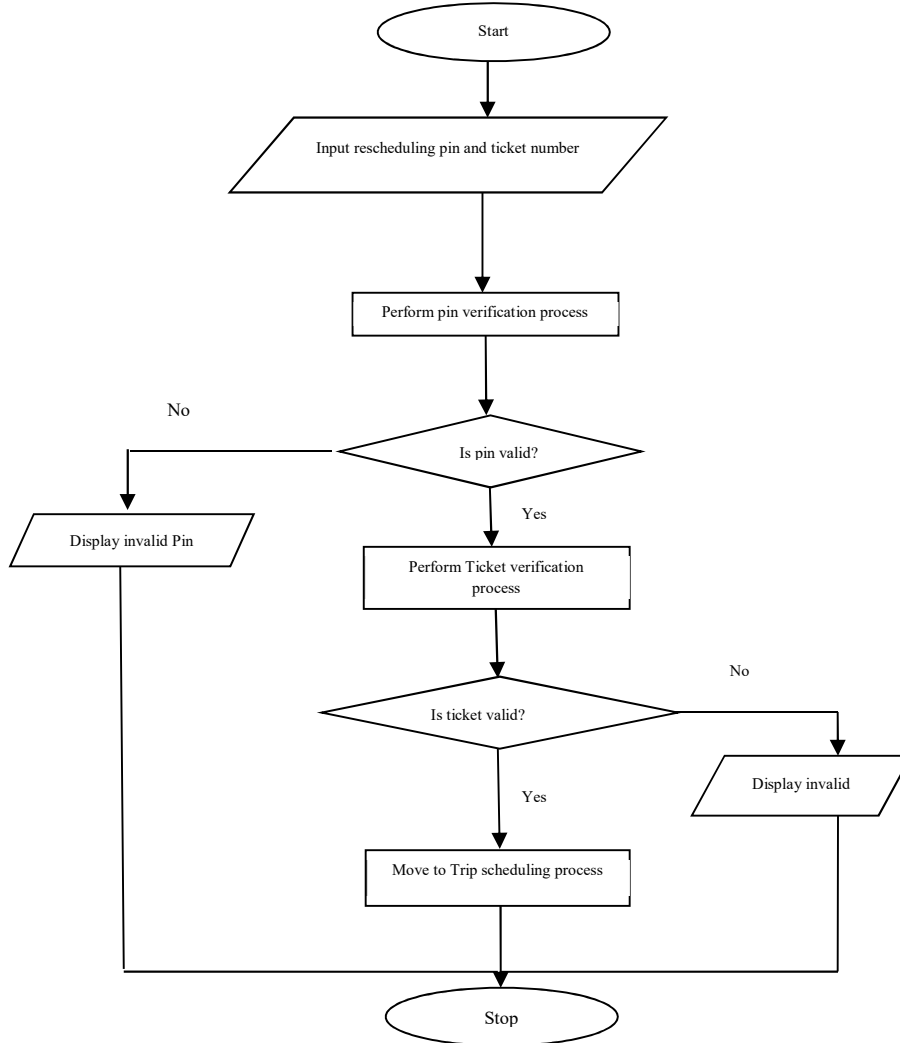
The figure below depict the flowchart of the developed we base reservation system. This chart explains different stages of booking for a trip by passengers.



3.6 Pin Verification Process flow



3.7 Flow chart of Trip Rescheduling Process



4. SYSTEM DESIGN

4.1 System Requirement

4.1.1 Hardware Requirement

Development a stand-alone application makes the hardware requirement at very minimal level. That is it requires not much hardware requirement. A system with a speed 400MHZ of processor speed, 128MB of RAM and hard disk of 50GB is required for the program processes. Meanwhile higher system results better and faster operation on the system.

4.1.2 Software Requirement

The major application required to run this software is a web application. The application was developed on a Windows Vista environment, it also run fine with other operating system like Windows and Mac Operating System.

4.1.3 Implementation.

Each module would be review briefly on by one to really see how each module was implemented.

Screen Shoots: The figures below depict the screenshots of various interfaces of the developed web based reservation system in which the passengers can access for trip bookings.

4.2.1 The index page

The is the page that consists of other menu in which passengers can use for their ticket bookings.



Fig. 4.2.1: The Index Page

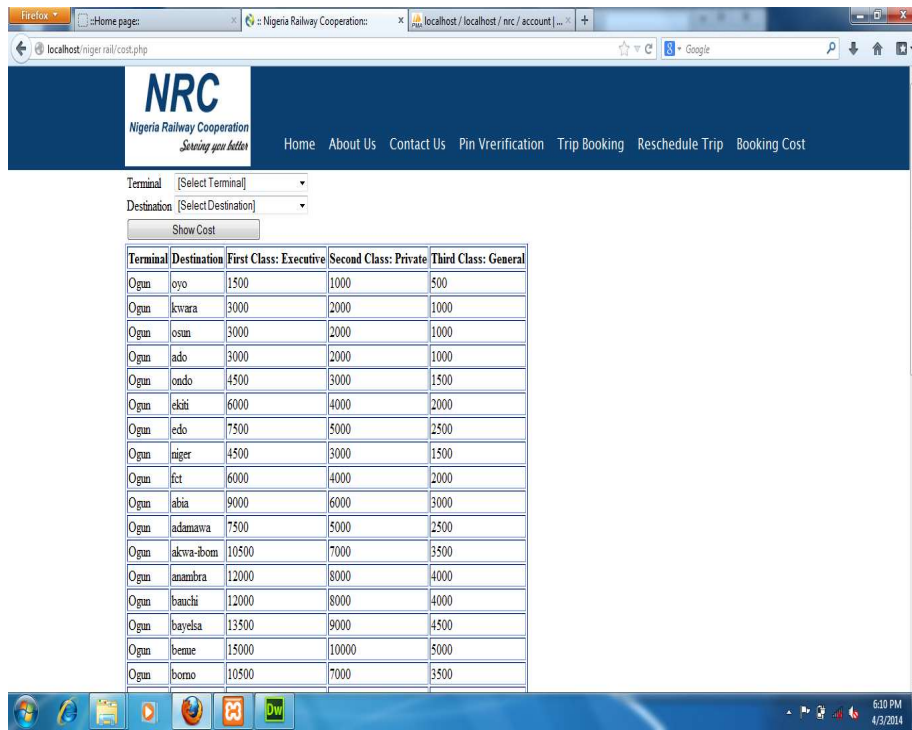


Fig 4.2.2: The trip Booking Cost Page

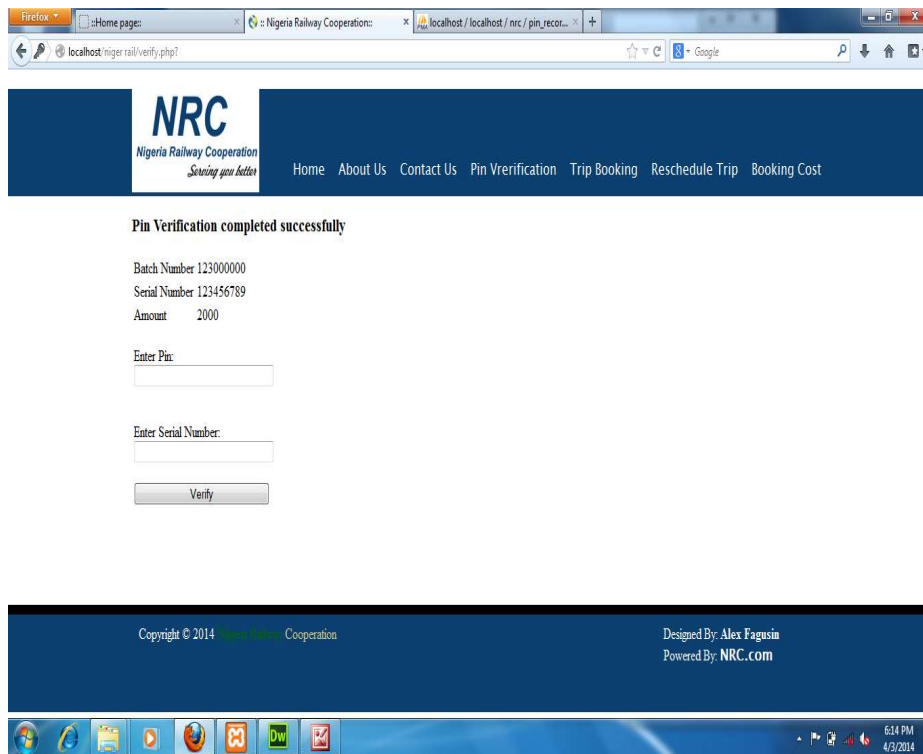


Fig 4.2.3: The Pin Verification Page

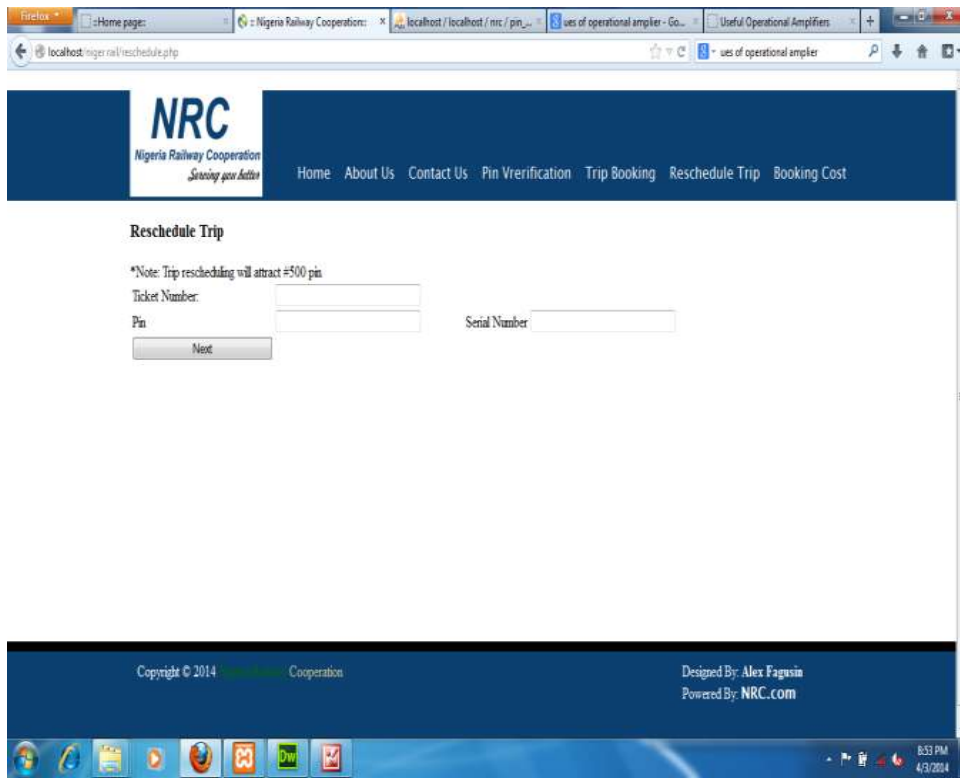


Fig. 4.2.4: Trip Rescheduling Payment Page

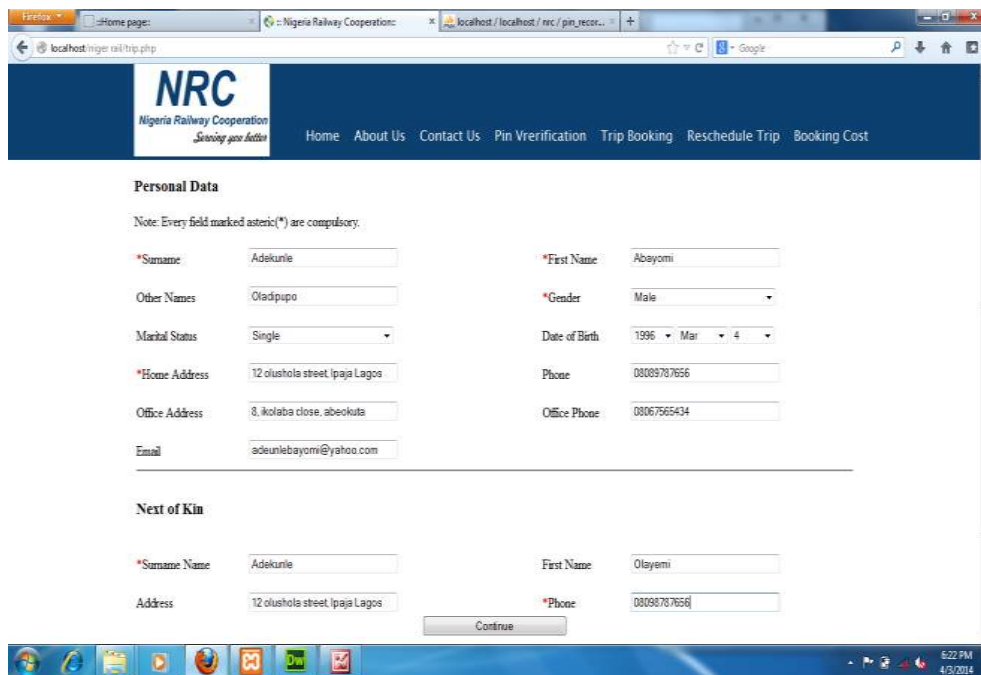


Fig. 4.2.5: Trip Booking (Personal Data)

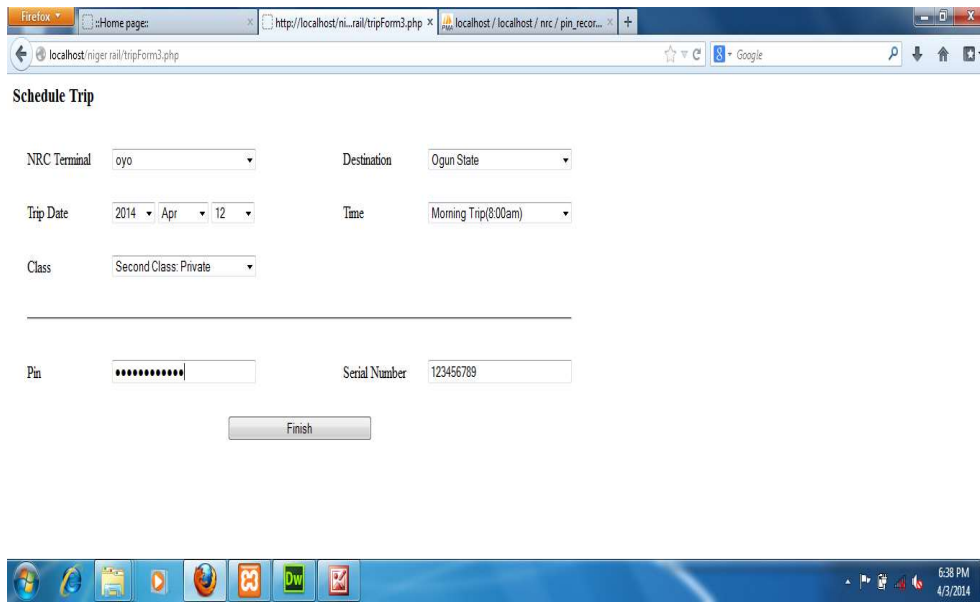


Fig. 4.2.6 Trip Booking (Scheduling)



Fig. 4.2.67 Trip Booking (Confirmation)

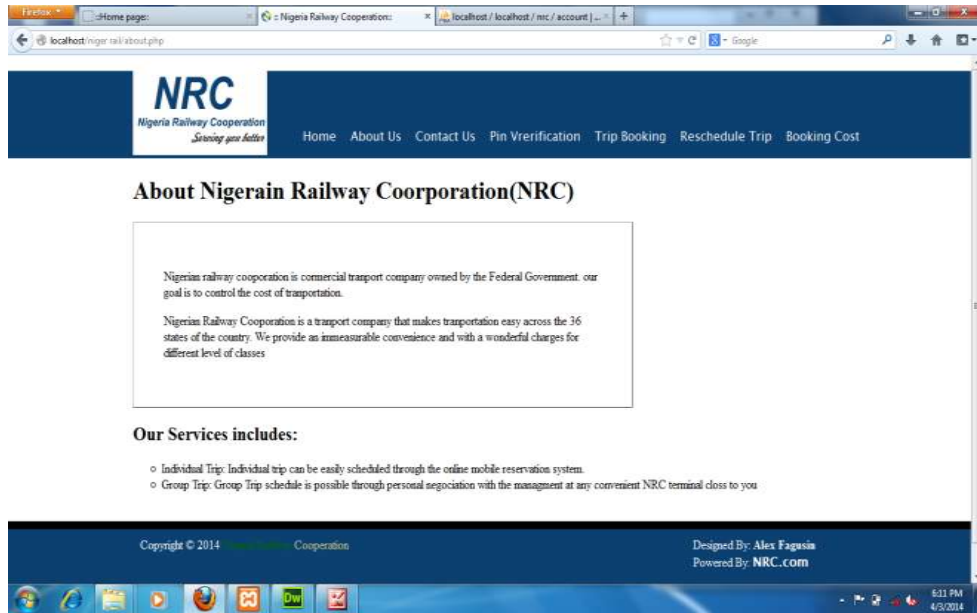


Fig. 4.2.8: The About us Page

5. CONCLUDNG REMARK

The developed reservation system provides the following benefits among others; Electronic Payment of trip reservation and Pricing, Traveler Information, rescheduling of trip reservation among others and this was developed in a bid to provide electronic, improvised and alternate/or substitute means of trip reservation in railway transport system.

It is a gainsaying that the web based reservation system was able to improve the service delivered by the railway management by serving as alternate to the usual manual method of reservation by passengers.

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