Research Paper

Emerging trends for integrating web application to develop smart phone application for android: A case study of Nigerian travel guide android application to promote tourism attraction places.

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ABSTRACT

This article is purposely to design and implement an android application that can be used by android smart devices. The application consists of many exciting features that will impress user with use of latest technology to design it. However; data were collected through research methodology of enquiry mode and application. For enquiry mode, data were collected as quantitative from questionnaire. While the application mode; goes with analysis and survey as applied research. For overall conclusion, testing were carried out on unite testing and integration testing. This is to verify and validate basic feature of the system entirely, it was tested certified the requirements. Thus; feature enhancement needs to be carried out in subsequent project, in conclusion this research certified the requirements.

Key words: Smart phone application, tourism, android OS, internet, web application.
INTRODUCTION

This article with titled Travel guide android application for Nigeria is a (web application); that will be designed from methodology concept through analysis and specification to achieve the project completion. This project research and analysis comprises of requirements that are splits into sub section in other to gain well sympathetic of the project work done. While research methodology will be used to collect the exact requirements of the system satisfaction from customer needs.

Aims: The essential purposes of this article of develop a travel guide system Using Android Phone Application. The Application Software could be worked or utilized on any real Smartphones that is fit for using Android Platform for a tour guide system.

Objectives: Main objective is to create an automated system that will be installing in smart phone for users to access details on travel guide Nigeria. Taking android is more suitable for the project due to high number of android users. These are, developing system that can supports all android OS version, application with less memory space, synchronised system serving dual purpose of mobile and web application and get halal food restaurant, hotels map and adequate information.

PROBLEM STATEMENTS:

The major factors of problem statements of usability, load and performance, lack of information, alert response and communication band width could hinder the research from achieving the main objective of it. These problems are describe with risk involve and solution for the problems. Analysis had shown with the smart phone anticipated that will surpass the business of Smartphone within a brief span of time and the general shipment of Smartphone determined to achieve 400 million by 2014 (Adolph, 2009), there is no better platform to create the travel guide application other than the Android.

CHALLENGES OF TOURISM IN NIGERIA DUE TO LACK OF INFORMATION:

Introduction: Nigeria is a nation with around a million square kilometres of landmass, favoured with undiscovered regular, human and tourism assets. Human exercises influencing the area are prompting frailty and fretfulness, which thusly is affecting
visitor stream. Discoveries demonstrate that land corruption, disintegration, desertification, oil spillage, gas flaring, deforestation, low yield, joblessness, financial and political turmoil are all key issues that effect on tourism. This article hence reasons that unless human exercises start to join the naturally capable approaches and movements, Nigeria will not succeed as per its potential. Early government and Non-Governmental organisation (NGO) intercession with the United Nations resolutions on environmental change furthermore tourism best practices are obliged to attain feasible tourism advancement in the nation, (written by Munzali A Dantata, 2013 Article on Meeting the challenges of climate change to Nigeria).

**Background:** Nigeria covers a sum of 923,768km² along the West African Gulf of Guinea and is an essential focal point of biodiversity with tropical rainforest, beachfront fields, and man grove and savannah zones. Its populace of 150 million makes it the most crowded nation of Africa. Nigeria’s economy is basically focused around petroleum with generally high development rates in both trade and industry. Populace blast has prompted a high rate of urbanization also material utilization that, together with mining and modern action, has prompted a nature’s domain as per the World Travel and Tourism Council (WTTC), travel and tourism incomes in 2007 were $10.67 billion in 2007 expanding to $12.35 billion in 2008. Travel also tourism obviously has amazing prospects for development in Nigeria and ought to be urged to supplement the petroleum business as a wellspring of income and outside trade, (Meeting the challenges of climate change to tourism Nigeria experience, 2013).

**Strategic approach:** Maintainable tourism improvement should additionally be connected to the administration’s general arrangement of improvement through institutional limit building. The advancement of a dynamic and economical tourism industry will rest on a scope of activities and execution forms. Nigeria’s tourism expert arrangement gives key proposals from which the activity and execution system can develop and incorporates. The works of Balmford, Bereford, Nadoo, Walpole, and Manica (2009) with further reference to Buckley (2009) and Volume II of the UNWTO’s Nigeria Tourism Advancement Master Plan (2006) tended to the issues recognized above, and decided the techniques and moves government must make if tourism is to turn into a productive and manageable financial movement.
TOURISM AND THE SMARTPHONE APPLICATION CAPABILITIES:

**Travel with smartphone:** Taking into account of computing abilities and smart phone application, the smart phone has quickly been received as a tourism travel instrument. With a developing number of clients and a wide mixture of uses developing, the smart phone is in a broad sense modifying our current utilization and understanding of the transport system and tourism travel. In view of a survey of smart phone applications, this research assesses the current functionalities utilized as a part of the household tourism travel area and highlights where the following significant improvements. (Norgate, S. (2014) Tourism and smart phone).

**Smart phone Application capabilities:** As the world become networked, and systems have gotten general through the use of smart phones, social practices are experiencing a radical conversion, none more so than in the space of travel. The fast uptake of portable engineering (Ofcom, 2011) has empowered individuals to arrange their everyday flexibility with expanding smoothness (Ling, 2004) giving extension to abhor choice making on the go focused around organized integration between individuals.

**THE SMART PHONE APPLICATION AND TOURISM MOBILITY IMPORTANCE:**

UK figures at the begin of 2011 show 27 per cent of grown-ups own smart phones and there is developing enthusiasm toward mobile Internet access for capacities, for example, long range informal communication (57% of mobile Internet clients), sending/accepting messages (53%) and data look (42%), (Ofcom 2011). The business sector is relied upon to develop, particularly as mid-extend and low-end 3 cell phones focus on the mass business. Campbell and Kwak (2011) classify smart phone use into three examples: logistical, for instance, authoritative use identified with travel, family unit administration and gatherings; social, for instance, staying in contact with companions; and instructive, for instance, getting to news updates. All of which are appropriate to tourism travel connections. (Norgate, S. (2014) Tourism and smart phone).
Fig1. Smart phone usage in Nigeria

NIGERIA ECONOMIC PROFILE ON TRAVEL AND TOURISM GDP

<table>
<thead>
<tr>
<th>Key indicators</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (millions), 2011</td>
<td>163.1</td>
</tr>
<tr>
<td>Surface area (1,000 square kilometers), 2011</td>
<td>9,638,8</td>
</tr>
<tr>
<td>Gross domestic product (current US$ billions), 2011</td>
<td>244.1</td>
</tr>
<tr>
<td>Gross domestic product (current PPP, B per capita), 2011</td>
<td>2,682.2</td>
</tr>
<tr>
<td>Real GDP growth (percent), 2011</td>
<td>7.4</td>
</tr>
<tr>
<td>Environmental Performance Index (EPI) 2012, rank (out of 152 economies), 2011</td>
<td>119</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Travel &amp; Tourism indicators</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;T industry GDP (US$ millions)</td>
<td>$4,290.5</td>
</tr>
<tr>
<td>T&amp;T industry employment (1,000 jobs)</td>
<td>867.4</td>
</tr>
<tr>
<td>T&amp;T industry GDP (current US$ billions)</td>
<td>1.7</td>
</tr>
<tr>
<td>T&amp;T industry employment (1,000 jobs)</td>
<td>14.1</td>
</tr>
<tr>
<td>T&amp;T industry GDP growth forecast (2015-2025)</td>
<td>6.3</td>
</tr>
<tr>
<td>T&amp;T industry GDP growth forecast (2015-2025)</td>
<td>3.7</td>
</tr>
<tr>
<td>T&amp;T industry GDP growth forecast (2015-2025)</td>
<td></td>
</tr>
<tr>
<td>International tourist arrivals (thousands), 2011</td>
<td>715.0</td>
</tr>
<tr>
<td>International tourism receipts (US$, millions), 2011</td>
<td>628.4</td>
</tr>
</tbody>
</table>

Fig2. GDP graph for Nigerian tourism

From the graph given on Nigeria economic profile, the GDP level can be increase by investing more on tourism industry. Taking into account of this article on travel guide Nigeria can boost more on the economy that Nigeria depends on crude oil. Many countries are generation lot revenue through tourism example Malaysia.

REVIEW ON RELATED EXISTING SYSTEMS:
1. Travel guide India application review: Travel Guide India offers you finish and avant-garde city guide for different tourist places in India. This application is completely based after giving you the genuine data from different sources, "It will direct you through the UNSEEN spots of different state of India." The application will examine some more places that you won’t get in any sort of Traveling application. This application will additionally help you to get data about traveling places, religious going by spots and a lot of people more. We have given the area of the going to places, Hotels for lodgings, shopping spots for that range. Some piece of the application use Internet and some don't. So it would be a good guide on the off chance that you want to visit INDIA, (Four orange technologies, July 2 2014).

Fig3. Travel guide India

Features:

- List of tourism places at each state.
- Nearby shopping spots and hotels
- Domestic and international airport information
- Metro route for Delhi and Kolkata route.
- Calculate distance between each route.

2. Positioning system application review: System design consideration: We start by plotting the five outline issues that must be considered in positioning system on travel guide application. We then continue to examine architectural subtle elements of three practical modules to positioning system, specifically identifying, processing, and storing of data.
Design issue: Before undertaking to an examination of the outline of a RSS-based positioning system in point of interest, let us give a review of two key configuration challenges in this application.

LATEST TREND FOR TRAVEL GUIDE NIGERIA ARCHITECTURE DIAGRAM:

After reviewing the existing system, the literature review have provides a vital source on the article to accomplish for bringing an additional feature which is not available for the previous existing systems. The system architectural diagram described how the proposed system will function, the latest trends of this system is serving for two purpose of; one as mobile application and secondly as web application. Therefore they are synchronized to serve the same function.

PROBLEMS WITH ANDROID APPLICATION
According to (James Steele 2010) describe lack of documentation is a problem related to android, this could be because of the fast improvement and changes of the Android stage, which outpaced its expert and scholastic audits. Thus, creating application for Android is still a challengeable project to most developer, particularly new personnel. An alternate conceivable problem for Android application is the different qualities of the cell phones that are using Android, which can make it hard for clients to use it (Zhang, 2010). Besides, Android being an open source stage, there is an expanding danger of infections and likewise hacking the device (Cinter sees, 2009); accordingly information security may be bargained.

**SOLUTIONS TO PROBLEM STATEMENTS**

This article has given a suitable solution to problem statements in terms of lack of information. General information is given for visitors to get valid passport, time to visit for particular period session. The entry formalities application and return ticket for the journey, the languages used in Nigeria, health regulation and vaccination against yellow fever. Alert response for emergency call for security response by clicking call us, the reason of this feature is to give tourist the privilege to make contact for any emergency needs. This is to secure tourist life and property by contacting appropriate agent.

Upgraded Data access and communication bandwidth to tap the page will reload back the webpage without EXIT since the system is a web application, after network is restore with accessible band-width (5 and 11 Mbps for an IEEE 802.11b wireless) connection from any service provider. Enhancing load and performance is an alternate vital performance thought on smart phone is battery life. Un-use notification icon is to be hiding. Notification icons competencies as of now exist on the iPhone, Android, and Windows Phone stages. Usability is one of the key elements that will genuinely represent the deciding moment client acknowledgement of application. This permits clients to learn rapidly how to utilize another application and rather concentrate on performing the current workload. When displaying information, make use of the Summary / Detail / Edit UI paradigm.

<table>
<thead>
<tr>
<th>Lack of information</th>
<th>Alert response</th>
<th>Data access</th>
<th>Load and performance</th>
<th>Usability</th>
</tr>
</thead>
</table>

Comparison between proposed and existing systems
<table>
<thead>
<tr>
<th>Interface</th>
<th>Tour Guide Nigeria</th>
<th>Travel Guide India</th>
<th>Positioning System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application format</td>
<td>Web application (HTML/CSS)</td>
<td>Native application</td>
<td>Web application</td>
</tr>
<tr>
<td>Usability</td>
<td>Quite acceptable for usability, and the interface is neutral flops in small screen devices.</td>
<td>Fully satisfied with usability and interface is excellent good for all device type.</td>
<td>It little complicated</td>
</tr>
<tr>
<td>Use of information</td>
<td>Provide enough information about the country culture, geographical, currency, economic, religion and regulation before coming into the country.</td>
<td>Mainly emphasis on tourist destination but not given more information about the country culture, religion, cuisines and regulations on how to visit the country.</td>
<td>Only for GPRS</td>
</tr>
<tr>
<td>Data Access</td>
<td>Medium data access to database</td>
<td>High data access to database</td>
<td>Limited communication bandwidth</td>
</tr>
<tr>
<td>Connectivity</td>
<td>Fully required internet connection.</td>
<td>Only required for specific feature.</td>
<td>Fully access internet</td>
</tr>
</tbody>
</table>

**RESEARCH METHODOLOGY:**
Every successful project has undergone research methodology to achieve the main objective. Likewise, this article on android application is based on two main key areas of research methodologies of enquiry mode and applied research.

**Research design:** Research design of this project focuses on the target audience of teenagers, tourists, and agents with an overall number of 20 people. This will help the researcher to collect data needed for the project. Using these three categories is more suitable for the project because teenagers and elders are mostly gone on tour.

**Analysis of data collection:** This chapter will analyse the data obtained from the main target audience of this research. Graphs will be plotted to find the statistical average of the requirements needed, all these will be summarized from both target audiences in order to meet the requirements. Sample of the graph analysis are as follows from teenagers, tourists, and travel agents.

**Age group response:** This illustrates the age group of 15 persons’ response in filling the questionnaire. From the graph, it shown that age group 20-25 are higher ahead the others.

![Age group response](image)

*Fig6. Age response to questionnaire*
The scales show the level of fulfilment questionnaire of the system by teenagers; therefore it is averagely satisfied by teenager from the graph above out of the 15 target audience of teenagers.

**Interview session:** This analysis of data collection has been obtained from interview conducted for three foreign tourist visitors in Abuja Nigeria capital city. The graph analysis showed the level of statistics for the interview session.

*Fig7. Interview statistical graph*

**Observation:** Observation also carried out for this research, two individuals as travel agent where observed thoroughly for the purpose of research finding.

**Summary of data collection:** After obtaining requirements from three different methods, its came to conclusion for the project to satisfy by meeting the requirements as follow.

- Teenagers travel not frequently; therefore a new travel guide for Nigeria is introduced to increase travel rate.
- A lot of travellers encounter problem from existing system, therefore travel guide Nigeria provide adequate information.
- It has shown majority of tourist are not satisfy with paper based system.
- Majority of teenagers uses android OS, for that reason the project was designed for android.
IMPLEMENTATION:

Tools and Technique used: Techniques and tools used in the developing of travel guide Nigeria application includes the JAVA ADT, Android SDK with Android Virtual Device for simulation used in testing prototype to understanding the system necessities. However notepad ++ is used in designing the interface layout for desk top version since the system is serving dual purpose. Later the android mobile APK file was install in mobile to run and test the application using the option of package installer mode from the mobile.

Eclipse and Android SDK: Development phase first began with JAVA ADT as the initial stage in developing of android application. The Eclipse, with the Android ADT plugin, which contains the AVD emulator, provides GUIs and wizards for developing new Android application project.

Android SDK: As for the Android SDK, an Android Virtual Device (AVD) emulator is created for the required Application Programming Interface (API) phase for new
android application. The first step is by clicking on (NEW) to chosen a project type, then follow by naming the project file and proceed to next step.

**High level coding:** High level coding for this project are very essential in development of the system, these help making the system to be more effective in performing a specific feature to meet the main objective of the project.

**Main activity:** To develop main activity for mobile application, java programming is needed to create APK folder using a supporting tools. This is done with the help of *tscolari.mobile_sample* in given public class of the mobile application package in java language.

![Fig9. Main activity with Android SDK](image)

**On create(bundle):** The second outline is given the set content view lay out, the web setting and main web view are set with scroll bar style in overlay that will allow user to move up or down when using the application to find view by id *(R. id. Main view).*
Fig 10. Creating public void with Android SDK

**Costume web view client**: This level is where the application is given a setting of main web view id link with a website address to load URL (“http://www.naijatour.netne.net/”). This should override URL loading (web view, string) boolean. With the assist of private class extend web view client to view.loadurl (url) and return true.

Fig 11. Costume web view with Android SDK

**Interface design**: This is used to design the GUI for the system in HTML; each of every page layout of this application is built from simple HTML tags such as background colour, image, and navigation links. This is to enable host it as website into 000webhost.com as directory tree: root/ public_html where all files are uploaded.
TESTING: Testing of travel guide android application is to be tested; first by installing the APK file into a device before proceeding to the next level. Testing will be done through different approach, for examples unit testing; integrated testing etc. Testing method will assists to evaluate the input and output of each functions designed for the application.

The figure above shown the instalment process, the first part is where user will install the APK file using package installer. The second step is for completing the process for user to cancel the process or install. The last shown the application has already been installed and it is ready for launch by clicking on the App icon.
TESTING OVERVIEW:

**Testing methods:** Based on this article research, testing methods will be carried in different approaches in other to ensure that the businesses objectives certify requirements are met. Therefore the following testing strategies uses are two.

- **Unit testing:** Unit testing approach was carried to test and examine the system if it is working as intended to be done. This include time taking for the system respond when execute a command, this should not exceed the appropriate time before it execute output. Under unit testing, all navigation links are tested to ensure user can move or short cut to any page on the system. Unit testing has been using in testing the prototype during developing of this system, the result obtained from this test make up the must tests conducted for this project of travel guide Nigeria android application.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Task</th>
<th>Procedure</th>
<th>Output result</th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Home key" /></td>
<td>Home key</td>
<td>Click the icon on the system interface.</td>
<td>Navigate user back to home page as short cut.</td>
<td><img src="image" alt="Image" /></td>
<td>Pass</td>
</tr>
<tr>
<td><img src="image" alt="Search restaurant's" /></td>
<td>Search restaurant's</td>
<td>Click on drop down list.</td>
<td>It highlights list of halal foods restaurants.</td>
<td><img src="image" alt="Image" /></td>
<td>Pass</td>
</tr>
</tbody>
</table>
| ![Feedback](image) | Feedback | Click on HELP page. | Blank form displays. | ![Image](image) | Pass
but under local host server. |
Integration testing: This system is been integrated with other functional features, this is to connect the system to interact and perform a specific task. Such task are making emergency alert call, by clicking on the icon it will direct user into phone dial pad highlighting the number ready for calling. Another aspect of this testing is on sharing/ bookmark or Google map, this system is integrated with these computer based application. The system communicates properly in adding additional features for the application.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Task</th>
<th>Procedure</th>
<th>Output result</th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>☎️</td>
<td>Emergency call</td>
<td>Click on the icon on the system interface.</td>
<td>It redirect user to complete action using call tools, then make the call instantly.</td>
<td>Pass</td>
<td></td>
</tr>
</tbody>
</table>
### Tracking device
- Follow the link and click on android logo.
- Request user to logon using password and user name for the Gmail account.

**Pass**
But have poor navigation

### Tell a friend
- Click on icon link.
- Sharing applications open to choose.

**Pass**
but failed to share for some applications

### Hotels
- Press key to enter.
- Search hotel by name or city.

**Pass**

### Get direction
- Click to search Google location.
- Google map opens in a new tap for view.

**Pass**

**Project evaluation:** As this project focuses on computer based system of android application for mobile, the idea of this is to reflect on the overall project milestone process, skills, problems and knowledge encounter in the taken the project. Furthermore future enhancement is needed to develop travel guide android application for Nigeria. Project problems statements and main objective is to be review in evaluating this system of android application. These may bring solution to project limitation in future project in given proper documentation for references usage.
CONCLUSION:

This research has meets and satisfied the requirements from the problems statements by enhancing the proposed system performances, provide adequate information for tourist, improve the usability aspect and finally the alert response system. Taken task like this in developing android application involves lots of obstacle and challenges due to rapid growth change technology. Taken into account of this project on travel guide Nigeria, one can become an expert application developer that can stand on the market to earn money.

Achievements: This project has been archived over the previous existing system in many ways. This system provide adequate information to tourist visiting Nigeria, the final version of this system provide user with tourist information on all tourist destination in Nigeria. It is clear to say that this project meets its objective looking at the project evaluation process or milestone. This can also be seen from the foregoing chapters of introduction, literature review, problem statements and solution, research methodology, system design, implementation and testing. To end this chapter on project achievement, the limitation achievements are.

- This system of travel guide Nigeria is built up with alert response for user to call in case of emergency needs, where such feature is not available on existing system.
Another achievement of this project it can also be access as web application, this serves as an additional latest trends over existing systems.

Travel guide Nigeria occupies less memory space in device; this improves the load and performance of the system because it consumes less RAM.

Usability of travel guide Nigeria has been improved in using clear matched colour text, theme, and proper page layout. These allow user to access it clear being at indoor or outdoor environments.

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