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Multilingual Social Media Platform-Based Tourism Operations in Uganda

Fagbolu Olutola Olaide[1]*, Edu Chukwunonso Stanley[2], Adewale Adekunle Joseph[3]

[1]Fourah Bay College, University of Sierra Leone, Sierra Leone
[2]Kampala International University, Uganda
[3]Osun State College of Technology Esa-Oke, Nigeria

*Corresponding author:Fagbolu Olutola Olaide: fagbolu.olutola@usl.edu.sl

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Abstract:

Tourism is travelling for pleasure to places outside the usual environment and it is an important source of revenue in Africa which has not been properly harnessed to generate expected income in Uganda hence the need to develop a social media app called TourIt. TourIt will showcase landscapes, rich history of ancient and cultural heritages, water bodies (such as lakes and rivers), wild safari expeditions, artefacts. It is user-centered design, interactive information-sharing, interoperability, and collaboration on tourism with multi-languages including Luganda, English, Swahili, Yoruba, Ibo for now while other languages can be added as the app evolves. The app was developed using Android Studio XML for the graphical user interface, Firebase for database, Java, and XML for coding while Javascript handles several modules including functions in the database and automatic restoration of multiple languages were done with MBL (Memory-Based Learning), CRF (Conditional Random Field) and rule expressions which were implemented in UML class of Python Programming Language with NLTK (Natural Language Tool Kit). This social media app will create and co-create tourism-based content, edit the content, determine the ratings of its content. Comments, commentaries and narrations are handled by the multilingual social media platform whenever it is necessary, contents of the social media platform are discussed, shared, tagged, organized and mashed with other contents to promote rich cultural values, natural endowments, tourist centres, and other attractive places in Uganda.

Keywords: Social Media, Mobile App, TourIt, Android Studio XML, Multilingual, Information Technology, Tourists

Introduction

Most of the African countries are naturally endowed with vast human and natural resources that are populated in a wide variety of points of interest. There are diverse cultural heritages and great numbers of landscapes that were left untapped or underutilized. In Uganda, more revenue would have been generated if all these natural and cultural resources are adequately publicized. Lesser revenues are obtained from her tourism than the expectation because prospective tourists or explorers were not aware of the abundance of tourist resources and attractive centres that are found in the Pearl of Africa [3] [7]. The continent of Africa can be divided into three categories relative to tourism: countries with the developed tourism industry (such as Egypt, South Africa, Morocco, and Tunisia); countries with developing tourism industry (such as Kenya, Mauritius, and Botswana); and countries with the evolving tourism industry (such as Algeria, Burundi, and Uganda)[4] [7].

Uganda has a magnificent piece of land whose diverse landscape is encompassing a snow-capped Mountain Rwenzori and other mountains such as Elgon, Mufumbiro, Stanley, Kiyanja, Speke, Gessi, Baker, Muhabura, Moroto, Toroto Rock, Zulia, Imatong, Wati, Morungole, Emin and so on. The nation's 40 percent landmass is covered with water bodies that are rivers, lakes, and wetlands as it is the home of the world's longest river, the River Nile [7]. This country has well over 1,000 species of birds, that is 68 percent of the Africa continent birds are domiciled in Uganda and 12 percent of the total population of the world birds are found in this nation. Uganda is one of the few countries in the world where the imaginary line that divides the earth into two half passes (Northern and Southern hemispheres). The equator which is a magnetic needle-like found on the compass where sunrises and falls rapidly with no gravitational pull that invariably reduces weight with about 3 percent.

There are numerous cultural sites and heritage of which some are recognized by UNESCO to preserve the rich culture of different ethnicities in the country, conserve historical values of events, commemorate incidents, hold treasure, and symbolize slavery. Some of the examples are Kasubi tombs, Namugongo Shrine, Baker's Fort, Bigo bya Mugenyi, Sezibwa Falls, Nakayima Tree, Nyero Rock Paintings,Naggalabi–Buddo Coronation Site, Itaaba Kyabanyoro, and other National parks. Its abundant wildlife includes Chimpanzees, Giraffes, Gorillas, Hippopotamus that littered all these National Parks and there is a plan to make Uganda an Africa's premier birdwatching destination.

The growth of social media is an added advantage in terms of connectivity which means people from all over the world can connect with one another [2], it represents a movement away from static web pages to dynamic and shareable content with social networking for example Facebook has evolved from what was college friend's network to host users that are more than U.S residents [13]. Nearly 4 or 5 people participate in one or more online communities or social networks. TourIt (social media app) is a tool that facilitates user-centered design, interactive information-sharing, interoperability, and collaboration on tourism with multi-languages such as Luganda, English, Swahili, Ibo, Yoruba for a start while other languages can be added as the app evolves [8] [10].

Social media and its tools have become a focal point for many people to connect around the world, expand to reach more people, new and diverse audiences meet for feedback mechanism and this app brings audiences who may share the same interest in an excursion, holiday, travelling and tour to bridge the geographical boundaries [1] [5]. The multilingual feature of this app will enhance free flow of communication between individuals of different backgrounds, languages, and other social status, these multiple languages, and compartmentalization of their interest is done based on their language of choice [8] [9] [11].

Research objectives

The objective of this research is to design social media app for prospective explorers and tourists in multiple languages [6] which will serve as a guide. It will typify how tourism businesses are to be conducted with the advent of ICT, increase the level of awareness, and explore untapped resources (tangible and intangible benefits) in Uganda.

a. To develop social media tourism app (TourIt) that can guide and provide vital information about places of interests
b. To implement the social app in (a)
c. To test and prototype the social media app in the tourism industry.

Methodology

To achieve all these objectives, an appropriate blueprint that represents all the necessary requirements were done with FIGMA and Adobe Photoshop as graphic editors to plan and document this project, Graphical User Interface (GUI) was designed using Android Studio XML which is an official IDE for Google's Android OS built with JetBrains' IntelliJ IDEA software and available for download on Windows, MacOS and Linux. 14 different UML diagrams that can model the social media platform entities and their attributes but the class diagram is selected to serve as a building block for Object-Oriented solutions within expected classes, its attributes and expected operations, and the existing relationship between classes. The figure below typifies how the class diagram is applied to the development of a multilingual social media platform for tourism operations in Uganda.

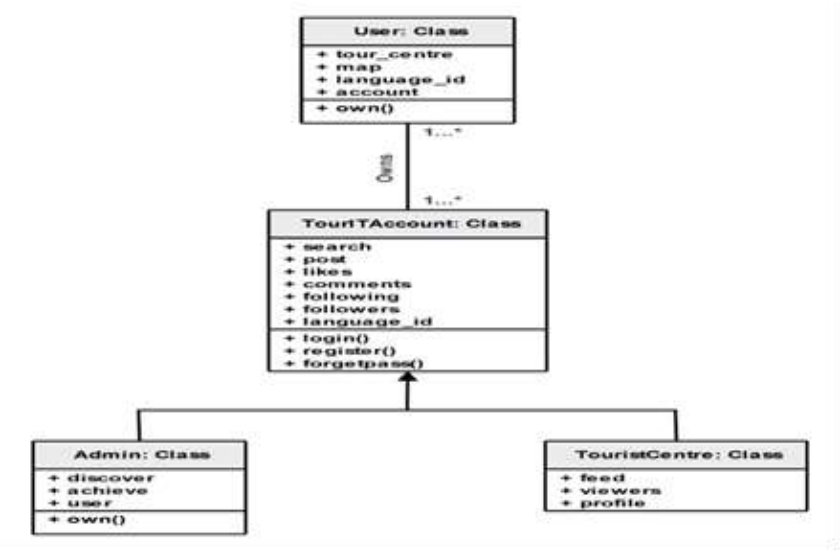

Figure 1. Class diagram for TourIt App

Mathematical model

In the development of a multilingual social media platform for tourists, the variable changes in discrete-time starts whenever a user creates any query into the platform through the graphical user interface provided. If the current variable is a_n then the predicted value of the variable will be a_{n+1}. A mathematical model for the evolution of the social media platform a_n will take the form of equation 1.

$$a_{n+1} = \alpha a_n + \beta \ldots\ldots\ldots 1$$

where the α is a scalar multiple of the social media platform by constant β. This model can be amended to make the dependence depend on more terms and include the possibility that every iteration in social media for tourists can be depicted as shown in equation 2.

$$a_{n+1} = \alpha_1 a_n + \alpha_2 a^2_n + \beta \ldots\ldots\ldots 2$$

which corresponds to the population model of visitors to the social media platform where the number of views changes every time.

Database design

The database was designed using firebase (it is a real-time database). Firebase is a mobile and web application development platform developed by Firebase, Inc. in 2011, then acquired by Google in 2014. As of October 2018, the firebase platform has 18 products, which are used by 1.5million apps [15] and list of firebase services used are firebase AUTH, firebase Database(real-time), cloud messaging, firebase functions

Multilingual approach

A computational model with the probabilistic and deterministic component for automatic restoration of multiple languages is required which will use Memory-Based Learning (MBL), Conditional Random Field (CRF), and rule expressions. The multilingual aspect of this app was handled with a UML class diagram and implemented using Python Programming Language with Natural Language ToolKit (NLTK). Distillation-based approach to boost the multilingual machine translation in which individual models are first trained and regarded as teachers and then the multilingual model is trained to fit the training data and match the outputs of individual models simultaneously through knowledge distillation and experimented in Ted Talk Translation [14].

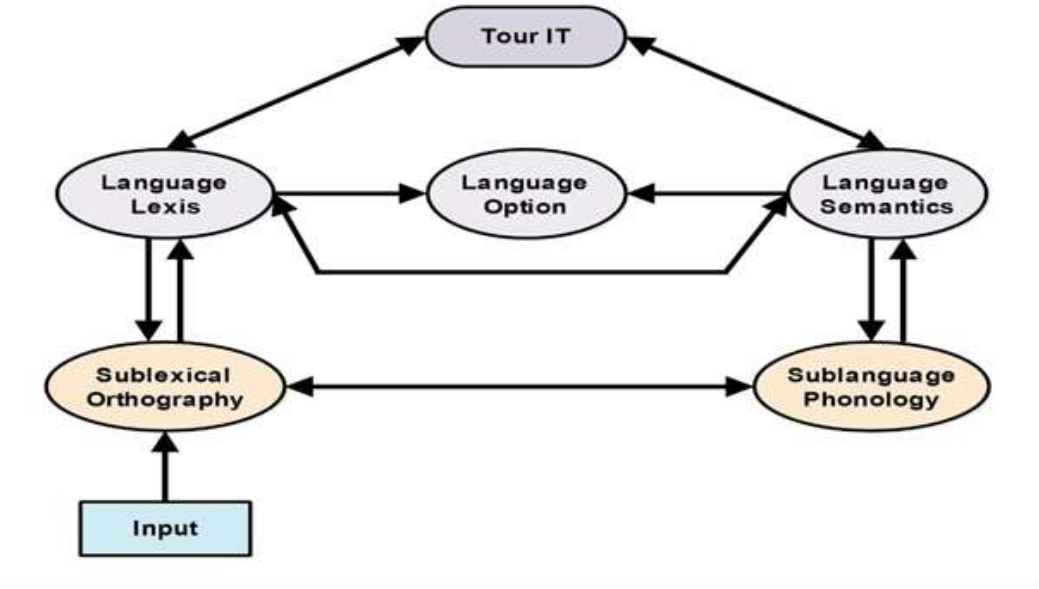

Figure 2. The multimodal representation of languages

Programming languages

Java and XML were used for most of the coding, Javascript handles several modules and were used to write functions like notifications in the firebase database. The choice was made based on the platform-independent, security features, high-performance of JIT compilers, and excellent for handling any complexities in data and its structure.

Advantages and Disadvantages of the System.

Advantages.

i. Lower costs.
ii. Improved integrity.
iii. Promotes confidentiality.
iv. Covers a wide area/vastness (the whole of Uganda).

Disadvantages.

i. Requires network connection (Data Charges).
ii. Limited access/only accessible on the mobile device (an Android phone).
iii. Requires prior knowledge about the system.

System requirements

It comprises of functional requirements and non-functional requirements. A functional requirement describes what the software will do that is, the main services the system should provide and how it will respond to inputs while non-functional requirement describes the criteria that can be used to judge the operation (behaviour) of the system such as usability requirement, efficiency requirement, performance requirement, space requirement, reliability requirement and portability requirement [12]. The hardware required is itemized as Phone with Android OS version 5.0 Lollipop and above, for system testing, Computer system with 512MB RAM, Monitor with a minimum resolution of 1024X768, Keyboard, Mouse, HDD with NTFS format system is needed. The use-case diagram list parameters and values of the requirements as depicted in fig 3

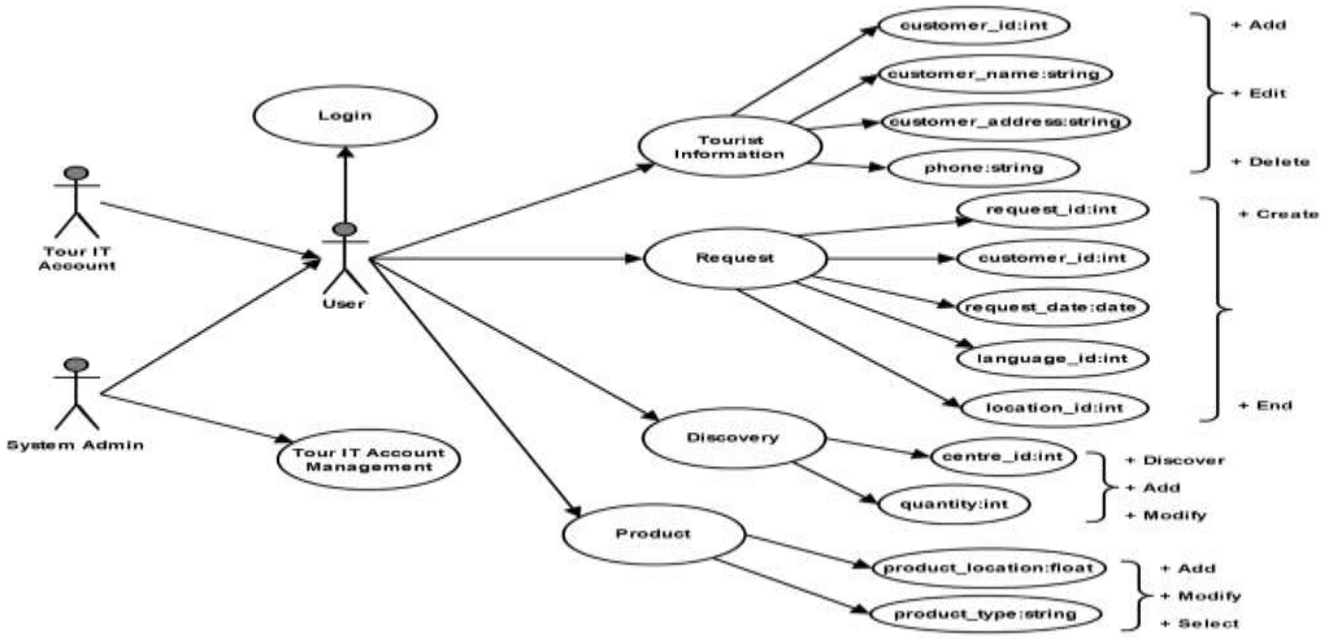

Figure 3. Use-case for social media App

Basic concept of the system

The developed app contains detailed texts, pictures, videos and other guiding information about tourist centres visited by any individual or intending centres to be visited. It is a value-added media for those interested in visiting some places while some people may have their interest arose for having a fair and better understanding of the tourist attractions that existed and make decisions objectively.

The Modules in the System.

i. Find the current location
ii. Locate in map
iii. Calculate the distance between two cities
iv. Location of different tourist sites

The annotated flowchart of TourIT that show how an account is created and what can be done once a particular tourist centre is looked for in Uganda

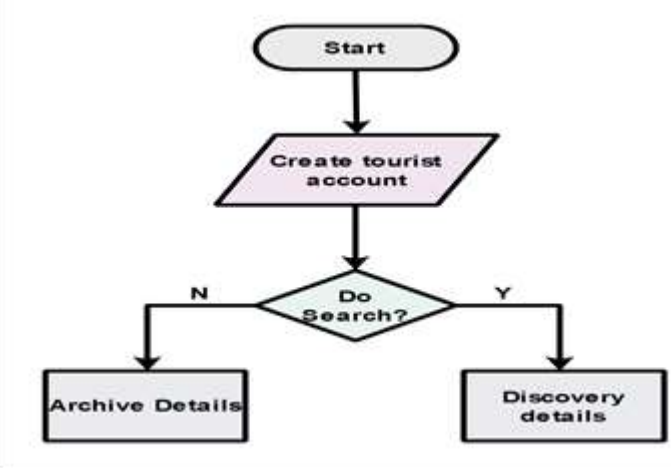

Figure 4. Annotated flowchart of TourIt

Implementation

This app offers an opportunity for users and a platform where potential tourists will be able to post pictures and videos of the places they are currently visiting or intend to tour in any of the prototyped languages. This platform will guide the prospective users and inform them about different tourist centers and attractions at the location he or she is currently, or check different districts within Uganda for tourist attractions, cultural heritage sites, and other places of interest from anywhere in the world. It is patterned after Instagram social media where tourists can view different activities through another tourist's post and the typical screenshots of the app are depicted in different figures and explicitly described. In fig 5, the following notations are found

List of activities in fig 5
1.Search icon
2.Following post icon
3.Change the language icon
4.Newsfeed posts from users
5.User's profile picture
6.Number of users that view the post
7.Liked posts (where user like others post)
8.Comment on post
9.Newsfeed
10.Map icon
11.Profile icon
12.Upload post

Figure 5. Home page of TourIt app

Once the app is launched, fig 6 automatically pop-up as the first page while the search icon look for different users' post or new user that are making use of the app and this can be accessed from the homepage as shown in pop-up fig 6

List of activities in fig 6 are:-

a) search(search on post based on what tab you choose)

b) post(click on the post tab to search for user post)

c) user(click on the user tab to search for user post)

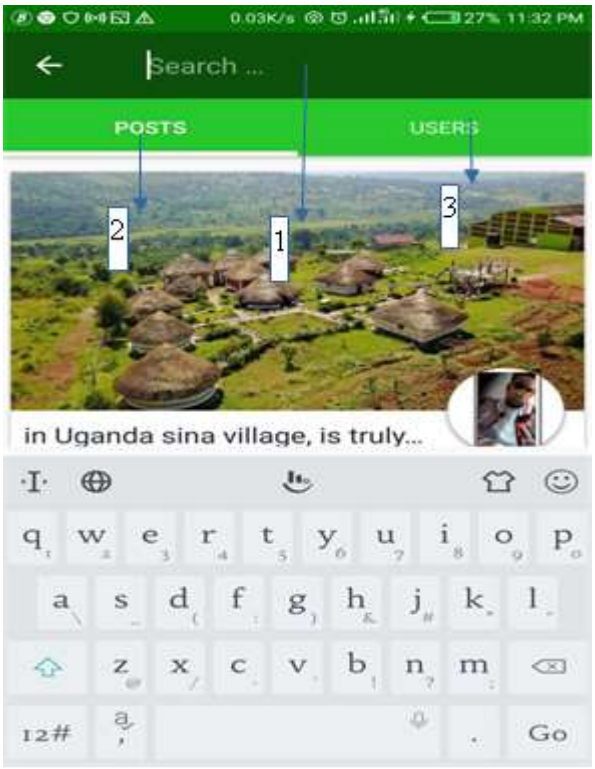

Figure 6. The search page of TourIt app

The map interface shows different tour attractions near your current location and direction as represented in fig 7 coupled with other information about the nearest hotels, restaurants, shopping malls etc.

List of activities in figure 7

1.Search(search for any location on map)

2.Search for nearest (restaurant, attraction, and hotel near your current location)

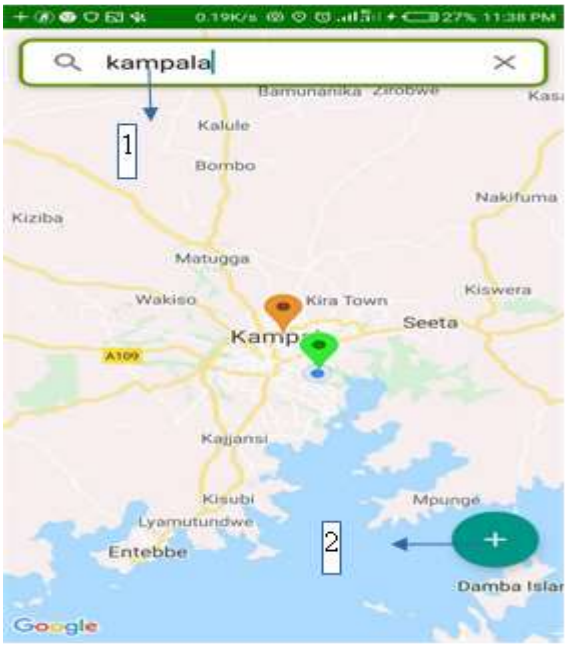

Figure 7. Map interface page

In fig 8, we have the user's current profile page with different posts the users have made, the number of likes, people that the user follows, others that are following the user coupled with other personal details.

Figure 8. Profile page

List of activities/modules in figure 8

1.post(how many posts the user have posted)

2.likes(accumulated likes the user have gotten from all the post only the user can see this)

3.followers(who is following the user)

4.following (who is the user following)

5.profile picture

6.Tab-bar(create a post, edit a post, and sign out)

Conclusion

In conclusion, the development of social media apps for prospective tourists in Uganda will promote tourism as an industry as well as increase internally generated revenue. More employment opportunities, enrich business scopes and build Uganda's brand, image, and identity that will make the nation more famous and wealthier than it is. It will encourage more people to visit the pearl of Africa, promote cultural diversity, and international connections and take the country to the category of countries with developed tourism such as South Africa, Morocco and Egypt. This app will offer exceptional tourism services to both users and the nation to solve problems of practice, application of new technology, and other sundry matters of tourism and travel. Any user or tourist that may wish to explore Uganda will be properly guided with the app.

This research work brought about Mobile application (android based application) that solve envisaged problems of the visitors, tourists or travellers by strengthening the tourism industry, enhance the social status of the nation and bring about economic transformation, the richer the nation, the more the quality of life of the citizenry. The ease of use and ICT adoption is part of the scope covered by this research.

This app accommodates a high number of users from different locations within and outside Uganda without redundancy and high-performance mobile computing are catered for with embedded fault-tolerant systems to prevent both expected and unexpected errors which will increase usability and acceptability of TourIt. Although there are few limitations, not all languages are catered for in the social media app but the more the languages the better the acceptability. The usability testing was done within the university campus and efficiently gathered statistical valid data on the TourIt, it includes twenty (20) questions which the user answered and Software Usability Scale (SUS) is 75 which attest to the priority given to users on the usability of tourism-based operation in Uganda. The future work is to include all languages of the world for the convenience of users and ease of use of any intending travellers to Uganda and possibly deploy the app for all nations of the world that are developing or have developed their tourism sector.

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