

Design and Implementation of an Android Application for Bus Rapid Ticket Reservation

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Abstract—Movement of people and goods from one place to another is an everyday thing and integral part of Ghana's growing economy. To meet the need of citizens in the capital city, Bus Rapid transit was introduced to ease movement of citizens within the city recently, the normal procedure requires that one acquires a customized card and load money on it before using the service, sometimes leading to shortage of the cards, money loading centers not easily accessible, loading service failure and loss of cards. It is for these issues that the research proposes a hybrid scheme to better the service with android ticket reservation application. It is developed and implemented using android studio 2.2.2 for native android application development, prototyping methodology was employed, Hypertext Markup Language (HTML) used in developing user interfaces, Hypertext Preprocessor (PHP) used as server-side programming language, and Wamp Server was used to locally host and test web pages, create and manipulate database. Online payment system is therefore integrated into the application using ipaygh.com to increase user's freedom through mobile money which is widely spread in Ghana. The proposed hybrid scheme shows better performance in the service delivery and is mostly preferable by user due to the freedom of space and time the application provides to the user.

Index Terms—Bus Rapid, Customized Card, ipay, Mobile Money, Citizens, Android Studio 2.2.2

I. INTRODUCTION

Years ago, mode of transport was by either walking or riding an animal, before arrival of modern and constantly changing means of transportation for both private and public users. On land, we have car, bus, train, motorbike, bicycle, etc. On water, we have ship, boat and many others, and in air, we have aircrafts. A period arose, before one is qualified to board any public transport, the fellow must have a ticket as evidence, which is manually done on small and different paper sizes and this is still practiced in the developing world like Ghana. The public transport is an increasing developing business sector in cities and every part of the globe, the normal ticket reservation is a highly tireless exercise [1]. This day and age, the transportation sector is equally affected in a steady manner just like many other industries in the world of information technology (IT). From education to

health care, agriculture, building, construction, government and corporate world. All received their share of information technology (IT) transformation. Recently, Bus Rapid Transit (BRT) was introduced in Ghana's capital city to ease movement of people and before any person can use the service, he/she is required to obtain a customized card, load money on it and use the card to pay for service. Bus Rapid Transit is becoming popular for its cost-effectiveness and its operations [2]. Bus Rapid Transit major elements includes Dedicated Running ways, Stations, Vehicles, Off-board Fare collection, Intelligent Transportation Systems (ITS), and Services and Operational structures [3]. Through history, the movement of persons and goods from place to place has resulted in high importance for social and economic "development", clearly showing the change in our society, in this light that research was conducted "to identify the scientific context of urban public transport management for applications focused on Bus Rapid Transit systems (from 2009 to 2014), allowing visualization of possible opportunities to increase the level and number of contributions to these systems, through the development of a bibliometric analysis" [4].

A research was carried out "Using microscopic simulation as the experimental framework for a calibrated and coded corridor within the Metropolitan network in Sydney, Australia, the impact of these parameters is explored." To discover which variables are most needed to BRT system "performance". "Several scenarios including the increasing capacity of vehicles, changing frequency and the introduction of bus lanes have been designed and measures used from the output of the microsimulation to compare with a baseline scenario." "The research findings point to the importance of particular components in the design of a BRT system and in particular the frequency of the

services, the number of bus stops within the network, the presence of bus lanes and the demand applied on the network.” [5].

II. ANDROID OPERATING SYSTEM (OS)

Android is a software platform upon which applications are developed [6]. And has become popular due to a number of reasons;

- It is an open source licensing software
- Free to develop in the sense that there is no need to sign any document or obtain any certificate or pay any fee before one can use it for any purpose.
- Android is a very suitable platform for addressing the growing needs of today, and android applications are coded in a well-known and respected language [7].

III. TRANSPORT

Among the fundamental needs of the modern society is an effective public transport system, not only to provide basic mobility requirement, but ensure that time, resources and assets are used in an effective way[8]. Public transport service demands that every traveler gets a ticket and keeps on him/her throughout the

journey as an evidence that he/she is permitted to travel on a bus. Just to acquire ticket, queues are developed at stop points and terminals creating much inconvenience to travelers and if they forget their tickets or misplace them they undergo indescribable discomfort. Many physical intercessions to resolve and eliminate these inconveniences have been proven to be ineffective, inefficient and not lasting. A solution to this problem, an android application is proposed which comprises of many functionalities where user can buy ticket using android application by selecting terminal and destination[9]. A ticket bought can be cancelled when one's intention changes, a report or comment can be sent to management and trip history can be viewed, all these can be done anywhere at any time and issues of stolen ticket/card, lost or left behind will no longer be a matter of dispute.

IV. PROPOSED SYSTEM

A. UML Sequence Diagram

A sequence diagram displays exactly how the user interacts with each activity and the order in which the interaction process occurs. It is essential to note the interaction of the booking process. The process is represented vertically and the interactions are shown as arrows.

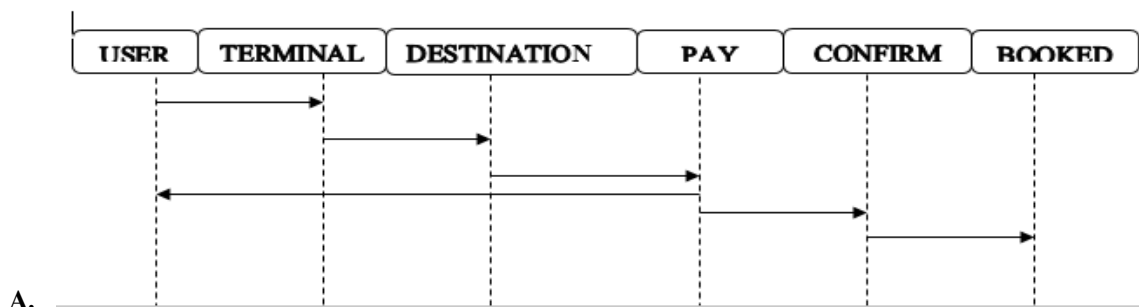


Fig. 1 A Sequence Diagram Displays Exactly How the User Interacts with Booking Process.

B. UML Use Case Diagram

Use case diagram is a type of behavioral UML diagrams which gives a graphic overview of the user interactions with the application.

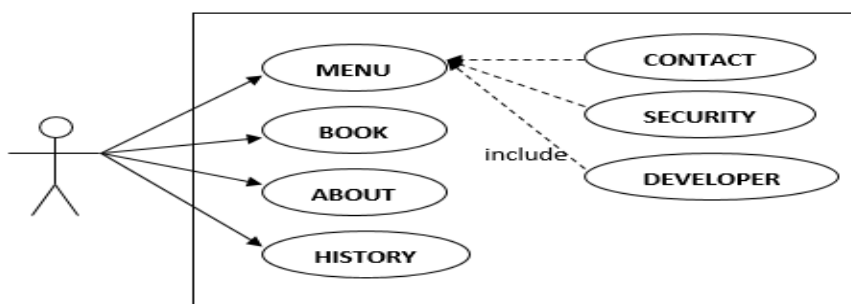


Fig. 2 The Most Common Activities Carried Out by User.

User Activities.

The most common activities carried out by user are illustrated below.

- The user can contact office, security and developer from the menu portal.
- The user can book a ticket with the application.
- The user can read more about BRT service.
- The user can check and view trip history.

The various frameworks used for the implementation of the project will be discussed in this section.

A. Android

The android platform is the foundation of the whole project implementation. Existing building blocks such as Activities, Fragments, Menu, Services, etc. were used to build the Application.

C. Installation

The application is available as an APK file which can be installed on Android devices. In order to install the APK file, the file needs to be transferred to the device. The easiest way to do so is to connect the device to a computer using the USB cable and copy the APK file to the device. Using a file manager on the mobile device, locate the APK file in your file system and install it by clicking on it. For this to work, the option Settings Security Unknown Sources must be enabled.

D. Start of the Application

After a successful installation, the application should be available in the applications screen of your Android device. The app can be started by clicking on the icon. This leads you to the main screen of the application.

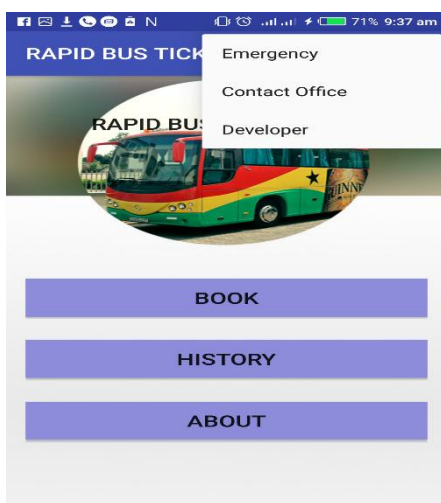


Fig. 3 Homepage.

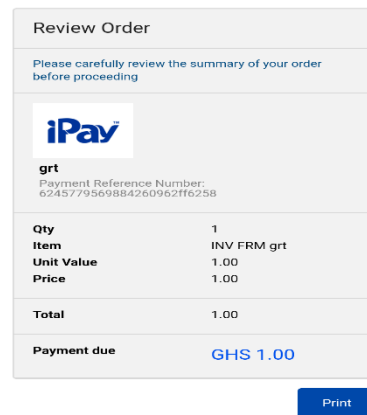
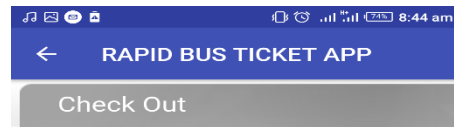


Fig. 4 Review and Payment of Ticket by User.

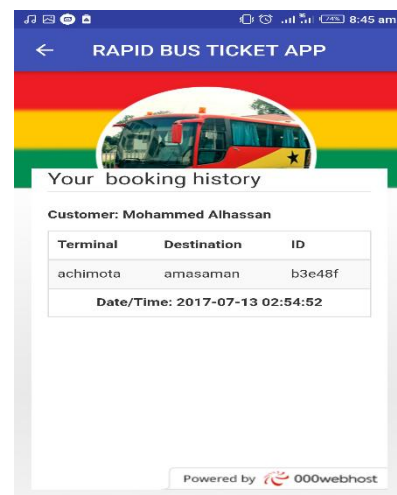


Fig. 5 Booking History of User.

Every booking has unique Identification Details which compresses of combination of both numbers and letters. This ID is use to board the bus and can only be use once by inputtingthe ID code at the Point of Service device for authentication.

V. CONCLUSION

When this application is adopted and implemented it will help to resolve existing problems and improve the efficiency of booking ticket. It can be used to send messages to management. Hence it will help to improve and better user's experience with Bus Rapid Transit. This paper can serve as a guide for further research works in future.

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