

# **ANDROID AIRTIME VOUCHER NUMBER SENDER AND ACTIVATOR**

BY

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A Project Report Submitted to the Department of Computer Engineering in  
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## DECLARATION

I, Semate James registration number BU/UP/2011/558 do hereby declare this project entitled “Android Airtime voucher number sender and activator” as my original work except where explicit citations have been made and that it has never been presented to any other university for any academic award.

Sign: .....

Name: .....

## **APPROVAL**

The undersigned certify that they have read and hereby recommend for acceptance of Busitema University a Project report entitled “Android Airtime voucher number sender and activator”.

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## **DEDICATION**

I dedicate this Report to My Supportive and Caring parents for the undying ,unselfish support and the conducive environment they have offered to me .

## **ACKNOWLEDGEMENT**

I would like to extend my sincere thanks to my Supervisor for his advice , guidance and technical help that he offered to me during the period of implementing this Project .

Lastly, I extend my thanks to God, my parents, the Supervisor, siblings and friends for all their support and guidance in the distinct aspects of my life.

## ABSTRACT

In Uganda there are number of ways of people use to share airtime on phones which include mobile money, MTN Me2U and using Airtime vouchers. However these methods have their cons which have lead to development of this mobile application to offer alternative to them. The use of airtime vouchers requires one to manually input the long 14 digit long number with ussd codes .But this method is time wasting, tedious and prone to errors . And in case of more than three consecutive errors attempts one is barred from loading airtime using airtime Vouchers for some period of time. In order to solve some of these problems, an application called Voucher up. However, this application is limited in functionality and lacks the ability of facilitating a user to send the voucher number to another user and also activate it in case a user receives it and it's accuracy is inconsistent. And also it does not give a user a way to share airtime with another person. This Project was aimed at solving the problem of time wasting that occurs when one manually types the Airtime Voucher numbers into an sms so as to send airtime to another person since the average typing speed of a user is low and the typing process is also prone to typing errors which can lead to the sim card being blocked from airtime recharge incase recharge exceeds three consecutive attempts. This problem was solved by designing and implementing a mobile application that can scan the airtime voucher number and facilitate a user to send to another person as an sms. And when the recipient receives the voucher number, the ussd recharge is executed by this application through it's voucher activator module. The developed android mobile application comprises of camera interface module, image processing module, optical character recognition module, messaging module and the dialing module in it's design. The camera interface module is comprises of android camera APIs which are used to draw camera frames on a surface View widget using Jpeg and picture Callback functions. The image processing module uses both leptonica and Android APIs to implement functions that can translate, scale, gray scale and binarize the captured image. The OCR module was created using Tesseract OCR engine APIs to facilitate character Recognition. The messaging module comprises of the android intents . This module takes the results of the OCR module as an input and requests a user for a contact and sends the message. The dialing module was created from android's calling APIs and intents and was coded to respond to clicked items of a integer data type and pass it as a variable to the another function especially in Android 4.1 or 4.2 OS versions. In android version of Kikat and Lollipop it uses the android intent for messaging sharing. This module was programmed to dial this statement \*130\*Voucher Number# where the Voucher Number is the passed variable. All these described modules were integrated into one working mobile application .

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## LIST OF ACRONYMS

OCR Optical Character Recognition

HOOCR Hebrew Optical Character Recognition

SDK Software Development Kit

NDK Native Development Kit

API Application program Interface

USSD Unstructured Supplementary Service Data

ADB Android Debug Bridge

SMS Short Message service.

EMAIL Electronic Mail.

ASCII American Standard Code for information interchange

UTF Unified Text Format

GUI Graphical User Interface

CLI Command Line Interface.

UI User Interface

# **CHAPTER ONE**

## **INTRODUCTION**

This section comprises of a background study of the Topic, the problem statement, the main objective, specific objectives, significance, the scope and the limitation of the developed mobile application.

### **1.1 BACKGROUND OF STUDY**

In Uganda there are number of ways of people use to share airtime on phones which include

mobile money, MTN Easy Load ,MTN Me2U and using Airtime vouchers [1] [2] [3].

Mobile Money also known as Mobile banking simply means using ones' mobile phone to conduct financial transactions. That is a consumer can use this method instead of paying with cash, credit cards and cheques to purchase airtime. It's the latest mobile banking innovation and revolution changing the lives of millions across the globe [4].

Mobile banking and payment services have grown rapidly in recent years [5]. They have the potential to offer benefits for some consumers in vulnerable circumstances, but only if the services are designed in an inclusive way. Furthermore, the developments raise questions about the effectiveness of regulation and implications for consumer protection. The study focused on the positive and negative implications for financial inclusion . The study, carried out by AnKa and George & Lennard Associates [5], explored the advantages and disadvantages of mobile payment services for people in vulnerable circumstances, including those who have difficulties in accessing or using traditional banking. It highlighted current gaps and concerns regarding regulatory frameworks and consumer protection. The overall aim was to ensure that the needs of people in vulnerable circumstances are taken into proper account in policy-making and industry developments. The research included an extensive literature review, and interviews and contacts with a range of stakeholders including regulators, consumer organizations, industry bodies and voluntary organizations. These were followed by a roundtable meeting to discuss the draft findings and recommendations.

According to AnKa and George & Lennard Associates [5], there are a number of significant barriers need to be addressed if mobile payment services are to be of benefit to all consumers. For example, the cost of smart phones and contracts can be prohibitive to those on a low income. The design of mobile phone handsets and software can create barriers to their use for many people, including those with dexterity problems or sight impairments. Companies' own communication systems and call centers can also create barriers for many people with sensory impairments.

However Mobile money can be used to recharge the airtime account of another person but is not perfectly reliable since its affected by security risks and network connection uncertainties which renders it unsecure in crowded areas and in-operational for a some period of time and is also prone to errors arising from mistyped mobile contacts by people. It does not allow a person in need of airtime to recharge his airtime account incase his or her mobile money account is zero. Mobile money does not cater for people with sight complications. Some of these uncertainties force a people to resort to other method such as use of airtime voucher cards, which require a user to scratch the airtime card and manually input the long 14 digit long number with ussd codes in a form of \*130\*voucher number#. But this method is time wasting and tedious and prone errors too. And in case of more than three errors attempts one is barred from loading airtime using airtime Vouchers for some period of time.

In order to solve some of these problems, an application called Voucher up [6] was created which is a prepaid airtime management application available for android devices. That uses ones' smart phone camera to scan airtime pins automatically eliminating tedious manual airtime recharge. Voucher up also keeps track of all ones monthly and yearly expenses on airtime to keep one aware. This application is limited in functionality and lacks the ability of facilitating a user to send the voucher number to another user and also activate it in case a user receives it. Hence it does not give a user a way to share airtime with another person.

The typical method used by telecom companies to facilitate airtime sharing is MTN Me2U [2]. It is a service that allows one to share his or her airtime with any other MTN user in Uganda, quickly and easily . This service allows one to share up to 200,000/- airtime directly from one phone to another. By simply dialing \*160\*6# and follow the

onscreen prompts. Its costs Normal SMS rates and requires a person to keep a significant amount of airtime on the sender's airtime account when sharing airtime.

This application reduces on these monetary costs incurred when using MTN Me2U by offering a user more options for sending the voucher numbers such as sms or email and eliminates the manual entry of ussd codes to share Airtime.

## **1.2 PROBLEM STATEMENT**

Manual typing of Airtime Voucher numbers by a user into an Sms so as to send airtime to another person is time wasting since the average typing speed of a user is low and the typing process is also prone to typing errors which can lead to the sim card being blocked from airtime recharge incase recharge exceeds three consecutive attempts.

This problem was solved by creating a mobile application that can scan the airtime voucher number and facilitate a user to send it to another person as an Sms. And when the recipient receives the voucher number, the ussd recharge is automated by this application by inserting the voucher number into the application's dialing function when a user taps on the 'Linkified' Voucher Number and follows prompts.

## **1.3 OBJECTIVES OF THE STUDY**

### **1.3.1 MAIN OBJECTIVE**

To design and implement an Android Airtime Voucher Number sender and Activator that can scan an airtime voucher and allow a user to send the voucher number to another person.

### **1.3.2 SPECIFIC OBJECTIVES**

- i. To review the existing literature on Android, Ugandan Airtime Vouchers USSD codes, OCR and image processing techniques.
- ii. To identify and analyze the requirements needed to accomplish the development of the mobile application.
- iii. To design the frontend and backend of the application in accordance with the properly analyzed user requirements and functional requirements
- iv. To develop the mobile application.

- v. To test and validate the mobile application.

## **1.4 JUSTIFICATION OF THE STUDY**

This mobile application eases the means of inputting and sending an airtime voucher number by a person to another by sms or email as well as activating it on the recipient's side .it also saves time spent on the tedious manual inputting of 14 digits of a voucher number by both people with good and poor eye sight and also prevents unnecessary costs arising from sms sent comprising of incorrect typed voucher numbers or using Me 2 U .

## **1.5 SCOPE OF THE STUDY.**

### **1.5.1 TIME SCOPE**

The review of literature and existing systems, application design, implementation, and testing and validation took five months from November 2015 to April 2016.

### **1.5.2 GEOGRAPHICAL SCOPE**

This Developed application is to be used by Ugandan Citizens with android smart phones to send airtime voucher numbers to people they choose and also by recipients of the voucher number Sms to activate the airtime by tapping on the voucher number in the Sms and following prompts.

### **1.5.3 CONTENT SCOPE**

Basing on the identified and analyzed requirements of this project. The source code was written using Android Studio, Android SDK and Android NDK. And this source code contains Android camera APIs for initializing a phone camera, which are integrated with Leptonica image processing APIs and Tesseract OCR engine APIs so that the image captured from the camera can be processed before it's taken as an input by the OCR engine. After OCR's results are inserted to an SMS and sent with the help of Android SMS APIs and Standard Android Intents. Android calling APIs are utilized in the source code to automate activation of the airtime by calling \*130 \*Voucher Number# on the recipients' side.

## 1.6 LIMITATIONS

- i. An android smart phone with high Quality camera is needed for the OCR to work Accurately.
- ii. The airtime voucher activator module of Mobile application operates efficiently alongside the stock Android OS messaging and Gmail clients in Android 4.1 and 4.2 OS versions.
- iii. The Mobile Application may not be efficient on all mobile devices made by Different vendors due differing camera parameters and configurations.
- iv. The Voucher card must be properly scratched in order for the OCR to function accurately.
- v. The Level of Light illumination affects the accuracy of the OCR.
- vi. The sent message should only comprise of 14 digits and any number of other characters.
- vii. The captured region of interest with in the Rectangular boundary must contain only Digits because unwanted patterns such as Borders can be read as extra digits.



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