Towards Enhancing Digital Satelite Television (DSTV) Service using Mobile Payment Platform

Sadiq F.I. (MCPN,MNCS)

Department of Computer Science, Ambrose Alli University, P.M.B 14, Ekpoma.

ABSTRACT

Digital Satellite Television (DSTV) is a service demanded by a larger population of over fifty percent home users. The service demand the need to always renew the subscription on monthly basis which was done by visiting the office in any town where they are located and that technique has further migrated to e-payment by visiting their site and a particular bank where PIN for payment will be obtained before the user can proceed for payment with the help of a user's smartcard number. In Nigeria, doing this, creates a lot of inconveniences. It is against this backdrop that this study designed an alternative means of payment known as "Mobile Payment", which allows payment to be done using a software that runs on a Mobile phones with the aim of using any of the communication network like GLO, MTN, ETISALAT etc, with the option of using recharge card for payment either in one's office, or home, during the weekend, anytime or anywhere where the account will be renewed immediately instead of the delay experienced with the earlier method of payment. The software was developed with Java Micro Edition (JME) as the front end while MySQL database was used as the backend with Object Oriented Analysis and Design Methodology (OOADM). Preliminary findings from the study showed very promising results.

General Terms

Your general terms must be any term which can be used for general classification of the submitted material such as Pattern Recognition, Security, Algorithms et. al.

Keywords

Digital Satellite Television, Mobile payment, Mobile phone, Recharge cards, Java Micro Edition

1. INTRODUCTION

Any device that can be easily moved around is known as mobile device, while mobile payment simply refers to the means of payment that can be done while on the move or at any place. Prior to the era of cell phones several payment methods have been in place and now in recent times, organizations, and even individuals have discovered that the power of Global System for Mobile (GSM) communication as a strong based payment service. From the foregoing, this paper was born out of the zeal to introduce how best this technology can enhance the Digital Satellite Television (DSTV) services. Banking institutions are not even left out of this giant stride of innovation. The mobile devices may include mobile phones, PDAs, wireless tablets and any other device that connect to mobile telecommunication network and make it possible for payments to be made [3].

2. RELATED WORK

Mobile payments are natural evolution of e-payment schemes that will facilitate mobile commerce. A mobile payment or m-payment may be defined, for our study, as any payment where a mobile device is used to initiate, authorize and confirm an exchange of financial transaction as cited in Mahil available at mahilcarr@idrbt.ac.in [1] Mobile payment also known as Mobile wallet is an alternative payment method. Rather than paying with cash, cheque or credit cards, a consumer can use a mobile phone to pay for a wide range of services and goods or hard goods such as: music, videos, ringtones, etc. There are several models which include; Premium SMS based transactional payments, Mobile Web Payments (WAP) etc.

According to [10], a concept called Innopay on mobile payment 2010 was launched. The concept was an independent full service consultancy that specialised in payments and services related to mobile payment. The basic fact outlined in their research was that a mobile payment services requires thorough understanding of the context. More so the development of such mobile payment system is costly and complex, hence it requires a specialist expertise and a particular approach. According to them, it has started many years ago and has experienced some up and down challenges which include "structure and understanding of mobile payment", "develop and manage mobile payment business", "choose and use mobile payment solutions". Their research also pointed out the fact that there is no definite definition for mobile payment therefore confusion and overlap exists between mobile payments, mobile banking and use of the mobile phone to simply order goods or receive delivery. This disparity in definition is a key factors limiting cooperation, standardization and contributing to the creation of mobile payment.

Mobile Money as a PIN-based Mobile Payment Solution designed by Mobile Money International to address the limitations and bottlenecks created by cash, cheques and credit cards as a technique for Mobile Payment with a view to improve payment system [11] The technique unlocks the power of the mobile phone to make payments, allowing registered users to pay for goods and services at anytime, anywhere using only a mobile phone coupled with a 6-digit security PIN (Personal Identification Number) via SMS (Short Messaging Service). [9] further opined that Mobile payments will gain significant traction in the coming years as the mobile and payment technologies mature and become widely available. They stated that various technologies are competing to become the established standards for physical and virtual mobile payments, yet it is ultimately the users who will determine the level of success of the technologies through their adoption. Only if it becomes easier and cheaper to transact business using mobile payment applications than by using conventional methods will they become popular, either with users or providers. The technologies highlighted are:

- Mobile Network
- 1G: Advance Mobile Phone System (AMPS) in North America,

- Total Access Communication System (TACS) in UK,
- Nippon Telegraph & Telephone (NTT) in Japan,

However, [9] further stated that as at that time, mobile payment has not been adopted on a large scale to make it viable, but it will arrive when the handset, network operator and vendor infrastructure are in place. Before mobile payment infrastructure can be rolled out on a large scale, much work must still be done in the areas of wireless network security, standardization of protocols, and user interface design. Though their paper discussed many of the technologies required for mobile payment and the state of the art in mobile payment solutions. [2] noted that payment system in Nigeria is typical of most developing economics. It is predominantly cash-based with growing use of cheque/money market instrument and low level use of e-payment mechanism. Dependence of cash for transaction implies that much cash is held outside the banking system which otherwise would have been available to banks for lending to more productive sector of the economy. Three billion people are expected to own mobile phones in the globe by 2012. There are currently 225 million mobile phones in India and 100 million are added every year. In a few years more than 500 million people are expected to have mobile phones in India [6].

Moreover [8], stated that mobile payments provide retailers an opportunity to take advantage of the newest method of payment. The Center of Retail Research recently released some interesting figures, numbers that clearly shows the growing trend of customers using mobile money. It also predicted that about one out of every 10 shoppers would purchase a gift this holiday season using a mobile device. This trend continues to grow as technology improves and customers feel secure using mobile payments. In 2012, it is expected that using mobile money will become even more mainstream as phones that offer the services become more affordable due to newer models of the devices being released. In this regard, DSTV for short, Digital Satellite Television is a service embraced by many Nigerians for the purpose of getting global access to news, sports, movies, internationally. Consolidation of standards in the mobile commerce arena is critical and it will enable producers and consumers to make investments that produce value [4].

3. PROBLEM DEFINITION

Transactional payments have been popular but are now being overtaken by other mobile payment methods such as Mobile Web Payments with (WAP), Mobile payment Client (Java ME, Android) and Direct Mobile Billing for a number of reason:

Poor reliability - transactional payments can easily fail as messages get lost. The subscription renewal for the DSTV service often post certain problem during the time of renewal, this is because the time may fall on weekend or the distance where the payment would be made may be far, at times queue or threat to ones life in banks at the cities or towns may also hinder or discourage the subscribers from going to the banks to use Automated Teller Machine (ATM) for payment renewal for the DSTV service. Moreso, when payment is made the activation is not always done immediately. All these are the problem associated with the current method of payment for the DSTV in Nigeria. As a result of this, we

report the result obtained from an undergraduate research in this study, with the mind to allow the use of mobile phone for the payment transaction using recharge card option, with different network services like GLO, MTN, AIRTEL etc. The mobile application developed for this purpose will eliminate or reduced the stress experienced during the DSTV monthly subscription.

The purpose of this study is to report the findings of a result obtained in a concluded undergraduate research work in the Department of Computer Science at Ambrose Alli University, Ekpoma. Titled "Design and implementation of Mobile Paym ent System for DSTV services in Nigeria". The study focused on the provision of a platform that will provide an alternative means of payment method to the customers or the lovers of the said service, so as to ease the means of payment whenever the customer wants to renew their monthly service that ranges from DSTV; access, family, compact, compact plus, etc. Hence the aim is to present the result of a Mobile Payment Platform that is suitable for DSTV monthly subscription in Nigeria and places where such method is presently not in use.

4. MATERIALS AND METHOD

Java Micro Edition (JME) was used to develop the m-payment system for DSTV service. Java micro edition was used because it enhances security application on java virtual machine, it cuts across 70% of mobile application and it is platform independent, that is, it runs regardless of the mobile platform. e.g, Pocket PCS, Symbian phones, etc. all of these applications supports java micro application, above all it is recommended for mobile application. Java micro edition is a technology that allows programmers to use the java programming language and relate tools to develop programs for mobile wireless information devices such as Cellular phones and Personal Digital Assistants (PDAs). In this application, it serves as the front- end for the users. Netbeans 6.8 IDE was used for the testing due to its flexibility and open source nature.

4.1 MySQL

This is popular with apache web cross platform for database management system. It uses the SQL {structured Query language} syntax for scripting queries. Its primary use is in storing data for websites that need to have dynamically generated content and is commonly used with apache web server and the PHP programming language in this case it was specifically used for the back-end in the application. MySQL was chosen due to the following reason;

- It is an open source application
- Free technical support is given to all users
- Strong protection for data through cryptography
- Water platform support: being an open source application, it enjoys supports from information.
- Technology giants such as linux, apple, IBM etc with this MySQL are supported on wide range of operating systems and application server.
- Simulator used

Sun Microsystems simulator was used to simulate how the program will work in real life; the simulator is embedded within the IDE 6.8.

Object Oriented Analysis and Design Methodology were used in the design with 2-yier architecture approach.

- Algorithm showing a segment of home page code for m-payment

```
/**
 * The mobiledstvpaymentsystem constructor.
 */
public mobiledstvpaymentsystem() {
}
//<editor-fold defaultstate="collapsed" desc=" Generated
Methods ">
//</editor-fold>
//<editor-fold defaultstate="collapsed" desc=" Generated
Method: initialize ">
/**
 * Initilizes the application.
 * It is called only once when the MIDlet is started. The
method is called before the <code>startMIDlet</code>
method.
 */
private void initialize() {
    // write pre-initialize user code here
    // write post-initialize user code here
}
//</editor-fold>
//<editor-fold defaultstate="collapsed" desc=" Generated
Method: startMIDlet ">
/**
 * Performs an action assigned to the Mobile Device -
MIDlet Started point.
 */
```


Fig. 1: Flow diagram of services available for DSTV on the interface. Source: [7]

able to renew their monthly subscription anytime using recharge cards of any kinds such GLO, MTN on the application's interface having entered their user name and password by following the steps provided via instructions on the software. For the goal to be achieved in real life the application required internet service by hosting it with a domain name before it can be accessible. Figures 2 to 5 display the screen shot of the interface during testing

Figure 2 introduced the purpose of the application in this paper and further display the logo of the service in which the application intend to enhance.
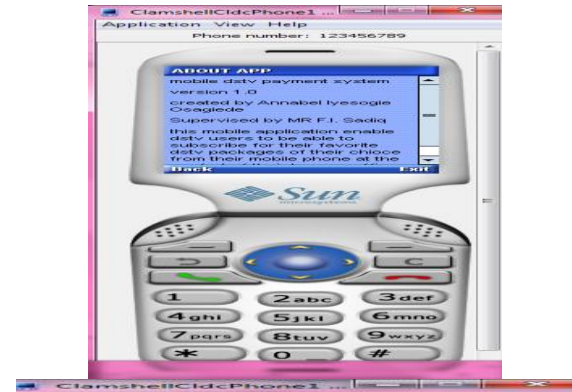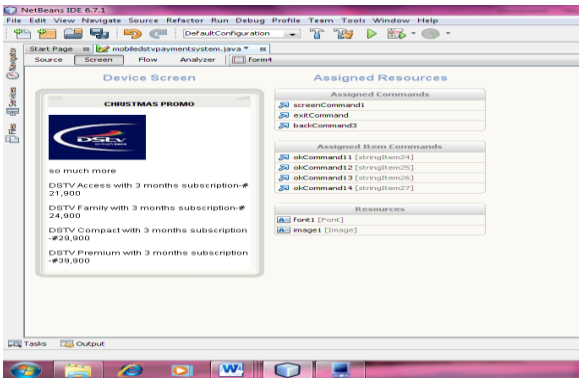

Figure 3 displays an interface that will request the customer to enter his or her smart card number to know if such customer is the bonafide owner of the dstv decoder. The essence is to ascertain the originality of the number since the number exist on the dstv database. Once it is certain, the payment option interface will then appear for subscription to be renewed (See figure 4).

Fig 3: Smartcard verification interface(Source: [7])

Figure 4 displays the interfaces for various services and the amount available on the DSTV for the customers to select

their choice of payment renewal, to enable them proceed by picking any net

work of their choice to use such network recharge card for immediate payment, in order to continue enjoying the dstv services.
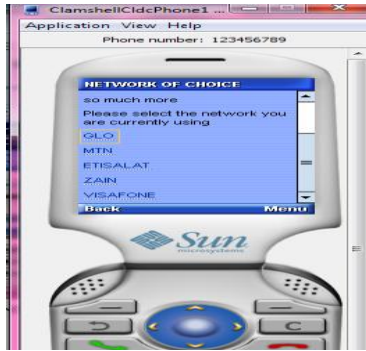

Figure 5: displays interfaces for different services on the DSTV and Mobile network available for monthly subscription renewal. (Source: [7])
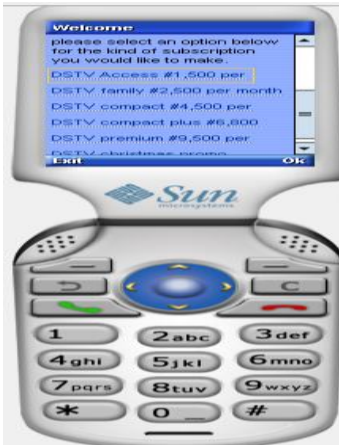

Figure 5 shows the interface indicating a successful payment renewal with the product .

Fig. 5: Successful payment renewer for family @ ₦2500 (Source: [7]).

The application is dynamic hence it can accommodate any changes once there is price review on the services available . Below are conditions to be met before this software can can work as specified.

5. APPLICATION INSTALLATION

For this application to be used, the following requirements must be met;

a) Display: screen size 96*54 pixels minimum
b) Colour depth: 1 bit, aspect ratio approximately 1:1
c) Intel Pentium with 1.4GHz with 256 L2 cache or other IBM compatible system
d) 1GB of memory (random access memory) capacity minimum

5.1 *Minimum software requirements*

The developed mobile payment system can run on any of the mobile phone's operating system that supports J2ME. this include; windows mobile, RIM blackberry OS, Android, Palm webOS, Symbian OS etc.

5.2 Analysis report

Research around the world showed that there are key drivers and barriers hindering the growth of adoption of mobile payment. These are presented in Table 1.1.

Table 1.1 Factors hindering Mobile payment growth

Drivers	Barriers
Provides added value for consumers, merchants , mobile operators financial institutions etc.	Complex value chain with lack of cooperation
User's experience/ easy of use	Financial regulation security/ risk
	Cost
	In availability of a broad of mobile payment capable handset
	Lack of interoperability

From our interactions with people in some part of Edo State in Nigeria, it was evident that illiteracy is one of the major factors that can hinder mobile payment innovation. Also, the issue of lack of adequate security on the part of the users is another concern that will not make mobile payment sees the light of the day.

5.3 Distinctive features of the research

This service currently featured the possibility of customer renewing their subscriptions using Banks, Automated Teller Machine (ATM) , Point of Sale (POS) and Online service using *www.quickteller.com.* But the uniqueness of this research is that a software developed will run on mobile phone of the subscribers ones they acquire a DSTV decoder. With the help of the software they can use the payment interface which will give them access to use recharge card of any of the displayed network in Figure 5. The phone require to run the application is affordable and target large users.

For now we are not aware of such service using a mobile payment of the kind introduce here as means of payment transaction.

6. FINDINGS

The method of payment renewal for customers of DSTV service is geared towards visiting their office around the town for the service demand and of recent they have migrated from this means to the use of bank ATM or via a website, www.quickteller.com. In this study we presented an alternative method of payment using a platform on the mobile phone. With this we feel that this technology will go a long way to facilitate the process involved in customer DSTV monthly renewal service. The idea was born out of personal experience during such transaction over the years. Also considering the fact that large populace owns cell phone, therefore the method is available at all times be it at home or on the move.

7. RECOMMENDATIONS

I recommend that;
1. the management of DSTV should study the program technique as presented in this study, and see how it can be added to help there existing method payment renewal.
2. effort should be made to contact the GSM network service provider to workout means of providing a common gateway so as to provide a link for the method of payment presented here. Since few organizations have embraced similar technology.
3. on achieving 1 and 2 above, awareness should be created for the customers

8. CONCLUSION

This study on mobile payment service for DSTV is a welcome development considering the power of GSM technology and the fact that they had a pass mark with the innovation that surrounds recharge card that exhibits pay as you go. It on this premises that we felt the entire Nigeria will welcome this type of technology, since that is already in vogue with recharge modem of all kinds for browsing. However we have developed an alternative means of payment for DSTV service in Nigeria using Java technology with 2 –tier architecture. The application was tested and results displayed in Figures 2 through 5. It is our hope that if the mobile application presented is embraced it will reduce or eliminates the problem experienced during customers' monthly renewal's payment and delay in reactivation if payment is made.

9. ACKNOWLEDGMENTS

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