Step Ahead to Digitization of Prepaid recharge using IVR and M-Commerce: A Comparative Study

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Abstract

Interactive Voice Response (IVR) systems play an important role in collecting and disseminating information in developing regions. Recently, researchers have used IVR technology to build voice forums, in which callers leave messages that can be heard over the Internet and over the phone. However, despite their appeal, voice forums remain difficult to set up, and difficult to scale due to the overhead of moderating content and the cost of phone calls.

Internet technology is regarded as the third wave of revolution after agricultural and industrial revolution. After phone technology is heralding the era of mobile in India. The growth of Mobile is phenomenal compared to previous deliver channels. It took approximately more than twenty years for Mobile to become popular for online services. More so, with India all set to emerge as the second largest mobile subscriber base in the world after China, the telecom operators are raring to use this medium to offer online services including fund transfers to all sorts of people. Mobile can be categorized as the latest advancement in digitization.

The paper describes the rapid growth and development of payment systems and how there has been a slow shift from IVR e-payment systems to m-payment systems. The key mobile payment systems described in the paper includes but not limited to, the m-Paisa, Airtel money, ICICI pocket etc. The business models described in the paper have been analyzed by considering a few key factors and analysis results depicted that the biggest challenge of deploying mobile payment systems is initiated by uncertainties in the environment.

1. Introduction

Most of the world's 3.6 billion mobile subscribers [2] live in the developing world, and they use their phones primarily for voice calls. As companies seek to enable this population to access, report, and share information using the phone, the HCI and ICT4D communities have witnessed a surge of interest in Interactive Voice Response

(IVR) systems. Recent voice-based services have spanned diverse domains, including citizen news journalism [6], agricultural discussion forums [8], community dialogue [1], user-generated maps [5], access to health information [10], group messaging [7], support for community radio stations [3, 4], and a viral entertainment platform [9].

Mobile to Mobile transaction is a term used for performing Mobile top-up and recharge, account transactions, payments etc. via a mobile device such as a mobile phone. Transactions today is most often performed via mobile can also use special programs called clients downloaded to the mobile device. It can also be understood as availing financial services with the help of mobile telecommunications devices. The services offered by mobile included getting account information, transferring funds, checking transactions and so on. The growing number of mobile subscribers in the country forms the most valuable support base for the growth and success of Mobile to Mobile transactions Mobile services in India started with SMS way back in 2002. With an increasing mobile subscriber base in India, mobile financial services have picked up steam in recent years. Today more than half the population in India has a mobile phone. However, less than 5% of that uses mobile phone as a medium for financial Transactions. With the advent of smart phones and ever growing usage of internet on mobile handsets, application based financial transactions has emerged as a new concept within this space. Other than SMS, companies are now offering banking services on mobile handsets through WAP-based internet websites and application based mobile banking services.

In this paper, we compare some new approaches for Mobile Based Transactions. We also describe some of ideas, called IVR Junction, which integrates commercial tools (Voxeo Prophecy) and freely-available services (YouTube, SkyDrive) to enable rapid construction of interactive voice forums and Mobile to Mobile transactions (M-Paisa, ICICI Pockets. etc).

2. Related Work

The IBM SpokenWeb project proposes a "Worldwide Telecom Browser" that acts as a single access point as the user browses content hosted on separate servers [2]. As the hyperlinked voice services remain distributed, this solution could incur long-distance charges between the browser and the remote services. In contrast, IVR Junction pushes remote content to each local node. Previously, cloud

telephony systems such as KooKoo and Exotel are accessible through centralized phone numbers.

Various ways of IVR usage

1. Voice-activated dialing (VAD) IVR systems are used to automate routine enquiries to switchboard or PABX (Private Automatic Branch eXchange) operators, and are used in many hospitals and large businesses to reduce the caller waiting time. An additional function is the ability to allow external callers to page staff and transfer the inbound call to the paged person.
2. Some of the largest installed IVR platforms are used for televoting on television game shows, such as Pop Idol and Big Brother, which can generate enormous call spikes. Often, the network provider will have to deploy call gapping in the PSTN to prevent network overload.
3. IVR systems allow callers to obtain data relatively anonymously. Hospitals and clinics have used IVR systems to allow callers to receive anonymous access to test results. This is information that could easily be handled by a person but the IVR system is used to preserve privacy and avoid potential embarrassment of sensitive information or test results. Users are given a passcode to access their results.
4. IVR systems are used by pharmaceutical companies and contract research organizations to conduct clinical trials and manage the large volumes of data generated. The caller will respond to questions in their preferred language and their responses will be logged into a database and possibly recorded at the same time to confirm authenticity. Applications include patient randomization and drug supply management. They are also used in recording patient diaries and questionnaires.
5. IVR systems can be used for outbound calls, as IVR systems are more intelligent than many predictive dialer systems, and can use call progress detection to recognize different line conditions
   a. Answer (the IVR can tell the customer who is calling and ask them to wait for an agent)
   b. Answered by voice mail or answering machine (in these circumstances the IVR system can leave a message)
   c. Fax tone (the IVR can leave a TIFF image fax message)
   d. Divert messages (the IVR will abandon the call)
   e. No answer

Technologies used for IVR:

1. DTMF decoding and speech recognition are used to interpret the caller's response to voice

prompts. DTMF tones are entered via the telephone keypad.

Two main varieties of speech recognition are used in IVR: that based upon predefined grammars (used in "directed" dialogues), and that based on statistically trained language models (used in "natural language" dialogues). Directed dialogues prompt the caller with specific questions or options. Natural language dialogues employ open questions (e.g. "How can I help you?"), are more conversational, and can interpret free-form responses.

Other technologies include using text-to-speech (TTS) to speak complex and dynamic information, such as e-mails, news reports or weather information. TTS is computer generated synthesized speech that is no longer the robotic voice traditionally associated with computers. Real voices create the speech in fragments that are spliced together (concatenated) and smoothed before being played to the caller.

An IVR can be deployed in several ways:

a. Equipment installed on the customer premises
b. Equipment installed in the PSTN (public switched telephone network)
c. Application service provider (ASP) / hosted IVR
d. IVR can be used to provide a more sophisticated voice mail experience to the caller. For example, the IVR could ask if the caller wishes to hear, edit, forward or remove a message.

2. An automatic call distributor (ACD) is often the first point of contact when calling many larger businesses. An ACD uses digital storage devices to play greetings or announcements, but typically routes a caller without prompting for input. An IVR can play announcements and request an input from the caller. This information can be used to profile the caller and route the call to an agent with a particular skill set. (A skill set is a function applied to a group of call-center agents with a particular skill.) Interactive voice response can be used to front-end a call center operation by identifying the needs of the caller. Information can be obtained from the caller such as an account number. Answers to simple questions such as account balances or pre-recorded information can be provided without operator intervention. Account numbers from the IVR are often compared to caller ID data for security reasons and additional IVR responses are required if the caller ID does not match the account record.

IVR call flows are created in a variety of ways. A traditional IVR depended upon proprietary programming or scripting languages, whereas modern IVR applications are generated in a similar way to Web pages, using standards such as VoiceXML, CCXML, SRGS and SSML. The ability to use XML-driven applications allows a web server to act as the application server, freeing the IVR developer to focus on the call flow. It was widely believed [who?] that developers would no longer require specialized programming skills; however, this has been proven[citation needed] to be misguided as IVR applications need to understand the human reaction to the application dialog. Higher level IVR development tools are available to further simplify the application development process. A call flow diagram can be drawn with a GUI tool and the presentation layer (typically VoiceXML) can be automatically generated. In addition, these tools normally provide extension mechanisms for software integration, such as an HTTP interface to a web site and a Java interface for connecting to a database. In telecommunications, an audio response unit (ARU) is a device that provides synthesized voice responses to DTMF key presses by processing calls based on (a) the call-originator input, (b) information received from a database, and (c) information in the incoming call, such as the time of day. ARUs increase the number of information calls handled and provide consistent quality in information retrieval [13].

Applications used for m-commerce:

Mobile banking is an application of m-commerce which enables customers to access bank accounts through mobile devices to conduct and complete bank-related transactions such as balancing cheques, checking account statuses, transferring money and selling stocks, defined mobile banking as an innovative method for accessing banking services via a channel whereby the customer interacts with a bank using a mobile device (e.g. mobile phone or personal digital assistant (PDA)). There are challenges associated with m-commerce, and specifically mobile banking. Mobile devices with a small screen size, limited screen resolution and uncooperative keypad may make it difficult for the customer to use mobile banking [11]. Mobile banking is also vulnerable to information and transaction eavesdropping risk, just like other e-commerce applications such as Internet banking

M-Commerce market in India is in nascent stage, m-payment and m-banking segments have shown significant growth over the last

few years. As smart phone sales continue their journey by 51% every three months, the mobile commerce (m-comm) market may grow by 55% from its present size of $2 billion to $19 billion by 2019.

Now a day's online recharge has become very exceptional choice for most of the people as they have the benefit to recharge instantly at anytime. In simple words, the recharge market is gradually growing as people don't have to go to any shop for bill recharge [6][8].

Meanwhile, some websites are also providing to pay electrical power invoice, gas bill and Land line costs. The modes of payment can be achieved by many means like internet banking or Debit Card or bank card. Few of the websites these days have also integrated e-Commerce in to it to grow in the industry and make name for them. These websites also offer Recharge Coupons for reductions, cashbacks and plenty of offers for the customers. There are more than a few mobile Recharge sites that gives to recharge safely at any time. Below are the top 3 recharge web pages in India.

Paytm

What do you think of when you think of quick recharge? Well, as per me I think it would be Paytm. It's Paytm because; currently it is the most popular mobile recharge site in India. Paytm stands for Pay Through Money. It is a Noida-based startup founded in the year 2009 by Vijay Shekar Sharma and became well known in a very short period. You can say, it has become a synonym for Mobile Recharge.

Currently it has 80 million wallet users according to Mary Meeker's 2015 Internet Trends Report. It offers Online Mobile Recharge, DTH Recharge, Electricity Bills, Data cards, Landline Bills, Gas Bills, Add Money to Paytm Wallet, Send Money to Friends, Bus Tickets, Coupons and e-Commerce. The Paytm's mobile application has also been into existence which is supported on Android, IOS and Windows Operating System Mobiles. The app makes it convenient for everyone to avail the above services on the go[5][7].

Freecharge

Freecharge is a Mumbai-based start-up that was founded in 2010 by Kunal Shah. On 8th April 2015 Snapdeal acquired the company. It started as an online platform for recharge and bill payments, but soon adopted a mobile first strategy with its app for Android, iOS and Windows smart phones. Its concept was to provide an easy platform to recharge mobiles

prepaid postpaid, data cards and DTH while giving out discount coupons for online shopping, restaurants and more, to make the overall recharge, free.

It has a freecharge credits wallet where users can add cash and use it for fastest recharge experience. It also provides turbo recharge where it remembers your numbers which you have recharged and allows an easy reference for the next time for quick recharge. It gives coupons for every online recharge from different sites like Dominos, Pizzahut, McDonalds, Cafe Coffee Day, Snapdeal.

MobiKwik

Mobikwik was founded in 2009 by Bipin Preet Singh, this website also provides an easy solution to Mobile Recharge. Its slogan goes "Mobile Wallet for Every Indian. Easiest way to Pay". Where it differentiates from the other two is that it started as a wallet and then moved into a recharge portal. Mobikwik allows you to add money from your Debit Card, Credit Card Internet Banking and also through Cash Pay, a door step cash collection service. It is a semi closed wallet authorized by Reserve Bank of India. They have tied up with various online websites like eBay, Bookmyshow, Dominos, Shopclues etc [12].

3. Comparative Study

IVR is a voice base model where as m-Commerce is voice, text, video chat based model M-commerce is not a direct extension of e-commerce. The key differences between m-commerce and e-commerce are the technology they use, the nature of service they provide, and the business model they represent For IVR activities we have to go the vendor and purchase the concerned coupon but in m-commerce we need not to go anywhere and only need smart phone with internet.

IVR needs physical stores such as retailers, booking windows etc. In m-commerce no such physical stores are required.

IVR coupon can be purchased only during fixed hours, but in m-commerce transactions can be made 24X7.

M-commerce facilitates us to buy from and sell to other consumers whereas IVR coupons can only be used by the purchaser.

In IVR the transaction or goods are immediately received, but in m-commerce we have to wait for the goods.

In IVR we have to handle the currency notes, m-commerce gives us freedom from such things.

In IVR we need to hire third party service where as in m-Commerce we need to download small application on mobile provided by vendors (Banks, Shopping portals etc.)

There is a single repository used in the IVR where as in m-Commerce have multi-repository model for e.g. if an item is purchased we can have after sale services from multiple windows (manufacturer, supplier etc)[10][12]

4. Conclusion

Step by step E-commerce Also M-commerce playing precise handy part previously, on the web retail advertising and people groups utilize this engineering organization step by step expanding throughout those universe. Versatile business includes every last bit sort of electronic transactions by the utilization for cell phone. M-Commerce may be that expression to settling on benefits of the business transactions utilizing versatile apparatuses. There need aid at that point a few existing M-Commerce provisions what's more benefits these days that need been extremely supportive with us. A portion need aid portable banking, location maps, and Also mixture from claiming news, portable shopping, and ticketing also versatile record offering.

Same time M-Commerce frameworks need rich possibility should give inventive data What's more correspondence administrations with portable subscribers in the Creating world, to date it need been was troublesome for IVR to extend frameworks Past this stage because of tests to directing content Furthermore overseeing bring costs during scale.

Abbreviations

a. IVR – Interactive Voice Response
b. ARU -Audio response unit
c. VAD- Voice-activated dialing
d. DTMF - Dual Tone - Multi Frequency
e. TTS - Text-to-speech
f. CCXML - Call Control XML
g. SRGS - Speech Recognition Grammar specification
h. SSML - Speech Synthesis Markup Language
i. PSTN- public switched telephone network
j. ASP- Application service provider
k. ACD - automatic call distributor
l. ARU - Audio Response Unit

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