IVRS AND DTMF BASED VOTING SYSTEM

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Abstract- In developing regions like India, voice based telecommunication services are one of the most appropriate medium for information dissemination as they overcome prevalent low literacy rate. However, voice based Interactive Voice Response (IVR) systems are still not exploited to their full potential and are commonly considered as frustrating to use. We work on a real world experiment to investigate the usability issues of a voice based system. This paper describes the implementation of IVRS and DTMF based voting system.By using IVRS and DTMF based voting system,we can save the time required for going to voting booth. This system is location independent. So we can vote from anywhere in the world. In this system, it does not allow even administrator to log in during voting period, hence corruption is not possible. We can vote through the toll free number. Hence it is free of cost. It is used for minimizing errors in voting and make the voting easier. It does not allow the person to vote who is already voted. Using this system, counting and displaying of voting result becomes easier. Using IVRS technology citizen can call on toll free number and by using DTMF technology authenticate himself using his voting number and give his vote using his mobile keypad .

Keywords- Interactive Voice Response System(IVRS), Dual Tone Multi Frequency(DTMF).

I. INTRODUCTION

Telecommunication services are a vital medium for information exchange and communication. They have a huge impact in developing countries, where reach of the Internet connection is relatively low compared to developed countries. At present, there are more than 5 billion mobile phone users compared to 2 billion Internet users in the entire world.By the 2011 statistics released by Telecom Regulatory Authority of India (TRAI), there are 885 million land-line and mobile connections in India whereas the count of the Internet users is around 100 million. Similar trends can be seen in other BRIC1 nations. Brazil, Russia and China have less than 42% of the total population connected to the Internet. The present number of subscribers of the cellular mobile in terms of total population for Brazil, Russia and China are 90.5%, 162.4% and 64.4% respectively. These figures clearly show high penetration of telecommunication services in the developing countries as compared to the Internet. Thus in developing regions, a phone based medium has much more reach ability than the Internet. Apart from reach ability, any technological intervention for large scale information dissemination also has to deal with the literacy rate of the end users.Researchers have shown after his experiment that voice based systems can overcome the barrier of low literacy, as voice is natural and an accessible medium for many people who often have limited formal education. Additionally, any voice based information dissemination system is accessible through the regular phones, will easily penetrate in existing infrastructure and will seamlessly integrate with what people routinely use. It has always been a difficult task for the election commission to conduct free and fair polls in our country,have the largest democracy in the world.In our nationcrore of rupees have been spent on this to make sure that the elections are riot free. But, now- a -days it has become common for some forces toindulge in rigging which may eventually lead to a result contrary to the actual verdict given by the people.

This paper aims to present a new voting system employing the IVRS and DTMF technology in order to avoid rigging and to enhance the accuracy and speed of the process.

An Interactive Voice Response or IVR providesinteractive communication between human and computer.The human interface is usually performed on a phone keypador a DTMF (Dual-Tone Multi-Frequency). The advancedIVR could recognize human voice and act as a voicecommand since a computer could recognize a vocal word ora whole sentence depending on how sophisticate thealgorithm is. Use of Interactive Voice Response (IVR) has already been advocated for information dissemination in developing regions. IVR is a voice based system that is accessible through any mobile or land-line phone.

IVR system has been mostly used in industry for call automation while providing customersservice.Italso argued that IVR is easier to use when compared to the Internet, as Internet use requires certain skills and training. In comparison to traditional information dissemination media like Television or Radio, communicationon traditional media is passive whereas IVR enables interactivity for active communication.

DTMF stands for Dual Tone - Multi Frequency and it is the basis for your telephone system. DTMF is

actually the generic term for Touch-Tone (touch-tone is a registered trademark of ATT). Your touch-tone® phone is technically a DTMF generator that produces DTMF tones as you press the buttons.

II. SYSTEM ARCHITECTURE

There are five major component in this System. Server is used to store the information of voters and candidates detail. Arduino is used to convert data from binary into serial and it is connected to server.The next component is decoder circuit. It converts DTMF signal into binary code.User's mobile is used for calling purpose and another mobile for automatically receiving call.

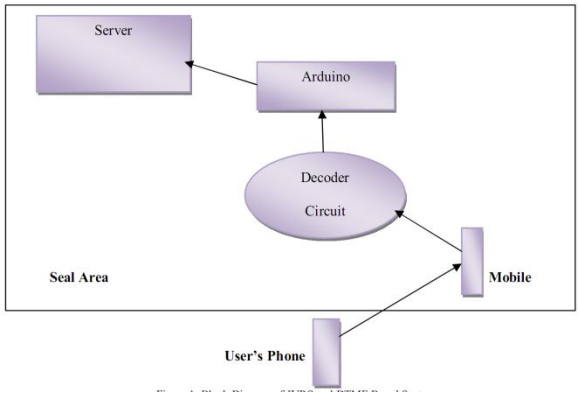


Figure 1. Block Diagram of IVRS and DTMF Based System

From above Fig.No.4.1, First admin will login to the system and will set the voting period and store the candidate list in the database server. Admin also set the citizen details that is voting ID and password. After setting time period required for voting and start the voting process, system will lock for given voting period. Even admin is not allowed to login during voting period. User will call to the toll free number that is given for voting. Then the mobile phone placed near the system will automatically receive the call. Then the system will give IVRS response to the caller. Now system will tell the caller to enter his/her voting ID and password. Then caller provides such details and the system will check it into database. If found correct details, then system will tell candidate list for his/her ward by using user's voting ID. User will give vote to anyone candidate. User can not give vote to more than one candidate in this system. When the user's vote is stored into the database server, the system will cut the call. After the vote is confirmed, the user with same voting ID cannot call again to that number.

1) Interactive Voice Response System(IVRS)-Self services are provided by the interactive voice response (IVR) system. Anyone with the phone has most likely experienced an Interactive Voice Response (IVR)system, also called as Voice Response Unit, which is the industrial version of answering machine. In the past Interactive Voice Response (IVR) unit was in the Automatic Call Distributor (ACD), but today IVR is an independent unit in the Contact center [1]. An IVR system can be used to automate a wide range of service and data request. These systems are generally used by the company to provide theself service to customer. The system takes the input from the user and provides back the enterprise information in the form of recorded or synthesized voice, fax or even an email by connecting one or more online databases to the caller.

There are two type of IVR system.

- Touch tone IVR.
- Speech enabled IVR

Touch tone IVR provide the service by having callers select from a list of options using their touch-tone keypad(i.e. "press 1 for travel, 2 for news, 3 for stock and 9 to speak to customer agent"). Speech enabled IVR provide service by having caller select from a list of options by speaking an option or by speaking a keyword (i.e. "say travel, news, Stocks,")[2].Clearly, a speech-enabled IVRthat mimics human interaction has edge over the touch-tone based IVR System.
Text-to-Speech (TTS), as the name indicates, is a technology which converts electronic text into human-like speech. This technology allows a machine such as a computer or a smart phone to talk to a user in a human-like voice. A TTS system is also knows as a speech synthesizer.Vaja is a Thai Text-To-Speech software which has been developed over the past several years. The most recentversion of Vaja utilizes the latest speech synthesis technique called HTS which uses a statistical model called HiddenMarkov to produce synthesized sound. This technique helps eliminate the problem of uneven sound that occurred from wave file concatenation in the previous versions. The new synthesis technique together with a prosody prediction module which predicts phrase boundaries and the duration of each phone make the synthesized speech sounds more natural and increase users' satisfaction. Furthermore, Vaja isable to synthesize all Thai words since it has a text analysis module which can generate the pronunciation of every word even the one not found in a dictionary based on a trained statistical model. In the Smart IVR platform, Vajaoperates as a web service and interacts with the Dialog Management module through a web API. Vaja receives atext from the Dialog Management module and generates the corresponding human speech that will be an output of an IVR system[3][10].

2)Dual Tone Multi Frequency(DTMF)-DTMF generation is a composite audio signals of two tones between the frequency of 707Hz and 1643Hz. The DTMF keypad is arranged such that each row will have it's own unique tone frequency and also each column will have its own unique tone. Below is a

representation of the typical DTMF keypad and the associated row/column frequencies[6].

High Tone Group	1209 Hz	1336 Hz	1477 Hz	1633 Hz
697Hz	1	2	3	A
LowToneGroup 770 Hz	4	5	6	B
852 Hz	7	8	9	C
941 Hz	*	0	#	D

Figure 2. DTMF Tone Generation

By pressing a key, for example 5 will generate a dual tone consist of an 770 Hz from the low tone group and the 1336 Hz from the high tone group.

3)Arduino-It is an single-board microcontroller to make use for electronics in multidisciplinary projects mostly accessible. Arduino hardware mead up of an open-source hardware board. It has an designed around an 8-bit Atmel(Advanced Technology for Memory and Logic) AVR(Alf Vagards Preprocessors) microcontroller or an 32-bit Atmel ARM(Advanced RISC Machine).

The software consists of a standard programming language compiler and a boot loader and that executes on the microcontroller.Microcontroller with complementary components to facilitate programming and incorporation into other circuits.

An important aspect of the Arduino has the standard way that connectors are exposed,it is allowing the CPU board to be connected to a various type of interchangeable add-on modules called as shields. Some shields are communicate with the Arduino board directly over various pins, but many shields are the individually addressable through an I²C serial bus, allowing many shields that to be stacked and used in parallel. A handful of another processors have been used by Arduinocompatibles. An Arduino's microcontroller is also pre-programmed with a boot loader that simplifies uploading of programs to the on chip flash memory and compare with another devices that typically needs an external programmer.

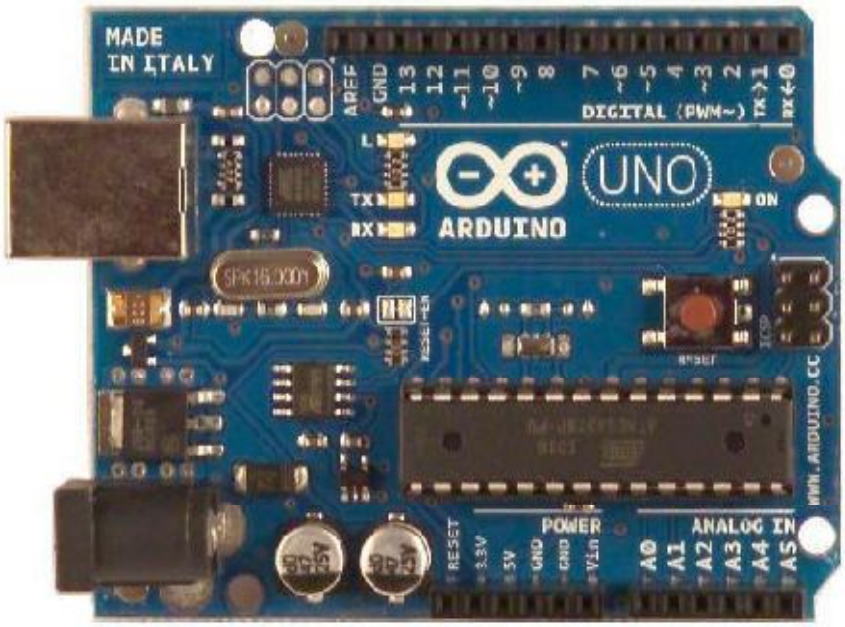


Figure 3.Arduino

4)Decoder IC MT8870- The MT8870D/MT8870D-1 is a complete DTMF receiver and integrating both the band split filter and digital decoder functions. The filter section using switched capacitor techniques for the high and low group filter.

Thisdecoder using an digital counting techniques for the detection purpose and decode all 16 DTMF tone-pairs into a 4-bit code.

Features

- Complete DTMF Receiver
- Low power consumption
- Internal gain setting amplifier
- Adjustable guard time
- Central office quality
- Power-down mode
- Inhibit mode
- Backward compatible with MT8870C/MT8870C-1

III. APPLICATION DESIGN

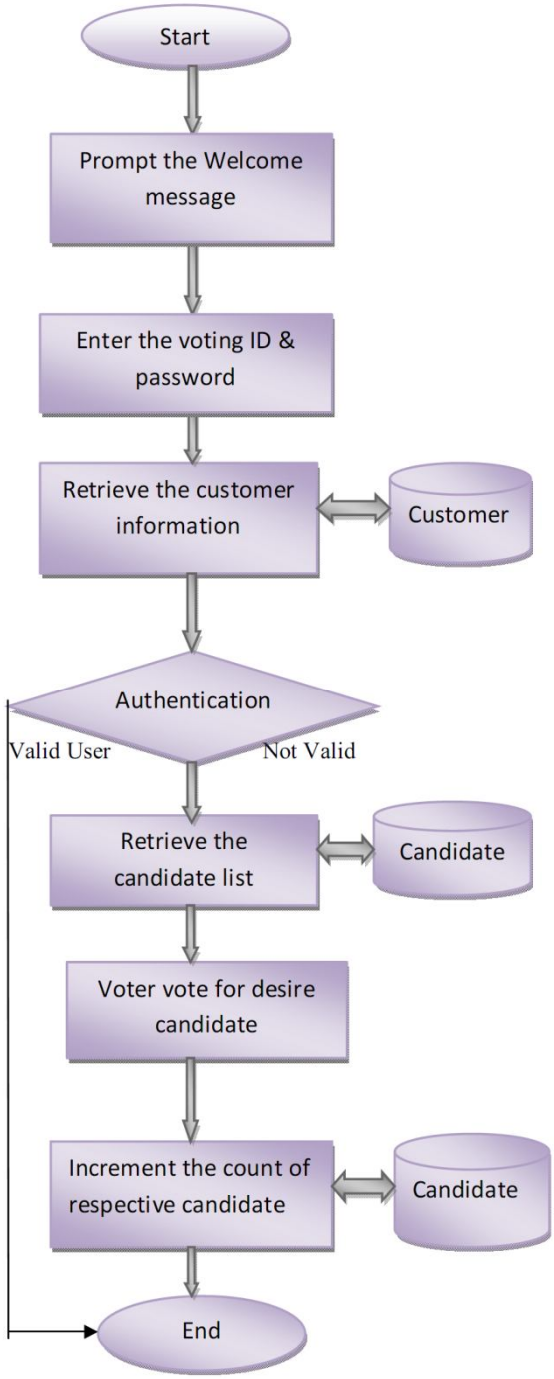


Figure 5.Flowchart of the System

Fig.1represents the flow chart of the IVRS and DTMF based voting System.In IVRS and DTMF based voting system when the customers make a call to the voting center, it uses the voter's voting no & password to interact with the database and retrieve the voter information from the database and Authenticate. As a pre-poll procedure the voting number & password of all the voters are collected and stored in a database initially at time of distribution of voting cards to voter.At the time of voting, the option of the voter is taken along with the voting number and password .our next task is to see that a particular person cannot vote more than one time that means the purpose is to avoid multiple votes of single voter.This task can be accomplished by simple software technique employed. It has consist of an two folders having name searched and unsearched.Initiallyfrom the both folders,the searched folder consists of no voting number. The voting number of all the voters of a constituency will be present in the unsearched folder. As and when a vote is cast, the voting number of the particular voter gets transferred to the searched folder.Searched folder have a programmed such that an image cannot be present more than once in this searched folder.So when the any voter casts multiple votes the exception is generated and an alarm is raised and even the police can be informed about the identity of the intruder indulging in this illegal activity.If there is no match then it automatically generates voice menus for voters. Voter can vote to desire candidate and respective count is increment by one. After voting period it display in the form of pie/chart or bar char.

IV. DEVELOPMENT TOOLS

- Visual studio 2008
- C#.net language framework3.5
- MySQL database
- ODBC connector
- Embedded C code for hardware
- Crystal report for analysis purpose
- Windows XP
- Windows7
- ARDUINO and decoder IC
- Personal Computer to store database.

CONCLUSION

By using IVRS and DTMF based voting system, voter can interact with the system and can give vote to the desirable candidate. The voting result will be display in the form of bar chart or pie chart which reduces the human efforts and time required for counting of votes.

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