MANAGEMENT OF INFORMATION THROUGH AN INTERACTIVE VOICE RESPONSE SYSTEM THE PROSPECT OF RELIGIOUS DOMAIN

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Abstract

This paper explores the potential of using an inteactive voice response system to maange information in institutions of religious domain. We first explain the terminologies involved such as an inteactive voice response system, computer telephony integration, information mansgement, and religious domain. Then we look at how information is manged through an inteactive voice response syste. IVR application supports two kinds of communications, i.e. real time communication and message type communication. Users could make either a real time communication or a message type communication as needed. Real time communication includes accessing databases in order to get instant and updated information within the real time during the call is made through the system. Message type communication includes voice mail application using telephone recording. The suitability of using inteactive voice response for institution of religious domain is studied, and we also describe a few options for the implementation of the system.

1. Introduction

Some of the terminologies might be new to you, so let us start by defining a few important terminologies used in this paper, i.e. computer telephony integration (CTI), interactive voice response (IVR) system, information management, and religious domain.

Computer Telephony Integration (CTI) is a technology that allows people to interact with a computer through their telephones, enabling the callers to access databases and perform transactions remotely. It applies to many types of applications, such as voice mail, auto-attendant, Interactive Voice Response (IVR), audiotex, fax-on-demand, and international callback. CTI technology encompasses voice processing,

fax, speech, automatic voice recognition, text-to-speech, routing & call control, audio board, digital signal processing, and telephony interfaces technology. The combination of wide technology enables its implementation in various domain and environment, to name a few, government, banking, health, and tourism. In a nutshell, CTI is an important technology for information gathering, data manipulation and information delivery.

Interactive Voice Response (IVR) system is included under the computer-telephony technology, that is a computer technology and application which increases the customer and organization service effectiveness by automating and adding intelligence to the telephone communication [7]. IVR is a result of 1970s' analog-to-digital format conversion technology. This technology enables analog voice signal to be converted into digital format and with that it is thus possible to save and re-access voice messages using the hard disk technology. The first application produced from such technology is a stand-alone voice mail system. Following that, since a decade ago voice processing technology has been much researched. IVR is a voice processing technology, which integrates with stand-alone or host-based computer databases. It is a generic term given to the applications that enable callers to interact directly with information resides on the computer data bases using touch-tone [10].

Information management is about creating, using, sharing, modifying and obliterating data or information by the supporting functions, which are normally critical corporate resources for the effectiveness and efficiency of the organizations activities [3].

Religious domain in this context is defined as an environment related to religious organizations, normally non-profit making organizations. The religious scope taken into account in this study is Islam, since Islam is an official religion in Malaysia. Religious organizations in general have the following objectives:

- as a centre of religious education for the community,
- to accelerate and to provide opportunities for the public to enhance their understanding of the true religious principles and activities.
- as a generator and a symbol of religious knowledge activities.

2. Management of Information using an IVR System

Access to information on religion is usually available from very limited resources, such as mosques, Islamic centers and some other Islamic organizations. There are some web sites which have included religious information, but they are comparatively smaller in number than those involve, for example, in entertainment. Apart from its small number, the amount of users in Malaysia is limited to those who own computers connected to Internet.

We want to talk about religious domain for an IVR system development here because IVR system had been utilized widely in other areas such as banking, sports, education, and entertainment, but not in religious domain. Users in the religious domain had not utilize IVR information access technology, which I think offeres many advantages. You might ask the question, why IVR? IVR is considered because, apart from the cheaper price compared to computers, telephone is very easily accessible for most of us.

IVR could increase the capability of religious organizations in managing information since the callers are allowed to add in and create new information. This capability enables organizers in charge of managing information to create and to update data. Scheduled reports generated by the system based on real calls provide important input for the organizers. Accordingly, the organizers would be able to check the following items:

- amount of calls at certain period of time;
- time duration where most calls are received;
- the most favorite kind of services accessed by users (at a certain period of time);
- combination of the above two, i.e. time duration where most calls are received and the most favorite kind of services accessed by users (at a certain period of time); and,
- the mostly accessed databases.

3. The Impact Of The System To The Society

As mentioned above, the IVR system is beneficial to religious organizations. On top of that, the system is also beneficial to users. It is clear that the accessing and the sharing of information can easily be performed. As shown in Figure 1, IVR can be accessed through any kind of touch-tone telephone, including public phone, home phone, hand

phone, smart phone, or PC phone. As a result, more groups of users would be able to access the system. In short, this system would easily enable religious information residing in the databases in the mosques, Islamic centers, and other religious organizations to be accessed by all groups of users.

IVR application supports two kinds of communications, i.e. real time communication and message type communication. Users could make either a real time communication or a message type communication as needed. Real time communication includes accessing databases in order to get instant and updated information within the real time during the call is made through the system. Message type communication includes voice mail application using telephone recording. IVR can handle interactive communication well although it is easier to deal with one way communication (broadcast type, which does not involved any data base alteration).

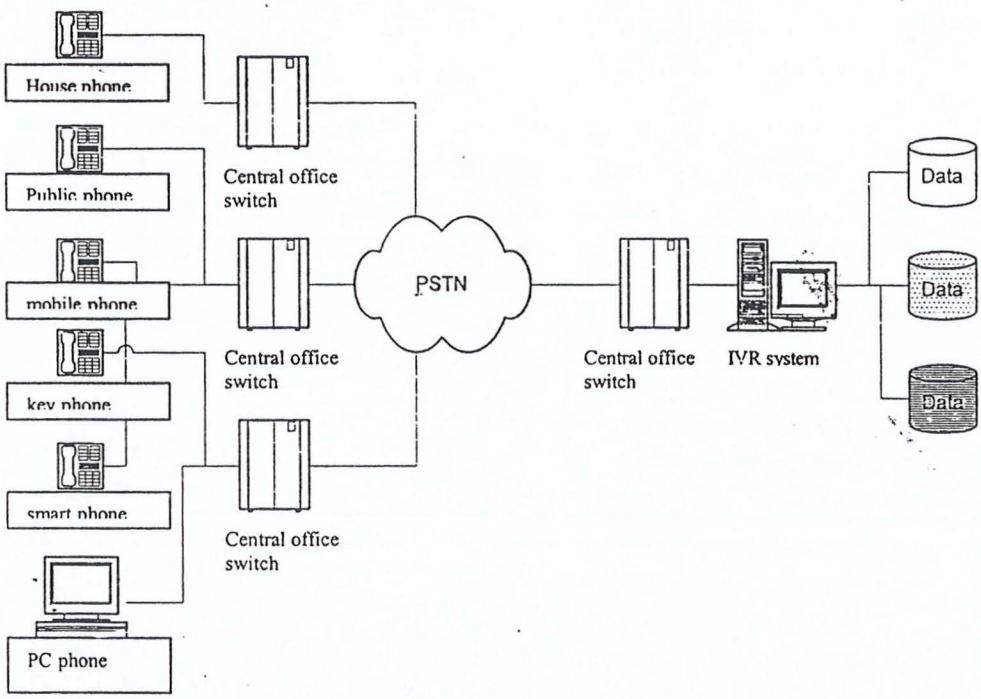

Figure 1: A configuration of a direct connection from an IVR system to the PSTN

4. Suitability of IVR for Religious Domain

According to the Malaysian Islamic Center, 50% of incoming calls received by the Center were questions which had been categorized as a

one-way information, mostly inquiring similar matters. In other words, the variety of the questions were low. Those calls which had characteristically been a one-way communication and low in variety are indeed suitable for IVR installation because the cost involved is much cheaper, and in terms of system development, IVR system supporting this kind of application is easier to do. In addition, Islamic information is precise for it has clear sources of reference, such as the Koran and the *Hadith* (record of actions or sayings of the Prophet Muhammad p.b.u.h.). Therefore, this kind of information could be categorized structurally and systematically and which in turn could enable us to create a more structured and much clearer flow of information. By so doing, the delivery process of information could be accelerated.

Further more, religious information becomes very important reference from time to time for variety of activities. Referring to religious authority is sometimes necessary in emergency, such as when death occurs. Users have reliable source that can be accessed at any time. On that account, serious attention should be given to developing a good and stable system, as well as to managing information effectively by the concerned officers of religious organizations.

5. Options for System Implementation Methods

By definition, IVR refers to the integration of computer application with telephone system. In this regard, the main focus of any IVR application is the way it is connected to telephone system. This kind of physical connection is known as network interface. There are several options available for this interface. The suitable option depends on the type of application. In a normal condition, for example, IVR application is directly connected to the public switch telephone network (PSTN). However, if the IVR application needs a call management service – even a very simple request, like "to be connected to operator, please dial 0" – it has to be integrated into the organization telephone system. In this case, IVR is usually connected to PSTN through organization private branch exchange (PBX) system (or a simulation of PBX system, using a certain add-on boards).

Direct Connection to PSTN

Direct connection to PSTN is popular for small Islamic centers, mosques or other religious organizations, which are small in terms of physical, infrastructures, and personnel. IVR could directly be connected to PSTN using additional hardware called PC-based telephony card. This card

could be in the form of voice modem or DSP base telephony interface card. Voice modem is a cheaper option and suitable for small mosques and small religious organizations. Nevertheless, it has some restrictions like limited lines for every PC (sometimes it has only one line), and it is not practical for professional solution. Moreover, this voice modem is incompatible with some sophisticated characteristics like its inability to clearly recognise certain tone range needed by IVR application. A better solution needs some hardware architecture consisting of one or more special architecture board to be connected together with standard bus system protocols (i.e. SCSA, SCAI, MVIP or H.100). This method could offer capability for combining and matching boards, which provide network interface (like ISDN network interface board).

Connection to PBX

IVR application providing call control characteristic is always connected to PBX (or a simulation of it) as shown in Figure 2. This application is constructed not only to direct and control organization internal telephone switch, but it could also involve other characteristics like auto attendant, voice mail, automatic call distribution (ACD), and call scanning. The switch distributor usually provides application that is integrated into this kind of PBX as a complete application.

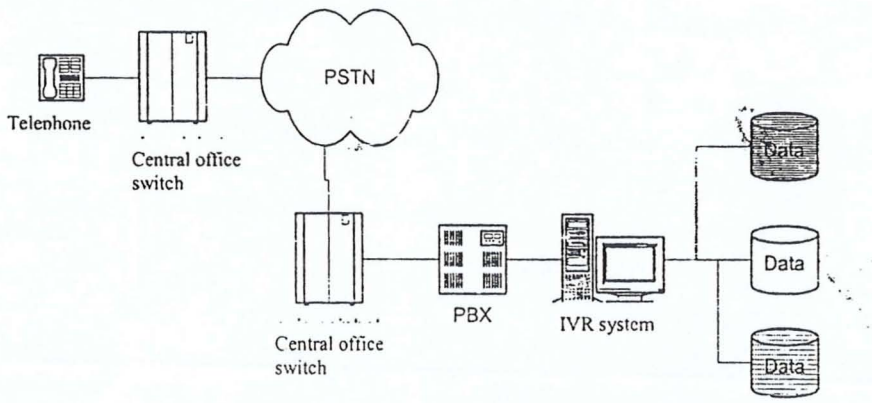

Figure 2: IVR System Connection Configuration through PBX.

IVR system offering the above-mentioned characteristic could however be constructed using interface between internal telephone system and IVR application. There are two available options. Firstly, we could use DSP-based board connected to PBX connection. Secondly, we could use a joined series of PBX. Those boards should be the kind that supports PBX proprietary communication protocol. Another possible solution, which is cheaper, is by using a PBX simulation board.

7. Towards A More Effective And Efficient Information Management Using IVR System

Based on the definition of information management given at the beginning of this talk, we could define religious information management as the activity of creating, using, sharing, modifying and obliterating data or information by the supporting functions. These information are normally critical corporate resources for the effectiveness and efficiency of the organizations (agency) activity. The critical questions to be addressed here are concerning the effectiveness and efficiency of Information Management using IVR system.

The effectiveness and efficiency of the relevant organizations should directly be involved in the following matters:

- Development of information technology infrastructure.
- Development and maintenance of information system applications.
- The use of information system applications for gaining some added values.
- Management of information assets.
- Development and retaining of relationship.
- Organization leadership for achieving the desired objectives.

Future prospect of IVR in religious domain seems promising. We have conducted a telephone survey using random technique by asking the following four questions

- whether the use of IVR system in religious domain increased the level of information management in religious organization,
- whether the use of IVR system in religious domain increased the comprehension of the callers,
- whether the use of IVR system in religious domain increased the image of religious organization, and
- whether the use of IVR system in religious domain increased the professionalism of religious organization.

The result of the survey was very positive. Percentage of those who agreed was more than 60%. Especially for the increment of professionalism level of religious organization, its percentage was 92.8%.

8. Future Works

IVR system in religious domain is still being under development and its usage level would be studied. Statistically, the fluctuation of incoming calls, the kind of service frequently reached, and any other status that could be used during the operation of the system could be analyzed based on the periodical report generated by the system. Accordingly, this kind of study could become a base for future studies of usability and effectiveness of the system. In this regard, speech recognition technology could be introduced. Vocabulary should be limited to religious domain whose amount is less than that of general vocabulary. It is expected that the use of IVR could enhance:

- Information management in religious domain.
- Users' understanding on religion.
- Image and professionalism of organization involved in religious domain.

Other prospect of using IVR system to manage information is in the emergency call centres in rural areas where telephone is more accessable compared to computers. The set-up of such centres would help the rural community to give early alert to the relevant authorities in case of flood, fire and other catastrophes. These centres would also help members of the community to get critical information almost immediately and around the clock.

9. Conclusion

Religious institutions seems to take the back seat in terms of technology. I think this true in Malaysia and probably in many other countries. Most of their administrators prefer to cling to the traditional way of doing things. Most of the religious departments in Malaysia are still using manual systems. The success, effectiveness, and the efficiency of the IVR system depend very much on the readiness of the administrators and the users to use the system. Another factor, which is critical to the effectiveness of the IVR system, is the infrastructure required, but since IVR is cheaper than the computer networking facilities, it is much easier to adopt.

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