

MICROCONTROLLER BASED INTERACTIVE VOICE RESPONSE SYSTEM

Project Synopsis

Submitted in Partial Fulfillment of the Requirements for the Degree of

BACHELOR OF ENGINEERING

in

ELECTRONICS ENGINEERING

By

Niket Shah (Roll No. 55)
Nishant Mody (Roll No. 43)
Vatsal Parekh (Roll No. 45)

Under the guidance of

Prof. R. Abhyankar



DEPT OF ELECTRONICS ENGINEERING

DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING

Vile Parle (West)
Mumbai – 400056

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Abstract

The Interactive Voice Response (IVR) System serves as a bridge between people and computer databases by connecting the telephone network with the database. The telephone user can access the information from anywhere at anytime simply by dialing a specified number and following an on-line instruction when a connection has been established.

The IVR system uses pre-recorded or computer generated voice responses to provide information in response to an input from a telephone caller. The input may be given by means of touch-tone or Dual Tone Multi-Frequency (DTMF) signal, which is generated when a caller presses a key of his/her telephone set, and the sequence of messages to be played is determined dynamically according to an internal menu structure (maintained within the IVR application program) and the user input.

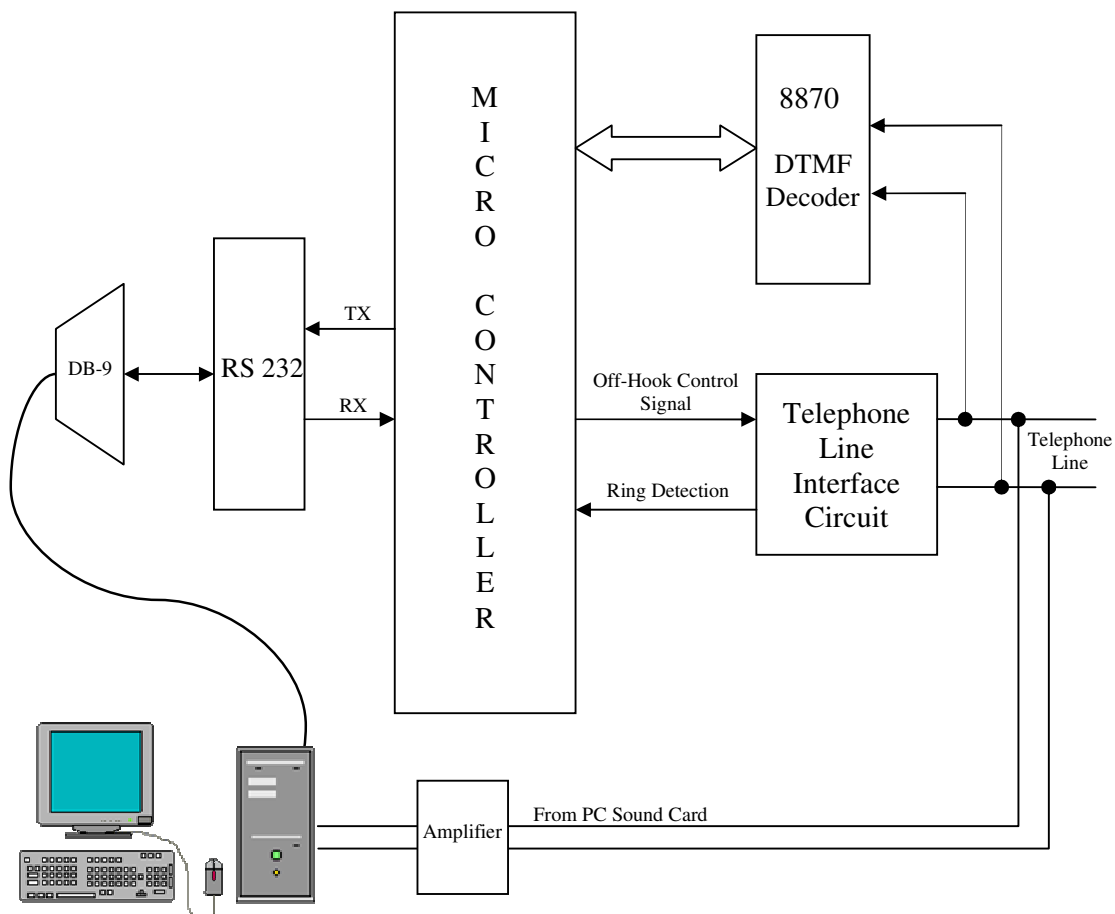
The IVRS system which will be designed will provide an ideal platform for the operation of start-ups and existing small concerns. It will be a highly economical and efficient way to replace the Dialogic card which is very costly and requires a high maintenance and regular upgradation.

The IVRS system which will be designed will consist of simple components like microcontroller and some basic application chips interfaced to a PC which will have small software running in the backend while the other jobs are performed on the front end.

Microcontroller Based Ivr's For College Automation

Now-A-Days Every Institution Needs Automation. As A Part Of College Automation, We Have Decided To Do A Project “Voice Interactive System For College Automation”. Our Project Allows The User To Know The Student’s Attendance And Marks Quickly Through The Telephone Line Without The Intention Of The College Authority. In The Hardware Side Embedded System Has Been Used. The Microcontroller Controls The Whole Hardware. Telephone Line Is Used For Communication Purpose. Visual Basic Has Been Used For Software Programming. Presentation In The Class And Outcome Of The University Are Made Reachable To The Parents By Our Project. It Will Be Very Obliging To The Parents To Be Acquainted With Their Son’s/Daughter’s Recital In The College.

Block Diagram



ALL ABOUT IVRS

In telephony, interactive voice response, or IVR, is a phone technology that allows a computer to detect voice and touch tones using a normal phone call. The IVR system can respond with pre-recorded or dynamically generated audio to further direct callers on how to proceed. IVR systems can be used to control almost any function where the interface can be broken down into a series of simple menu choices. Once constructed IVR systems generally scale well to handle large call volumes.

Example Usage

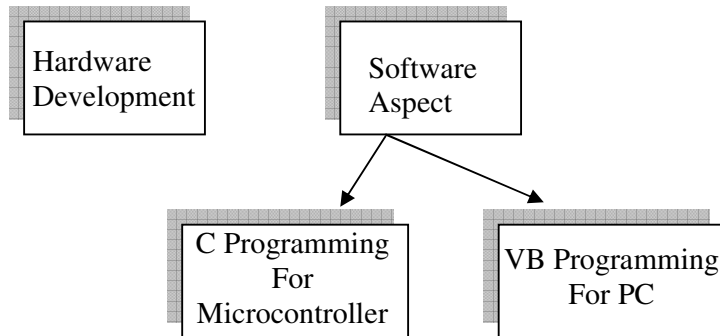
A caller dials a telephone number that is answered by an IVR system. The IVR system executes an application which is tied to the number dialed (DNIS Dialed number information service). As part of the application, prerecorded audio files or dynamically generated Text to Speech (TTS) audio explain the options available to the caller. The caller is given the choice to select options using DTMF tones or spoken word. Speech recognition is normally used to carryout more complex transactions and simplifies the application menu structure.

Typical Uses

- IVR systems are typically used to service high call volumes, reduce cost and improve the customer experience. Examples of typical IVR applications are, telephone banking, televoting, and credit card transactions.
- Large companies use IVR services to extend the business hours of operation. The use of the VUI (Voice User Interface) is designed to match the customer experience of the web interface. Companies have realised that access to voice services is impulsive and readily available. This is down to the high penetration of mobile phones.

- Call centers use IVR systems to identify and segment callers. The ability to identify customers allows the ability to tailor services according to the customer profile. It also allows the option of choosing automated services. Information can be fed to the caller allowing choices such as, wait in the queue, choose an automated service, or request a callback. (At a suitable time and telephone number) The use of CTI(Computer Telephone Integration) will allow the IVR system to look up the CLI (Calling Line ID) on a network database and identify the caller. This is currently accurate for about 80% of inbound calls, but will increase as mobile phones become more popular. In the cases where CLI is withheld or unavailable, the caller can be asked to identify themselves by other methods such as a pin number or password. The use of DNIS (Dialled number information services) will ensure that the correct application and language is executed by the IVR system.
- Voice activated Diallers. (VAD) Voice activated IVR systems are now used to replace the switchboard or PABX (Private Automatic Branch Exchange) operators. These are used in many hospitals and large business to reduce the caller waiting time. An additional function is the ability to allow external callers to page hospital staff and transfer the inbound call to the paged person.
- Entertainment and information. The largest installed IVR platforms are used for applications such as voting in TV game shows such as American Idol, X Factor, Big Brother, etc., which can generate enormous call spikes. IVRs have also been widely used to take orders for mobile content, such as ringtones and logos, weather forecasts, crossword answers, and the whole spectrum of adult entertainment.
- Anonymous Access. IVR systems also 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.
- Clinical Trials. IVR systems are used by large pharmaceutical companies to conduct global clinical trials and manage the large volumes of data generated. The application used by the IVR in clinical trials is generally referred to as a Voiceform application. 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.

PROJECT PHASES



Hardware

1. Basic Microcontroller based Hardware
 - To interface Telephone line
 - To provide various control signals
 - Give commands serially to PC
2. Telephone Line Interfacing Circuit
 - Ring Detection Circuit
 - Protection Circuit
3. DTMF Decoder Circuit
 - To detect DTMF Pulses on telephone line
4. Audio Amplifier (optional)
 - to drive PC Sound Card audio output

Software

1. Basic Application Software: for Microcontroller (Using Keil Compiler)
 - I/O Port functionality
 - DTMF Decoder 8870 Driver
 - Serial Communication Driver
 - Real Time Application Support
2. PC Side: Win32 Application Software (Using Visual Basic)
 - Student Database
 - Audio Output Support
 - Serial Communication Driver

PROJECT SCHEDULE

Rough Estimation of Work

WEEK NO.	ESTIMATED WORK
WEEK 1	Build an analog part on Bread Board and test its functionality (Telephone line Interface circuit)
WEEK 2	Build a DTMF decoder circuit on Bread Board and test its functionality
WEEK 3	Start developing software for microcontroller as well as PC. Make PCB for tested hardware
WEEK 4	Interface analog part with microcontrollers and test hardware as well as software functionality for microcontroller.
WEEK 5	Integrate all the sections and finalize a system
WEEK 6	Final Stage: Testing and Finishing

Scope Of The Project:

In today's world everything needs to be done from the comfort of one's home or office. For this application is prepared in such a way that they can be easily accessed through computers. In the same way our project's aim is to provide the entire information to the user at the tip of his fingers.

Due to this project the traditional manual way of handling the customers queries will be handled in a more technological and automated way. This type of system performs operations similar to that of a human telephone operator. The USP of the project is its relevance to the field of telephony and its cost that will be bearable even by a small concern due to its simpler and easily available components.