

Automatic Attendance System using Biometric Sensor and IVRS

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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 up gradation. 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 and for Automatic Attendance system used Biometric finger print sensor and notification msg send through GSM module.

Keywords: Dual Tone Multi-Frequency (DTMF), Goertzel algorithm, Speech synthesis, Voice Over Internet Protocol.

I. INTRODUCTION

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 Interactive Voice Response (IVR) is a phone system application that prompts callers with recorded messages and options and processes voice input and/or touch-phone keypad selections from these menus. The IVR script responds to this input by providing appropriate information in the form of

voice answer or provides a connection to a "live" operator.

Interactive Voice Response, or IVR systems, run on computers. They handle incoming phone calls and provide callers with a range of automated options, allowing them to report specific events or get specific information.

Broadly defined, 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 volume. Taking advantages of IVRS we are developing the system for college automation using voice over internet protocol (VOIP). Which is described in next section. 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 dialled DNIS (Dialled number information service). As part of the application, pre-recorded 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 carry out more complex transactions and simplifies the application menu structure

1.1 Basic Idea

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1.2 History of Project

An IVRS is an exemplary innovation in the area of voice assisted browsing and data retrieval on telephone, data that contains information of interest and has straight relevance to the user. This application software allows full resource sharing and integration with the existing data base.

We are developing the college automation system using voice over internet protocol (VOIP). Which the major part of the system software design. The system software development includes the technologies Goertzel algorithm, dual-tone multi-frequency signaling (DTMF), speech synthesizer etc. When caller dial the number then the technique used for identifying frequency components of a signal is Goertzel algorithm. That is for Dual Tone Multi-Frequency (DTMF) detection or decoding. A text-to-speech (TTS) system converts normal language text into speech. For that Speech synthesis is used.

1.3 Need of Project

Call centers play an increasingly growing part in today's business world and global economy. Indeed, they serve as the primary customer-contact channel, for companies in many different industries. Employing millions of agents across the globe, call centers are highly labor-intensive operations, with the cost of staff members who handle phone calls. The optimization of IVR system design, management and performance can be achieved through system modeling and careful analysis of the data supporting the model. By estimating above problem we try to overcome this problem by studying the various IEEE paper and the solution of that problem is overcome in our project.

1.4 Objective of Project

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.

The IVRS can collect necessary information relating to the call from the customer which he is waiting to be connected to a customer care executive.

Customer service cost can be significantly reduced through automated customer service and it reduces human resource inefficiencies. Since IVR works for 24 hours. In this research we shall try to model the customer flow within the IVR using a stochastic model, and based on real data.

II. BLOCK DIAGRAM

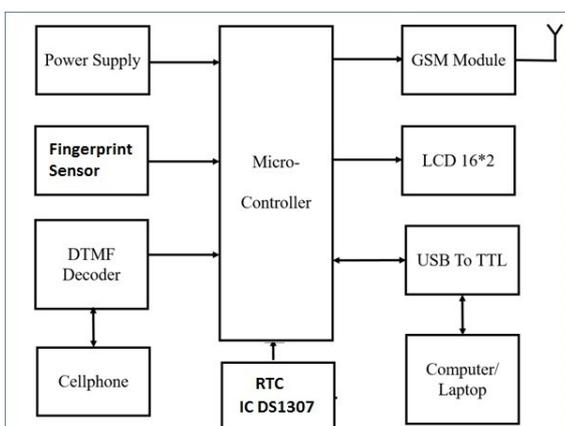


Figure 1. Block Diagram

The block diagram contains the control unit, DTMF Decoder Unit, USB to TTL, PC unit, GSM Module, PC Speaker out, Telephone unit and very important power supply. To run any of the electronic system a regulated power DC power supply is very necessary. The control unit consists of a microcontroller that is ATMEGA16. This microcontroller is of AVR Family. The function of this block to carry out all the process and have control on it. It is having a program saved in its memory. A next block is DTMF Decoder unit. This block functions to detect incoming call, and receive it. Then it decodes the input signal that are provided by the user. The USB to TTL block is use as a communication protocol between the Microcontroller and PC unit. According to the signal coming from the microcontroller the PC unit gives the audio output which is listen by the user on other side of telephone .In PC unit the software will be developed that can be able to convert a text signal into the voice signals.

The telephone line transmits the DTMF tones which indicates the call made by user. The signal is now available at ring detector and DTMF decoder.

- **8870 DTMF Decoder:**

It is an IC that takes DTMF signal as input and decodes it and shows the corresponding key as four bit output. The M-8870 is a full DTMF Receiver that integrates both band split filter and decoder functions into a single 18-pin DIP or SOIC package. Manufactured using CMOS process technology, the M-8870 offers low power consumption (35 mw max) and precise data handling. Its filter section uses switched capacitor technology for both the high and low group filters and for dial tone rejection. Its decoder uses digital counting techniques to detect and decode all 16 DTMF tone pairs into a 4-bit code. External component count is minimized by provision of an on-chip differential input amplifier, clock generator, and latched tri-state interface bus. Minimal external components required include a low-cost 3.579545 MHz color burst crystal, a timing resistor, and a timing capacitor. The M-8870-02 provides a

“power-down” option which, when enabled, drops consumption to less than 0.5 mw. The M-8870-02 can also inhibit the decoding of fourth column digits.

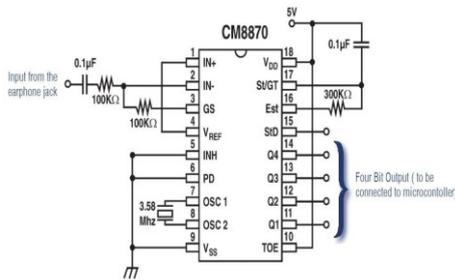


Figure 2. Dtmf Decoder 8870 Ic

CIRCUIT DIAGRAM

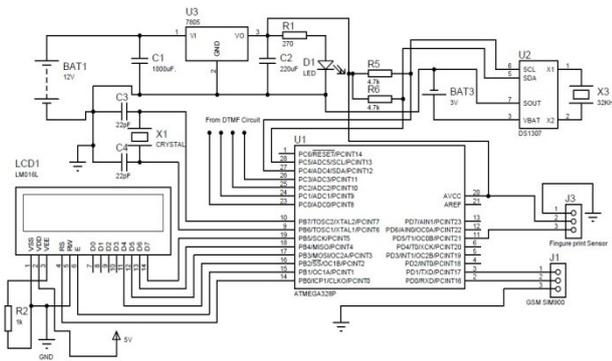
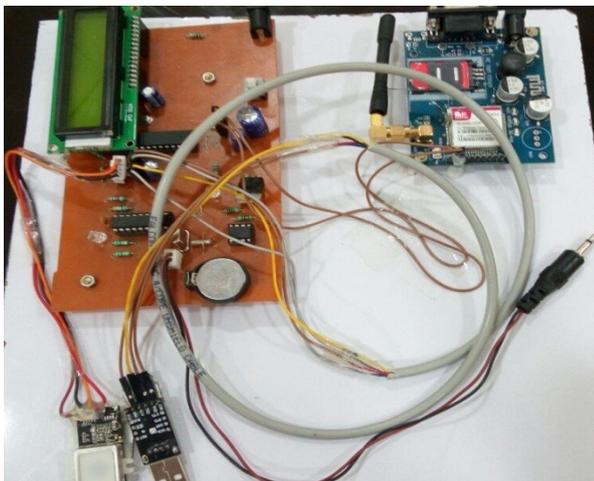


Figure 4. Circuit Diagram

III. RESULT



In this project we design two system, one is IVRS system and biometric fingerprint sensor based attendance system with notification SMS to parents using GSM.

IV. CONCLUSION

• Feature

1. Better Customer Contact

The IVRS can collect necessary information relating to the call from the customer which he is waiting to be connected to a customer care executive. The IVRS will collect the details from the customers and is been displayed on the customer care executive's system. Thus helping him to handle the in a swift professional manner. Both parties can straightaway get down to resolving the object of the call.

2. Better Customer Satisfaction

This can make sure by the following ways: The number of missed calls will be very much less as the calls are attended by the system Instead of waiting for a customer care executive the customer can get the necessary details directly from the system very easily by just pressing necessary keys. The company can provide consistent replies for all routine enquires. This enhances the quality of customer service. Customer can obtain the requested information, products and service at any time, 24X7.

3. Cost Effective

Customer service cost can be significantly reduced through automated customer service and it reduces human resource inefficiencies. Since IVR works for 24 hours, the company can use it as a sales order line. Also the increase in customer satisfaction promotes repeat business with existing customers thus generating more revenue without much expenditure. Many clients often realize a full return on investment within a year of implementation.

4. Security

Unlike internet-based applications, in IVR system there is no entry point for hackers. This will give more security to the data.

5. Upgradeability

The latest cutting edge technologies can be easily adapted to the existing system. The biggest advantage of IVR for small and large organizations is to save time and money. Answering phone calls takes a lot of time, and not every phone call deserves the attention

of a trained employee. IVR systems can take care of most of the frequently asked questions that an organization receives (office hours, directions, phone directory, common tech support questions, et cetera) and allow customer service reps, salesmen and tech support specialists to concentrate on the harder stuff. If a large company is able to shave even a second off the average length of each phone call with a live operator, it can save them hundreds of thousands or even millions of dollars a year [source: Human Factors International]. IVR systems have the advantage of making callers and customers feel like they're being attended to, even if it's just by a machine. If you have a simple question, it's better to get a quick answer from a computerized operator than to wait ten minutes on hold before talking to a human being.

The addition of speech recognition capabilities help IVRS owners derives more benefit from their investment in existing IVRS resource.

Application

1. In educational institutes
2. With IVR system parents and student as well can use this system to know students academics progresses, notice, etc.
3. In banking
4. With the use of IVRS bank customers came to know about balance availability and any queries related to customers wish.
5. In Railway enquiry
6. Using these system users knows train related enquiries and queries.
7. In Bus enquiry.
8. In customer care services.
9. In colleges, School information provider Interactive voice response system.
10. In Promotional advertisement at the time Election and Mann ki baat.
11. Bank Security and one time password (OTP)

Future Scope

1. Call key select menus and ability for caller to enter numbers.
2. Automatic hours feature (enter your office hours and it will automatically answer after hours).
3. When student is regularly absent within four day or six days, a free voice call is generated to call the parents mobile number by using GSM technology.
4. For developing a multiple face detection and recognition device as a replacement of the fingerprint reader for easy login and logout transaction in the system.

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