

IVRS BASED NEWS EXTRACTING SYSTEM

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Abstract

In today's era, the human being is very concern about to know its circumstances behavior whether it is environmental, politics, current affairs, sports or the weather condition of upcoming days i.e. News, which can be easily available through television or internet sources in our daily routine but it's one of the human tendency, to feel the peak level of necessity of the something when we know to acquire such facility in particular situation is truly impossible to deal with such occurrences, our system can fulfill their needs just by dialing one toll free number through user i.e. 1800-XX-XXXX, where our smart and intelligent IVRS based news extractor will take care of their needs and fulfils it by responding in voice based form. Best part of this system is user himself will not be able to compare that in spite of any human operator, a genius system is responding to his needs. Proposed system will be able to automatically answer the user's call and can play the welcome tone that will be the pre-recorded voice and allow user to select his news domain. It will acquire the input as a DTMF signals through users cell phone's keystrokes after analyzing the signals meaning it will extract the related news information from data source. System will provide the main categories and sub-categories to fulfill the user's requirements optimally, motive of designing such smart system is to accomplish the society needs with modern technical assistance and make people's life easier and convenient.

Keywords—DTMF, IVRS, Speech Synthesis

1. INTRODUCTION

Consider the situations like, any user on his business tour and travelling from **Bangalore to Mumbai** via train and somehow he was unable to subscribe the internet service in his cell phone, and interested to know rain fall status of Mumbai or a **blind** but responsible & patriotic citizen of an India is very eager to know about results of prime minister's election poles or a farmer wishes that anyhow he can know the weather information of upcoming days so that he can plan its agricultural activities.

In above all three cases user is eagerly waiting to acquire his requirement but due to some circumstances he is unable to get that, like for person on its business tour is able to see and read the information but he is not having such source in his journey and person is in second case is although well qualified and concern but due to its blindness, he can't read the newspaper or operate news channels on televisions efficiently, in third case although the poor farmer is able to see but not that much qualified to read and acquire its need through the news channels or weather journals. So in such scenario traditionally user will wait, wait and wait only and at last he will prepare himself for facing worst situation but in era of modern science, our proposed system will act as magic wands for them. In our system all users can fulfill their needs just by dialing one toll free number ex. 1800-XX-XXXX, where our smart and intelligent IVRS based

news extractor will take care of their needs and fulfills it by responding in voice based form.

Problem Definition: To Design a system which is able to provide voice based response to user as per his/her needs via accepting the input as DTMF touchtone.

2. REQUIREMENTS AND CHALLENGES

It is observed that accepting natural language as an input for any system enhance the ease of accessibility for any user to satisfy his/her needs, but it is also true that it is not too easy to implement voice synthesis units for all local languages [4]. Accepting standard integers as an input provide any system a great ease, hence IVRS uses numeric inputs for accepting selection through users [4,3]. Managing CSR resource for any organization lead another overhead for them where as IVRS system overcome those issues via replacing manual intervention through automation of functionality of serving users[1].

3. PROPOSED SYSTEM

3.1 Interactive Voice Response (IVR) System

It is a communication system which provides automated telephone call access to specified computer database information. Interactive Voice Response is a methodology that lead computer to detect Dual tone multi frequency key inputs and produces

voice response as per the input. Dual tone multi frequency signaling allows for telecommunication signaling over analog telephone lines in the voice-frequency band between telephone/cell phone equipment and other communications devices.

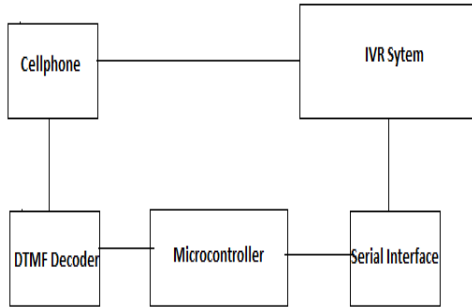


Fig 1 IVRS Basic Block

3.2 DTMF (Dual Tone Multi Frequency)

It is the frequency to the phone companies that we produce when we press telephone's keys. it's also known as Touchtone . With DTMF, each key you press on your phone generates two tones of specific frequencies. So that a voice can't imitate the tones, one tone is generated from a high- frequency band of tones and the other from a low frequency band.

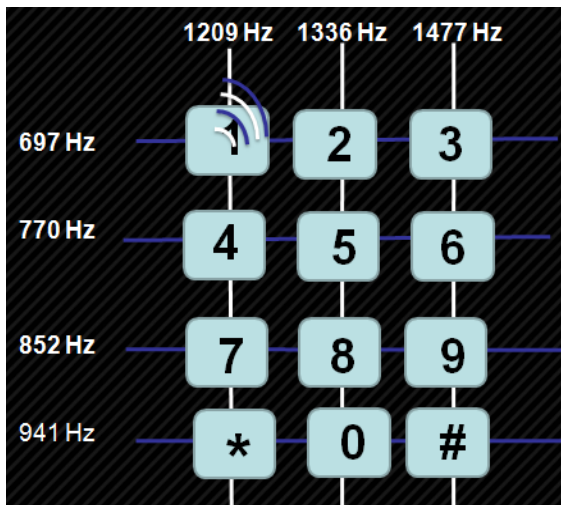


Fig 2 DTMF Generation

3.3 Speech Synthesis

Speech synthesis is a process of artificially produced human speech. A system used for this cause is called a **speech synthesizer**. A **text-to-speech (TTS)** system converts natural language text into speech.

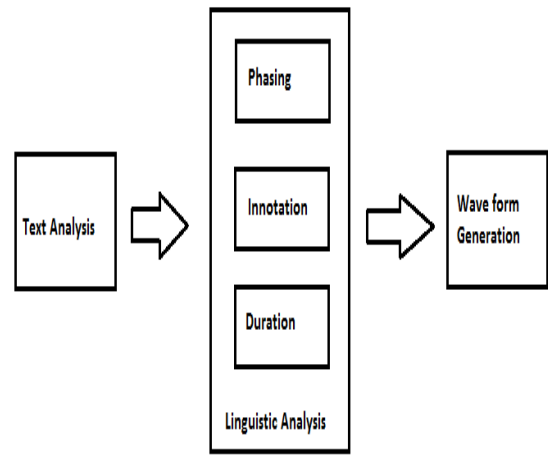


Fig 3 Text To Speech Conversions

4. SYSTEM DESIGN

Proposed System receives calls automatically from user and it will provide welcome tone, News domain menu to the user for further selection which will be made by user as per his/her needs ,once the news domain is decided system will respond to user for making selection on sub domain of news after accepting selection on sub categories of news system will acquire the particular specified news data from news database and deliver it to text to speech module for processing text data and transforming it into voice based form. Transformed voice based news will delivered to the user.

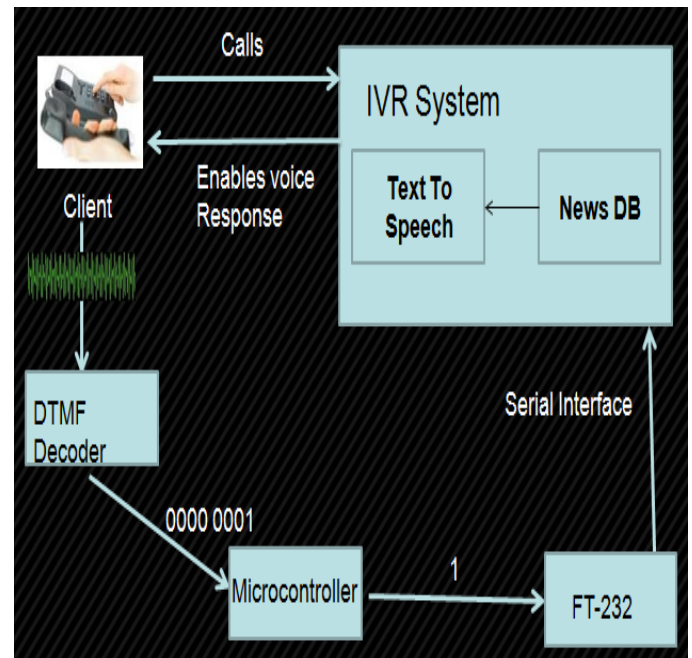


Fig 4 System Architectural view

5. MATHEMATICAL MODEL

System is depicted as in various phases to elaborate system's behavior mathematically.

Phase: 1

Caller would be the entity whose unique identification would makes the service secure and reliable i.e. $C = \{c1, c2, c3, \dots, cn\}$ Where, $C[i] \leftarrow$ customer unique identification no. i.e. 91-8655123123, News resided in database is only the need and feature of whole system that can be represented as, $W = \{w1, w2, w3, \dots, wn\}$ Where, $W[i] \leftarrow$ News related to specific domain. Each caller will press the keypad for making the precise selection as per his need each pressed keypad will induce the unique analog DTMF frequency i.e. $= \{a0, a1, a2, \dots, a12\}$ Where, $A[i] \leftarrow$ Analog signal for keypad $[i]$.

Each induced analog signal should be get rectified in its readable digital form through DTMF reader i.e. DT = DTMF Decoder, Each analog signal will be get process through the DTMF decoder FT8870 and will output the digital BCD(Binary Coded Decimal) for further processing i.e. $B = \{b1, b2, b3, \dots, bn\}$ Where, $B[i] \leftarrow$ BCD for specific analog frequency $A[i]$. Binary coded decimal values will be bring as input to the Atmega8 microcontroller for further processing, which will convert the BCD into equivalent decimal digits. μc = Microcontroller.

$D = \{d0, d1, d2, \dots, dn\}$ Where $d[i] \leftarrow$ Decimal for specific BCD, $\mu c(B[i])$. Acquired $d[i]$ through μc , will be transmitted to the system which would be responsible for matching the input data with repository via serial bus i.e. Sbus. System will possess the data repository unit which will maintain the whole records, log, reports etc. $P = \{c1 \cup a1 \cup w1, c2 \cup a2 \cup w2, \dots, cn \cup a1 \cup wn\}$, Selected or extracted result will be acknowledged to the caller in the voice based form

$V = \{v1, v2, v3, \dots, vn\}$ Where, $V[i] \leftarrow$ Voice response towards the customer for individual selection $A[i]$.

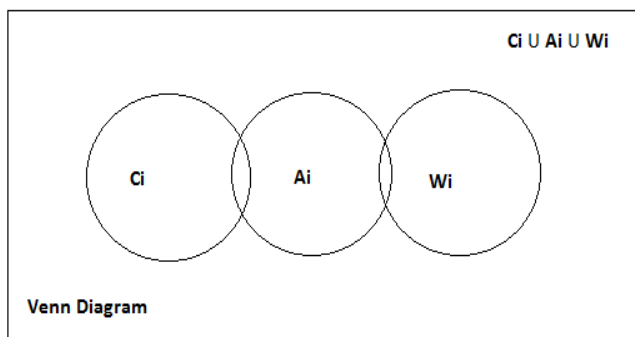


Fig 5 Data repository Venn Representation

Phase: 2

As soon as the caller will be get automatically attended by the IVRS actual procedure will carry out in following manner, If (Auto-answering)

Then

```
Pn ← Cn ;
Cn ← Vn;
D ← A[i];
B ← D ;
Phase 3 ( );
```

Else

```
Busy Mode ( );
Kill Phase ( );
```

The above assignment shows that once the auto-answering is performed caller information (91-8655123123) would be transferred to the data repository unit, where in response IVRS will throw the voice based welcome tone to the caller as a ack of call and also provide the set of domain options respectively and as soon as an user will select the domain through key press, individual DTMF signals will be transmitted to the MT8870 decoder then decoder will generate the BCD code for the acquired analog signal and phase-3 will initiate.

Phase: 3

If (B)

Then

```
μc ← B [ i ];
N [ i ] ← μc;
Sbus ← μc ( Ni)
IVRS ← Sbus (Ni)
```

Else

```
Generate Exception
Kill Phase ( );
```

As soon as the BCD code will get generated each BCD code will get transfer to the microcontroller and then it will generate the decimal number for further processing, after that microcontroller will transmit that decimal number towards IVRS through serial bus interface

Phase: 4

If (W) then

```
TextTOSpeech( )
C ← IVRS (W)
```

Else

```
Kill Phase ( )
```

In above phase, it shown that once the required news is fetched from repository performs voice synthesis for it and transmits it to the caller.

Phase: Kill Phase

AbnormallyTerminationOfCall ();

This phase will just terminate the session of the current user during invalid circumstances.

6. CONCLUSIONS

Specified IVRS based news extracting system is capable of providing the user required news information through voice based response which also make difference to their knowledge base and needs, irrespective of any eligibility like literacy , qualification, physical fitness for that user just need to make some selections and can make their life easier and convenient.

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