Mann Ki Baat on IVRS

Connecting To The Unreached

The Mann Ki Baat (MKB) on IVRS application developed by NIC connects the Hon'ble Prime Minister with the citizens telephonically. The MyGov cell of DeitY and NIC jointly facilitate this toll-free service, in which citizens get the opportunity to voice their opinions/suggestions through a 30 second message. Held during the last week of every month, this system allows 40 concurrent calls, enabling a large number of calls in a short span of time.

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Data reach through mobile apps, web etc. has low penetration in our country's rural population because of high input costs of mobile devices, low IT literacy, high data charges and low bandwidth besides challenges thereof. Penetration of combined mobile apps/smart phones & web related data is limited to semi urban areas which constitutes 15-18% of country's total population. PMO realized the potential of IVRS to reach this unattended 82-85% population through a toll-free IVR Service for the Hon'ble Prime Minister's popular programme "Mann Ki Baat".

The toll-free IVRS number is **1800-11-7800** and this service provides the user to select their choice of language for communication, collect personal information such as name of the caller, place of residence and the State. Afterwards, the caller's message of 30 seconds duration is collected and a back-end team transcribes the audio and forwards it to PMO for selecting the most viable and suitable opinions, which are taken up for the fourth coming edition of Mann Ki Baat.

IVRS- AN OVERVIEW

Now let's get to know what an IVRS is all about. IVRS or Interactive Voice Response System is a technology that allows humans to interact with the computers through telephones using voice (Speech) Recognition or DTMF (Dual Tone Multiple Frequency) tones through telephone keypad. Voice recognition can reduce operational expenses by up to 30% and are faster as compared to collecting information from caller via DTMF tones. Initially known as Computer Telephony Integration (CTI), IVRS today has grown from mere DTMF inputs to the modern age speech recognition

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based on Hidden Markov Model. With an advent in better research, the technology improved with more CPU & RAM, and the systems could recognise caller independent speech for limited vocabularies. Today, the implementation is standardized under W3C in the VXML.

IVRS is now in place to answer trivial and more common issues, connecting to a human agent only to resolve complex queries or more personal interaction during business hours that were not covered by IVRS, thereby reducing cost, and improving quality of service with the overall customer experience. Primarily the interactions using dialogs are kept as simple as possible and the choices given to the caller are as few as 5 or 6, followed by collecting an input, processing it, and returning a result. One of the main reasons why the choices are so few in number is that the human mind does not register spoken inputs for more than 5-6 at a time. It is deployed for handling large call volumes. Since IVRS does not require human intervention, it is sometimes referred to as an automated attendant or Voice Response Unit (VRU) or Audio Response Unit (ARU) as well.

IVRS flow was earlier provided through proprietary coding with C++ interface for Dialogic hardware APIs, to the latest by web based VoiceXML (VXML), CCXML (Call Control XML), SRGS (Speech Recognition Grammar Specification) and SSML (Speech Synthesis Markup Language). The XML-web based systems allow central deployment of the IVRS flow control through any web application servers much like web pages. The database interaction is done by the more common ASP/JSP/PHP like programming environment. Introduction of Session Initiation Protocol (SIP) has made a giant leap for the IVRS, making it to be available on WAN and allowing video also for interaction on mobile phones termed as IVVR (Interactive Voice and Video Response). Usage of full duplex video would help in identifying callers further by Iris scan, etc.

Call centres also use IVRS upfront to reduce the cost and answer normal queries and to queue callers using ACD (Automatic Call distributor), or request for a call back by registering the CLID (Caller Line identification) from the telephone network. CLID is also used for authenticating and sometimes prioritising callers. Besides CLID, account number, PIN or even Voice biometric are used for caller authentication. DNIS (dialed Number Information system) is used extensively when an IVRS has to handle multiple applications with individual numbers. Besides logging MIS data for audit, improvement performance reports, it can also interact with back-end databases & customer information systems. Sometimes whole call recording of IVRS-human agent interactions are stored for various purposes. When connected with a call centre, it triggers agent pop-ups showing caller details from CRM (Customer Relationship Management) software for the human agent to interact better, effectively and efficiently with the caller. IVRS can be used for collecting personal and sensitive details which the caller may not divulge easily to a human agent like drug usage, sexual behaviour, clinical details, etc. Outbound calls from IVRS are more configurable and intelligent than predictive dialing (sequential calling from a list and handing over calls to a human agent) and can detect network conditions like busy, no-answer, out-of-reach, FAX / answering machines tones, etc.

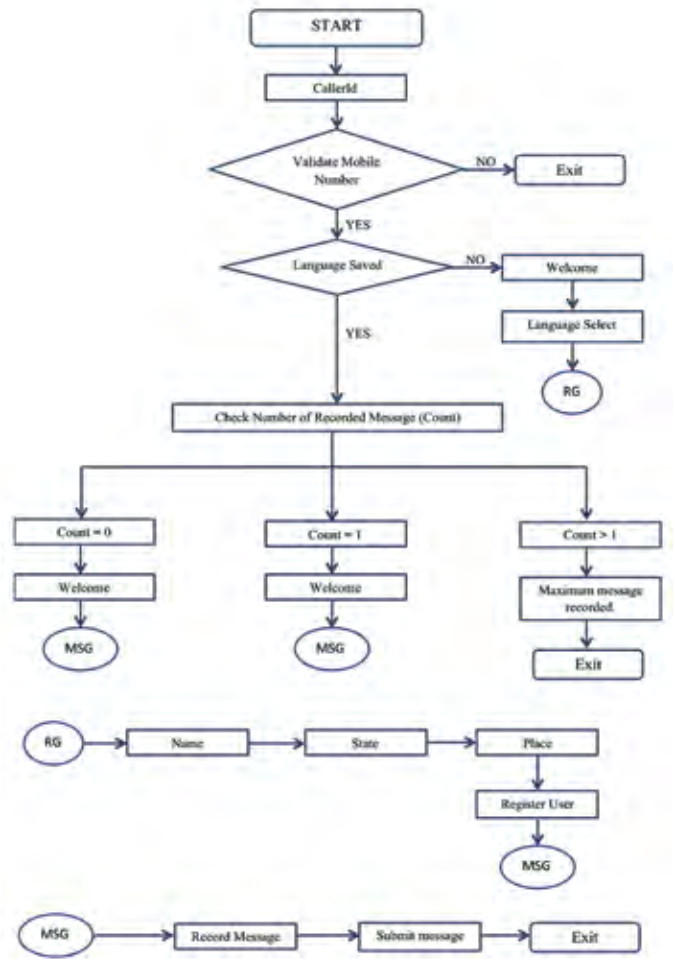
ABOUT VOICE RECOGNITION & SYNTHESIS

The two main flavours of voice recognition are Directed Dialogs and Natural Language Dialogs. In Directed Dialogs, which are based on predefined grammar, a caller is asked specific questions in a manner that leads the user to give short expected answers. For example, a question is asked as "please tell your language choice. Say Hindi or English". While in Natural Language Dialogs, which is based on statistically trained language models, it is expected that the user will respond in a manner that they're talking to a fellow human. For example, we may simply ask, "What language would you like to continue in?", and the user could probably respond as "Ok, I would like to converse in English please."

The information is received from user through dialogs in steps by using pre-recorded audio prompts or by text through Text-To-Speech (TTS) engines which may be used for prompting dynamic text as from a database or email, weather information, etc. TTS is a computer generated synthesized speech which no longer is a robotic type voice, but with real voices of good artists' speech in fragments which are concatenated and smoothened to generate more human like voice.

MANN KI BAAT ON IVRS – TECHNICAL DETAILS

Only two messages per user for each monthly MKB edition are allowed and restricted from a mobile phone. So caller ID based validation is done before presenting the language choice. For a registered caller, his/her initials opted language is used and no language option is asked for. All the prompts are played out in this language, else the caller is asked to select a language, currently Hindi or English, for further interaction. From the first time callers, personal data consist of name, place of residence and state is collected.



Flow diagram of Mann Ki Baat on IVRS

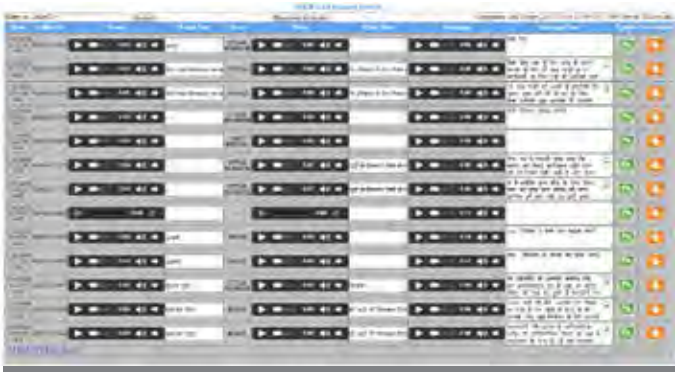
The whole call flow is built using VXML 2.1 with DTMF & Speech grammars made on SRGS, for the language and state name selections. When this service was first launched in December 2015, around 40% callers had difficulty in selecting the State from the 35 options using speech grammar. The grammar and corresponding prompts were tuned in the January edition to reduce the drop rate to less than 1% This has been achieved by using intricate mechanisms available in the recognition.

The audios recorded for the name, place of caller and message had to be transcribed to text, which was a huge task and was done on interpretation mode by volunteers. For this, the Nuance Transcription Engine for Hindi, on trial basis, was used to convert the audio to text, which reduced the human effort considerably.

MESSAGES DASHBOARD

In order to make it as a complete IVRS solution, the NIC-IVRS team has built an interim dashboard for interpretation, listening/ viewing of the messages until the final dashboard comes up from the MyGov NIC team.

This dashboard gives a paginated records view for the backend team with the audio details and transcription available side-by-side with provision for editing and updating the records. It also gives provision for downloading of individual and bulk records for offline editing. The dashboard has been built completely in-house, using .Net technology.



A screenshot of Messages Dashboard

IVRS SESSIONS BY NIC- RECENT HIGHLIGHTS

The IVRS messages recorded by Sh. Dilip Chauhan, a visually impaired teacher from Gujarat was aired in the December 2015 episode of MKB, while those of celebrities like Viswanathan Anand and Prof. C.N.R Rao were included in the February 2016 edition.

Recent inbound/outbound calls for data collection used by NIC-IVRS

- Mann Ki Baat (**1800-11-7800**)
- Hon'ble Supreme Court case status information (**24300601**)
- Kailash Mansarovar Yatra with call back and help-desk feature (**24300655**)
- e-TV support IVRS with 24x7 call centre for international tourists (**24300666**)
- CEO Delhi Voter ID application status (**24300660**)
- Ministry of Minority Affairs details information with help-desk (**under process**)

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