

CONVERSATIONAL IVR MODERNIZATION FRAMEWORK

USECASE - IRCTC IVR MODEL

Submitted by : AKHIL T M

Submitted to : Mis Saadhana

PROBLEM STATEMENT

- The existing IVR system operates on a rigid, menu-driven structure requiring users to navigate multiple keypad options.
- Users experience difficulty accessing services such as PNR status, ticket booking details, cancellations, refunds, and train schedules.
- The absence of natural language support makes the system less accessible, especially for elderly and non-technical users.
- High call volumes during peak seasons and Tatkal bookings lead to delays, call drops, and reduced system performance.
- The current system lacks conversational intelligence and personalized interaction capabilities.
- Completely replacing the legacy IVR infrastructure is costly, time-consuming, and operationally risky.
- There is a need to modernize the IVR system with Conversational AI to enable natural language interaction, improve efficiency, and enhance overall user experience while minimizing redevelopment efforts.

INTRODUCTION

IRCTC IVR SYSTEM OVERVIEW

The IRCTC IVR (Interactive Voice Response) system is an automated telephone-based service that assists railway passengers by providing information and support through voice prompts. When users call the railway helpline, the system guides them through recorded menu options to access services such as PNR status, train arrival and departure details, ticket booking information, cancellation updates, refund status, and general enquiries. It uses a traditional IVR model based on text-driven logic and DTMF (keypad) input, where users press numeric keys to navigate through predefined menu options. The system connects to railway backend databases to retrieve real-time information and delivers responses using automated voice messages.

OBJECTIVE FOR NEW IVR MODEL USING AI

- To modernize the existing IRCTC IVR system by integrating Conversational AI capabilities.
- To enable natural language interaction, allowing passengers to speak their queries instead of navigating keypad menus.
- To reduce call handling time and improve response accuracy during peak booking periods.
- To enhance user experience by providing faster, smarter, and more intuitive voice-based assistance.
- To ensure seamless integration with existing IRCTC backend systems while minimizing redevelopment efforts.
- To improve system scalability, reliability, and overall operational efficiency.

EXISTING SYSTEM

- The legacy IRCTC IVR system is a menu-driven system that operates using keypad (DTMF) inputs.
- Users must listen to recorded options and press numbers to access services like PNR status, ticket details, cancellations, and train schedules.
- The system follows a fixed hierarchical structure built on VoiceXML (VXML).
- It connects to railway backend databases to fetch and read out information using Text-to-Speech.
- The system lacks natural language support and often becomes slow or overloaded during peak booking periods.

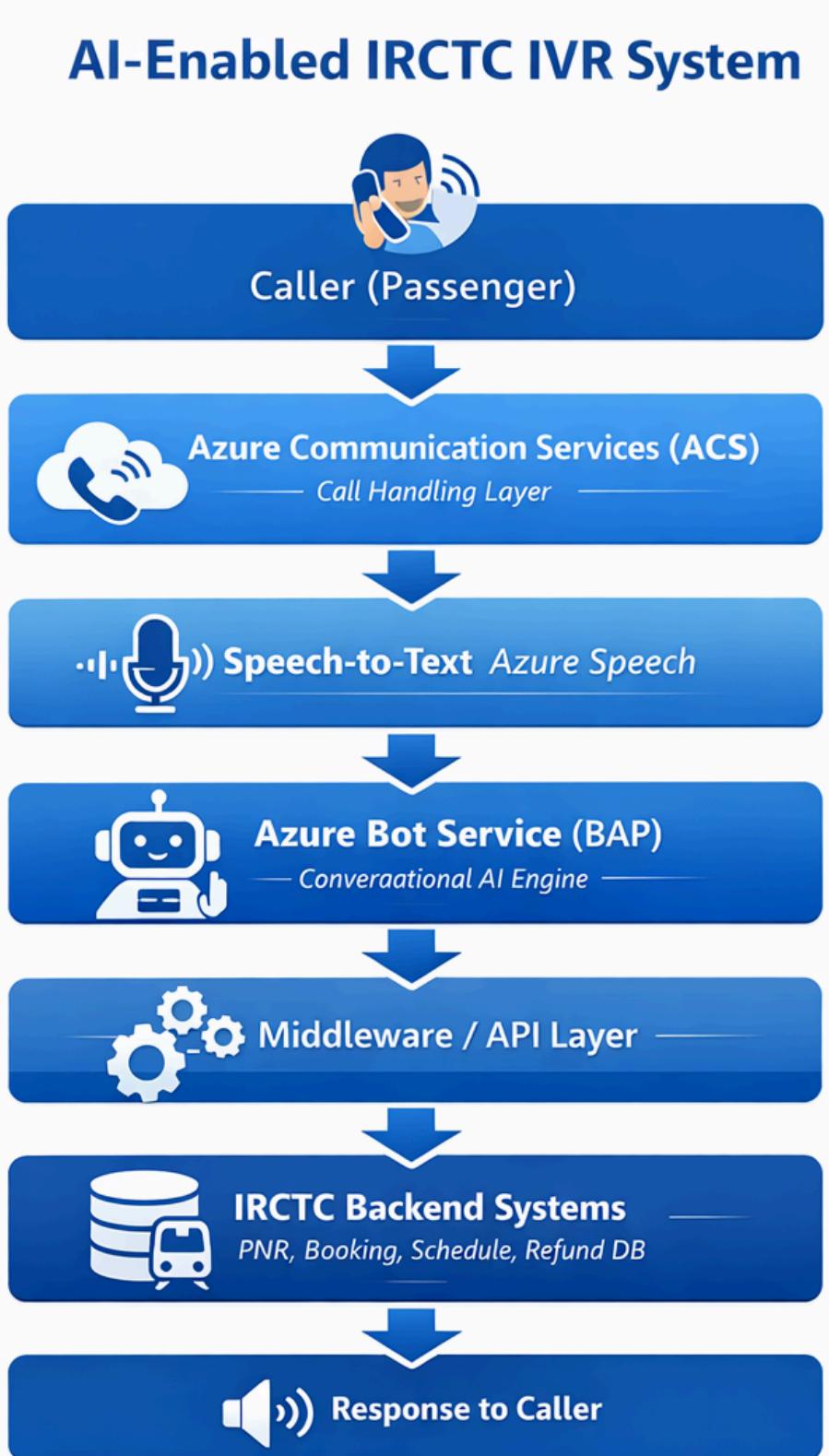
PROPOSED SYSTEM

- The proposed system is an AI-based conversational IVR model that allows passengers to interact using natural voice commands instead of keypad inputs.
- It integrates Conversational AI with the existing IRCTC backend systems to provide real-time responses.
- The system enables faster, smarter, and more user-friendly access to services such as PNR status, ticket details, cancellations, and train information.
- It enhances passenger experience while maintaining compatibility with the existing infrastructure.

Components required

- **Telephony Component** – Handles incoming and outgoing calls using ACS or Twilio.
- **Legacy IVR (VXML) Component** – Manages existing menu-based call flows and DTMF inputs.
- **Integration / Middleware Layer** – Connects the legacy IVR with the Conversational AI system through APIs.
- **Conversational AI Engine** – Processes user queries using Natural Language Understanding (NLU).
- **Speech Processing Service** – Converts voice to text (STT) and text to voice (TTS).
- **Backend Service Layer** – Fetches real-time data such as PNR, booking details, and train schedules.
- **Database Component** – Stores railway data, session logs, and transaction records.
- **Security Component** – Ensures secure communication and authentication.
- **Monitoring & Logging Component** – Tracks system performance and manages error handling.

AI-Enabled IRCTC IVR – Simple Architecture Diagram



THANK YOU !