

AI-Powered LED Advertising Booking System

Shrey Shukla

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1. Introduction

This document presents an AI-powered LED advertising booking system designed to automate the process of checking availability, estimating prices, booking LED slots, updating bookings, and handling cancellations. The system integrates a conversational AI assistant with backend automation workflows to reduce manual effort and prevent double booking.

2. Problem Statement

Traditional LED advertisement booking processes are manual and error-prone. Common issues include double bookings, incorrect pricing, lack of real-time availability checks, and inefficient communication with customers. This project aims to solve these challenges through automation and AI-driven interaction.

3. System Overview

The system allows users to interact through a chatbot-based interface powered by Vapi AI. Using natural conversation, users can:

- Check LED slot availability
- Receive price estimates
- Confirm bookings
- Update or cancel existing bookings
- Retrieve booking details using phone number

4. Technologies Used

- **Vapi AI** for conversational chatbot interaction
- **n8n** for workflow automation
- **Google Calendar** for availability checking and booking management
- **Supabase** for persistent data storage
- **Telegram** for internal notifications

5. Workflow Description

5.1 AI Assistant Interaction (Vapi)

The system uses Vapi AI as the primary user interface. The assistant communicates with users in a conversational manner, collects booking details step by step, answers queries, and forwards structured data to backend workflows. The assistant does not directly confirm bookings or accept payments, ensuring human-in-the-loop control.

5.2 Availability Check and Price Estimation

User-provided details such as LED location, date range, and time slot are validated against Google Calendar to determine availability. If available, a price estimate is calculated and shown to the user. If unavailable, alternate dates are automatically suggested.

5.3 Booking Confirmation

Once the user confirms the estimate, an automated workflow creates a booking entry in Google Calendar and stores the booking details in Supabase. A confirmation notification is sent via Telegram.

5.4 Update Booking

For booking updates, the system checks availability for new dates, provides a revised estimate, and upon confirmation, safely removes the old booking and creates a new one.

5.5 Cancellation

Bookings can be cancelled using a unique booking ID. The corresponding Google Calendar event is deleted and the database record is updated accordingly.

5.6 Get Booking Details

Users can retrieve their booking information using their registered phone number, ensuring easy access and management.

6. Key Features

- Real-time availability checking
- Vapi-powered conversational AI interface
- Prevention of double booking
- Secure booking update and cancellation mechanism
- Production-ready automation workflows

7. Conclusion

This project demonstrates a real-world, production-grade LED advertising booking system that combines a Vapi-powered AI assistant with automated backend workflows. The solution improves operational efficiency, minimizes errors, and delivers a seamless user experience for LED advertisement management.