AI Hotel Receptionist - Project Presentation

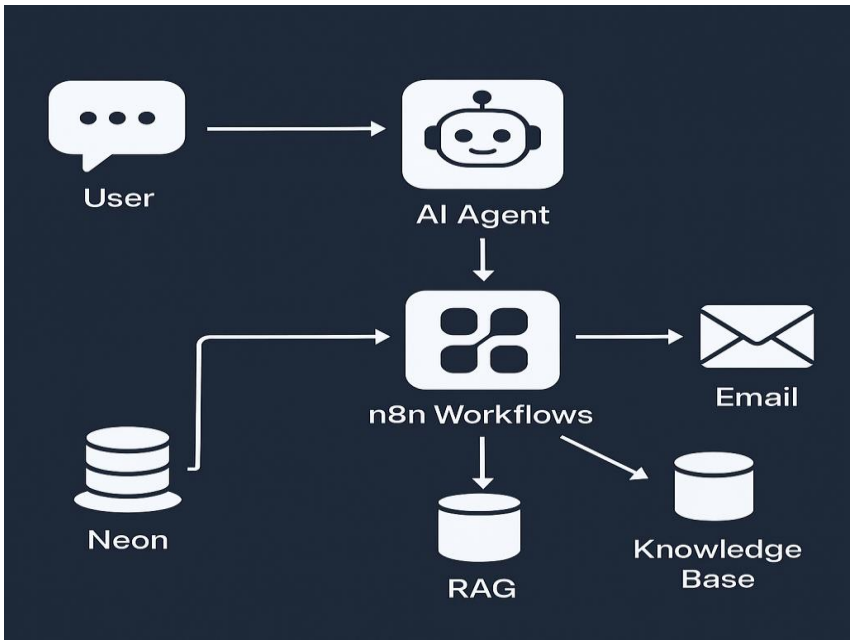
Introduction

In today's hospitality industry, automation and artificial intelligence can dramatically improve guest experiences and operational efficiency. This project uses conversational AI and automation to handle common front-desk tasks such as checking room availability, making and cancelling bookings, and answering general hotel questions.

System Architecture

The system consists of several key components working together to provide a seamless, conversational booking experience:

- A chat interface where guests ask questions or make bookings.
- An AI agent built with LangGraph that interprets the user's intent and manages the conversation flow.
- n8n workflows for checking room availability, making reservations, cancelling reservations and retrieving hotel information.
- A serverless Neon PostgreSQL database used to store and manage booking records.
- A Retrieval-Augmented Generation (RAG) knowledge base containing hotel information, accessible through n8n's JSON and vector store nodes.
- Email integration for sending booking confirmations or cancellation notifications to the guest.



n8n Workflows

n8n orchestrates all business logic for the hotel receptionist. Each workflow acts on user intents identified by the AI agent:

- **Check Room Availability:** This workflow receives dates and optional room types from the agent, queries the hotel's system (via API or database) and returns available rooms. It can also hold the selected room for a short time until the booking is confirmed.
- **Make Booking:** When the guest wants to book a room, n8n collects the customer's name, contact details and chosen dates, inserts a new record into the Neon database and triggers a confirmation email.
- **Cancel Booking:** For cancellation requests, n8n verifies the booking details, deletes the record from the Neon database and sends a cancellation email to the customer.
- **Hotel Information (RAG):** This workflow uses data stored in a JSON node and optional vector store to answer common questions about the hotel (check-in times, spa facilities, restaurant menus, etc.). It leverages RAG to fetch relevant context, giving accurate and up-to-date answers.

AI Agent with LangGraph

LangGraph provides a controllable cognitive architecture for designing stateful agents. In this project, the AI agent manages the conversation with the guest. It performs the following steps:

- Interpret the user's message and classify the intent (room availability, booking, cancellation, hotel info or small talk).
- Gather all required parameters (dates, room type, customer name) before triggering a workflow.
- Invoke the correct n8n workflow via webhook or direct node integration.
- Maintain context between messages using LangGraph's built-in memory so that the guest doesn't need to repeat information.
- Use moderation or quality loops to ensure safe, friendly responses and prevent errors.

If the agent cannot identify an intent, it engages in small talk using a lightweight GPT-4 model. For information requests such as check-in times, spa facilities or restaurant menus, the agent uses RAG through n8n, retrieving information from a JSON knowledge base and embedding it with vector search to provide fact-based answers.

Serverless Data Storage with Neon

The booking records and room informations are stored in Neon, a serverless PostgreSQL platform built for AI agents. Neon provides instant provisioning and scale-to-zero capabilities, meaning that the database spins up in under a second and consumes no compute when idle. Its deep compatibility with Postgres features makes it easy to integrate using familiar SQL queries, while also supporting vector search for future AI expansions.

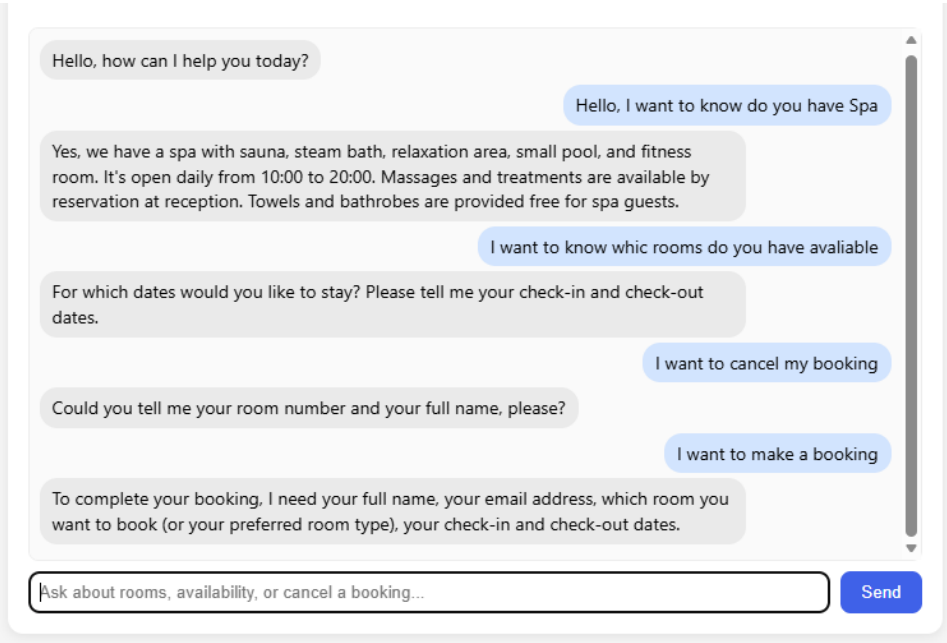
Skills Demonstrated

This project allowed me to develop and showcase a range of technical and design skills:

Skill	Description
Workflow Automation (n8n)	Designed and implemented workflows for availability checks, bookings, cancellations and information retrieval; configured triggers, conditionals and email nodes.
AI Agent Development (LangGraph)	Built a stateful conversational agent capable of intent recognition, context tracking and multi-step interactions.
Database Integration (Neon)	Structured and managed booking data in a serverless PostgreSQL database with automatic scaling and instant provisioning.
Retrieval-Augmented Generation	Leveraged RAG through n8n to answer hotel information questions using a knowledge base and vector search.
Prompt Engineering & Small Talk	Created prompts and fallback logic for engaging conversation; used GPT-4 mini for small-talk scenarios.
System Design & Architecture	Designed a scalable architecture integrating chat, AI, workflows, database and email into a cohesive user experience.

Chat Demonstration

Below is a screenshot of the chat interface used to interact with the AI hotel receptionist. It shows how the system handles different requests (asking about spa facilities, checking room availability, cancelling a booking and making a new booking).



Conclusion

The AI Hotel Receptionist showcases how modern AI technologies can be integrated into a single, intelligent system that significantly improves the efficiency and quality of hotel guest interactions. By combining LangGraph for structured multi-step agent behaviour, n8n for workflow orchestration, Neon for serverless database operations, and RAG pipelines for accurate hotel-info retrieval, the project demonstrates a complete end-to-end automation solution.

The system can understand guest intents, gather missing information through natural conversation, trigger the correct automation workflow, and read/write booking data in real time. Tasks such as room availability checks, booking creation, booking cancellation, and general hotel information are handled automatically, consistently, and without human intervention. At the same time, fallback behaviour and small-talk mode ensure a natural, human-like experience.

This project highlights strong skills in AI engineering, backend development, workflow automation, API communication, vector search, and database modelling. It represents a scalable foundation for real-world hospitality applications and provides a clear demonstration of the user's ability to design, implement, and integrate advanced AI-driven systems from scratch.