Grand Azure Hotel Booking Chatbot

Finalization Phase Abstract

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This project implements an AI-powered conversational system for hotel reservations, allowing users to book rooms at the fictional "Grand Azure Hotel" through natural language interaction. The chatbot guides users through a structured booking process while maintaining a friendly, conversational tone, collecting essential reservation details and providing a visually appealing confirmation upon completion. Unlike traditional form-based interfaces that can feel mechanical and impersonal, this conversational approach creates a more engaging and human-like experience for users while still gathering all necessary booking information (Følstad & Brandtzæg, 2020).

The primary objective of this project was to create a natural language interface for hotel bookings that reduces friction compared to traditional systems. This involved implementing a structured conversation flow that collects all necessary booking information while maintaining a natural dialogue experience. A key focus was developing a locally-deployable solution using open-source LLM technology that provides clear visual feedback throughout the booking process. The system needed to balance the structured nature of data collection with the flexibility and naturalness of human conversation (Chaves & Gerosa, 2021).

The chatbot employs a hybrid architecture combining rule-based conversation management with AI-generated responses. At the core of the architecture is a conversation manager that controls the flow of questions, tracks state, and maintains context throughout the interaction. The language model integration interprets user inputs and generates natural language responses that feel appropriate and contextually relevant. This approach aligns with best practices outlined by Adamopoulou and Moussiades (2020) for building effective conversational agents.

For the technology stack, Python 3.10+ serves as the core programming language, with the LangChain framework orchestrating conversation flow and managing prompts (Chase, 2023). This framework provides essential components for building conversational applications with LLMs, including prompt templates, output parsers, and conversation chains. Ollama with Llama3 provides local language model deployment for generating responses (Ollama Team, 2023), allowing the system to operate without requiring external API access or internet connectivity. The Llama3 model from Meta AI (Meta AI, 2024) enables high-quality conversational capabilities while being deployable on consumer hardware.

The implementation follows a sequential question flow with a predefined question set covering both mandatory and optional booking details. The system progresses systematically through collecting the guest's name, check-in and check-out dates, guest count, breakfast preferences, room type selection, and payment method. Visual progress tracking using completion indicators (✅/❌) provides immediate feedback to users about which information has been collected and what remains.

This visual element enhances user understanding of the process despite the text-based interface, building on principles of user experience design for conversational systems.

Prompt engineering proved critical to the system's effectiveness. Carefully crafted templates provide context and instructions to the LLM, including the conversation history for context awareness and clear specification of the current state and next required information. White (2023) highlights the importance of effective prompt design in controlling LLM outputs, particularly for task-oriented systems. The prompts are structured to guide the model toward generating appropriate conversational responses while staying on task with the information collection process.

Data management is handled through a simple dictionary-based storage of booking details, with question-answer pairs maintained throughout the conversation. This approach provides sufficient structure for the limited scope of a hotel booking system while avoiding the complexity of a full database implementation. Error handling includes graceful recovery from unexpected user inputs, fallback mechanisms when LLM responses are inadequate, and a simple exit command to terminate the conversation at any point—following established practices for robust conversational applications.

The development process revealed several key insights about building conversational AI systems. The quality of LLM responses depends heavily on prompt engineering—clear instructions and context were essential for guiding the model toward helpful outputs. Finding the right balance between structured question flow and natural conversation required iterative refinement and testing with different prompt formulations. Using Ollama with Llama3 provided a practical balance between response quality and deployment simplicity, though it required addressing version compatibility issues.

While the current implementation meets all core requirements, several enhancements could further improve the system in future iterations. Input validation could be more robust for dates, guest counts, and other structured data to prevent errors and improve data quality. Multi-platform support could extend the chatbot to web interfaces or messaging platforms, making it accessible to a wider range of users. These potential improvements align with industry best practices for conversational system development (Hwang & Kim, 2021).

The Grand Azure Hotel Booking Chatbot successfully demonstrates how conversational AI can streamline the hotel reservation process. By combining structured conversation flow with natural language processing, the system provides an engaging user experience while efficiently collecting all necessary booking information. Recent studies have shown that domain-specific chatbots that focus on clear user goals tend to achieve higher satisfaction rates than more general-purpose assistants.

This project achieved its primary objectives of creating a natural, conversational booking experience while maintaining the structured data collection necessary for a hotel reservation system. The challenges encountered during development provided valuable insights into effective prompt engineering, state management, and error handling in conversational AI applications. These lessons learned and techniques applied demonstrate the viability of using locally deployed language models for specific domain tasks, showing that even with limited computational resources, effective AI-powered conversational systems can be built for practical everyday applications.

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