

Problem Statement

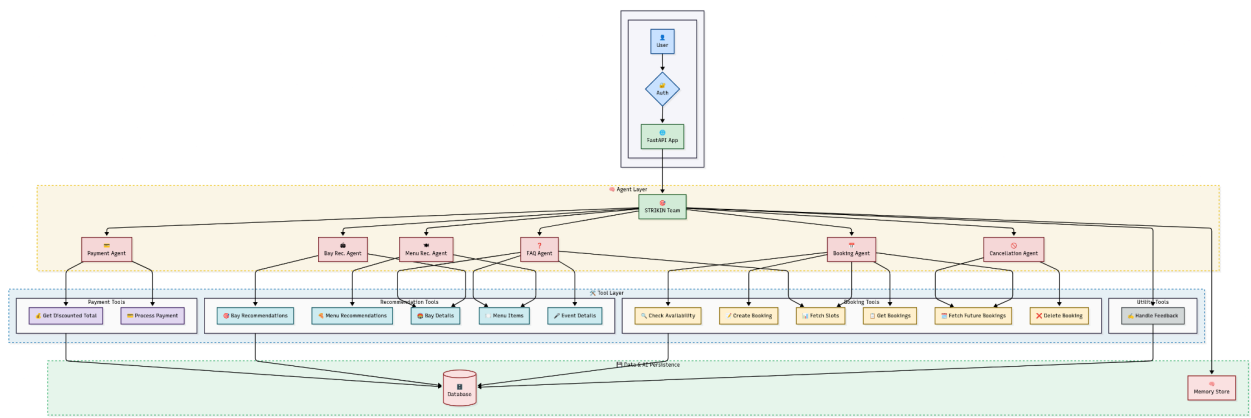
The core problem is to create a chatbot that can effectively manage sports bookings, provide personalized recommendations, and answer frequently asked questions related to the STRIKIN facility. This requires integrating several components: user authentication, a booking system, a recommendation engine, and a knowledge base.

Agent Design

The multi-agent system is designed to divide responsibilities among different specialized agents, each focusing on a specific task to ensure smooth and efficient service. The Booking Agent is responsible for managing all reservations related to bays. When a user wants to book a time slot or order food, this agent takes care of the entire process and the Cancellation Agent helps in cancelling the booking. The Payment Agent handles everything related to payments, including processing transactions and ensuring secure payment flows. To help users make better choices, the system includes a Bay Recommendation Agent that suggests suitable bay types based on the user's past booking history and preferences. Similarly, the Menu Recommendation Agent offers food suggestions by analyzing what the user has liked or ordered before. This makes the user experience more personalized and convenient. Lastly, the FAQ Agent is in charge of answering general questions about STRIKIN's services, facilities and also collects feedback. It helps users quickly get answers to common queries without needing human assistance, improving the overall efficiency of the system.

Architecture

The agents are orchestrated by a central "Concierge Team" that coordinates the workflow and provides a unified interface.



Flow and Interaction

When the user first starts a conversation, they talk to the main team - STRIKIN Team. This team is the first point of contact and helps understand what the user needs. Based on the user's question or request, the team decides which specialized agent should take over. For example, if the user wants to make a booking, the request is sent to the Booking Agent. If the user wants to make a payment, it is passed to the Payment Agent. Each type of request is directed to the right agent to make sure the user gets accurate and helpful responses. After the user's request is completed, the team also collects feedback using a tool that helps save the user's comments or ratings about the experience, which can later be used to improve the service.

Data Sources

The system uses a MySQL database called agentdb to store all important information such as user details, bay information, menu items, bookings, and payment records. The backend of the application is built using FastAPI, which helps create and manage all the APIs that connect the database and the frontend.

Data Ingestion & Flow

1. API Layer (FastAPI)

- Receives all incoming requests (bookings, payments, recommendations, FAQs, cancellations).
- Validates and routes them to the appropriate smart agent or tool.

2. Smart Agents & Tools

- Booking Agent invokes Booking Tools to read/write from the bookings, bay, users, and discounts tables.
- Payment Agent uses Payment Tools to calculate totals and record transactions in the payments table.
- Recommendation Agents query historical data (e.g., past bookings in bookings, menu orders in menu) to generate personalized suggestions.
- FAQ Agent & Feedback insert/read to/from feedback_table and reference static data in events.

3. Data Storage

Primary Database: MySQL

a. Users table: Registered customer profiles

user_id
name
email
phone_number
age
password (hashed)

b. Bay table: Master list of bay types and rates

bay_id
bay_name
price_per_hour

c. Bookings table: Records all slot bookings (with optional extras)

id
booking_ref
user_id
bay_type
booking_date
time_slot
participants
extras
booking_price
transaction_ref

d. Discounts table: Promotions and seasonal offers

discount_id
discount_name
discount_percentage
start_date
end_date
min_booking_amount

e. Events table: STRIKIN-hosted events or special promotions

event_id
event_name
event_description
event_date

f. Feedback_table: Captures user feedback and FAQ submissions

id
user_id
feedback_title

feedback

g. Menu table: Available food items and pricing

menu_id
food_item
price

h. Payments table: Logs every transaction attempt and completion

transaction_ref
booking_amount
payment_method
payment_date

MVP Features

1. User Login & Authentication

- Allow users to sign up, log in, and log out securely.
- Handle user sessions and permissions.

2. Core Application Backend (API)

- Built the main backend server using FastAPI.
- It receives user requests and sends them to the team which responds to the requests.

3. Main Assistant/Team Orchestration

A central logic system (called it the "STRIKIN Team") that:

- Decides which feature or agent should respond based on the user request.
- Keeps track of the flow of conversation or actions.
- Think of it as the brain that connects everything together.

4. Smart Agents (Task Handlers)

a. Booking Agent: Handles everything related to booking a slot. Talks to the booking tools to:

- Check what slots are free.
- Create new bookings.
- Fetch upcoming bookings.

b. Bay Recommendation Agent: Helps suggest which bays the user might like. Useful for decision-making when multiple options are available.

c. Menu Recommendation Agent: Helps suggest food items the user might like based on the popularity index. Useful for decision-making when multiple options are available.

d. Payment Agent: Calculates total cost, including any discounts. Processes the user's payment securely.

e. FAQ Agent: Answers the generic queries of the user's regarding STRIKIN like timings, slot availability, menu items, types of bays and also takes the user feedback.

f. Cancellation Agent: Allows users to view and cancel future bookings easily.

5. Booking Tools (Core Booking Functions)

These are small tools that do specific jobs for the booking agent:

- Check Availability: Find open time slots for bays.
- Create Booking: Save a new booking for the user.
- Fetch Slots: Get available time slots for a day or bay.
- Get Existing Bookings: Show the user their current bookings.
- Cancel or Delete Booking: Let users cancel if needed.

6. Recommendation Tools

- Bay Details: Give users more info about each bay before they book.
- Menu Items: Show food or menu options related to a bay/event.

7. Payment Tools

Two basic functions for handling payments:

- Calculate Discounted Total: Shows total amount due, including any discounts.
- Process Payment: Handles actual payment transaction.

8. Data Layer (Database & Memory)

- Database: Save bookings, user info, bay info, payments, etc.
- Memory Store: Short-term memory for handling conversation or context between user requests. For example, if the user says “book that one,” the system remembers what “that one” was.