

AI-Based Chatbot for Hotel Management Homepage

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OVERVIEW :

- **Natural-language input & NLP slot-filling**
Guests describe destination, dates, party size and preferences in plain text—and the bot auto-detects and extracts all key details.
- **Real-time availability & star-rating filters**
Instantly queries inventory and lets users refine by star count.
- **Price-range & amenity filters**
Apply dynamic price caps and choose amenities (Wi-Fi, pool, pet-friendly, etc.).
- **Quick-reply buttons & guided room selection**
Matching hotels appear as tappable options, leading seamlessly into room type and guest-count prompts.
- **In-chat spa & room-service bookings**
Request spa packages or order room service directly within the conversation.
- **Housekeeping scheduling & loyalty-discount offers**
Book housekeeping slots and automatically receive personalized loyalty discounts if eligible.
- **One-tap discount response & instant subtotal recalculation**
Guests accept or decline offers with a tap, and the total updates in real time.
- **Seamless booking confirmation & simulated payment**
“Yes, book it” plus typing “paid” completes the reservation—no page reloads.
- **Post-booking feedback & optional comments**
One-tap 1–5 rating followed by free-text feedback, all captured and saved.
- **Human-agent escalation & context preservation**
Typing “agent” triggers name/phone collection, saves the ticket, and hands off the full chat state.
- **Multilingual support & intelligent upsells over secure JWT-protected APIs**
Conversations auto-detect language, offer history-based recommendations, and run on OAuth2/JWT-secured REST endpoints.

Tech Stack:

Java-Based Backend: Spring Boot and Spring AI powering core business logic and LLM orchestration

OpenAI Integration: Calls to OpenAI's APIs for natural-language understanding, slot filling, and dynamic response generation

Data Persistence: PostgreSQL database enhanced with pgvector for fast embedding storage and similarity searches

Security: Spring Security with JWT for fully stateless, token-based authentication on every request

API Layer: Exposes all chat functionality via RESTful endpoints for easy integration

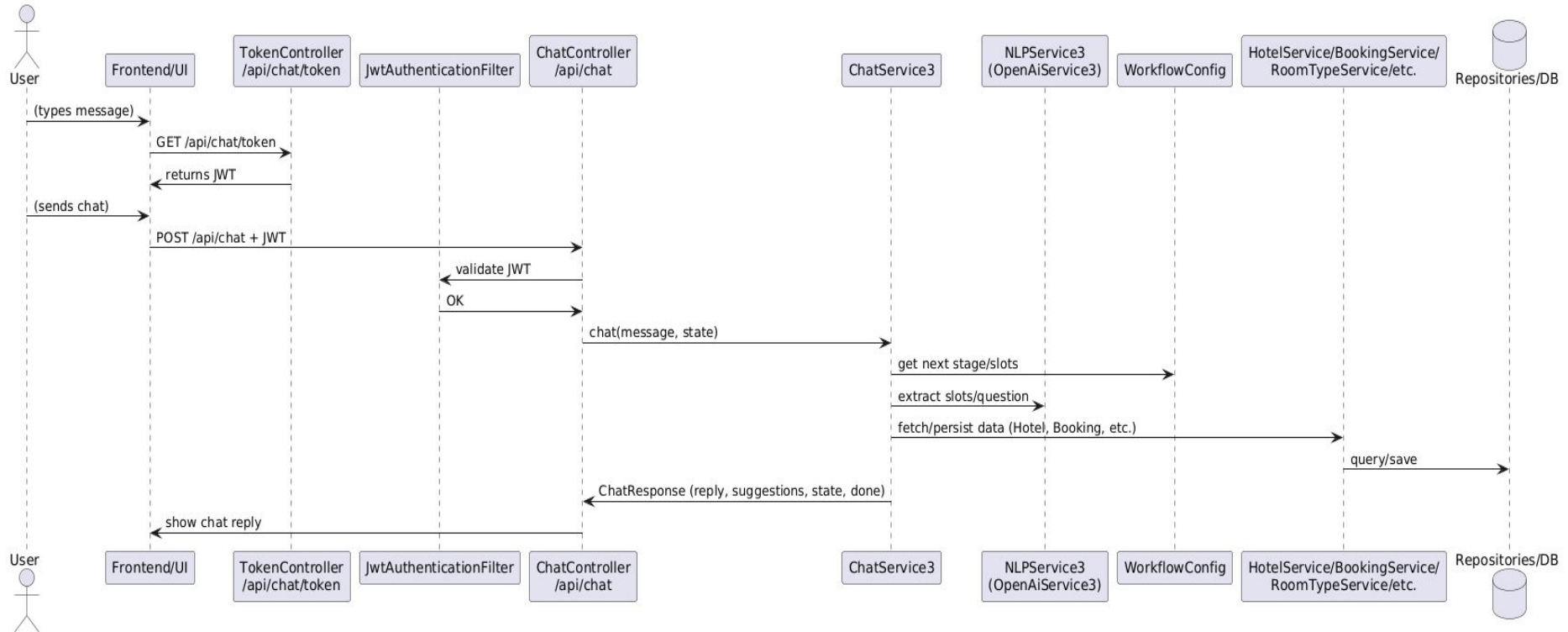
Optional Frontend: Lightweight JavaScript & jQuery UI using Axios for responsive API calls

Containerization & Orchestration: Docker containers managed by Kubernetes for scalable deployment

Cloud Hosting: Flexible deployment on AWS, Azure, or GCP based on your infrastructure

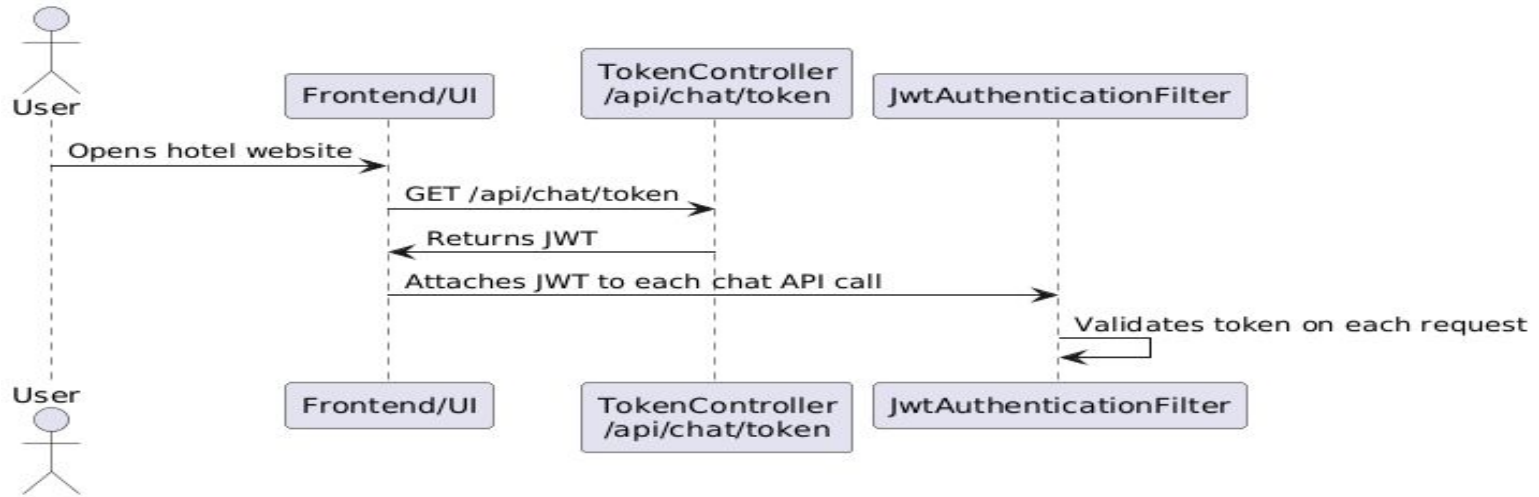
CI/CD Pipelines: Automated build, test, and deployment pipelines for rapid, reliable releases

Complete Workflow for Hotel ChatBot Application :



JWT Authentication :

To ensure secure and personalized interactions, the chatbot implements robust authentication using JSON Web Tokens (JWT). Each user session is assigned a short-lived token that protects sensitive operations and maintains privacy throughout the chat experience.



Session Management :

- Users authenticate via the Login Page (POST `/api/auth/login`)
- Backend issues a JWT (`accessToken`) on successful login
- Session Duration: JWT expires after 1 hour
- Key Rotation: Signing keys rotated every 7 days for enhanced security
- JWT stored in an `HttpOnly` cookie (or secure in-memory store)
- Each API call (search, chat, etc.) includes `Authorization: Bearer <token>`
- `JwtAuthenticationFilter` verifies signature, expiry, and validity
- Logout button clears the `access Token` cookie (or storage)
- Frontend then redirects back to the Login Page

Please sign in

Username

admin

Password

.....

Login

User Initiation & Homepage
Functionality :

24/7 Availability

AI-powered support is online around the clock on desktop, tablet, and mobile.

Quick Search & Booking

Top search bar accepts destination (hotel/city/state), dates, number of rooms and guests.
“Search” button returns live availability.

Powerful Filtering

Left sidebar lets users refine by star rating (1–5), price range (up to \$500), and amenities (Wi-Fi, parking, pool, etc.).

Clear Results & Next Steps

Central panel shows each hotel’s name, star count, and location.
“View Details” & “Search Rooms” buttons guide guests seamlessly onward.

Continuous AI Assistance

Chatbot icon remains in the bottom-right on every page, ready to help at any stage.

Instant Chat Access

Chat widget auto-appears on page load–no extra clicks or logins needed. Guests simply click the bubble or start typing to begin.

Welcome to Booking Hotels Page

Search your desired hotel Below:

Narrow your search results

Hotel/City/State

No. Rooms

No. Guests

Check-In Date

Check-Out Date

SEARCH

Star Rating:

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

Range:

Price: \$500

Filters:

☐ Parking

☐ Breakfast

☐ WiFi

☐ Fitness Center

☐ Bar / Lounge

☐ Spa Services

☐ Swimming Pool

☐ Pet-Friendly

☐ Airport Shuttle

☐ Business Center

FILTER

List of Hotels:

Lakeview Lodge (4)

Lake Tahoe, CA

View Details

Search Rooms

Urban Oasis (5)

San Diego, CA

View Details

Search Rooms

Desert Sands Resort (5)

Palm Springs, CA

View Details

Search Rooms

Forest Haven (4)

Asheville, NC

View Details

Search Rooms

Coastal Breeze (3)

Myrtle Beach, SC

View Details

Search Rooms

Grand Vista (4)

Highland, TX

View Details

Search Rooms

Beachcomber Suites (3)

Santa Monica, CA

View Details

Search Rooms

Multilingual Support :

Automatic Language Detection

On the first user message, the chatbot detects the message's language (e.g., English, Spanish, French, German).

Seamless Reply Localization

All bot responses and button labels are generated in the user's language—no manual translation needed.

Manual Language Override

A visible dropdown lets guests switch languages on the fly (e.g. English ↔ Español ↔ Français ↔ Deutsch).

Persistent Session Language

Once set (auto or manual), the chosen language remains for the entire chat session. If user wanted to switch in between it's always available.

UI & Emoji Consistency

Translated quick-replies, suggestions, and even localized emojis/emblems keep the experience natural and engaging.

You: Me gustaría reservar un hotel en Miami.



Bot:

¡Hola! 🌴 Aquí tienes las opciones de hoteles disponibles en Miami, Florida:



Sunset Motel

- Precio: \$120.00 por noche
- Estrellas: ★★☆☆
- Amenidades:
 - Desayuno 🍳
 - Centro de Fitness 🏋️
 - Piscina 🏊
 - Acepta Mascotas 🐾
 - Centro de Negocios 🏢

Si necesitas más información, ¡aquí estoy para ayudar! 😊

¿Cuáles son las fechas de check-in y check-out que planeas para tu estancia en

Español ▾

Type a message...



Guest Query Handling – Instant FAQs & Slot Extraction

You: Do you have pet-friendly rooms in San Diego from next monday to next thursday

Bot:

🌟 Welcome to San Diego, CA! Here are some lovely hotel options for you:



Urban Oasis

- Price: \$180.00 per night
- Stars: ★★★★★
- Amenities:
 - 🍳 Breakfast included
 - 🏊 Fitness Center

You: next monday to next thursday

Bot:

Booking Information Needed

To assist you better, may I know how many guests will be staying?

Feel free to ask if you have any questions! 😊

1

2

3

4

5

You: 2

Bot:

Hotel Booking Options in San Diego

- Check-In Date: 2025-10-13
- Check-Out Date: 2025-10-16
- Guests: 2

Instant FAQ Answers

Answers on room availability, pricing, check-in/out policies, amenities in under 1 second

AI-Driven Slot Filling

Extracts key details (city, check-in/check-out dates, number of guests, room preferences) from any free-form text

Built-In Validation

Converts dates to ISO format, sums adults/children into a single "guests" value, enforces price caps
Eg: maximum price above \$500 is reset to \$500 automatically.

State-Driven Follow-Ups

If any required slot is missing or invalid, the bot asks one concise question (e.g., "Which dates would you like?")

Natural Conversation Flow

Guests never feel like they're filling out a form—each prompt reads like a human follow-up

Booking Assistance :

A) Real-Time Availability & Reservation

In-Chat Availability Check

Guests type requests like "Show me rooms June 10-12" directly in chat

Bot calls your REST endpoint (`/api/booking`) under the hood

Live Room & Rate Display

Lists available room types, room number after confirmation, policies everything is real time

Seamless Reservation Trigger

"Yes, Book Now" button in chat sends a booking request to your backend

No page reloads-everything stays within the conversation

B) Context-Aware Suggestions & Quick-Reply Buttons

Dynamic Suggestion Chips

Presents user with button choices (e.g. hotel names, date ranges) based on context

Reduces Typing Effort & Errors

Guests click "Lakeview Lodge" instead of typing the name

Localized to User's Language

Button labels auto-translate to match chat language

Consistent, Friendly UI

Visually distinct, color-coded chips guide the next step

★ Please choose a hotel by typing the number or name!

Check-in and Check-out Details:

- **Check-in:** 2025-06-28
- **Check-out:** 2025-06-29
- **Guests:** 2

To assist you further, could you please let me know your preferred hotel? ★

Feel free to ask if you have any questions!

Lakeview Lodge

Urban Oasis

Desert Sands Resort

Beachcomber Suites

Desert Oasis Inn

Coastal Cliff Resort

Booking Assistance :

Bot:

Please provide your payment details to proceed, or simply type 'paid' to confirm your payment for the booking.

Yes, Pay now

No, Pay later

You: Yes, Pay now

Bot:

Here is your booking summary:

- **Hotel Name:** Desert Oasis Inn
- **Room Price:** \$265.00
- **Check-in:** After 3 PM
- **Check-out:** By 11 AM
- **Guests:** 2
- **Rooms:** 1
- **Services:** Virtual Reality City Tour
- **Subtotal:** \$305.00
- **Customer Name:** spola

Would you like to confirm the booking?
(yes/no)

Yes, Book Now

No

Bot:

🎉 Thank you, Spola! Your reservation has been successfully confirmed! 🎉

Here are your booking details:

🏨 **Hotel Name:** Desert Oasis Inn

🛏️ **Room Type:** Standard Queen

📅 **Check-in Date:** June 28, 2025

📅 **Check-out Date:** [Check-out not specified, but please remember to check out by 11 AM]

👤 **Number of Guests:** 2

🛏️ **Number of Rooms:** 1

🔑 **Services Included:** Virtual Reality City Tour

💰 **Subtotal:** \$305.00

🔖 **Booking ID:** 30

Please make sure to save your Booking ID: 30 for future reference! ✨

C)End-to-End In-Chat Booking :

Room Selection & Details

Choose room type and specify number of rooms

Enter guest names or confirm default guest count

Booking Summary & Subtotal

Calculates total cost (room × nights × rooms)

Applies loyalty discounts automatically if eligible

Confirmation & Payment

Guest confirms booking by clicking "Yes, book it"

Simulated payment: guest types "paid" or clicks "Pay Now"

Booking ID & Receipt

Bot returns reservation ID and summary in chat

Encourages guest to save or screenshot their booking

Integration with Hotel Services :

You: Buckeye Lodge

Bot:

🌟 Available Services at Buckeye Lodge 🌟

1. Ice-Carving Masterclass
💰 Price: \$80.00
2. Bioluminescent Cruise
💰 Price: \$140.00
3. Private Stargazing Dome
💰 Price: \$100.00

Would you like to add any of these services to your booking, or would you prefer to proceed to the booking? 😊

Ice-Carving Masterclass — \$80.00

Bioluminescent Cruise — \$140.00

Private Stargazing Dome — \$100.00

You: okay, lets add stargazing

Bot:

🏠 Service Summary

Selected Service:

- 🏠 Private Stargazing Dome

Subtotal:

- 💰 \$100.00

Ancillary Services Catalog

Comprehensive, numbered list of add-on offerings (e.g. Ice-Carving Masterclass, Private Stargazing Dome). Each entry features itemized pricing and iconography for quick recognition

Dynamic Confirmation Panel

Immediately displays the guest's chosen service(s) with subtotal calculation. Ensures transparent pricing and next-step clarity within the same chat interface

Seamless Backend Invocation

Selection triggers REST API calls to the corresponding hotel service modules (room service, spa reservations, etc.)

Smart Recommendations – AI-Powered Personalized Offers

- Services: Private Stargazing Dome
- Subtotal: \$235.00
- Customer Name: spola

Please confirm your booking (yes/no).

Yes, Book Now

No

You: Yes, Book Now

Bot:

🌟 Great news! 🎉 You are eligible for a loyalty discount of 5% on your booking!

Would you like to apply this discount to your reservation? Please let me know with a simple Yes or No. 😊

Yes

No

🌟 Great news! 🎉 You are eligible for a loyalty discount of 5% on your booking!

Would you like to apply this discount to your reservation? Please let me know with a simple Yes or No. 😊

Yes

No

You: Yes

Bot:

Great news, Spola! Your loyalty discount of 5% has been applied to your booking at Buckeye Lodge.

Here are the details for your stay:

1. Room Type: Standard Queen
2. Subtotal: \$223.25
3. Services: Private Stargazing Dome

Automatic Eligibility Detection

Bot checks `user Has Booked Hotel Before(...)` and room discount rate

In-Chat Discount Offer

🎉 “Great news! You’re eligible for a 5 % loyalty discount on your booking!”

Yes / No quick-reply buttons

Instant Discount Application

On **Yes**, recalculates `subtotal = subtotal × (1 – discount)`
Persists via `booking Service.create(...)`

Booking Confirmation

“Your loyalty discount of 5 % has been applied to your booking at Buckeye Lodge.”
Shows **updated subtotal**, room type, services

Next Steps

Invite user to **save booking ID**, book another stay, or request support

Customer Support – Feedback Collection

Post-Stay Feedback Prompt

"Please rate your experience (1-5) and share any comments."

One-Tap Ratings & Free-Text Comments

Clickable buttons 1-5 minimize friction

Optional comment field for open-ended insights

AI-Driven Slot Extraction

LLM parses numeric rating into

`feedback Rating`

Captures `feedback Comments` verbatim

Seamless Persistence

`feedback@Service.save(rating, comments)`

Aggregates data for real-time dashboards and analytics

Friendly Acknowledgment

"Thank you for your feedback! How else can I assist you today?"

I would love to hear your thoughts! Could you provide your feedback rating and any comments regarding your experience?

If you have any follow-up questions, feel free to ask! 😊



You: Average, 3

Bot:

Thank you for using our hotel booking service! If you have any other inquiries or would like to start a new booking in the future, feel free to reach out. Have a great day!

Human Escalation & Agent Handoff :

You: I would like to talk to an agent

Bot:

Could you please provide your full name and phone number so we can connect you to a live support agent?

Provide your full name

Provide your phone number

You: Sravya, 156-437-7712

Bot:

Thank you for providing your information. An agent will reach out to you shortly. How else can I help you today?

Yes, continue my booking

No, end chat

You: No, end chat

Bot:

Would you like to continue with your hotel booking or end the chat?

You: End the chat

Bot:

Thank you for contacting support! If you need anything else, I'm here to help. Have a great day!

Escalation Trigger

Guest types "agent," "representative," or "human" at any point

Context Preservation

Bot records **previous Stage** so no data is lost

Contact Info Collection

Asks for **Full Name & Phone Number** via LLM slot-filling

Ticket Creation

Calls `supportService.save(new AgentRequest(name, phone))`

Guest Choice

Yes, continue my booking → resumes from saved stage

No, end chat → thanks user and closes conversation

Seamless Handoff

Your support team receives full transcript + state
Agents pick up the conversation exactly where the bot left off

Thank you!
