OFPPT

INSTITUT SPECIALISE DE TECHNOLOGIE APPLIQUEE - HAY AL ADARISSA FES

RAPPORT PROJECT FIN ETUDE: **2025/2026**

Smart Restaurant Web Platform – Fez

Réalisé par Faycal

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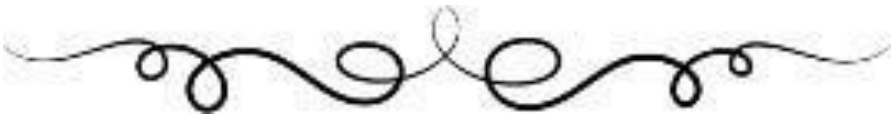
I would also like to thank Mr. Qassi Mohamed, my teacher, for his enriching lessons and guidance throughout my training. His expertise and encouragement allowed me to make progress on my project and to acquire new knowledge essential to my career.



Summary

This project is part of a digital transformation initiative for a restaurant based in Fez, aiming to replace an outdated website with a smart, modern, and interactive platform. The main objective is to provide an immersive, personalized, and seamless user experience for both customers and administrators.

The platform offers a complete ecosystem:
• A reservation system with a dynamic calendar,
• An intelligent chatbot capable of suggesting dishes from the menu,
• An evolving loyalty system that converts loyalty points into discount vouchers with a QR code,
• An animated interface featuring videos inspired by the restaurant and GSAP animations,
• Multilingual support (i18n),
• Centralized management of users and reservations via an admin dashboard,
• Real-time notifications on WhatsApp through the Twilio API, informing the team of every new, modified, or canceled reservation.

The platform is built on a modern stack (React.js, Tailwind CSS, Express.js, MongoDB with an online database), offering performance, scalability, and security. It fully meets the expectations of modern establishments looking to digitalize their customer relations and internal processes.

Introduction

This project aims to deliver a smart web platform, designed from the ground up to meet the specific needs of a modern restaurant.

Unlike generic or rigid solutions, this platform focuses on innovation: chatbot, instant notifications, modern animations, customer loyalty features, and the integration of intelligent tools.

1 Analysis and Study of the Specifications

1.1 Study of the Specifications

1.1.1 Problem Statement

Traditional restaurant websites have several technical and functional limitations:

- **Inefficient reservations**: Lack of an interactive calendar or automated reservation management (modification, cancellation, confirmation).
- **Lack of interactivity**: Few or no smart tools (chatbot, dynamic recommendations, personalized interface).
- **Low customer engagement**: No loyalty system, instant notifications, or evolving discount programs.
- **Manual management**: Reservations are often handled by phone or on paper, leading to forgetfulness, duplicates, or errors.
- **Outdated digital presence**: Old design, lack of responsive layout, no modern animations, and low visual appeal.

Impact: These limitations reduce the restaurant's ability to attract and retain modern customers, optimize internal operations, and stand out in a highly competitive industry.

1.1.2 Objectives

This project aims to develop a smart, modern, and fully customized web platform tailored to the specific needs of a restaurant in Fez:

- ✅ **Smart Reservation**:
  - Dynamic interface with an integrated reservation calendar
  - Automatic backup to Google Sheets
  - Instant WhatsApp notifications via Twilio API (for new, canceled, or modified reservations)
- ✅ **Personalized Customer Experience**:
  - Interactive chatbot (dish recommendations based on customer preferences)
  - Simplified order form for events or takeout meals
- ✅ **Statistical Dashboard**:
  - Global view of reservations (daily/weekly/monthly), occupancy rate, peak times
  - Customer statistics (number of visits, loyalty, feedback)
- ✅ **Modern Loyalty System**:
  - Loyalty points convertible into discount vouchers
  - Automatically generated QR codes to be scanned on-site

Added Value: A powerful, scalable digital platform fully adapted to the restaurant sector, without relying on limited third-party solutions.

1.1.3 Proposed Solution

Technical Architecture:

- 🔹 **Front-end**:
  - **React.js + Tailwind CSS**: Smooth, responsive, and lightweight user interface
  - **GSAP** for animations (page transitions, hover effects)
- 🔹 **Back-end**:
  - **Express.js (Node.js)**: API management, reservation logic, notifications
  - **MongoDB (Atlas)**: Flexible storage for users, reservations, and feedback
- 🔹 **Integrations**:

- **Twilio API**: Automatic WhatsApp message sending to the team
- **i18n (internationalization)**: Multi-language platform
- **Cloudinary**: Optimized image and video management

Key Features:

1. ✅ **Smart Reservation**:
   - Smooth pop-up triggered by clicking on a specific date
   - Real-time form validation (phone number check, availability, etc.)
2. ✅ **Abuse Detection**:
   - Reservation limits per user/day
   - Alerts for suspicious IPs or recurring names
3. ✅ **Admin Interface**:
   - Filterable reservation list (confirmed, canceled, past)
   - Team management (waiters, schedules), table configuration
   - Access to visitor statistics and customer behavior analysis

1.1.4 Feasibility Study

Technical Aspect:

- ✅ **Compatibility**: The chosen technologies (React.js, Node.js with Express, MongoDB) are proven, high-performing, well-documented, and particularly suitable for real-time applications such as reservations.
- ✅ **Integrations**: The APIs from Twilio (WhatsApp), Google Sheets, and Cloudinary are stable, widely used, and recognized in many professional projects.
- ✅ **Performance**: The modular architecture based on React components and Express routes allows for updates without service interruption, ensuring high availability.

Economic Aspect:

- 💰 **Low Costs**: Use of open-source technologies (React, Node.js, MongoDB) and affordable cloud hosting (e.g., Render, Vercel, Railway).
- 📈 **Return on Investment (ROI)**:

- Reduction in phone calls and manual errors thanks to automated reservations.
- Time savings in daily operations (+40% operational efficiency).
- Increase in reservations and customer loyalty through notifications and point systems.

Timeline:

- **Estimated Duration**:
  3 to 4 weeks for an MVP (Minimum Viable Product) including:
  - Online reservations with WhatsApp confirmation
  - Admin dashboard
  - Menu and schedule display
  - Responsive interface for mobile and desktop

1.1.5 Business Constraints

Security:

- Use of SSL certificates for all communications
- GDPR compliance for collecting and storing customer data (name, phone number, preferences)
- Protection against web attacks (SQL/XSS injections, form spam)

Responsive Design:

- Use of Tailwind CSS to ensure perfect adaptation of the interface across all devices:
  - Smartphones (Android/iOS)
  - Tablets (portrait/landscape mode)
  - Desktop screens

Performance:

- Page load times < 2 seconds through:
  - Lazy loading of dish images
  - Animation optimization (GSAP)

- Use of CDN for static files

UX/UI:

- Navigation designed for both locals and tourists:
  - Fewer than 3 clicks to reserve a table or view the menu
  - Smart recommendation system based on preferences
  - Modern theme with clear icons and smooth transitions

Maintainability:

- Structured and modular code (React Components + REST API).
- Provided technical documentation (Swagger for API, Storybook for UI).
- Automated testing:
  - Supertest for the API
  - Error monitoring via Sentry

1.2 Specification of Requirements

1.2.1 Functional Requirements

The system must provide the following features, adapted to the specific needs of a modern restaurant:

- 🍽 **Dish and Menu Management**
  - Adding, modifying, and deleting dishes
  - Categorization by type (starter, main course, dessert, drink)
  - Dynamic display with photos and descriptions
- 🗓 **Reservation Management**
  - Online reservation with choice of time, number of people, and a personalized message
  - Admin view of reservations with status (pending, confirmed, canceled)

    - Automatic notifications to admin via WhatsApp
- 🛒 **Takeaway Order Management**
    - Dynamic cart with online ordering capability
    - Online payment (Stripe) or payment on delivery
    - Automatic generation of PDF invoice
- 👤 **User Management**
    - Optional customer account creation (quick access possible via phone number)
    - Order history, favorites system, loyalty points
- 📊 **Admin Dashboard**
    - Overview of sales by day/week/month
    - Most ordered products
    - Traffic rate by hour or day
- 🎁 **Coupons & Promotions**
    - Creation of promo codes with validity rules
    - Automatic application during checkout
- 🔔 **Real-Time Notification System**
    - Alerts for new orders or reservations
    - Customer notification upon confirmation or cancellation

1.2.2 Non-Functional Requirements

To ensure stability, security, and quality of service, the following requirements must be met:

- 🔐 **Security**
    - Secure authentication, protection against attacks (XSS, CSRF, injections), SSL encryption
- ⚡ **Performance**
    - Page load time under 2 seconds
    - Image optimization, caching, and lazy loading
- 📱 **Cross-Platform Compatibility**
    - Responsive design for mobile, tablet, and desktop
    - Testing on popular browsers (Chrome, Safari, Firefox, Edge)

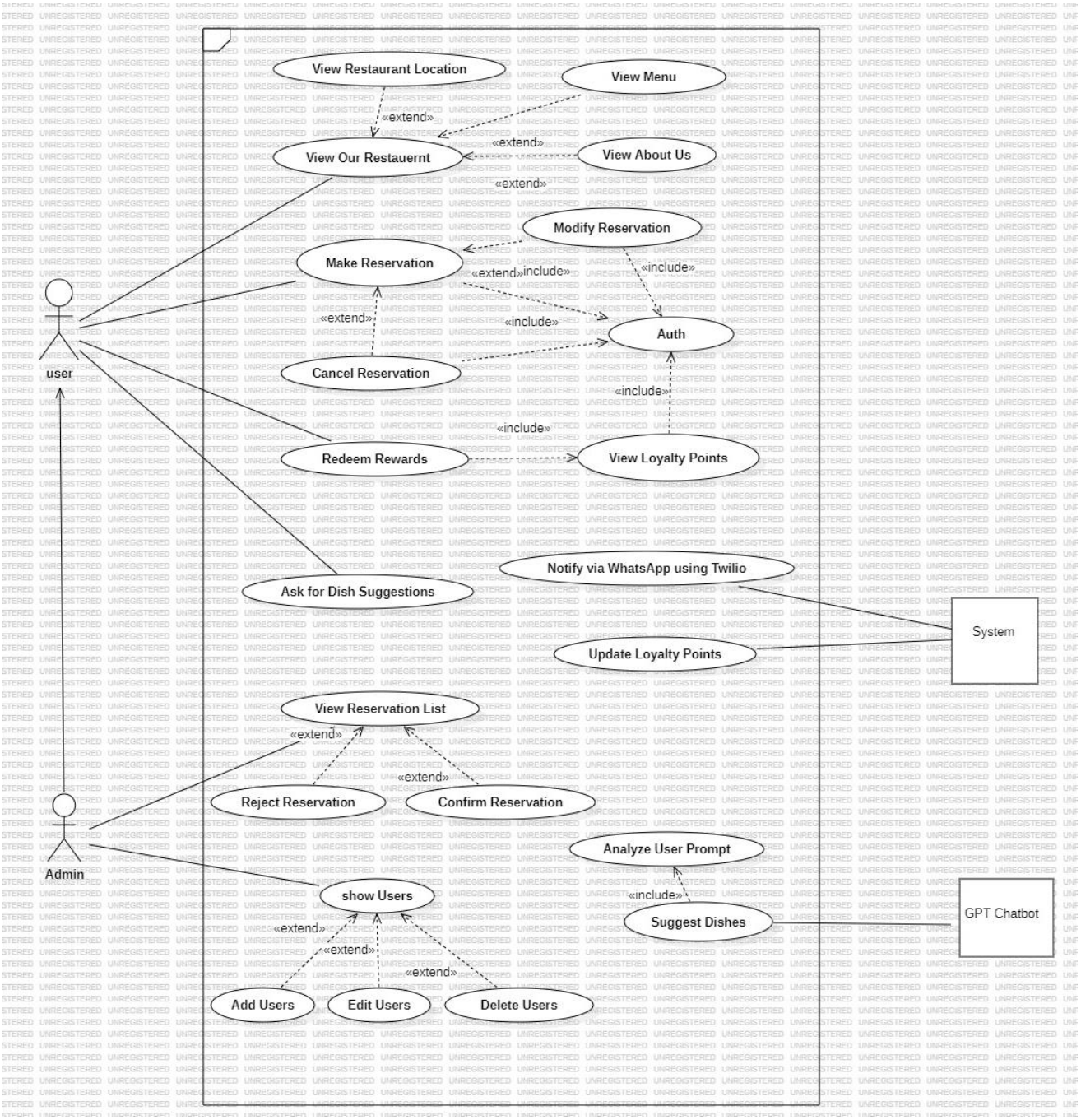
2 Design and Modeling

2.1 Planning

The project was planned over a period of 30 days, organized using agile methodology (Scrum type).

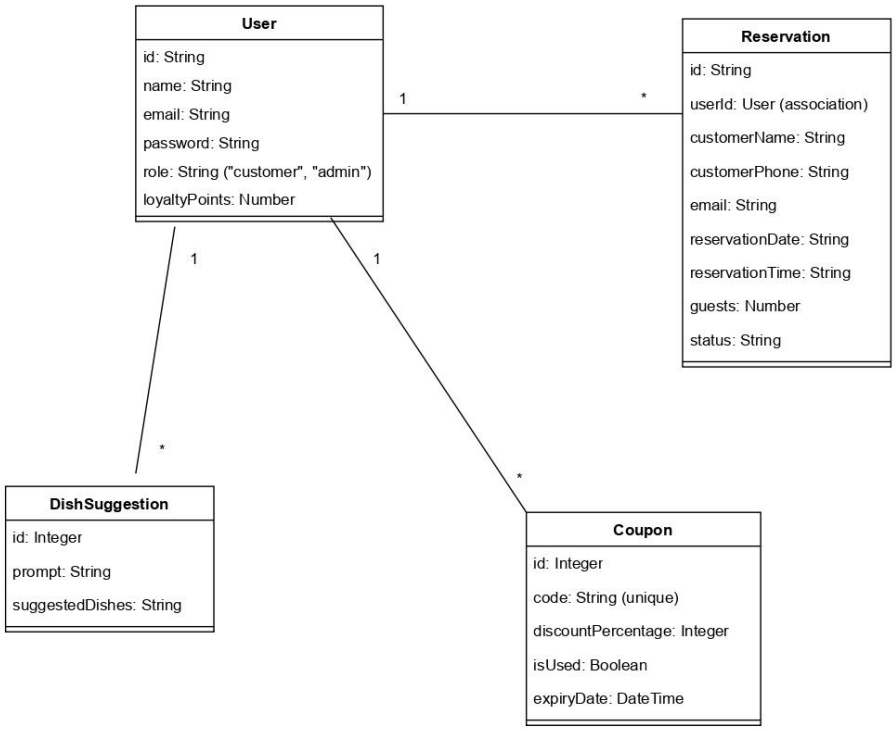
2.2 Conception UML

2.2.1 Diagramme de cas d'utilisation



2.3.2 Class Diagram

Main classes and their relationships:



3 System Architecture and Processing Workflow

3.1 Working Environment

3.1.1 Software Environment

- **Développement** :
  - IDE principal : VS Code (WITH extensions ESLint, Prettier …)
  - Versioning : Git avec GitHub
  - Modélisation : draw.io FOR diagramsUML
  - Tests API : Postman

Key Technologies :

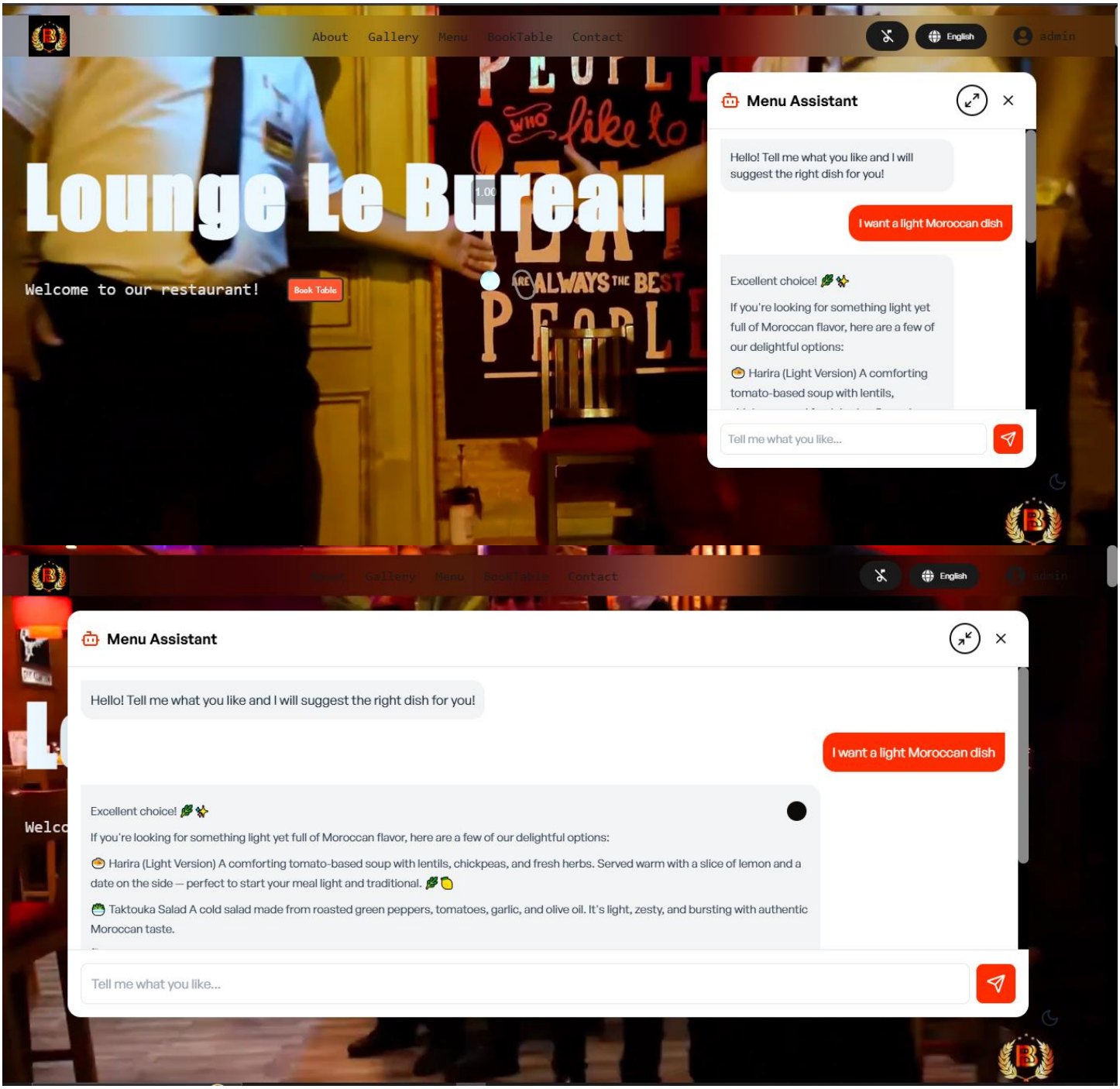
Layer	Technologies Used	*Description*
Frontend	React.js + Tailwind CSS + GSAP	Interactive and responsive user interface, optimized for mobile and desktop devices. Smooth animations for customer experience (e.g., menu navigation, reservation confirmation).
Backend	Node.js + Express.js	Secure RESTful API handling reservations, menu, users, and communication with the database.
Database	MongoDB	NoSQL storage optimized for flexible document management (orders, tables, customers, schedules).

Demo

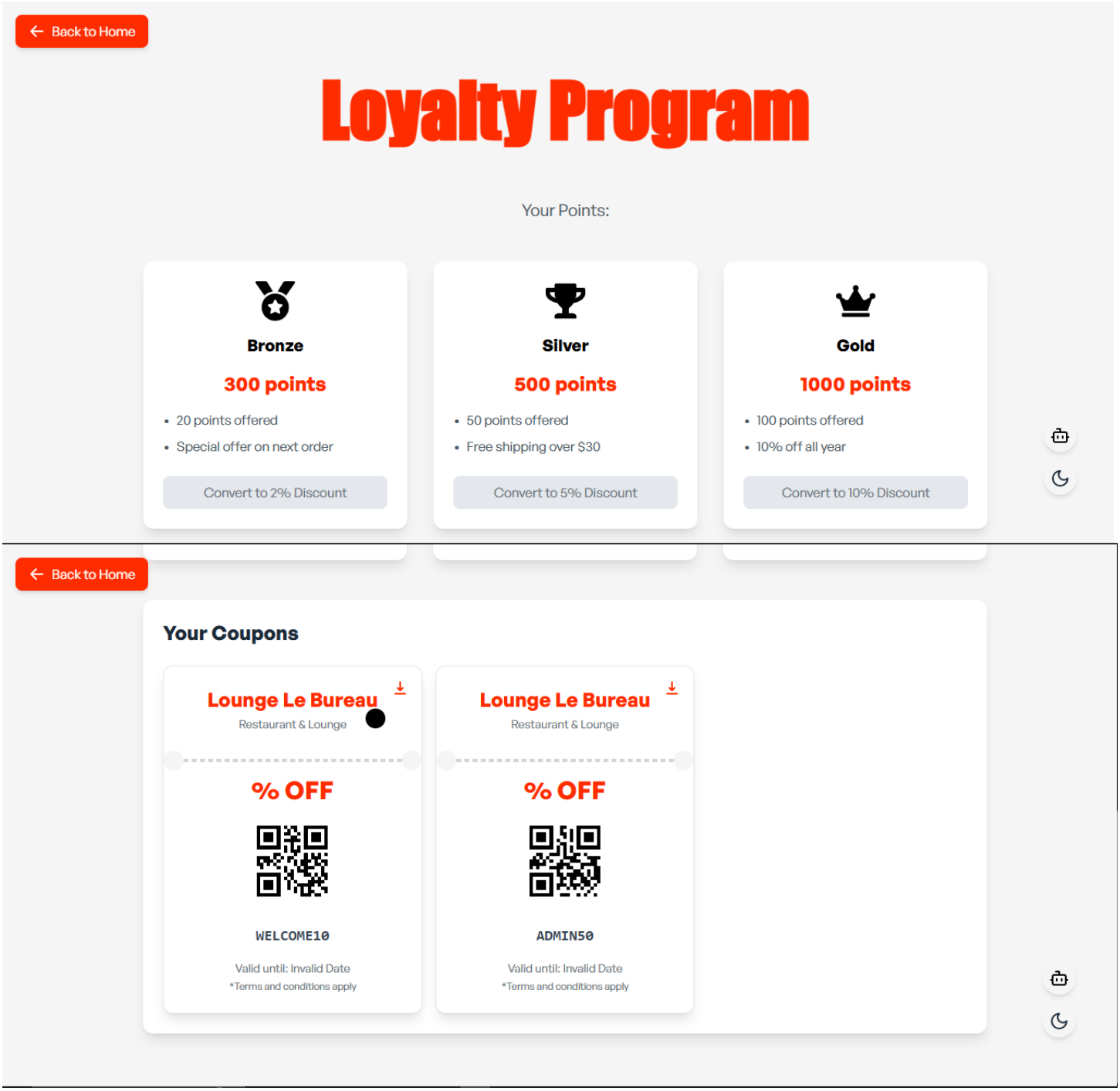
Here I will show you the latest updates that I have made to this site such as chatbot, loyalty system and the possibility of downloading factor qr code and possibility to scan it .

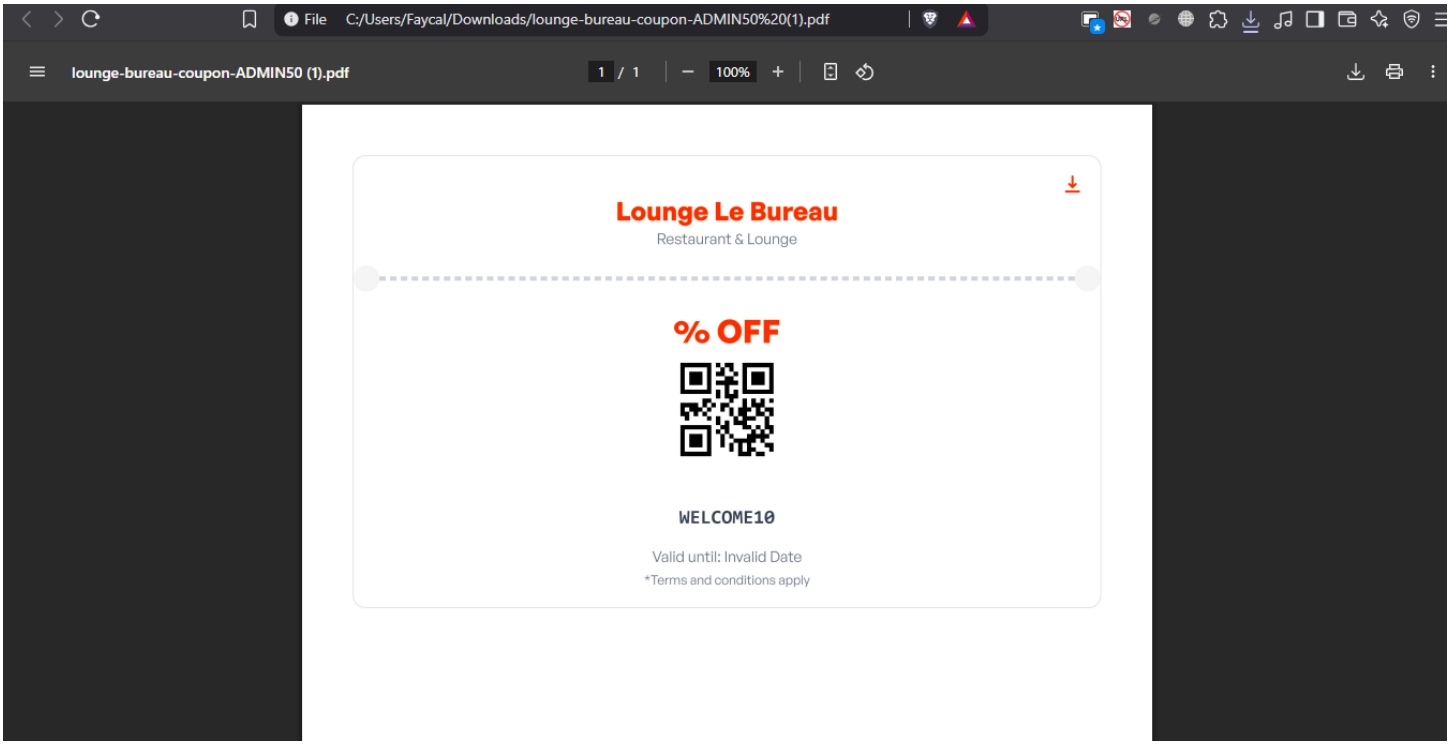
If you haven't seen the site yet, you can see it from this link: Click here

Here, as you can see, is an interactive chatbot that relies on a database and responds to the user. This saves the user a lot of time and gives him a wonderful user experience.



Here is the loyalty system that brings many or keeps many customers with advanced technology where the user can convert his points into a discount and then download it on the basis of a ticket and go with it to the store and in the store the administrators can check it out.

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