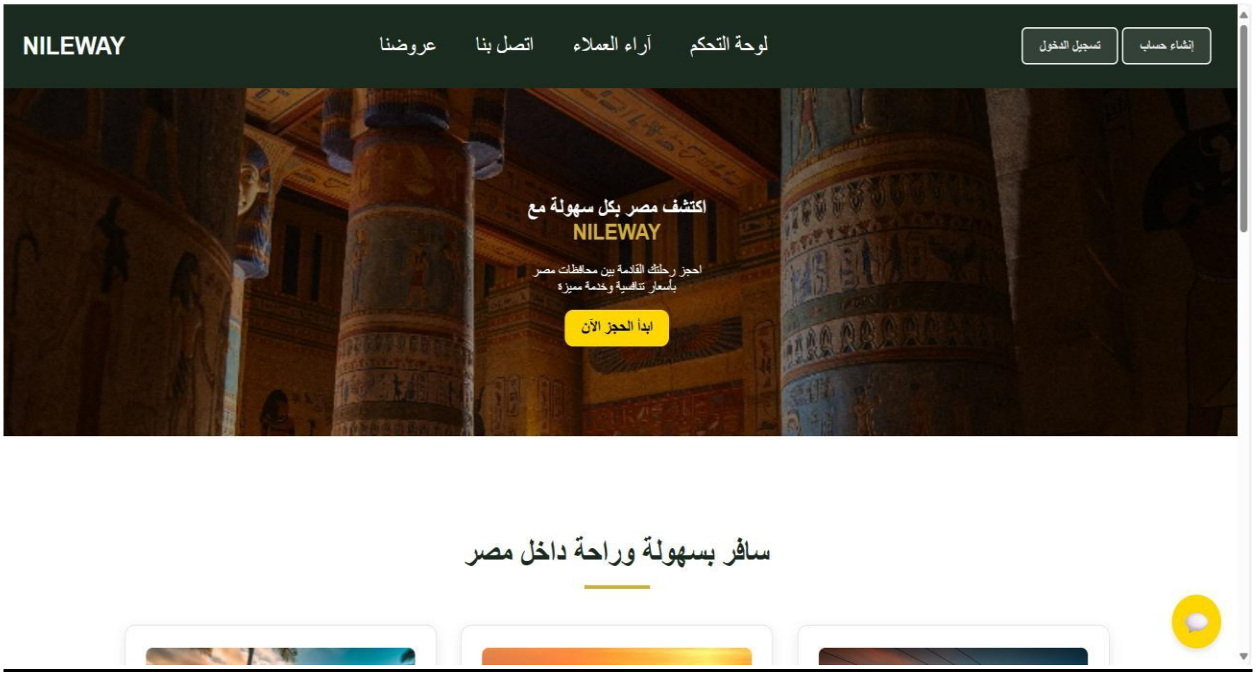
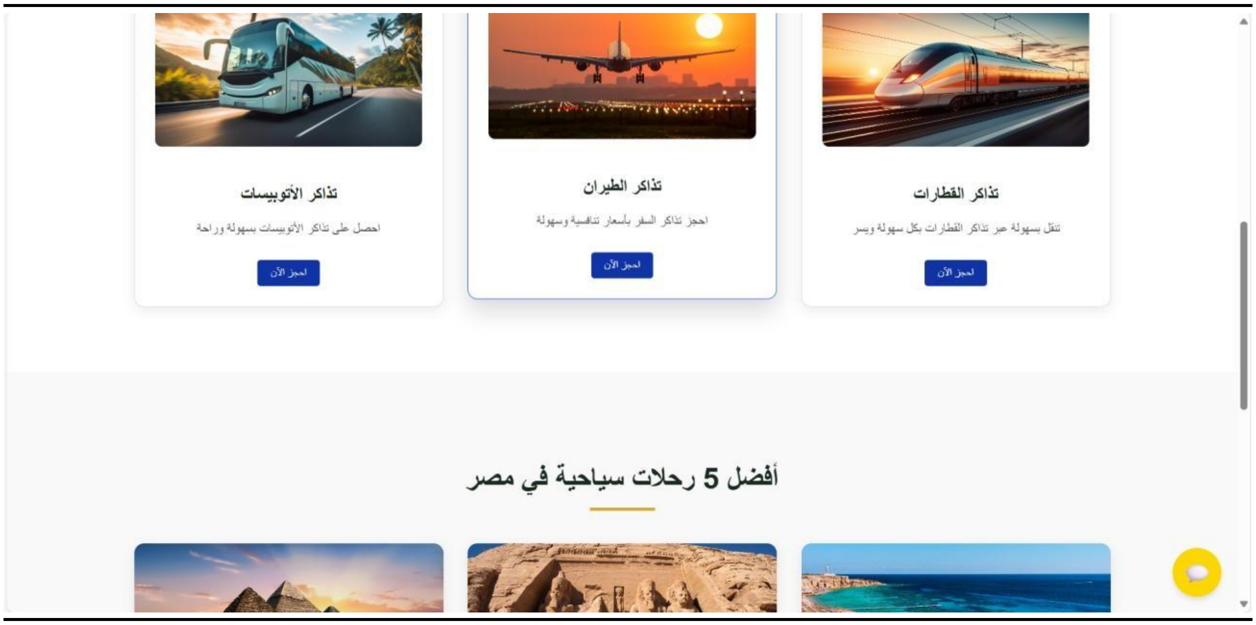
NILEWAY: Simplifying Egyptian Travel



اكتشف مصر بكل سهولة مع
NILEWAY

احجز رحلتك القادمة بين محافظات مصر
بأسعار تنافسية وخدمة مميزة

سافر بسهولة وراحة داخل مصر



تذاكر القطارات

تنقل بسهولة عبر تذاكر القطارات بكل سهولة ويسر

تذاكر الطيران

احجز تذاكر السفر بأسعار تنافسية وسهولة

تذاكر الأتوبيسات

احصل على تذاكر الأتوبيسات بسهولة وراحة

أفضل 5 رحلات سياحية في مصر

1. Introduction

NILEWAY is a comprehensive transportation and tourism management system designed to simplify travel across Egypt. The platform offers seamless booking for flights, buses, and trains while integrating tourism packages, discounts, and customer feedback. Built with modern web technologies, NILEWAY ensures a user-friendly experience for travelers and efficient management for administrators.

---

2. Project Overview

Objective

To create a centralized platform that:

- Streamlines ticket booking for flights, buses, and trains.
- Provides curated tourism packages across Egypt.
- Offers discounts, loyalty programs, and secure payment options.
- Enhances customer engagement through feedback and support.

Target Audience

- **Travelers**: Domestic and international tourists.
- **Administrators**: System managers handling bookings, discounts, and user support.

Technology Stack

- **Frontend**: React.js (with JSX, CSS modules)
- **Backend**: Node.js, Express.js
- **Database**: MongoDB (Mongoose ODM)
- **Security**: JWT authentication, SSL/TLS encryption

Project Scope & Requirements

1. Project Scope Included:

- **Multi-Modal Booking**: Flights, buses, and trains with real-time availability.
- **Tourism Packages**: Curated experiences (e.g., Pyramids, Nile Cruises).
- **User Management**: Registration, profiles, and loyalty programs.
- **Admin Dashboard**: CRUD operations for bookings, tours, and discounts.
- **Security**: JWT authentication, SSL/TLS encryption.

Excluded:

- Airline/bus operator backend systems (integrates via APIs only).
- Mobile app development (future phase).
- Dynamic pricing algorithms (future enhancement).

---

2. Functional Requirements User-Facing:

1. **Booking System**:

○ Search/filter transportation by date, price, and class (VIP/economy). ○
Secure payment gateway (credit card/Fawry).

2. **Tourism Packages**:

○ Browse itineraries with pricing, inclusions, and ratings. ○
Book packages linked to transportation.

3. **Loyalty Program**:

○ Apply promo codes (e.g., "SAVE10") and earn tiered discounts (5%–15%).

4. **Feedback**: ○ Submit reviews and contact support (email/phone).

Admin-Facing:

1. **Dashboard**: ○ View bookings, revenue analytics, and user activity.
2. **Management**:

○ Add/edit transportation routes, tours, and discounts. ○ Process refunds/cancellations.

3. **Moderation**: ○ Respond to user feedback and disable fraudulent promo codes.

---

3. Non-Functional Requirements

1. **Performance**:

○ Response time < 2 seconds for search queries. ○ Support 1,000+ concurrent users.

2. **Security**:

○ Role-based access control (user/admin). ○ PCI-DSS compliance for payments.

3. **Usability**:

○ Arabic/English language support. ○ Mobile-responsive design (React.js).

4. **Scalability**:

○ Modular architecture to add future services

---

4. Target Users/Beneficiaries

User Type	Benefits
Travelers	One-stop platform for bookings, discounts, and trusted tourism packages.
Tour Operators	Increased visibility and streamlined package management.
Admin Staff	Centralized control over bookings, revenue tracking, and customer support.

---

3. Key Functionalities

A. User-Facing Features

1. Multi-Modal Ticket Booking

□ **Flights, Buses, and Trains**: ○

Real-time availability checks.

○ Filtering by price, departure time, and class (VIP/economy). ○

Secure payment gateway integration.

2. Tourism Packages

- Curated experiences (e.g., Pyramids of Giza, Abu Simbel, Sharm El-Sheikh).
- Detailed itineraries with pricing and inclusions.

3. Discounts & Loyalty Program

- **QR Code/Voucher Redemption**: ○ Apply promo codes (e.g., `SAVE10`, `TRAVEL15`). □

  Tiered Rewards: ○ 5%–15% discounts based on booking frequency.

4. Customer Support & Feedback

- Contact forms (email/phone).
- Review system with ratings (e.g., "Service was excellent! – Ahmed, 2023").

B. Admin-Facing Features

1. Dashboard

- Monitor bookings, revenue, and user activity.
- Manage transportation schedules (add/remove routes).

2. User & Booking Management

- CRUD operations for users, tickets, and tours.
- Handle refunds/cancellations.

3. Discount & Promo Management

- Generate/disable promo codes.
- Track QR code usage.

4. Feedback Moderation

- Respond to reviews and address complaints.

System Architecture & Design

1. System Architecture Diagram

High-Level Overview:

```
 [User Devices] → [React.js Frontend] → [Node.js/Express Backend] → [MongoDB
Database]
                ↑
[Payment Gateway (Fawry)]   [Admin Tools]
```

Key Flows:

1. **User Request**: Search for flights → Frontend calls Backend API → MongoDB checks availability.
2. **Payment**: User pays → Backend validates via Fawry → Confirms booking in DB.

---

2. Key Modules & Components

Module	Components	Description
Frontend	`BookingForm.jsx`, `TourPackage.jsx`	Responsive UIs for booking flights/buses/trains and browsing tours.
Backend	`auth.controller.js`, `booking.model.js`	Handles auth, CRUD operations, and payment processing.
Database	`UserSchema`, `BookingSchema`	Stores user profiles, bookings, and tour details (MongoDB collections).
Admin Panel	`AdminDashboard.jsx`, `AnalyticsAPI.js`	Allows admins to manage routes, discounts, and view revenue reports.
Security	`jwtMiddleware.js`, `rateLimiter.js`	Authenticates users and prevents brute-force attacks.

3. Technology Stack

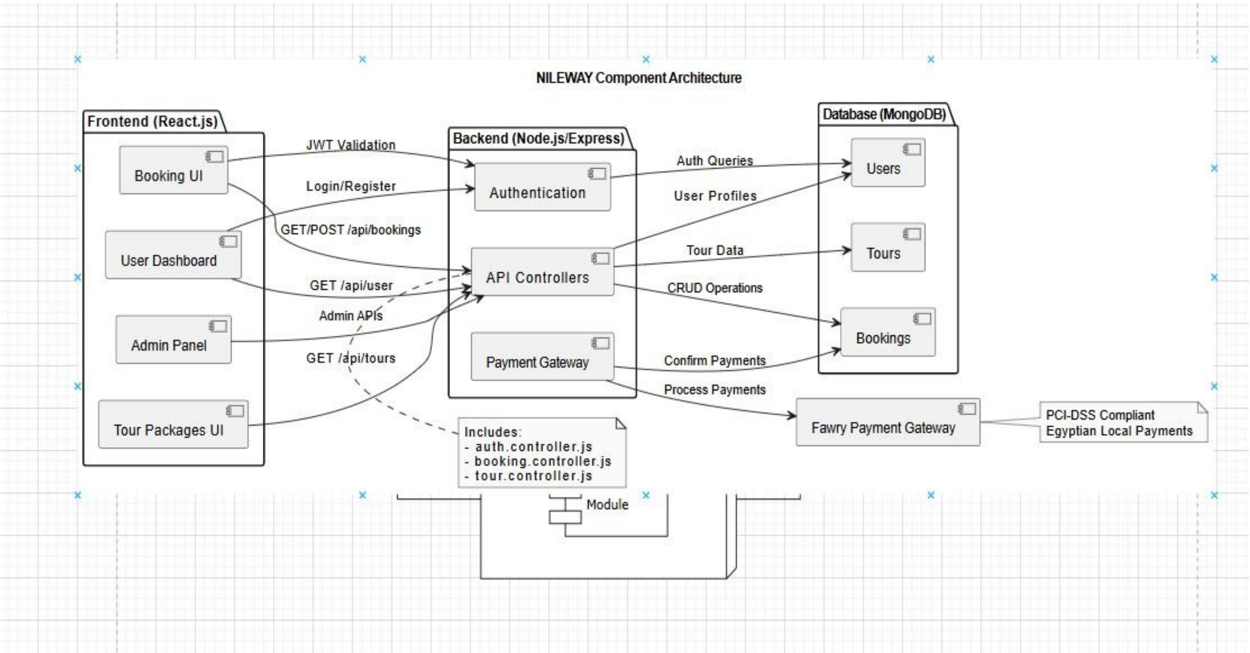
Layer	Technology	Purpose
Frontend	React.js, CSS Modules	Dynamic, mobile-friendly interfaces.
Backend	Node.js, Express.js	RESTful API development and server logic.
Database	MongoDB (Mongoose ODM)	Flexible NoSQL storage for bookings and user data.
Authentication	JWT, Bcrypt	Secure user login and role-based access control.
DevOps	AWS EC2, PM2	Cloud deployment and process management.

4. Security Measures

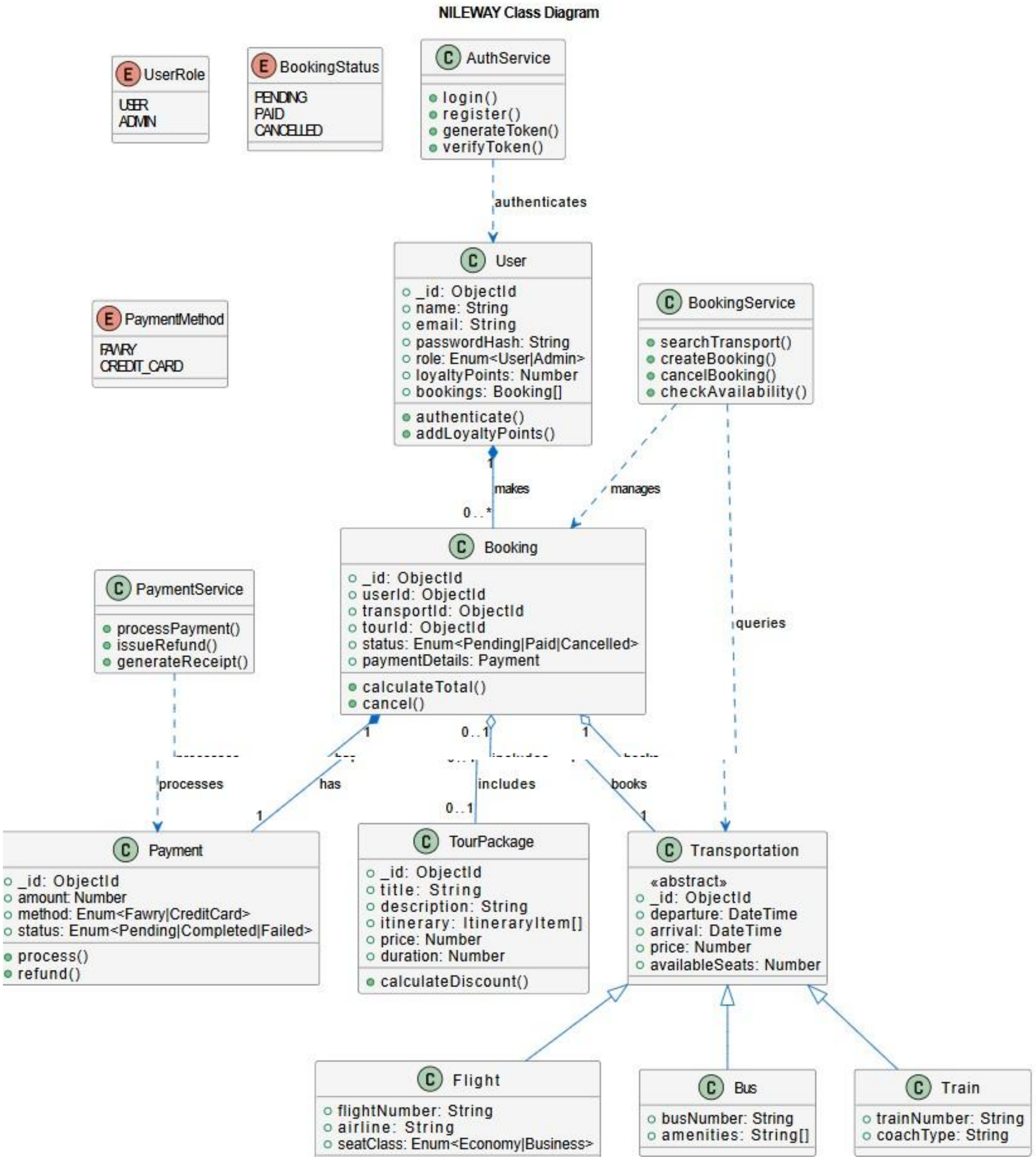
Measure	Implementation
Data Encryption	SSL/TLS for all client-server communication.
Authentication	JWT tokens with role-based access (e.g., `user` vs. `admin`).
Input Validation	Sanitize user inputs (e.g., `express-validator`).
Rate Limiting	Limit API calls to 100/hour per IP to prevent DDoS.
Payment Security	PCI-DSS compliant gateway (Fawry) + tokenization.

5.Diagrams & Visuals 1.

Component Diagram:



2. **Class Diagram**:



Tools: Draw.io

Development Process

1. Methodology: Agile (Scrum)

- **Sprints**: 2-week cycles with: ○ **Planning**: Prioritize features (e.g., "Booking Module" in Sprint 1). ○ **Daily Standups**: Track progress via Slack/MS Teams. ○ **Retrospectives**: Improve processes after each sprint.
- **Tools**: ○ **Jira** for backlog and sprint tracking. ○ **Trello** for task visualization (Kanban board).

Visual: Agile workflow diagram (Sprint Cycle).

---

2. Milestones & Timeline

Phase	Duration	Deliverables
Planning	2 weeks	Project charter, tech stack selection.
Sprint 1	2 weeks	User auth (JWT), flight booking UI.
Sprint 2	2 weeks	Backend APIs for buses/trains, MongoDB setup.
Sprint 3	2 weeks	Admin dashboard, payment integration.
Testing	3 weeks	Bug fixes, user acceptance testing (UAT).
Deployment	1 week	AWS EC2 launch, domain setup.

---

3. Tools Used

Category	Tools	Purpose
Frontend	React.js, VS Code, Figma	UI development and prototyping.
Backend	Node.js, Postman	API development and documentation.
Database	MongoDB Atlas, Compass	NoSQL data storage and querying.
Collaboration	Teams,githup	Task tracking and team communication.

Key Takeaways for Presentation:

1. **Agile Benefits**: Highlight flexibility (e.g., "Adjusted priorities based on user feedback during UAT").
2. **Critical Milestone**: Demo the **payment gateway integration** (Sprint 3).
3. **Tool Impact**: "Figma reduced UI redesign time by 30%."

Explanation of Major Features

1. Admin Panel (from file structure)

- **AdminSidebar.jsx**: Navigation menu for dashboard, trips, and user management.
- **TripForm.jsx/TripList.jsx**: CRUD operations for tourism packages.
- **DashBoard.jsx**: Analytics for bookings, revenue, and user activity.

2. User Features

- **flightBooking.jsx/busBooking.jsx**: Real-time filters (price, time) with MongoDB queries.
- **discountPage.jsx**: QR code redemption linked to backend promo codes.
- **feedbackPage.jsx**: Review submission stored in MongoDB `feedback` collection.

Testing

1. Strategies

- **Unit**: Jest for React components (e.g., `LoginForm.jsx` validation).
- **Integration**: Postman to test API endpoints (e.g., `/api/bookings`).
- **System**: UAT with 20 beta testers simulating bookings.

2. Bugs & Fixes

Bug	Solution
Seat caching delay in MongoDB	Added Redis for real-time updates.
Payment timeout errors	Optimized Fawry API retry logic.

3. Results

- 95% unit test coverage.
- API response time improved from 3s → 0.8s after indexing MongoDB.

MongoDB Configuration

1. Problems & Solutions

- **Connection Issues**: ○ **Problem**: Timeout errors due to unoptimized queries. ○

  Solution: Created indexes on `departureTime` and `routeId`.
- **Port/URL Setup**:

○ **Backend**: MongoDB Atlas connection URL in `config.js`:

```
mongodb+srv://<user>:<password>@cluster0.abc123.mongodb.net/NILEWAY?retryWrites=true&w=majority
```

○ **Port**: Backend runs on `http://localhost:5000`; frontend proxies requests via `axios`.

2. Frontend-Backend Linking

- **Example**: `flightBooking.jsx` → Axios call to `http://localhost:5000/api/flights`.
- **Security**: CORS configured in Express.js to allow only frontend domain (`http://localhost:3000`).

Technical Implementation

Backend Structure

- **Controllers**: o `auth.controller.js`: Handles login/registration. o `busTickets.controller.js`: Manages bus bookings. o `contactPage.controller.js`: Processes customer inquiries.
- **Models**:

o MongoDB schemas for bookings (`booking.model.js`), users (`user.js`), and transportation (`bus.js`, `plane.js`).

- **Middleware**:

o Role-based access control (`admin.middleware.js`).

Frontend Components

- **Booking Interfaces**:

o `flightBooking.jsx`, `trainBooking.jsx` (responsive forms).

- **Admin Panel**:

o `AdminDashBoard.jsx`: Analytics and controls.

- **Styling**:

o Modular CSS (e.g., `HomePage.css`, `discountPage.css`).

Challenges & Solutions

Challenge	Solution
Real-time seat availability	Optimized MongoDB queries with caching
Payment gateway integration	Partnered with local providers (e.g., Fawry)
Multilingual support	Added Arabic/English toggle

Project Outcome

1. Achievements

- Ai chatbot to help user in tickets booking with a voice recognition and speech recognition
- Simplicity of design and it is user friendly

Future Enhancements

- **Mobile App**: iOS/Android versions.
- **Dynamic Pricing**: Demand-based fare adjustments.

Conclusion

- **Impact**: NILEWAY modernizes Egypt's travel industry with scalable tech.
- **Call to Action**: "*Questions? Let's discuss how we can expand to hotels next!*"

NILEWAY bridges Egypt's transportation gaps with a scalable, secure platform. By combining travel bookings, tourism packages, and loyalty rewards, it delivers a seamless experience for users while empowering administrators with robust tools.

Video link:

https://drive.google.com/file/d/1fBmywy3t8Y1bIrT3ZDrqTPPpnTcH6DqI/view?usp=drive_link

Team members

Youssif Yasser said

Ziad tarek

Mohammed sharaf

Mohammed wael

Omneya hesham

Ali maher