

Graduation Project Summary

SmartLand Marketplace is a comprehensive full-stack web and mobile platform designed to modernize and digitize the land buying and selling process in Palestine.

The project aims to provide a secure, transparent, and user-friendly marketplace that connects buyers, sellers, lawyers, and administrators while reducing fraud, improving accessibility, and simplifying land transactions.

The platform was developed using a modern technology stack including React.js and Tailwind CSS for the web interface, React Native for the mobile application, Node.js with Express.js for the backend, and MySQL as the relational database. The system follows a RESTful architecture and supports both web and mobile clients through a shared backend.

A secure authentication and authorization system was implemented using JSON Web Tokens (JWT) with role-based access control supporting buyers, sellers, lawyers, administrators, and super administrators.

To increase trust and reduce fraudulent activities, the platform includes an identity verification process where users upload official identification documents that are reviewed by administrators before account verification.

The platform enables sellers to create and manage detailed land listings, including prices, land area, location, land type, descriptions, images, and land plans. Buyers can discover properties through advanced search filters and an interactive Leaflet map integrated with OpenStreetMap, allowing users to browse available lands geographically.

To improve communication, the project includes a real-time messaging system built with Socket.io, allowing buyers, sellers, and lawyers to communicate instantly. It also provides appointment scheduling, seller availability management, and a real-time notification system that keeps users informed about messages, appointments, legal requests, and platform activities.

One of the project's key innovations is the integration of artificial intelligence. An AI chatbot, powered locally through Ollama, analyzes user questions, distinguishes

between general inquiries and database-related requests, generates SQL queries when needed, and provides natural language responses. Additionally, a voice assistant built using the Web Speech API allows users to search for lands and manage availability schedules using voice commands.

The platform also offers integrated legal services, enabling users to request legal consultations or authorize lawyers to supervise property transactions.

Administrators are provided with a comprehensive dashboard to manage users, verify identities, review land listings, monitor platform activities, and oversee marketplace operations.

Security was a major focus throughout development. The system uses bcrypt for password hashing, parameterized SQL queries to prevent SQL injection, XSS protection, rate limiting, Helmet security headers, and secure role-based authorization. Furthermore, the entire platform supports both Arabic and English with complete RTL/LTR adaptation and features a fully responsive design for desktop and mobile devices.

Overall, SmartLand Marketplace successfully combines modern web technologies, artificial intelligence, real-time communication, interactive mapping, multilingual support, legal services, and secure authentication into a unified digital ecosystem. The project provides a practical and scalable solution for modernizing land transactions in Palestine while offering a strong foundation for future enhancements such as online payments, automated identity verification, and more advanced AI capabilities.