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Plot Point : The Real Estate Hub

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Abstract- The real estate sector still depends heavily on manual processes for maintaining land records, managing customer enquiries, verifying documents, and confirming plot bookings. These traditional approaches result in delays, inconsistent data management, limited transparency, and a high risk of human error. Plot Point is a web-based, centralized land and plot management system developed to address these challenges by automating the complete workflow of plot booking and real-estate documentation. The proposed system integrates modules for staff authentication, customer enquiry handling, real-time plot availability tracking, digital document submission and verification, automated agreement generation, and booking confirmation. Through its structured workflow and secure data management architecture, Plot Point minimizes manual workload, enhances accuracy, and ensures traceability throughout the booking lifecycle. The system also supports faster decision-making by providing staff with consolidated dashboards and well-organized records. This digital transformation improves operational efficiency, reduces administrative overhead, and enhances customer satisfaction by enabling transparent, error-free, and time-efficient plot booking operations.

Keywords: DBMS, Property Booking, Real Estate Management, Recommendation System.

I. INTRODUCTION

Real-estate organizations often struggle with managing plot allocation, documentation, and customer enquiries using traditional manual methods, leading to delays, data inconsistencies, and difficulty in maintaining records. Plot Point is a web-based solution designed to digitize and automate the plot booking and land record management process. It uses a multi-layered architecture with an interactive user interface, workflow-driven business logic, and a secure centralized database for smooth data handling.

The system includes key modules such as customer enquiry registration, plot availability management, digital document verification, automated agreement generation, and structured booking confirmation. Role-based access control ensures secure usage, while standardized workflows reduce redundancy and improve data integrity.

Overall, Plot Point enhances organizational productivity by reducing manual work and providing real-time access to reliable information. With features like analytical dashboards and centralized records, it improves decision-making, speeds up booking processes, and increases transparency between staff and clients.

II. RELATED WORK

Digital Land Record Management Using Centralized Databases: Sinha et al. [1] proposed an e-governance–based land record digitization system that converts manual land ownership documents into a centralized digital repository. The system improves accessibility, reduces fraud, and enables quicker retrieval of land information. Their approach emphasized secure storage and structured indexing of property records. However, the work primarily focused on government-level digitization and did

not include features such as plot booking, customer enquiry management, or document workflow automation, which are essential for private real estate firms.

GIS-Based Plot Information and Property Visualization Systems: Rahman and Nair [2] introduced a GIS-enabled land parcel mapping system that visualizes plot boundaries, area measurements, and ownership details on a digital map. The system enhances the accuracy of spatial information and helps users understand land layouts more effectively. While the use of GIS significantly improves transparency in land related data, the solution lacks end-to-end booking workflow support, such as enquiry tracking, agreement generation, or customer document verification.

Real Estate Customer Relationship and Lead Management Platforms: Prakash et al. [3] developed a CRM-based real estate management solution that enables organizations to manage leads, track customer interactions, and generate automated follow-ups. Their system improves sales coordination and communication between sales teams and potential buyers. Although highly effective for lead nurturing and sales forecasting, the system does not provide modules for managing plot availability, checking booking conflicts, or maintaining structured land records, limiting its suitability for plot allocation processes.

Workflow-Driven Property Booking and Document Automation : George and Mathew [4] proposed a workflow automation model for housing project bookings, incorporating document management, customer communication, and automated invoice generation. The system reduced administrative overhead and improved process transparency. However, the solution catered mainly to apartment-based housing projects and did not account for plot-level availability tracking, agreement generation, or centralized land record management—key elements required for real-estate plot booking workflows.

III. PROPOSED UNITS

The proposed system, Plot Point, is a comprehensive web based platform designed to overcome the limitations of traditional real estate processes. By centralizing property information and providing user-friendly tools for searching, booking, and managing properties, the system ensures efficiency, transparency, and reliability for all stakeholders, including administrators, and customers. The system is built on a role-based architecture, meaning that each type of user has customized dashboards and access permissions. Administrators can manage user accounts, monitor property listings, generate reports, add, update, and remove listings, respond to customer inquiries, and track bookings. Customers can browse properties, compare options, and make secure bookings online, all in a single, integrated platform. The system aims to eliminate the inconsistencies and delays commonly associated with manual booking processes by introducing structured modules, secure data handling, and real-time status updates.

At the core of the proposed solution is the Plot Management Module, which provides real-time visibility into the availability of each plot. Staff members can update plot status, assign plots to customers, and track changes throughout different stages of the booking process. This minimizes the risk of double-booking and ensures that customers receive accurate information at all times. Another key component is the Document Management and Verification Module.

Customers' identification and property related documents are uploaded digitally and reviewed by authorized staff. The system maintains a consistent document verification workflow, ensuring traceability and accountability. By centralizing document storage, the platform reduces the chances of misplaced files and supports quick retrieval during agreement processing. Overall, the proposed Plot Point system provides a comprehensive and streamlined solution that enhances workflow efficiency, reduces administrative overhead, and improves customer service. By integrating enquiry handling, plot availability, document verification, and

booking confirmation within a single platform, the system addresses the major limitations of existing real-estate administration practices.

Software and Hardware Requirements

- **Software Requirements** - The Plot Point system is compatible with operating systems such as Windows 10 or 11, Linux, or macOS, offering flexibility across various development environments. The application can be accessed through modern web browsers including Google Chrome, Firefox, or Microsoft Edge. The frontend is developed using HTML5, CSS3, JavaScript, and optionally Bootstrap for responsive design. The backend of the system is implemented using Python and Flask, which together manage user authentication, property listings, bookings, and database interactions. For data storage, SQLite is used as the primary database, allowing fast local operations with minimal configuration; however, the system is also compatible with MySQL if needed.

- **Hardware Requirements** - The Plot Point system requires a computer with at least an Intel i3 processor or an equivalent model to ensure smooth execution of the application. While the minimum RAM required is 4 GB, the recommended configuration is 8 GB or more, especially for handling database operations, image processing, and local testing. The system needs approximately 100 GB of free storage, although a 250 GB SSD is recommended to enable faster data retrieval and improved overall performance. The display resolution should be at least 1280 × 720, with 1920 × 1080 being ideal for comfortable use of the admin and user interfaces. Consistent internet connectivity is required for cloud updates, email notifications, and testing, but the system can still be developed and run completely on a local server environment for academic use.

Functional specifications

The functional specifications of the Plot Point system define the key operations performed by administrators and customers within the platform. The system enables secure user authentication, role-based access, and efficient management of plot information. Administrators can add, edit, verify, or remove property listings, monitor booking requests, manage user accounts, and generate reports for analysis. Customers can create accounts, browse available plots, search using filters, view detailed property descriptions, and complete online bookings with instant confirmation. The platform supports document handling, image uploads, booking history tracking, and a recommendation feature that suggests relevant plots based on user preferences. Additionally, automated notifications, personalized dashboards, and real-time updates ensure a streamlined workflow for all users. These functional components collectively enhance plot booking accuracy, transparency, and efficiency within the real estate management process.

System Architecture

The architecture of Plot Point follows a multi-tier design that separates the presentation, application, and data layers to ensure scalability, security, and efficient property management. At the presentation layer, the system provides user interfaces for both customers and administrators through responsive web pages built with HTML, CSS, and JavaScript frameworks. These interfaces allow users to search for properties, apply filters, make bookings, and access dashboards. The application layer is implemented using Node.js and Express, which handle the business logic of the system. This layer manages authentication, booking workflows, property management, and the recommendation engine.

It exposes RESTful APIs that enable communication between the frontend and the database, ensuring smooth data exchange and secure transactions. The data layer relies on MySQL or MongoDB to store structured information about users, property listings, bookings, and images. The database design ensures data integrity and supports real-time updates so that property availability is always accurate and duplicate bookings are prevented. Within this architecture, several core modules operate together. The

authentication module manages secure login and role-based access, while the property management module allows administrators to add, edit, and verify listings. The booking module processes customer requests and updates property status automatically, and the recommendation engine analyses user behaviour to suggest similar properties. An administrator dashboard provides real-time monitoring of bookings, property availability, and user activity, along with analytics for market trends. Data flows seamlessly across these layers: a customer logs in and searches for properties, the backend processes the query and retrieves results from the database, and the customer can then book a property online. The booking request is confirmed instantly, and administrators can monitor or approve it through their dashboard.

The recommendation engine continuously analyses user interactions to enhance property discovery. Security is maintained through SSL encryption, password hashing, role-based permissions, and audit logs, while scalability is achieved through modular design that allows future integration of mobile applications, blockchain-based document verification, and virtual reality property tours. This architecture ensures that Plot Point is not only efficient and reliable but also adaptable to future technological advancements and broader deployment across multiple regions.

Modules

The Plot Point system is divided into several functional modules, each responsible for a specific aspect of property management and booking. The Authentication Module manages secure login and registration for both customers and administrators, ensuring role-based access control and protecting user data through encryption. The Property Management Module allows administrators to add, edit, verify, and delete property listings, while customers can browse detailed descriptions and images of available plots. The Image Management Module supports the uploading, storage, and retrieval of property photographs, linking them to corresponding plot records to enhance the browsing experience. The Booking Module enables customers to reserve properties online, automatically updating availability to prevent duplicate reservations. Administrators can approve or cancel bookings, and customers receive instant confirmation through email notifications. The Recommendation Module analyses user preferences and browsing history to suggest similar properties, thereby improving engagement and decision-making. The Administrator Dashboard Module provides a centralized interface for monitoring system activity, generating reports, and managing user queries, ensuring transparency and efficiency in overall operations.

Database Design

The database design of Plot Point is structured to ensure efficient storage, retrieval, and management of property, user, and booking information. A relational schema was adopted to maintain data integrity and support real-time updates. The system consists of four primary tables: Users, Plots, Bookings, and Plot_Images.

- The Users table stores information about all registered customers and administrators, including user ID, name, email, password, and role.
- The Plots table maintains property details such as plot ID, location, size, price, description, and availability status. Each plot record is linked to images stored in the Plot_Images table, which contains image IDs, plot IDs, and file paths for property photographs.
- The Bookings table records all customer booking requests. It includes booking ID, user ID, plot ID, booking date, approval status, and cancellation details. Once a booking is confirmed, the corresponding plot status is updated to unavailable, preventing duplicate reservations.

The Users table is linked to Bookings through the user ID, while the Plots table is linked to both Bookings and Plot_Images through the plot ID. This relational design ensures consistency across modules and supports efficient queries for property search, booking management, and recommendation generation.

IV. RESULTS AND DISCUSSIONS

Testing methodology

The testing methodology for the Plot Point system was designed to ensure correct, secure, and efficient functioning across all user roles. It began with unit testing, where individual modules like login, plot management, booking, and document upload were tested separately to verify their logic. This was followed by integration testing to ensure smooth communication between the frontend, backend, and database.

After integration, system testing was conducted to evaluate the complete workflow, including authentication, plot browsing, booking, admin actions, and notifications under different scenarios using real-world data. User acceptance testing (UAT) was then performed with sample users to gather feedback on usability, navigation, and interface clarity.

Additionally, performance testing checked system speed and stability under multiple requests, while security testing ensured safe login, proper input validation, and protection against unauthorized access. Overall, this structured approach ensured the system's reliability, accuracy, and robustness before deployment.

Performance Results

The performance of Plot Point was evaluated through a series of functional, usability, and load tests to ensure reliability, responsiveness, and accuracy across all modules. The system was deployed in a controlled environment and tested with multiple user scenarios to simulate real-world usage. The system consistently responded to user interactions without noticeable delays, indicating efficient handling of backend processes and database operations. During testing, data retrieval, plot filtering, and booking validation were performed without interruptions, demonstrating the reliability of the system's logic and workflow. The platform also maintained stable behaviour when accessed by multiple users simultaneously, with no crashes or performance degradation. Overall, the results confirm that the Plot Point system delivers a stable, responsive, and user-friendly experience suitable for real-world real estate management environments.

System Advantages

The Plot Point system offers several advantages that enhance the efficiency and accuracy of real estate plot management. I t provides a centralized platform where all plot details, user the information, and booking data are organized systematically, reducing chances of manual errors and miscommunication. The system streamlines the booking process by providing real-time plot availability, ensuring transparency for both customers and administrators. Its digital document handling eliminates the need for physical paperwork and minimizes the risk of misplaced records. The user-friendly interface improves accessibility, making it easier for customers to explore plots and complete bookings with minimal effort. Administrators benefit from automated workflows that simplify verification, monitoring, and report generation. Additionally, the system enhances decision making by maintaining clear records and offering structured information that can be accessed quickly whenever needed.

Limitations and Challenges

Despite its effectiveness, the Plot Point system has certain limitations and challenges that may affect its performance in real-world scenarios. The system relies heavily on consistent internet connectivity, which may limit accessibility for users in areas with unstable networks. As the platform grows, managing larger datasets may require more advanced optimization techniques to maintain smooth performance. The system currently depends on manual data entry for plot information, which can introduce human errors if not verified carefully. Integration with external services, such as payment gateways or third-party property data platforms, remains limited and may require additional development effort. The system also lacks advanced security features such as multi-factor authentication,

which could enhance protection against unauthorized access.

Future Enhancements

The future scope of PLOT POINT focuses on expanding its usability, scalability, and intelligence to meet the evolving demands of the real estate market. One major enhancement planned for the future is the development of a dedicated mobile application for both Android and iOS platforms. This would allow users to conveniently access property listings, apply filters, and book properties directly through their smartphones. A mobile version would also help property owners and agents manage listings more efficiently, making the platform more versatile and accessible to a wider audience. Another significant improvement would be the integration of map-based property visualization. By linking property details with their geographical locations, users can easily identify nearby landmarks, facilities, and transport accessibility before making a decision. This enhancement would add more clarity and practicality to the property selection process, enabling users to visualize the surroundings and make well informed choices without needing to visit every site physically. Additionally, introducing automated verification of property data and a feedback or rating mechanism could enhance the credibility and trustworthiness of the platform. These improvements would strengthen the overall transparency and reliability of the system.

V. CONCLUSION

The project Plot Point provides a complete web-based property management and booking system. It simplifies property search, comparison, and booking through a centralized platform. The system improves transparency by updating property availability in real time. Duplicate bookings are prevented and confirmations are delivered instantly. The recommendation engine enhances user engagement with personalized suggestions. Administrators benefit from dashboards for monitoring and managing listings. Security is ensured through authentication, encryption, and role-based access control. Testing confirmed reliability, usability, and stable performance under moderate load. The modular design supports scalability and future enhancements. Overall, Plot Point bridges technology and real estate, delivering efficiency, trust, and convenience.

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