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Society Complaint Management System: A MERN Stack-Based Web Platform for Efficient Residential Community Management

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Abstract: ***This paper presents the design and implementation of a Society Complaint Management System, a web-based application developed using the MERN stack (MongoDB, Express.js, React.js, Node.js) to improve the efficiency and transparency of residential community management. Traditional housing societies rely heavily on manual methods such as registers, notice boards, and verbal communication, leading to delays, mismanagement, and lack of accountability.***
The proposed system introduces a centralized digital platform that enables residents to raise complaints, track their status in real-time, and receive updates through an interactive dashboard. Administrators are provided with role-based access to manage complaints, update their progress, publish notices, and handle permission requests. The system uses JWT-based authentication for secure login and ensures data integrity through structured database management.
The results demonstrate improved communication, reduced response time, and efficient handling of society operations. The system offers a scalable and user-friendly solution that supports the digital transformation of residential societies.
Keywords: Society Management System, Complaint Management, MERN Stack, JWT Authentication, Web Application, Residential Community
Keywords: MERN Stack, Agricultural Equipment Rental, Land Leasing, Cloudinary, HTML5 Geolocation, WebRTC, Smart Farming, Minimum Support Price, JWT Authentication, React.js

I. INTRODUCTION

Residential societies play a crucial role in urban living, housing a large population in organized communities. However, managing these societies efficiently remains a significant challenge due to reliance on outdated manual systems. Activities such as complaint handling, notice distribution, and communication between residents and administrators are often managed using paper-based methods.

These traditional approaches lead to inefficiencies such as delayed complaint resolution, lack of transparency, and poor record management. Residents are unable to track the status of their complaints, while administrators face difficulties in managing multiple tasks simultaneously.

To address these issues, this paper proposes a **Society Complaint Management System**, a centralized web-based platform built using the MERN stack. The system enables residents to submit complaints digitally and track their progress, while administrators can efficiently manage and resolve issues through a dedicated dashboard.

The proposed system enhances transparency, improves communication, and reduces manual workload, making society management more efficient and reliable.

II. LITERATURE REVIEW

A review of existing systems highlights several limitations in current society management solutions:

Sharma et al. (2022): developed a web-based housing society management system that focused on maintaining resident records and displaying notices. Their system improved record management but lacked a proper mechanism for complaint tracking and real-time updates. As a result, users were unable to monitor the status of their complaints effectively.

Patil et al. (2021): introduced a smart society management system using web technologies. Their work emphasized automation and digital communication; however, the system lacked role-based access control, which limited its usability for different types of users such as residents and administrators. Additionally, the complaint resolution process was not well-defined.

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Kumar et al. (2020): proposed a digital society management system aimed at improving efficiency through online operations. While the system reduced manual workload, it faced challenges related to scalability and user interface design. The lack of a user-friendly interface made it difficult for residents to interact with the system effectively.

Gupta et al. (2022): focused specifically on complaint management systems for residential societies. Their system allowed users to submit complaints digitally, but it did not provide real-time status updates or feedback mechanisms. This resulted in limited transparency and reduced user satisfaction

Jain and Mehta et al. (2019): explored e-governance applications in housing societies, highlighting the importance of digital platforms in improving administrative processes. Their study emphasized the need for centralized systems but did not provide a complete implementation model.

Jhoshi (2023): proposed a smart residential society automation system that integrates digital tools to manage daily operations. Their system focused on automation and ease of access but lacked a structured complaint lifecycle management process. The absence of proper status tracking made it difficult for users to monitor the progress of their requests.

TABLE I: COMPARATIVE ANALYSIS OF EXISTING SOCIETY MANAGEMENT PLATFORM

Feature	Patil 2022	Sharma 2022	Kumar 2020	Gupta 2022	Jain 2024	Anurag 2026
User management	Yes	Yes	Yes	Partial	Yes	Yes
Complaint submission	No	No	Yes	Yes	No	Yes
Real time update	No	No	No	No	No	Yes
Role base access	No	No	Partial	No	No	Yes
Notice management	No	Yes	No	No	Yes	Yes
Permission handling	No	No	No	No	No	Yes
Complaint tracking	No	No	Partial	Partial	No	Yes

III. PROBLEM STATEMENT

Traditional society management systems suffer from multiple challenges:

1) Inefficient Complaint Handling: In most residential societies, complaints are recorded manually in registers or communicated verbally to management. This process is highly unreliable, as complaints can be easily misplaced, ignored, or delayed. There is no structured mechanism to track the progress of complaints, leading to dissatisfaction among residents and inefficient issue resolution.

2) Lack of Transparency in Operations: Traditional systems do not provide visibility into administrative actions. Residents are often unaware of whether their complaints have been reviewed, assigned, or resolved. This lack of transparency creates mistrust between residents and society management and reduces accountability.

3) Poor Communication Channels: Communication in many societies is limited to physical notice boards or informal messaging, which often fails to reach all residents. Important announcements regarding maintenance, events, or emergencies may be missed, resulting in confusion and mismanagement. The absence of a real-time communication system further aggravates this issue.

4) Data Mismanagement and Record Maintenance Issues:: Manual record-keeping is prone to errors, data loss, and physical damage. Maintaining large volumes of records in paper form makes it difficult to retrieve information quickly. Additionally, there is no proper backup mechanism, which increases the risk of permanent data loss.

5) Lack of Real-Time Updates: Residents do not receive immediate updates regarding complaint status or administrative actions. This delay in information flow leads to poor coordination and inefficient decision-making. Real-time data synchronization is essential for effective management but is absent in traditional systems.
6) Limited Accountability and Monitoring: Without a digital system, it is difficult to assign responsibility for specific tasks or monitor the performance of administrators. There is no mechanism to track how long a complaint takes to be resolved or who is responsible for delays. This lack of accountability reduces overall efficiency.

IV. PROPOSED SYSTEM / METHODOLOGY

The management of residential societies continues to rely heavily on traditional manual processes, which introduce multiple inefficiencies and operational challenges. As urban populations grow and residential complexes become larger and more complex, the limitations of these outdated systems become increasingly evident.

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2) Lack of Transparency in Operations: Traditional systems do not provide visibility into administrative actions. Residents are often unaware of whether their complaints have been reviewed, assigned, or resolved. This lack of transparency creates mistrust between residents and society management and reduces accountability.
3) Absence of Role-Based Access Control: Most existing systems do not differentiate between different types of users such as residents and administrators. This lack of role-based access leads to security concerns and improper handling of sensitive information. A structured access control mechanism is necessary to ensure secure and efficient operations.
4) User Dashboard: Existing approaches often address individual problems such as complaint handling or notice management separately. However, there is no unified system that integrates all functionalities into a single platform. This forces users to rely on multiple disconnected processes, reducing overall efficiency.

V. SYSTEM ARCHITECTURE

The Society Complaint Management System is designed using a three-tier architecture model, which ensures separation of concerns, scalability, and efficient data handling. The architecture consists of three main layers: the Presentation Layer (Frontend), the Application Layer (Backend), and the Data Layer (Database). These layers interact with each other through well-defined interfaces to provide a seamless user experience.

A. Presentation Layer (Frontend)

The presentation layer is responsible for providing an interactive and user-friendly interface to the users. It is developed using React.js, which enables the creation of dynamic and responsive web pages.This layer allows users to interact with the system through various components such as login forms, dashboards, complaint submission forms, and notice boards. The frontend communicates with the backend through RESTful APIs to send user requests and retrieve data.

B. Backend (Application Logic Layer)

The application layer handles the core logic and processing of the system. It is developed using Node.js and Express.js, which provide a robust environment for building scalable server-side applications.This layer processes user requests received from the frontend, performs necessary operations, and sends appropriate responses. It also implements business logic such as complaint handling, status updates, authentication, and authorization.

C. Data Layer (Database)

The data layer is responsible for storing and managing all system data. The system uses MongoDB, a NoSQL database, which provides flexibility and scalability for handling large volumes of data.All information related to users, complaints, notices, and permissions is stored in the database. The database is structured using collections and documents, allowing efficient data retrieval and manipulation.

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VI. IMPLEMENTATION

The implementation is divided into multiple components, each responsible for a specific functionality. The integration of these components results in a fully functional and user-friendly system.

A. Frontend Implementation

The frontend of the system is developed using **React.js**, which provides a dynamic and responsive user interface. The application is designed using reusable components such as login forms, dashboards, complaint forms, and notice panels.React hooks and state management techniques are used to handle dynamic data and user interactions. The frontend communicates with the backend using RESTful APIs to fetch and update data in real time. Routing is implemented to enable seamless navigation between different pages of the application

B. Backend Implementation

The backend is developed using Node.js with the Express.js framework. It is responsible for handling all server-side operations, including request processing, business logic implementation, and API management.RESTful APIs are created to handle various operations such as user authentication, complaint submission, status updates, and notice management. Middleware functions are used to manage authentication, authorization, and error handling.JWT (JSON Web Token) is implemented to ensure secure user authentication. Each user is assigned a token upon successful login, which is used to access protected routes

C. Database Implementation

The system uses MongoDB as the database, which stores all application data in the form of collections and documents. Mongoose is used as an Object Data Modeling (ODM) library to define schemas and interact with the database.Separate collections are created for users, complaints, notices, and permission requests. Each collection is structured to ensure efficient data storage and retrieval. Relationships between data are maintained logically through references.

D. Security and Validation

Security is a critical aspect of the system implementation. Passwords are encrypted before storing them in the database, and JWT tokens are used for secure session management. Input validation is performed at both frontend and backend levels to prevent invalid or malicious data from entering the system. Protected routes ensure that only authorized users can access specific functionalities
Key security features include:

- Password encryption
- Token-based authentication
- Input validation and sanitization
- Protected API routes

E. Testing and Deployment

The system is tested using both manual and functional testing method to ensure reliability and performance. Test case are designed to verify all functionalities, including login, complaint submission, and status update. The application can be deployed on cloud platform such as Heroku or AWS, making it accessible from anywhere.

VII. RESULTS AND TESTING

Testing Methodology: The testing process was conducted in multiple stages to ensure the correctness and stability of the system. Initially, unit testing was performed on individual modules such as user authentication, complaint submission, and notice management. Each module was tested independently to verify its functionality. Following this, integration testing was carried out to ensure smooth interaction between the frontend, backend, and database components. System testing was then performed on the complete application to evaluate overall performance. Finally, user acceptance testing (UAT) was conducted with real users to confirm that the system meets practical requirements and is easy to use. Functional Testing: Functional testing was performed to verify that all features of the system operate according to the specified requirements. The system was tested with various input conditions, including both valid and invalid data. The results showed that users were able to log in successfully, submit complaints, track complaint status, view notices, and send permission requests without any issues.

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Error handling mechanisms were also tested, and the system displayed appropriate messages for incorrect inputs. This confirms that all core functionalities are working correctly and efficiently.

1) Usability Testing: Usability testing focused on assessing the ease of use and user experience of the system. The interface was found to be intuitive, well-structured, and easy to navigate. Users were able to perform tasks such as submitting complaints and accessing notices without requiring technical knowledge. The responsive design of the application ensured compatibility across different devices, including desktops and mobile devices. Overall, the system provides a smooth and user-friendly experience.

2) Security Testing: Security testing was performed to ensure that the system is protected against unauthorized access and potential threats. The implementation of JWT-based authentication provides secure user sessions, while encrypted passwords protect user credentials. Role-based access control ensures that users can only access features relevant to their roles. Additionally, input validation mechanisms prevent malicious data from being entered into the system. These measures collectively enhance the security and reliability of the application.

3) Results Analysis: The results obtained from testing indicate significant improvements over traditional society management systems. The system reduces the time required for complaint resolution and enhances transparency by providing real-time status updates. Communication between residents and administrators is improved through digital notices and notifications. The automation of processes reduces manual workload and minimizes errors. Users reported high satisfaction due to the system's efficiency, reliability, and ease of use.

Overall, the testing confirms that Society management system delivers on all core design objectives. The platform successfully all possible functions in any society.

VIII. CONCLUSIONS

The **Society** Complaint Management System has been successfully designed and implemented as a web-based solution to address the challenges associated with traditional residential society management. The system effectively digitizes key operations such as complaint handling, notice distribution, and communication between residents and administrators, thereby improving overall efficiency and transparency.

This project focused on developing a centralized platform using the MERN stack that enables residents to register complaints, track their status in real time, and access important notices. The system also provides administrators with tools to manage complaints, update their progress, and communicate effectively with residents. By integrating multiple functionalities into a single platform, the system eliminates the need for manual processes and reduces administrative workload.

The proposed system successfully achieves its primary objectives by providing a structured and efficient complaint management process. It ensures transparency by allowing users to monitor the status of their complaints and enhances communication through instant notice updates. The implementation of role-based access control improves security, while the use of modern web technologies ensures scalability and responsiveness. The system also demonstrates high performance and reliability during testing.

In conclusion, the society complaint management system represents a significant step toward the digital transformation of residential society management. by addressing the limitations of traditional systems and providing a comprehensive, user-friendly solution, the project contributes to improved efficiency, transparency, and user satisfaction. the system serves as a strong foundation for further enhancements and can be extended to include additional features in the future, making it a valuable tool for modern residential communities**.**

IX. FUTURE SCOPE

The Society Complaint Management System provides a strong digital foundation for managing residential communities efficiently. However, with the advancement of technology and increasing user expectations, there are several opportunities to enhance and expand the system in the future.

1) Mobile Application Development: In the future, the system can be extended by developing a dedicated mobile application for Android and iOS platforms. A mobile application will allow users to access the system more conveniently and perform activities such as submitting complaints, tracking their status, and viewing notices from anywhere. This enhancement will improve accessibility and increase user engagement by providing a seamless experience across devices.

2) Online Payment Integration: Another important enhancement is the integration of an online payment system for maintenance fees and other charges. This feature will allow residents to make secure payments directly through the platform and maintain a digital record of transactions. It will simplify financial management and reduce the dependency on manual payment methods.

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3) AI-Based Complaint Prioritization: The system can be further improved by incorporating Artificial Intelligence to analyze and prioritize complaints automatically. AI algorithms can classify complaints based on urgency and type, ensuring that critical issues are addressed first. This will enhance efficiency and optimize resource allocation within the society.

4) Enhanced Security Features: Security can be further strengthened by implementing advanced measures such as two-factor authentication and improved encryption techniques. These enhancements will protect user data and ensure secure access to the system, making it more reliable and trustworthy.

5) Integration with IoT Devices: The system can be integrated with Internet of Things (IoT) devices to create a smart society environment. Sensors and smart devices can automatically detect issues such as water leakage or power failures and generate complaints without user intervention. This will increase automation and improve response time.

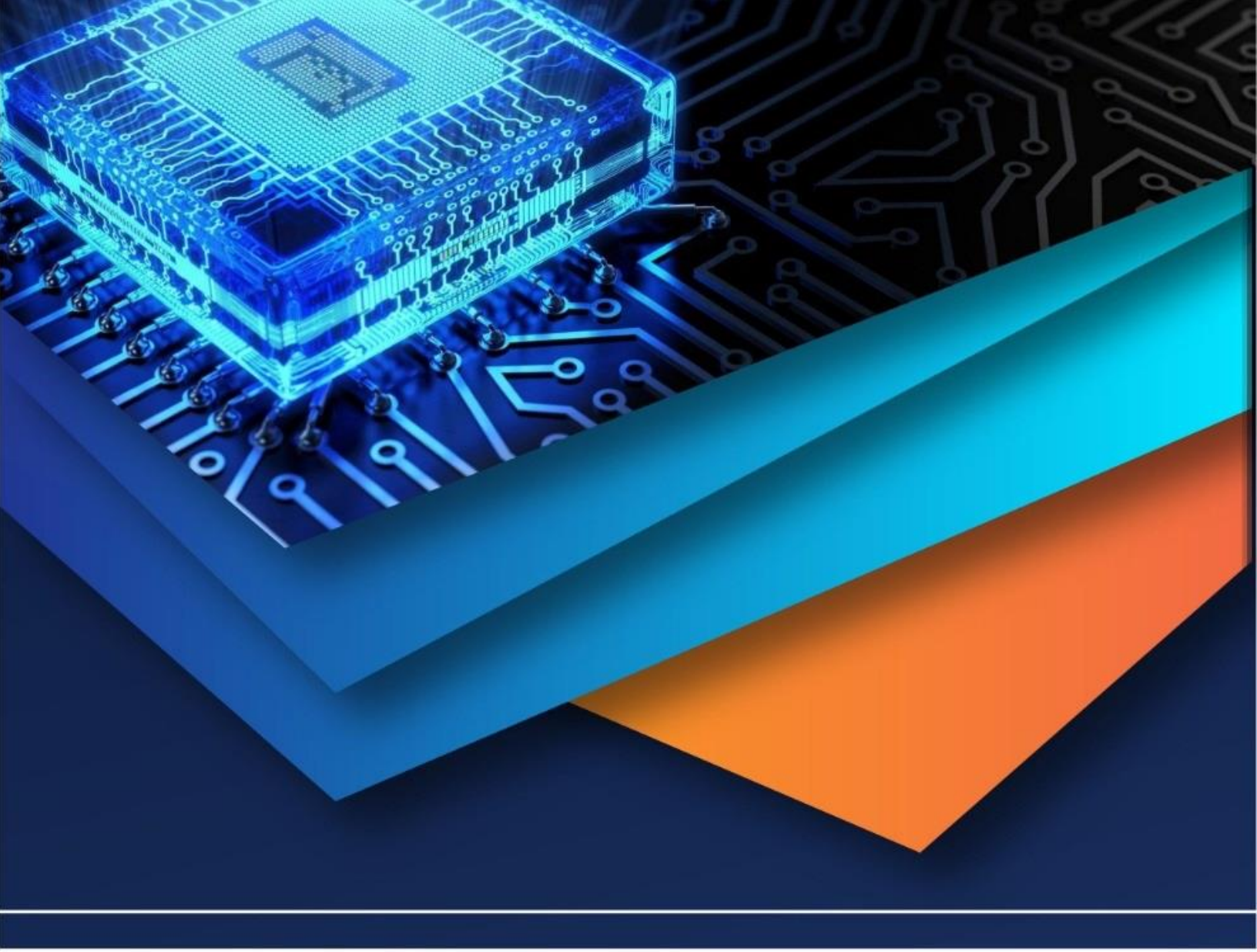
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