

Design and Development of a Web-Based RERA Compliance : Monitoring and Real Estate Transparency System Using Secure Database Architecture

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Abstract

Within this paper, the challenges associated with real estate data management, including information sources, lack of centralised access, and difficulties in verifying data related to real estate, are addressed. The current systems are scattered across various platforms, which makes it difficult for users to access reliable information. Within this research, a web-based system for compliance monitoring and real estate transparency is proposed using a secure cloud database system. The system is designed as a full-stack web application using various technologies such as HTML, CSS, JavaScript, PHP, and MySQL to enable efficient performance. The system is designed as a layered system consisting of a frontend, backend, and database layer. It is designed as a centralised system in which users can access information related to real estate and analyse it using a dashboard system. It is designed as a secure database system in which users can access reliable information. It is evident from the implementation of the system that the proposed system is efficient in terms of accessibility, accuracy, and usability of data related to real estate.

Keywords: web application, real estate system, compliance monitoring system, data security, dashboard analytics system, centralised system, MySQL, PHP



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1. INTRODUCTION

The present study focuses on the problems and advancements in the realm of real estate data management. Various challenges were observed within the real estate industry due to fragmented sources of data, unreliable data, and restricted access for users to validated projects. These problems have had a notable impact on decision making and user trust in the context of real estate business transactions [1,2].

The enactment of the Real Estate (Regulation and Development) Act, 2016, has resulted in the creation of a regulatory structure that has been beneficial for achieving greater transparency and accountability in the sector, and consequently, protecting consumers' rights through the adoption of a consistent regulatory framework. However, while recognizing this progress in regulation, I have noted that the accessibility and usability of the information on the sector have remained poor because of the dispersion of the real estate data [1,2].

For instance, in most cases, the real estate data is available on separate state portals and platforms that are not consistent with one another and therefore do not offer standardized real estate information to users. Users are compelled to look into numerous websites in search of real estate information, thus making their job very difficult. It seems that the lack of a consistent platform means

that although the data may be available, it is inaccessible and cannot be used by users in any useful manner.

Apart from the technologies used for websites, database management system software has also become critical for managing structured data efficiently. For instance, technologies such as MySQL offer efficient means of storing, accessing, and managing data while maintaining data consistency and integrity. Additionally, the use of cloud databases ensures that data management systems are scalable, secure, and easily accessible. From my understanding, integrating web technologies with secure database management systems can greatly enhance the performance of data management systems [2,3].

However, despite the advancement in digital technology, some problems remain prevalent in current digital platforms. The first limitation is that there is no integration between frontend and backend applications, leading to inefficiency in data processing and representation. Most digital platforms only consider the presentation aspect and ignore other functionalities such as real-time data verification and visualization. As a result, users may not derive maximum benefits from these platforms when making decisions.

The other problem is that there lacks a secure and robust database structure. From what I have been reading, it seems many systems do not utilize data validation, authentication, and access controls, thus making it more likely for such data to be manipulated and/or accessed by unauthorized individuals. It becomes quite hard to establish the authenticity of data when there is no reliable and secure environment to hold and store it [3,4].

The user interface experience is yet another factor that makes using real estate software much harder. Some platforms may lack visual and intuitive interfaces that will allow users to analyze large amounts of data effectively. Lack of dashboards and other visual tools means that users may find it difficult to make sense of all the data they have at their disposal.

In summary, it can be noted that this study emphasizes the need for the integration of web-based technology and database technology as an effective means of dealing with problems facing current real estate management databases. This proposed system attempts to solve problems such as information fragmentation, lack of integration and security issues and will help develop a real estate information management platform [1,3,4].

USER LAYER	AI ENGINE LAYER	DATA LAYER
Responsive Web UI	Recommendation Model	Multi-vendor Data
User Preferences	Deal Scoring System	REST API Integration
Mobile Friendly UI	Filtering Algorithm	SQL/NoSQL Database

2. Literature Review

Recent research indicates the importance of digital technology in enhancing the management, accessibility, and transparency of real estate data. I came across an article which states that although the rules and regulations have improved the level of accountability, the actual implementation is still in its early stages. Many studies emphasise the importance of web-based technology and database architecture in managing real estate data efficiently. But the current technology still faces many challenges, such as the lack of data integration and user experience. These challenges show the requirement for a centralised and secure technology that can efficiently integrate data management, data monitoring, and data visualisation [1, 2].

2.1. Impact of the Regulatory on Real Estate Systems

Research papers on the Real Estate (Regulation and Development) Act, 2016, show the significance of the act in the improvement of transparency and accountability in the real estate sector.

Pros: Strong regulatory control, reduction of fraud Cons: Focus is only on the legal aspects

Gap: Technical system implementation is not addressed

2.2. Digital Platforms in Data Accessibility

Research papers published on Google Scholar and ScienceDirect show the significance of digital platforms in the improvement of data accessibility.

Pros: Better access to data, improved user interface Cons: Limited integration with other platforms

Gap: No centralised platform is available

2.3. Web-Based Systems in Real Estate

Studies show the significance of the application of web-based systems in the improvement of the real estate sector.

Pros: Better access to data, improved interface Cons: Limited real-time data availability

Gap: No monitoring feature is included

2.4. Secure Database Architectures

Research papers show the significance of cloud databases and the importance of structured databases like MySQL.

Pros: Data integrity, security, and flexibility Cons: Implementation is complex

Gap: It is not integrated with the front end

2.5. Limitations of the Existing Systems

The current systems lack the following features:

Pros: Information availability

Cons: Data is inconsistent, and the interface is not user-friendly Gap: No unified platform is developed

3. Proposed System

3.1. System Overview

In this research, a web-based system for managing and monitoring real estate data is proposed with the aim of resolving issues associated with scattered data, inaccessibility, and unreliability of data [1,2]. The system will comprise a full-stack web system, which offers a platform for accessing, managing, and analysing real estate data.

The system will enable users to interact with a user-friendly interface through which they will be able to search, view, and analyse real estate data. The system will comprise a front-end, which will be implemented using HTML, CSS, and JavaScript, while the back-end will be implemented using PHP. The database will comprise MySQL with cloud support, which will enable efficient data storage, efficient data retrieval, and scalability of data [2,3]. The system will comprise a layered architecture, which will include a presentation layer, application layer, and data layer. The system will comprise a dashboard, which will enable interaction with the system, where users will be able to comprehend and interpret data effectively.

3.2. Problem Decomposition

The problem in the area of real estate data management has been decomposed in this research to ensure proper and efficient design and implementation of the proposed system, as stated in [1,3].

- Data Fragmentation: Information is scattered in many areas, and it becomes difficult to access and verify.
- Data Accessibility: It becomes difficult to access the relevant and updated information.

- **Data Reliability:** The lack of proper validation and verification results in incorrect information.
- **System Integration:** The lack of proper coordination between the frontend and backend leads to improper handling of data.
- **Data Security:** The lack of proper authentication and access control leads to improper handling.
- **User Interaction:** The lack of proper visualization tools results in an improper understanding of the data.

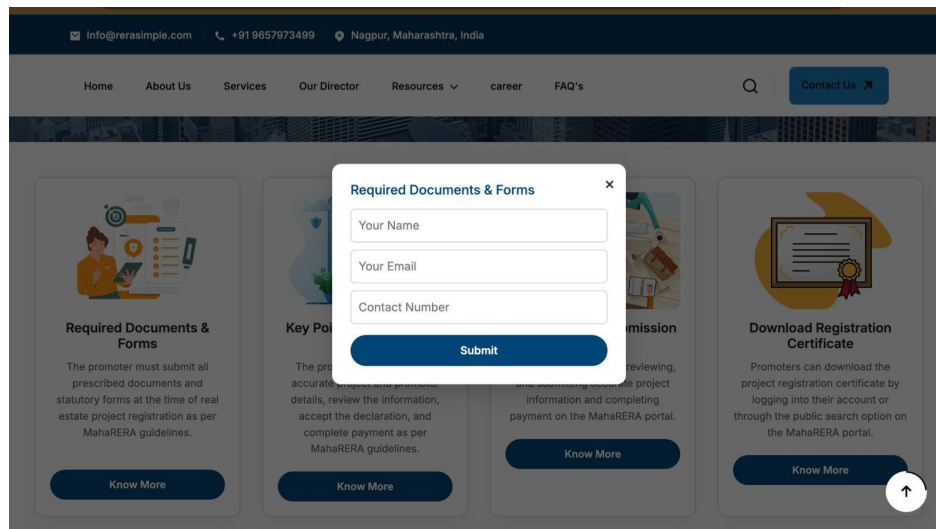
The proposed system deals with all these areas, and the problems in the area of real estate data management can be solved.

4. SYSTEM ARCHITECTURE & METHODOLOGY

4.1. Frontend Architecture

For this research, the frontend architecture has been designed using HTML, CSS, and JavaScript. The frontend acts as a presentation layer, and the user can interact with the system by performing actions like login, searching, and viewing the results in the form of dashboards.

The interface has been designed in a manner that the user can easily navigate and use the system. The interface uses forms to input data, and the dynamic content has been rendered using JavaScript. The design of the dashboard has been made in a manner that the data can be easily understood and used by the end-user. The frontend communicates with the backend by sending requests and displaying responses to the processed data. [1,2]

The image is a screenshot of a web application interface for MahaRERA. At the top, there is a dark blue header with contact information: 'Info@rerasimple.com', '+91 9657973499', and 'Nagpur, Maharashtra, India'. Below the header is a navigation bar with links: 'Home', 'About Us', 'Services', 'Our Director', 'Resources', 'career', 'FAQ's', and a 'Contact Us' button. The main content area features four cards: 'Required Documents & Forms', 'Key Points', 'Registration Process', and 'Download Registration Certificate'. A modal form titled 'Required Documents & Forms' is overlaid on the first card. The modal contains three input fields: 'Your Name', 'Your Email', and 'Contact Number', followed by a 'Submit' button. The background cards contain text and icons related to the registration process.

4.2. Backend Workflow

During the development of the present system backend, the PHP programming language is utilized. This language takes care of all server-side functionalities and data processing in the current study [1,2]. The backend is a vital aspect of the system, facilitating communication between the UI and the database. As soon as a user interacts with the system via form filling, property search, or application of various filters, the data is sent from the frontend to the PHP server for processing.

PHP server receives data from the frontend and processes it depending on the required tasks such as data validation, execution of certain business logic, and function handling. Prior to processing, the data undergoes validation procedures aimed at making sure the inputted data is reliable, complete, and safe. The implementation of validation is important to avoid various errors as well as to guarantee that the processed data will not damage the system in any way. For instance, some data may be entered deliberately in order to carry out an attack against the website, such as SQL injections.

Once the requests have been processed, the backend makes interactions with the MySQL database, which acts as the core data storage for the application [2,3]. Structured Query Language is used to fetch information or insert new entries into the database [2,3]. When the user signs up or signs into the application, for example, their credentials are stored and authenticated using database queries. Likewise, data related to properties, like their pictures, price, description, and other details are accessed from the database depending on the requests made by the users. Optimization of database interaction is done through appropriate indexing and structuring of queries.

Session handling and authentication are key components of the backend process. The PHP-based backend is responsible for session handling to keep track of activities made by the users, while authentication is used to limit the access only to authorized users. Such processes will be critical in limiting access to sensitive parts of the application.

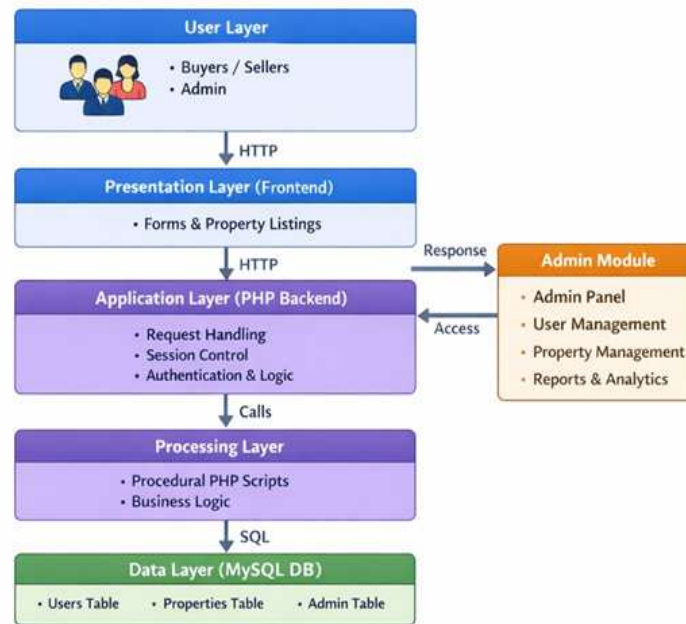
Error handling and logging are other aspects that make up the backend process. In situations where an error happens, for example, failed database connections, invalid inputs, or any issue that may arise from the server side, all these are logged by the backend system to help solve them effectively. On the other hand, user-friendly error messages are presented to the end-user in the front-end without disclosing sensitive information to ensure security and usability.

Modular programming is used in building the backend process to improve scalability and maintenance. The processes like user management, property management, search functionality, and authentication are split across different modules for ease of debugging and expansion purposes. API (Application Programming Interface) can also be used in order to connect one service to another and facilitate communication.

Furthermore, performance enhancement measures like caching may be used to decrease server load and increase speed. Caching involves storing frequently used data within cache memory, thus avoiding the frequent querying of data from the database. With this approach, performance can be significantly improved. The end-user will notice a reduction in the time taken by the system to perform operations.

After all the processes have been successfully completed at the backend level, the server sends the data to the frontend. The frontend displays the data to the user in an easy-to-read format. This process is made possible by the seamless flow of information between the frontend and backend systems.

On the whole, the backend workflow that was developed with the use of PHP and MySQL technologies is quite solid and reliable enough to serve as a basis for the proposed solution. In fact, this workflow facilitates efficient handling of data, secure interaction with users, and communication between various application components. All these factors make the backend workflow vital for the development of an efficient real estate management solution.

RERA RealtyVista – System Architecture**Problem Statement**

From the observations made in this research, it has been noted that there are many challenges in terms of data accessibility and reliability in the existing real estate data management systems. The existing systems have scattered data sources, and it becomes difficult to access reliable and verified information. The existing systems only offer basic information and do not have advanced features like centralized management, real-time data, and data verification. In addition, there is a lack of proper integration between the frontend and backend, which results in poor representation of data and inefficiency in the system. Another challenge that can be observed in these systems is related to security, which has not been addressed adequately in these systems.

Thus, there is a need to develop a centralized web-based system with a secure cloud-based database to ensure efficient data management, easy accessibility, and reliable information delivery.

Results and Discussion

The created web-based system was tested for its efficiency, usability, and functionality during the use with real estate information. This is a user-oriented tool which helps users find, store, process, manage, and analyze information related to real estate properties. It enables searching, viewing details, and interacting with the required data via a convenient dashboard.

Thus, the performance analysis shows that the created tool works effectively when processing data input by users. In particular, the system is successful in processing, storing, and retrieving up-to-date information. The structure and logic of the database used in the developed system are appropriate because they ensure consistency and accuracy of stored information. Users can search, find, and process any information without facing such problems as duplicated information or its inaccuracy as it is common for other real estate systems.

In the testing phase, it was noted that there were no issues navigating through the system. The user interface is well-designed, making navigation effortless for all types of users, including non-tech-savvy individuals. Functions like the search bar filter, categorized listing, and responsive design have added to the usability of the system. Moreover, the dashboard gives a brief summary of the status of properties available, helping the users gain insights into the features, pricing, and other information about the properties available.

From a technical standpoint, the use of technologies like HTML, CSS, JavaScript, PHP, and MySQL was integral to the development process of the website. It enabled the application to be scalable, efficient, and responsive enough to respond to multiple requests at once. The PHP backend effectively processed requests, and MySQL ensured data storage and extraction. Frontend and backend technologies were used together to facilitate smooth communication.

The system also shows great efficiency in response time and handling of data. Responses to the queries are received fast, and users are able to view the results immediately. This is made possible by efficient database querying and indexing. In addition, the system architecture is scalable, meaning that it will continue performing efficiently regardless of the number of added components or data.

The system has been developed with consideration of various security measures. Input validation, data security, and secure data transmission are among the security measures implemented in the system. Data transmitted across the system is safe because it has been encrypted using a database management system. Although the implemented system already has a decent security feature, there is more room for improvement in the area of security.

Regarding reliability, this system executes operations effectively without any errors. There are reliable error handling techniques in place, which help in managing any problem encountered. In addition,

suitable error messages are shown to the user, enhancing the experience of the user and preventing any system crash. The logging technique can also prove beneficial to the developers in case of any issue.

The above results discussion shows how this system enhances the accessibility and usability of information about real estate. The users do not have to depend on unstructured information from various sources. They can get information from one source and be assured of its validity. This is very important since the user is able to make correct decisions with the verified information.

The system also enables the user to make informed decisions because of the availability of accurate and real-time data. Analyzing the dashboard helps in making decisions. The user compares various properties and their pricing trend, helping him/her to make a well-informed decision.

Generally speaking, the created system proves itself to be more efficient, reliable, and user-friendly in handling real estate information. The use of contemporary web technologies, efficient database management, and user-oriented interface makes it effective. However, while fulfilling its present objectives well, the system may become even more beneficial and powerful in the future by introducing some enhancements.

Conclusion

The main problems involved in the use of real estate data, such as inadequate structure, poor accessibility, and data accuracy problems, have been critically discussed in this investigation. It is clear from the discussion that the problem lies in the fact that current systems use fragmented sources of information, which result in duplication, inconsistency and inability to access authentic data sources. Such systems lead to confusion on the part of the users. The findings clearly indicate that present-day systems are not adequate enough to provide a reliable platform for the management of real estate data [1,2].

This limitation in the present-day system has prompted the development of a compliant and transparent system through the use of current web technology. The system makes use of such web tools as HTML, CSS, JavaScript, PHP, and MySQL as well as a cloud database system to achieve its objective. The system integrates frontend and backend components efficiently as well as the database component to enable smooth interaction between different components. Such an integration greatly enhances the efficiency of the system [3,4].

The frontend of the system is created with the aim of developing an interactive user interface for ease of navigation through the system by users. The use of tools such as search, filters, and visualization allows users to get the required information fast and effectively. However, on the backend of the system, which is built on PHP, all server-side processes such as handling requests and communicating with the database are managed.

The database system of the project serves the purpose of ensuring consistency and integrity of data. MySQL is employed in the system to ensure proper validation, management, and data storage. Structured data management practices are used in the database to eliminate any instances of duplication. Also, through the cloud-based nature of the database, users are able to access data from anywhere securely.

One of the important findings in this study is that users can get access to the real estate data easily. They can get the data after verifying and organizing it from one platform. This means that the user will be able to get information quickly without going through several sources. Additionally, the system ensures that there is no risk of misinformation, which is one of the most common problems associated with real estate in traditional methods.

The system shows high performance because it is highly efficient and scalable. The system can handle multiple user requests at once without any noticeable delays. This means that users will not face any challenges in accessing information when using the system. Furthermore, there will be opportunities to upgrade the system in the future.

Security is yet another crucial issue covered in this study. Simple security systems that include such things as input validation, authentication, and data access control have been integrated into the application for ensuring safety of the stored user data. While the existing security system is quite efficient, there are some aspects that may be improved in the future through integration of various encryption algorithms and enhanced user authentication tools.

Alongside technological advancements, there are a number of aspects which improve user experience of working with this system. Specifically, the provided interface is quite user-friendly, and therefore people without sufficient technical skills will find it easy to use this application. Moreover, there is an additional dashboard option which improves comprehension of presented data.

Conclusion

Thus, it can be concluded that the system created during this research successfully solves the problems typical for existing systems designed for managing data related to real estate properties. It is a unified, reliable and efficient platform for storing and accessing property data. Implementation of such innovative technologies as the web and database management systems has greatly increased availability and reliability of property data.

This research proves that the development of a good-quality web-based system may play an important role in the real estate industry. Its further implementation and improvements may bring great benefits for all those interested in real estate data management.

References

1. "Overview of Real Estate (Regulation and Development) Act, 2016," VIIRJ Journal, 2023. Available: <https://www.viirj.org/vol11issue2/28.pdf>
2. "Web-Based Real Estate System and Data Management," IRJET, vol. 10, no. 3, 2023. Available: <https://www.irjet.net/archives/V10/I3/IRJET-V10I314.pdf>
3. "Database and Information Systems Based on Cloud Computing," IJSSER, 2024. Available: https://ijsser.org/2024files/ijsser_09_156.pdf
4. "Contemporary Legal Provisions for Consumer Protection in Real Estate," ACR Journal,

5. A. Silberschatz, H. Korth, and S. Sudarshan, Database System Concepts, 7th Edition, McGraw-Hill Education, 2019.
6. P. Deitel and H. Deitel, Internet & World Wide Web: How To Program, 5th Edition, Pearson Education, Inc., 2012.
7. M. Fowler, Patterns of Enterprise Application Architecture, Addison-Wesley Professional, 2002.
8. M. L. Scott, Programming Language Pragmatics, Morgan Kaufmann Publishers, 2015.
9. R. Pressman, Software Engineering: A Practitioner's Approach, 8th Edition, McGraw-Hill, 2014.
10. A. Tanenbaum and H. Bos, Modern Operating Systems, 4th Edition