Design and Implementation of A Web-Based Lodge Leasing System (A Case Study of Student Lodges at Unwana Community)

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Abstract

This paper presents the design, implementation, and evaluation of the Lodge Leasing System, a web-based platform developed to address the inefficiencies and security challenges in the student accommodation market. The traditional process of securing lodging is often fragmented and vulnerable to fraud, lacking a centralized, trustworthy channel for communication between students and landlords. The Lodge Leasing System aims to solve this problem by providing a secure, transparent, and user-friendly online marketplace. The system's core functionalities include a multi-role structure for students, landlords, and administrators; a robust administrative verification process forboth landlords and their property listings; and a secure, streamlined communication channel. Students are empowered with advanced search capabilities and interactive features such as commenting and liking lodges, while landlords can effectively manage and market their properties. The system is built using Python and the Django framework with a MySQL database. Through rigorous testing, the system's security, performance, and usability were validated, demonstrating its potential to significantly improve the efficiency and security of the student housing process. This work concludes that the Lodge Leasing System successfully provides a modern digital solution to a persistent real-world problem, offering a valuable contribution to the field of information systems and web application development.

Keywords: Application development, Framework, Lodge, Leasing System, Web-based,

1.0 Introduction

A hostel or a dormitory could be defined as a property that provides short-term, shared accommodation for individual travelers or students [8]. While hostel management is the process of managing the activities in the hostel involving room information, room allocation, fees details, and room occupants' information [9]. Apart from the hostels provided by schools for their students, in communities hosting these higher institutions of learning, designated students residents are also referred to as hostels.

The exponential growth of student enrollment in higher education institutions has created a significant demand for off-campus accommodation. However, the traditional process of securing lodging is often fraught with challenges, including the prevalence of fraudulent listings, opaque pricing, unreliable landlords, and a general lack of a centralized, trustworthy platform. Students frequently rely on informal networks, local agents, or outdated classifieds, which can lead to insecurity and exploitation. Furthermore, landlords face difficulties in reaching a wide audience of potential tenants and managing their properties efficiently. There is a pressing need for a modern,

digital solution that centralizes the accommodation search, streamlines communication, and establishes a robust verification process for all stakeholders. The Lodge Leasing System is proposed as a web-based platform to address these critical inefficiencies, providing a secure, transparent, and user-friendly environment for students and landlords.

The primary objectives of this study are to: develop and implement a web-based Lodge Leasing System that serves as a centralized platform for student accommodation; design a comprehensive and secure verification process for both landlords and their properties; establish a transparent and efficient communication channel between students and landlords; provide students with a robust search functionality and tools for interactive engagement (e.g., commenting, liking); and enhance the overall security, efficiency, and user experience for all system stakeholders.

The scope of this study is focused on student accommodation. Its core functionalities including user registration (for students and landlords), an administrative verification module for landlords and their listed properties, a sophisticated

search and filtering system for students, and a secure internal communication channel. User engagement features, such as commenting and liking/disliking lodges, are also within scope. The system will be designed with a responsive interface to ensure accessibility across various devices. The project will not cover direct payment processing, legal contract generation, or advanced analytics beyond basic reportingThis article is structured into five seections. Section 1 provides the introduction, problem statement, objectives, and scope. Section 2 presents a literature review of related works and technologies. Section 3 details the system analysis and design, including use case models and the system flowchart. Section 4 covers system implementation, hardware/software requirements, and the testing process. Finally, Section 5 concludes the study with a summary, final conclusions, and recommendations for future work.

2.0 Literature Review

Over the centuries, leases have served many purposes and the nature of legal regulation has varied according to those purpose and the social economic conditions of the times. Leases, for example were mainly used for agricultural purposes until the late 18th century and early 19th century when the growth of cities in industrialized countries made leases in important form of landholding in urban area. The modern law of landlord and tenant in common law jurisdictions retains the influence of the common law and particularly, the Laisez-Faire philosophy that dominated the law of contract and property law in the 19th century. With the growth of consumerism, consumer protection legislation recognized that common law principles, which assume equal bargaining power between the contracting parties, creating hardships when that assumption is in accordance [10]

Twin Brothers, Nelson and Norman Lechouts, founded home leasing in 1968 for more than 25 years, Nelson and Norman grew home leasing corporation into a substantial real estate business with a diversified apartmentsand commercial properties. After years of success, Nelson and Norman formed home properties, which became a public company in1994 and is traded on the New York Stock Exchange under the symbol HME. During that time the company grew to have more than50,000 rental apartments in 12 states, including 10,000 affordable apartments for1994

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until 2005, Nelson and Norman saved as joint CED's of Home Properties [11].

In 2004, Home properties transitioned its affordable housing and commercial real estate back to Nelson and Norman. In 2006, Home leasing shift the affordable housing and commercial business, with Norman's family formed Broadstone Real Estate and taking over all commercial properties, while Nelson family formed Home leasing, LLC, and took over the affordable housing and community development segments of the business. Today, there is three generations family on the home leasing term. Folger (2017) identified some of the challenges of home leasing to include unexpected maintenance where emergency fix which cost more is preferred to the less costlier routine maintenance; absence of bookkeeping system; property damages by residents; and the attitude of late or none payment of rent by some tenants. Some of the common computer-based home leasing system today include Craigslist (TerynnBoulton, 2017), Oodlei (Jeremy,2005). Zillow (Jim , 2007), Rentals.com (Boeing, 2016), and Pad mapper (Wendy, 2006),

3.0 System Analysis and Design

The development of the Lodge Leasing System is fundamentally guided by the Client-Server Model, a distributed computing architecture where clients (e.g., web browsers) request services from a server that The development of the Lodge Leasing System is fundamentally guided by the Client-Server Model, a distributed computing architecture where clients (e.g., web browsers) request services from a server that provides them. This model is ideal for web applications as it separates the presentation logic from the business logic and data management, enhancing scalability and security. Furthermore, the development process adheres to the principles of Agile Software Development, an iterative approach that prioritizes flexibility, collaboration, and continuous delivery of working software. This methodology allows the project to respond effectively to evolving requirements and user feedback. The system's relational database design is based on the principles of Database Normalization, a process that structures data to reduce redundancy and improve data integrity. An analysis of the current market reveals that while numerous property listing websites exist, many fail to meet the specific needs of the student demographic. A common weakness is the lack of a robust verification process, which leaves users

susceptible to fraudulent listings and scams [4]. The Lodge Leasing System addresses this critical security gap by integrating a mandatory administrative verification step for both landlords and their properties, a feature that distinguishes it from susceptible to fraudulent listings and scams [4]. The Lodge Leasing System addresses this critical security gap by integrating a mandatory administrative verification step for both landlords and their properties, a feature that distinguishes it from The system is developed using Python and the Django web framework. Django was chosen for its high-level, "batteries-included" philosophy, which accelerates development and includes built-in security features that protect against common web vulnerabilities like SQL injection and cross-site scripting (XSS) [6]. The framework's Object-Relational Mapper (ORM) simplifies database interactions, and its automated admin development time [7]. The MySQL database management system was selected for its reliability, performance, and scalability, making it a suitable choice for a transactional system that demands high data integrity. Frontend development is built on standard HTML, CSS, and JavaScript to ensure a responsive and accessible user interface across all devices. The system's high-level model (see Figure 1), represented by a

Use Case Diagram, identifies the primary actors—the Landlord, , Student, and Admin—and the key functions they perform. The diagram

illustrates how a Landlord can `` register, login, and upload house, while a Student can register, login, search house, and view lodges. The Admin actor plays a crucial role in verifying landlords and approving all content, ensuring the integrity of the platform.
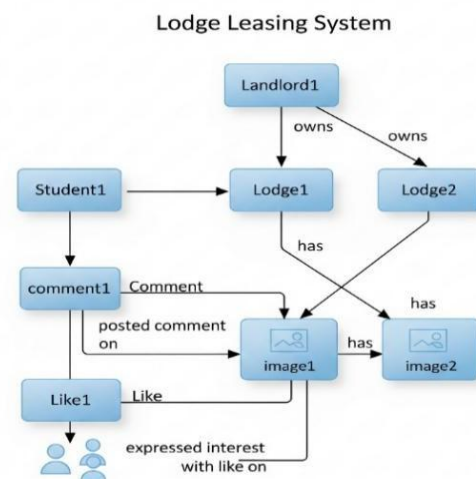

Figure 1: The high-level model of the proposed system (source: author)

The functional requirements of the proposed system include the user management; the verification module; the lodge management; the lodge search; and the interaction module. The user management allows for user registration, login, and profile management for all three user types; the verification module is used by an

administrator to review and approve landlord registrations and lodge listings; the lodge management allows the landlords to upload, edit, and delete lodge listings, including descriptions, prices, locations, and images; the lodge search module is used by students to search and filter lodges based on criteria such as price, location, and amenities; and the interaction module enables students to view detailed lodge information, communicate directly with landlords, and leave comments or express likes/dislikes on listings.

For the non-functional requirements, we have the security module, the performance module, and the usability module. The security module provides protection for user data through measures like password hashing, role-based access control, and HTTPS encryption; the performance module handles concurrent user traffic without significant degradation in response time; the usability module provides intuitive, easy to navigate, and responsive user interface across different devices.

The system flowchart (see Figure 2) provides a detailed, step-by-step visual representation of the system's processes, starting from the landing page to user interactions. A key aspect of the flowchart is the explicit dependency of lodge visibility on administrative approval. The process begins with a user accessing the

landing page and choosing to either register or log in. Landlord registration requires the upload of verification documents. These documents are then reviewed by an Admin. Only upon Admin approval is the landlord given access to the lodge upload page. When a landlord uploads a lodge, it is flagged as pending. The Admin must review and approve the lodge before it becomes visible to any student. A student, once logged in, can view only the approved and visible lodges. They can then view full details, comment on the property, like or dislike it, and communicate with the landlord.
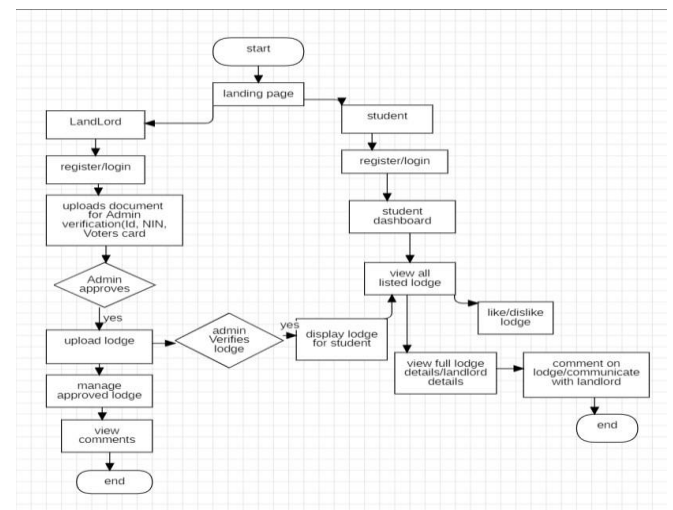

Figure 2. System flowchart of the proposed system (source: author)

Section 4: System Implementation and Testing

The proposed system was implemented on a computer system

with: 8 GB RAM and a 2.5 GHz multi-core processor to handle concurrent user requests efficiently; a 250 GB Solid State Drive (SSD) is for faster data access and database operations; an Internet modern device with a web browser; and a software stack including Linux Operating system, Python (3.8+), the Django framework, and MySQL.

To test the new system, we used a test plan and a set of test data. The test plan involved the used of Selenium WebDriver and Pytes for both functional testing and backend unit and integration testing, respectively; while the included a wide range of test data, including valid, invalid, and boundary cases, is used to rigorously test each system component. JMeter was used as a performance evaluation tool to simulate user load and evaluate the system's performance, measuring key metrics like response time and throughput.

The new system integrates the use of password; Role-Based Access Control (RBAC) and cryptography as its security measures

5.0 Conclusion

The Lodge Leasing System was developed to provide a centralized, secure, and efficient platform for student accommodation. The system successfully addresses the key problems of decentralization and security by implementing a robust administrative verification process and a structured communication channel. Through a phased approach, the system was designed, implemented, and rigorously tested to meet its functional and non-functional requirements. The Lodge Leasing System successfully meets all the stated objectives. It provides a reliable platform for students to find and engage with verified lodges and for landlords to manage their properties effectively. The integration of security measures and a systematic testing process ensures the system's quality and dependability. The project's success validates the feasibility of using a modern web application to solve the persistent challenges in the student housing market. This study recommends the integration payment gateway, mobile application; rating review, and advance analytics for future enhancements of the new system.
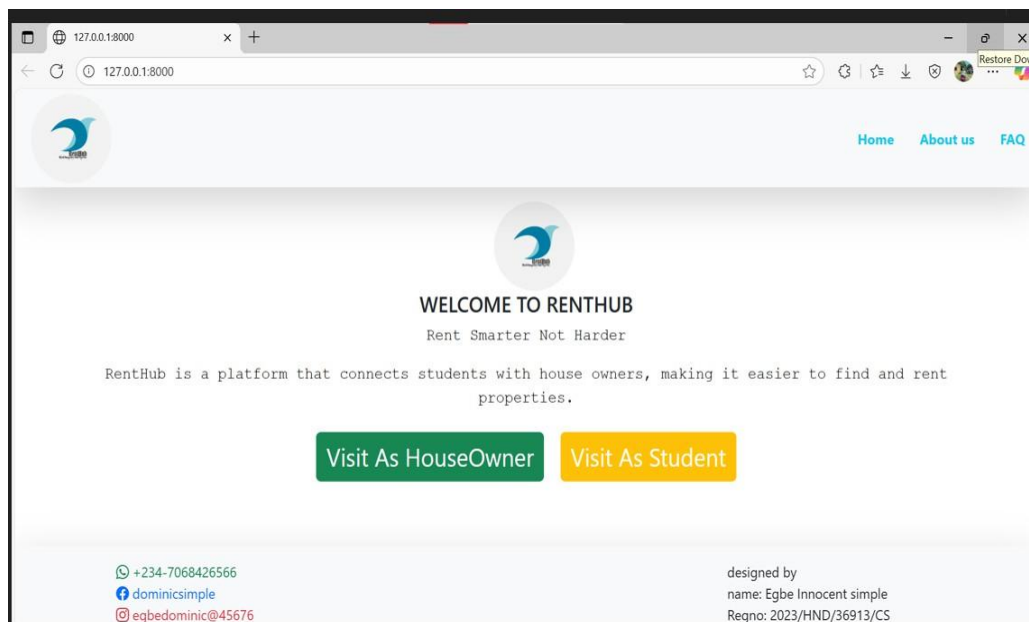
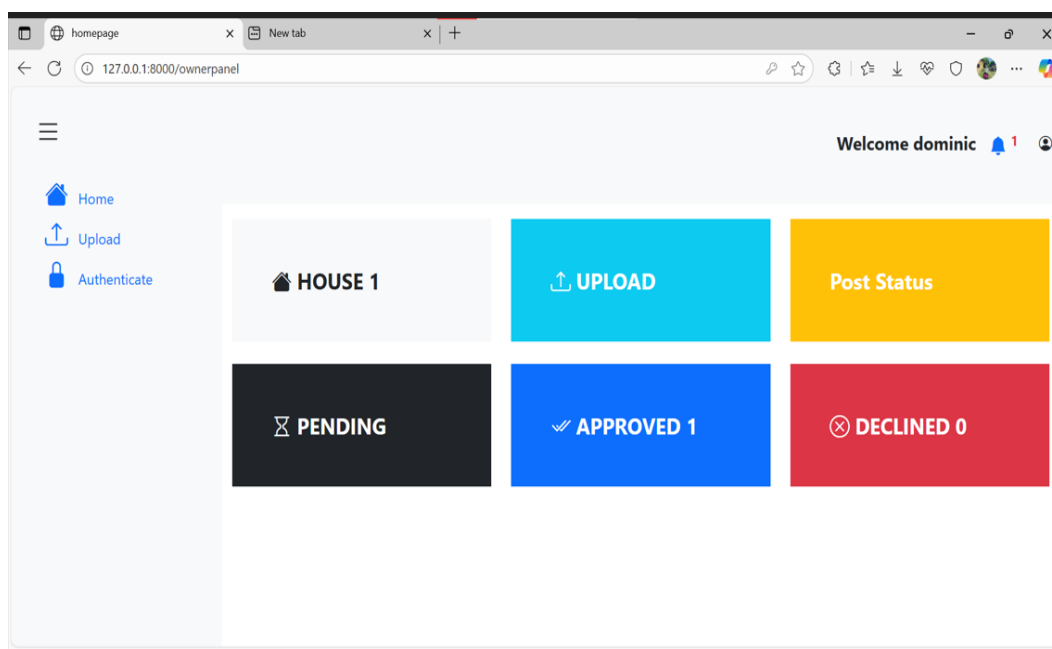**Figure 3: Home page of the new system (source: author)**

Figure 3: Admin dashboard page of the new system (source: author)

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