ADDIS ABABA SCIENCE AND TECHNOLOGY UNIVERSITY
COLLEGE OF ENGINEERING

INTERNET PROGRAMMING I

DOCUMENTATION
DESIGNING OF ADAPTIVE HOME RENTING SYSTEM

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INTRODUCTION

Background of the Organization

For this project, our team has developed a small-scale real estate service platform called "EthiHome Services". This platform is designed to help local Ethiopians rent and buy houses more efficiently. Although it is a class project, it simulates a real organization providing a valuable service to the community.

The project team consists of six members, each taking a specific role to ensure smooth development and operation of the system. These roles include project manager, developer, designer, database manager, and two testers/support personnel. Together, the team aims to build a system that organizes property listings, tracks client requests, and provides an easy way for users to search and manage rental and purchase options. Currently, most housing transactions and information sharing in the local community are handled manually or informally, which can be slow, inaccurate, and prone to errors. EthiHome Services intends to solve these problems by providing a computerized platform that makes house searching, listing, and client management fast, accurate, and user-friendly.

General Description of the Existing System

In Ethiopia, individuals seeking houses to rent or buy often rely on a combination of online property platforms and traditional informal methods. Among the popular online platforms are Jiji Ethiopia(https://jiji.com.et/real-estate),EthiopiaPropertyCentre (https://ethiopiapropertycentre.com/), and RealEthio (https://realethio.com/). Jiji Ethiopia serves as a large classifieds platform where property owners can list houses for sale and rent. Users can search listings based on location, price, and type of property. While it provides a broad selection, the platform faces challenges such as outdated listings and occasional confusion between properties for sale and those for rent. EthiopiaPropertyCentre offers a more specialized marketplace for both house rentals and sales, providing detailed listings in major cities such as Addis Ababa. The platform allows users to filter searches according to their preferences, but not all listings are regularly updated, and some property information may be incomplete.

RealEthio focuses on houses and apartments available for sale and rent, primarily in Addis Ababa. It provides categorized sections for houses for rent and houses for sale, making it easier for users to navigate. However, similar to other platforms, occasional inconsistencies in listing updates and incomplete information reduce its overall efficiency.

Context

Background Information

In Ethiopia, housing transactions traditionally depend on informal networks such as word of mouth, local brokers, handwritten posters, and phone calls. While these methods have been used for decades, they are increasingly inadequate in today's fast-paced and urbanized society. Property seekers often spend weeks or even months searching for suitable houses, frequently encountering outdated information, unavailable properties, or misleading listings.

In recent years, several online platforms such as **Jiji Ethiopia**, **EthiopiaPropertyCentre**, and **RealEthio** have attempted to digitize the housing market. While these platforms provide some level of convenience, they suffer from several limitations, including lack of verification, outdated listings, poor rental focus, and limited user interaction tools.

Environment of the System

The RentSmart system is intended to operate in an environment characterized by:

- Mixed levels of digital literacy among users
- Moderate and sometimes unstable internet connectivity
- High demand for affordable rental housing
- Strong reliance on trust and verification in transactions

The system is therefore designed to be lightweight, user-friendly, and accessible through standard web browsers without requiring advanced technical skills.

Motivation

Despite the availability of these digital platforms, a significant portion of property transactions still occurs through manual or informal channels, including word of mouth, local bulletin boards, and

phone calls to agents or property owners. This combination of manual and digital approaches results in fragmented information, difficulty in tracking properties, and delays in connecting clients with property owners.

The main users of the current systems include property seekers, property owners, and agents facilitating transactions. While online platforms provide convenience and wider reach, the lack of centralized, accurate, and timely data highlights the need for a more comprehensive and reliable system that can effectively manage both house rentals and sales.

Objective of the Project

General Objective

The general objective of the RentSmart project is to design and develop a centralized, secure, and reliable web-based system that facilitates efficient renting and buying of residential houses while improving transparency, accuracy, and user satisfaction.

Specific Objectives

The specific objectives of the system include:

- To automate the recording and management of house listings with complete and accurate information
- To enable property seekers to search and filter houses based on location, price, type, and availability
- To provide an integrated inquiry and messaging system between property seekers and owners
- To ensure verification of property listings through administrative control
- To generate real-time reports for monitoring listings and user activities
- To enhance data security and privacy through authentication and access control
- To reduce the overall time and effort required in the housing search process

Corresponding Requirements

Objective	Supporting Requirement
Accurate listings	Admin verification of properties
Efficient searching	Advanced search and filtering
Inquiry tracking	Messaging and inquiry system
Reporting	Real-time reporting module
Security	Authentication and access control
Efficiency	Automated listing and inquiry workflows

Functional Requirements

The RentSmart system shall provide the following functional requirements:

1. The system shall allow users to register and log in securely.
2. The system shall allow property owners to add new property listings.
3. The system shall allow property owners to update existing listings.
4. The system shall allow property owners to delete listings when properties are no longer available.
5. The system shall allow property seekers to search properties by location.
6. The system shall allow filtering by price range and property type.
7. The system shall allow property seekers to send inquiries to owners.
8. The system shall notify owners of new inquiries.
9. The system shall allow administrators to verify or reject listings.
10. The system shall allow users to submit reviews and ratings.
11. The system shall generate reports for administrators.
12. The system shall maintain logs of user activities for monitoring.

Significance of the System

The RentSmart Home Renting System plays a significant role in improving the overall housing rental and sales process in Ethiopia by introducing a structured, reliable, and technology-driven approach. One of the major contributions of the system is the enhancement of **transparency in housing transactions**. In the existing environment, property seekers often face uncertainty regarding the availability, authenticity, and condition of houses due to outdated or misleading information. RentSmart addresses this issue by ensuring that all property listings are clearly presented, regularly updated, and verified by system administrators before being made visible to users. This transparency reduces misinformation and builds confidence among users.

Another important significance of the system is the establishment of **trust through verified listings**. Trust is a critical factor in housing transactions, especially in environments where informal agreements are common. RentSmart introduces an administrative verification mechanism that confirms the legitimacy of property listings and property owners. This reduces the risk of fraud, fake advertisements, and exploitation of property seekers. As a result, users are more likely to rely on the system as a trusted platform for housing decisions.

The system also greatly improves **efficiency in property search and management**. Traditionally, searching for a house involves visiting multiple locations, making repeated phone calls, or browsing several unrelated online platforms. RentSmart centralizes this process by providing advanced search and filtering options that allow users to quickly find houses that match their preferences, such as location, price range, and availability. Property owners also benefit from efficient management tools that enable them to update listings, respond to inquiries, and monitor interest in their properties without unnecessary delays.

In addition, RentSmart enhances **data accuracy and security**. Accurate data management ensures that users access reliable information, while strong security measures protect sensitive user details such as contact information and login credentials. By implementing authentication, authorization, and controlled access, the system safeguards user data and ensures privacy. Overall, RentSmart contributes significantly to the modernization of housing services in Ethiopia by replacing inefficient manual practices with a secure, transparent, and efficient digital solution.

Beneficiaries of the System

The RentSmart system benefits multiple stakeholders involved in the housing rental and sales process, each in different but interconnected ways.

Property Seekers

Property seekers are among the primary beneficiaries of the system. RentSmart provides them with a faster, safer, and more convenient way to search for houses. Instead of relying on unreliable word-of-mouth information or visiting multiple physical locations, users can access verified listings from anywhere with internet access. The system reduces the risk of scams and wasted time by presenting only approved properties, allowing seekers to make informed decisions with confidence.

Property Owners

Property owners benefit from increased visibility and improved property management. RentSmart enables owners to reach a wider audience without the need for intermediaries or informal brokers. The platform allows them to manage multiple listings, update availability in real time, and respond to inquiries efficiently. This improves occupancy rates and helps owners make better decisions based on user interest and demand patterns.

Administrators

System administrators benefit from centralized monitoring and control. Through the admin interface, administrators can verify listings, manage users, monitor system activity, and generate reports. This centralized oversight ensures data integrity, platform reliability, and consistent enforcement of system policies.

Local Community

The broader local community also benefits from the system. By improving the efficiency and transparency of housing transactions, RentSmart contributes to a more organized housing market. This supports urban development, reduces conflicts related to housing misinformation, and promotes trust between property owners and renters, ultimately improving social and economic stability.

Feasibility Analysis

Technical Feasibility

From a technical perspective, the RentSmart system is highly feasible. The system is developed using widely adopted and well-supported technologies such as **HTML, CSS, JavaScript, PHP, and MySQL**. These technologies are suitable for web-based applications and are capable of handling the required system functionalities, including data storage, user authentication, and real-time interactions. Development tools such as **Visual Studio Code and GitHub** further support efficient coding, version control, and collaboration. Additionally, the project team possesses sufficient technical knowledge and experience with these technologies, making implementation realistic and achievable.

Economic Feasibility

Economically, the system is feasible due to its low development and operational costs. Most of the tools and technologies used are open-source or freely available, which minimizes financial expenditure. Since the development is carried out by students as part of an academic project, labor costs are negligible. When compared to the long-term benefits—such as reduced time spent searching for housing, increased efficiency, and improved service quality—the costs involved are minimal. Therefore, the benefits clearly outweigh the expenses.

Operational Feasibility

Operational feasibility is ensured through the system's user-friendly design and practical functionality. RentSmart is designed to be intuitive, requiring minimal training for users. The system aligns closely with real user needs by addressing common problems such as outdated listings, lack of verification, and poor communication. As a result, users are likely to accept and adopt the system easily, making it highly operationally feasible.

Use Case of the Existing System

Actors

- Property Seeker
- Property Owner
- Agent

Main Activities

In the existing system, property seekers manually search for houses by walking through neighborhoods, contacting agents, or browsing unverified online platforms. Communication is primarily phone-based, and there is no structured process for tracking inquiries or property availability. Online browsing, when used, often involves platforms with incomplete or outdated information.

Problems and Limitations of the Existing System

The existing system suffers from several major limitations. One of the most common problems is **outdated listings**, where advertised properties are no longer available. There is also **no verification mechanism**, which exposes users to fraudulent listings. Communication tools are poor and unstructured, making follow-ups difficult. Additionally, there is **no reporting or tracking system**, preventing effective monitoring of property demand. Security and privacy risks are also significant, as personal contact information is often publicly shared.

Use Case of the Proposed System

Actors

- Property Seeker
- Property Owner
- Administrator

Improvements

The proposed RentSmart system introduces verified listings, integrated messaging, centralized data management, and secure authentication. Property seekers can search confidently, owners can manage properties efficiently, and administrators ensure system integrity. The inclusion of reviews and ratings further enhances trust and transparency.

Featured Products (Adaptive Features)

The RentSmart Home Renting System incorporates a set of **adaptive features** designed to enhance user experience, improve decision-making, and increase overall system efficiency. These adaptive features enable the system to respond dynamically to user behavior, preferences, and usage patterns rather than providing static and generalized information to all users. By leveraging adaptive mechanisms, RentSmart ensures that users receive relevant, personalized, and timely property information that aligns closely with their specific housing needs.

One of the core adaptive features of RentSmart is the **personalized property recommendation system**. This feature analyzes user search behavior, such as preferred locations, price ranges, property types, and frequency of searches, to generate customized property suggestions. For instance, if a property seeker consistently searches for rental houses within a specific city or neighborhood and within a particular budget range, the system prioritizes and recommends similar properties in subsequent sessions. This personalization reduces unnecessary browsing and significantly improves the efficiency of the house-searching process.

Another important adaptive feature is **location- and budget-based suggestion filtering**. The system automatically adjusts displayed results based on the user's previously selected geographic areas and financial constraints. For example, a user who frequently searches for affordable rental houses in a specific district will primarily see listings within that district and price range. This feature minimizes irrelevant results and allows users to focus on properties that realistically match their needs, saving both time and effort.

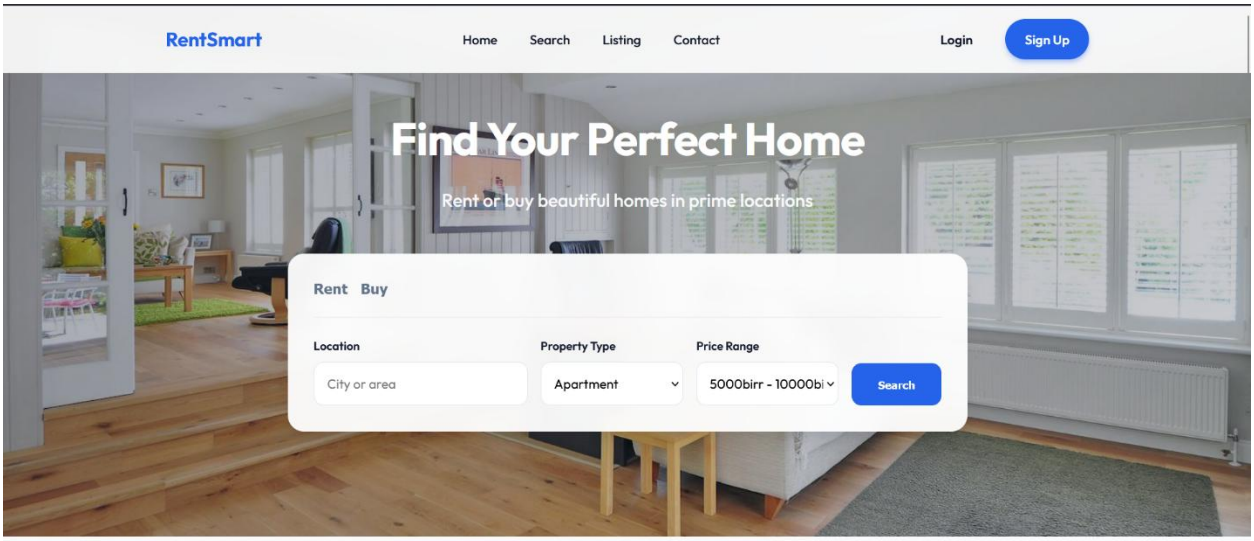
RentSmart also includes **adaptive filtering mechanisms** that enhance search efficiency. Instead of requiring users to repeatedly apply the same filters, the system remembers commonly used filters and applies them automatically where appropriate. This intelligent filtering improves usability, particularly for users with limited technical experience, and ensures a smoother interaction with the platform. Adaptive filtering also helps manage large volumes of property listings by prioritizing the most relevant results at the top of search outputs.

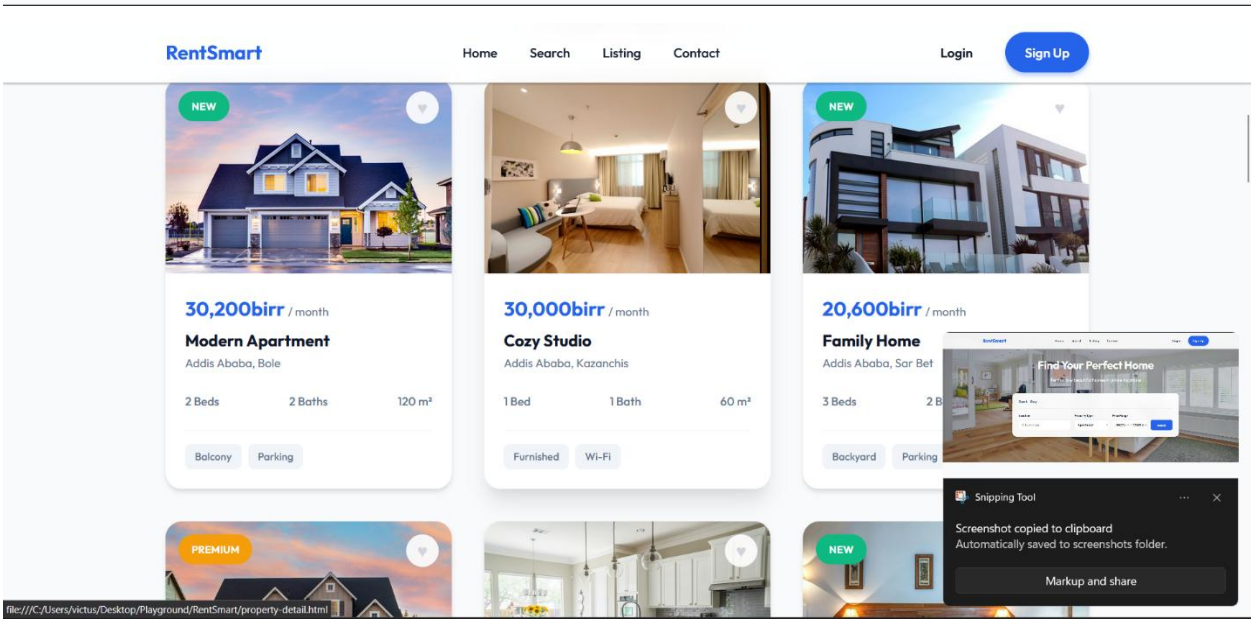
From an administrative perspective, RentSmart provides **adaptive analytics and reporting tools** that support informed decision-making and system optimization. The system analyzes aggregated user activity data, such as search trends, inquiry frequency, and property demand by location. Using this information, administrators can identify **high-demand areas**, popular price ranges, and frequently searched property types. These insights enable administrators to monitor market behavior and plan system improvements accordingly.

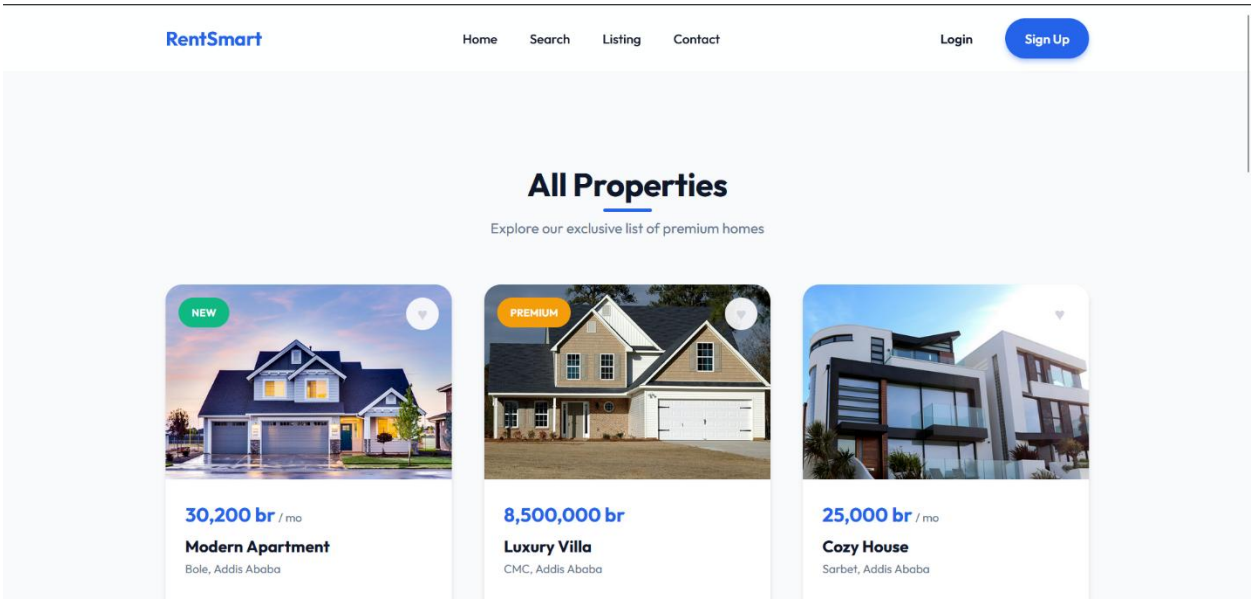
The adaptive features of RentSmart also enhance **scalability and future expansion**. As more users join the platform and more data is collected, the system's adaptive mechanisms become increasingly effective. This allows the platform to evolve naturally with user need–s without requiring constant manual configuration. Future enhancements, such as machine-learning-based recommendations or predictive demand analysis, can be seamlessly integrated into the existing adaptive framework.

Overall, the adaptive features of RentSmart significantly improve system usability, efficiency, and relevance. By personalizing user experiences, optimizing search results, and providing administrators with actionable insights, the system moves beyond a traditional static housing platform. Instead, it functions as an intelligent, user-centered solution that supports better housing decisions, improves market transparency, and enhances the overall effectiveness of housing rental services in Ethiopia.

Demonstration



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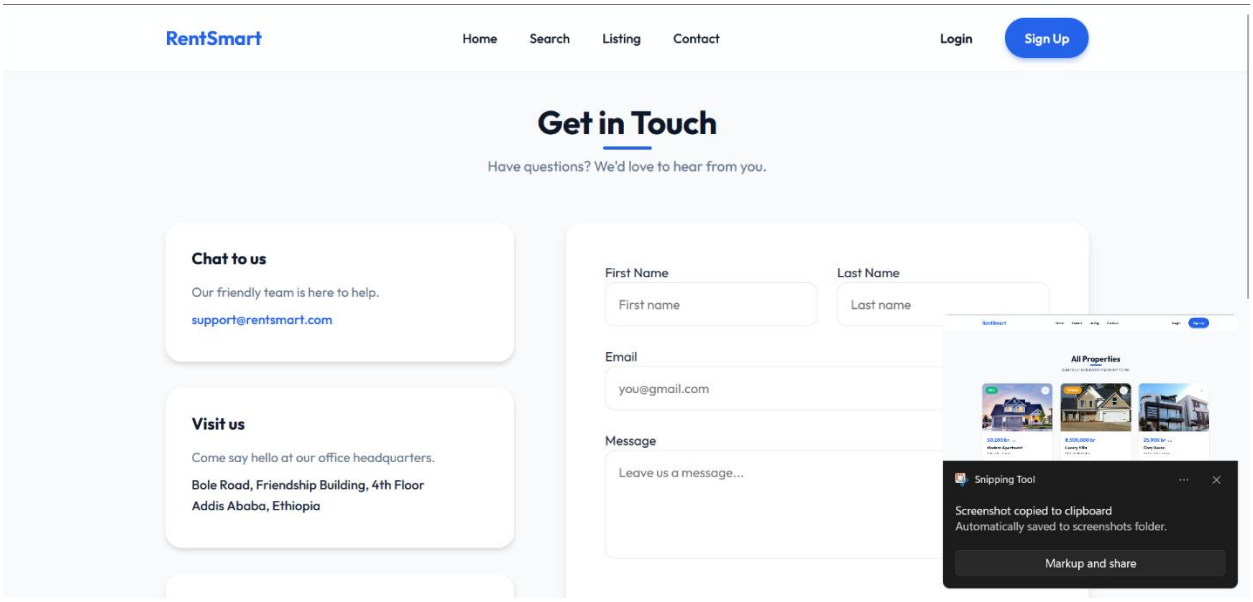
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