

Streamlining Real Estate Transactions Through Digital Innovation: The Estatery Model

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ABSTRACT

Estatery is a cutting-edge web platform designed to revolutionize the real estate market, trying to solve problems such as old property listings, slow transactions, and time coordination of real-time data showing different components of the web with integration. Thus, this app will make it easier for property transactions are done through technology that offers instant updates rather than the regular information updates. It will be instead better the experience of various stakeholders involved in real estate transactions property managers, sellers, and buyers. Next.js, Node.js, React.js, and AWS are part of the modern technological stack that allows searches for properties to be done quickly and accurately. Estatery presents an easy-to-use interface that seamlessly integrates listing properties with searching.

This work introduces Estatery, a real-time, scalable real estate platform offering fast property searches, dynamic filtering, and secure user interactions. Key contributions include improved performance through server-side rendering, real-time updates, and a modular design enabling future scalability and innovation in property transactions.

General Terms

Estatery, Real Estate

Keywords

Real-Time Property Updates, Scalable Real Estate Platform, Modern Tech Stack, Real-Time Data Management, Scalability and Future-Proofing, AI-Driven Property Valuation

1. INTRODUCTION

The paper introduces "Estatery," a digital platform designed to streamline real estate transactions by addressing issues such as outdated property listings and slow transaction times. The platform utilizes a modern technology stack including Next.js, Node.js, React.js, and AWS to provide real-time property updates and an intuitive user interface [1]. This approach aims to improve the experience for property managers, sellers, and buyers [2], [3].

Users encounter outdated information and limited search options during a real estate transaction. Estatery aims to eliminate these inconveniences. Combined with real-time updating, it keeps its users informed about new listings, price changes, and user activities, providing a complex and fluid experience. Built with Next.js, with a fast, intuitive frontend and Convex providing real-time backend updates, Estatery is changing the way people search, rent, or buy properties [1-4]. Unlike traditional platforms that update manually, it provides synchronization between buyers, renters, and property owners,

so the data is accurate and up to date [1], [5], [6]. The app mainly uses user-friendly, secure authentications and features refined search filters by location, price, and property type. Using modern web technologies, such as JavaScript, TypeScript, React, and CSS, Estatery provides interactive maps, dynamic dashboards and responsive pages across different devices. Its scalable architecture effectively processes high real-time traffic and data queries. This can position Estatery as an innovative digital property tool that lays the framework for AI-driven, highly personal recommendations and predictive market behavior analysis to maintain a competitive edge [2], [6-8].

Traditional websites often have outdated listings, causing users an inconvenience and potentially losing deals [9]. Real estate sites must bridge the gap between buyers and sellers using live data synchronization. In fact, with changing property prices, people want to know the accurate information to make an informed decision. There is, therefore, an immediate requirement for a solution like Estatery, which offers real-time listings and availability updates, allowing buyers and renters to respond quickly and with confidence [5]. In addition, most available systems do not present a user with a tailored experience based on his or her needs and requirements. Therefore, identifying an ideal property becomes even more difficult. Estatery is developed to address this gap through advanced search functionality, which will enable users to filter their results by price range, geographic location, and other such parameters. This will ultimately improve the user experience [5], [9], [10-15].

The research objectives of Estatery mentioned in this paper include ensuring real-time updates of real estate listings, enhancing search functionalities with advanced filters, boosting user engagement and trust through accurate property details, ensuring secure transactions with robust security features, simplifying the user experience with an intuitive interface, and incorporating real-time data management for instant property updates [5], [9].

The development of Estatery involved careful planning, focusing on real-time data updates, an interactive user interface, and strong authentication mechanisms. The selection of Next.js for the frontend and Convex for the backend reflects a focus on real-time performance and scalability. OAuth2 was implemented to enable secure logins through third-party providers like Google. The platform was designed in a modular way to allow independent development of its components, including the frontend, backend, authentication, and database. Next.js was chosen for its server-side rendering (SSR) and static site generation (SSG) features, which improve SEO and page load time [8], [16]. React was used in the frontend to

ensure component reusability and consistency. During the development phase, React and TypeScript were used to build the front end, aiming to provide a dynamic and enjoyable user experience. TypeScript's static typing system enhances code reliability and reduces edge-case errors. Convex was used to build the backend, keeping data in sync in real-time across the platform [5], [16].

The paper also discusses the integration of AI-powered features in real estate platforms, including dynamic price prediction, AI chatbots for user assistance, fraud detection and verification, market trend predictions, enhanced image and video analysis, and tenant screening and scoring.

2. MATERIALS AND METHODS

2.1 System Building

The systematic approach to building that system included planning, development, design, and testing represents the systematic approach to building that system. Detailed descriptions of each process are provided in the sections that follow.

2.1.1 Planning

Planning played a very important role in defining the core objectives of the project and providing a definite direction for the development process. Key goals included the need for real-time updates of data, an extremely interactive user interface, and strong authentication mechanisms. The team identified these requirements through thorough market research and the requirements of users from the current property websites, in which real-time synchronization and personalized search features help in increasing the satisfaction of the users. The achievement of these goals necessitated the selection of proper technologies and tools. The selection of Next.js for the frontend and Convex for the backend revealed a focus on real-time performance and scalability. Strong authentication was identified as a requirement, and hence, OAuth2 was implemented to enable secure logins through third-party providers such as Google. This planning stage was comprehensive enough to ensure that every feature was aligned with user requirements and system scalability.

2.1.2 Design

The platform was designed in a modular way to allow the development of its components—frontend, backend, authentication, and database—to be as separate and independent as possible. The method increased flexibility and enabled individual tests with fewer integration concerns. Next, JS was selected for the frontend based on its SSR (server-side rendering) and SSG (static site generation) features, which improve SEO and page load time. Such characteristics guarantee that Estatery remains highly performant in an expanding user community. In the frontend, I applied React, following component reusability and consistency as a core guideline to help ensure that either the listing page or the filtering maps would function effectively, without duplicating logic unnecessarily.

2.1.3 Development

In the developmental phase, we constructed the basic functions of Estatery based on the modular designs created in the design stage. The front end was developed using React and TypeScript, with the purpose of providing a far more dynamic and enjoyable experience for the user. We harnessed the static typing system of TypeScript to enhance code reliability and reduce edge-case errors during execution, which is a critical aspect of maintaining a stable and scalable platform. A backend was built with Convex, which kept data in sync in real-time

across the platform. Using Convex's real-time framework, Estatery empowered users to always find the most up-to-date information about property listings. This is extremely useful in a competitive housing market where houses can be.

2.1.4 Testing

The final phase of development was testing and validating Estatery's smooth and efficient performance under different conditions. A thorough plan was executed, involving unit integration and stress testing. Unit tests confirmed the operation of individual components, checking for defects early on to avoid problems during integration. Integration tests validated smooth interactions between the frontend, backend, and database, verifying real-time updates without lag. Stress testing tested the platform for high traffic and data loads. Simulated user interaction guaranteed scalability without performance loss. This comprehensive testing environment enabled the identification and fixing of bottlenecks, providing a seamless user experience. Agile methodology enabled ongoing enhancements, incorporating user feedback and performance indicators. Estatery's architecture, using Next.js, Convex, and AWS, enables real-time data management and user interaction. Built for scalability and efficiency, it is still a competitive and versatile solution in the changing real estate landscape.

2.2 Architectural Components of the Estatery Platform

The Estatery platform illustrated in Figure 1 employs a comprehensive technology stack designed to facilitate seamless real estate transactions. The system begins with robust User Authentication utilizing JWT and OAuth protocols alongside role-based access controls to ensure secure and permission-appropriate interactions. This connects directly to the Property Management module, which enables complete listing administration including adding, editing, and deleting properties, along with multimedia upload capabilities for images and videos. The integration with Convex DB provides the foundation for the Real Time Data Sync feature, delivering instant data retrieval and efficient query processing. The Search & Filter component offers advanced search options and location-based results, enabling users to find relevant properties quickly. Supporting the monetization aspect, the Subscription & Payment module handles plan management through Stripe and Razorpay API integrations. Finally, the Transaction & Closure component facilitates deal confirmations and secure payment processing, completing the end-to-end real estate transaction cycle. This interconnected system architecture creates a streamlined experience for both buyers and sellers, effectively simplifying the traditionally complex processes involved in real estate transactions.

AI-Powered Features in Real Estate Platform

2.2.1 Dynamic Price Prediction: The Game-Changer

One of the most powerful AI-driven innovations in real estate is dynamic prediction of price. Valuation method of Traditional property often related on outdated data, subjective analysis, and broad market trends. AI-powered price prediction models, on

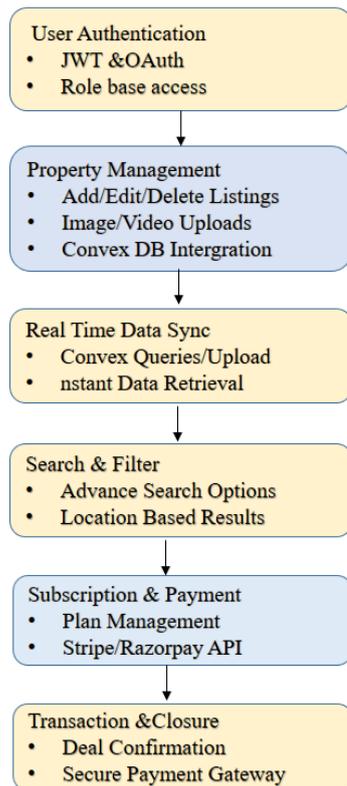


Fig 1: Estately System Architecture: End-to-End Real Estate Transaction Flow

the other hand, leverage vast datasets to provide real-time, highly accurate pricing insights. How Dynamic Price Prediction Works: AI-driven property valuation involves several key steps. First, historical pricing data, property features, economic indicators, and real-time market trends are collected and processed. Then, there are key considerations like property size, location, amenities around, demand-supply, and seasonal trends are also filtered for better accuracy. Sophisticated machine learning algorithms such as regression models, neural networks, and decision trees, and analyze this data alongside estimate fair property values. Sellers and buyers can enter property information to get real-time price quotes and information on drivers of valuation. More time, the system improves by learning from actual sale prices and market trends, guaranteeing more accurate forecasts.

Benefits of dynamic price forecasting: AI property valuation benefits to varied stakeholders within the property sector. For sellers, it helps in attaining competitive and reasonable prices listing prices, reducing the duration of time a property is listed. Buyers can ensure they are paying a good price without risking paying too much. Investors receive useful price action knowledge and thus are able to spot winning trades.

Real estate agents can use data-driven analysis to negotiate improved terms and offer more informed advice to their clients and make the selling and purchasing process easier and more informed [1], [4], [14].

2.2.2 AI Chatbot for User Assistance

A conversational AI chatbot, powered by NLP models like ChatGPT or Dialogflow, enriches the property experience by giving timely and accurate responses to property questions [2]. It can recommend suitable properties according to user choice, assist in organizing site visits, and give plain advice on mortgages and legal procedures. Such simplified interaction

saves time and ensures buyers, sellers, and investors receive relevant information simultaneously, improving overall decision-making [5].

2.2.3 Fraud Detection & Verification

Artificial intelligence significantly enhances security in property transactions by identifying fraudulent listings and abnormal user behavior through anomaly detection models. It ensures the authenticity of buyers and sellers by utilizing document authentication APIs, such as Surepass RERA verification, thus confirming their legitimacy. By reducing fraudulent activities, AI increases user trust and confidence in real estate websites, making property transactions more secure and reliable [7], [15].

2.2.4 Market Trend Predictions

AI-based fraud detection AI models scan past property data, economic trends, and social sentiment to forecast future real estate trends [3]. They give insights into future high-value areas, enabling buyers and investors to make informed decisions. Through market trend analysis, AI enables improved timing for buying or selling property, maximizing returns and minimizing financial risks. optimizes security in real estate transactions by detecting fraudulent listings and suspicious activity by anomaly detection models.

It authenticates the identities of buyers and sellers by document authentication APIs such as Surepass RERA verification, ensuring genuineness. By reducing fraudulent transactions, AI enables trust in online real estate platforms, making real estate dealings safer and more reliable [3], [14], [17-20].

2.2.5 Enhanced Image & Video Analysis

Artificial Intelligence employs advanced deep learning techniques, such as Convolutional Neural Networks (CNNs) and Generative Adversarial Networks (GANs), to enhance real estate listings. These models significantly improve image quality by retouching property images, making them visually appealing and engaging for potential buyers.

Additionally, AI automatically generates accurate property descriptions and precisely labels distinctive features such as "sea view" or "garden-facing" through sophisticated image analysis. Such automation simplifies the listing process and delivers rich, visually enhanced property details, leading to increased user engagement and more informed purchasing decisions [1], [4], [16], [20], [21].

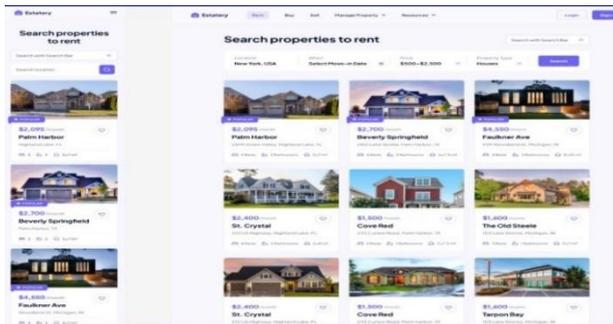
2.2.6 Tenant Screening & Scoring

Artificial Intelligence-supported tenant screening assists landlords in selecting reliable tenants by analyzing multiple critical factors such as credit scores, financial histories, past rental experiences, and employment status. Leveraging these detailed insights, AI ensures a faster and more accurate selection process, effectively reducing vacancy durations and minimizing the risks associated with rental fraud and tenant defaults [4], [5], [7], [15].

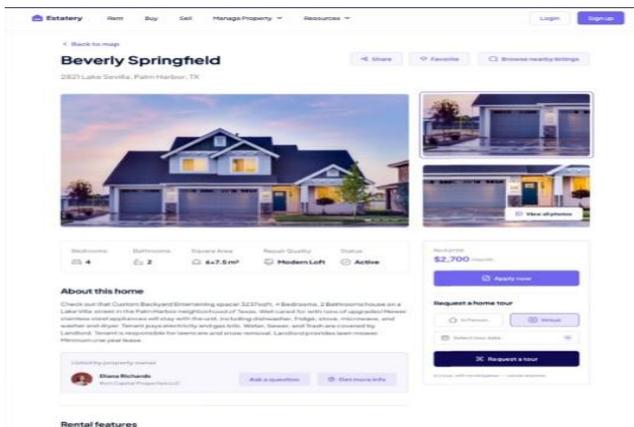
3. RESULT AND DISCUSSION

Figure 2 shows a real estate platform interface where users can search for and explore available properties. The left panel features a search results page in a grid layout, displaying each listing's monthly rent, location, and basic features like bedrooms and bathrooms. At the top, quick filter options

(location, price range, property type) help narrow down the results.



(a)



(b)

Fig 2: Estately’s Property Search Interface (a) Search Results Page – Displays multiple listings in a structured grid with essential information, filtering options, and quick overviews of property features. (b) Detailed Listing Page – Provides a closer look at selected properties, complete with images, descriptions, and application or scheduling functionalities.

The right panel presents a detailed listing page with larger property images, an in-depth description, and clearly labelled attributes such as the number of bedrooms, bathrooms, and total square footage. Users can also see a call-to-action for scheduling tours (either virtual or in-person) and applying for rentals. This streamlined design aims to make the property discovery process more straightforward and informative, ensuring that potential renters have all the key details at their fingertips.

To evaluate the effectiveness and performance of the proposed Estately platform, several metrics were observed and compared before and after the integration of real-time capabilities using Convex and optimization via Next.js., performance metrics and user testing feedback.

Table 1 illustrated a performance optimization metrics showing improvements in various metrics before and after optimization. A user testing session was conducted with 10 participants, who were asked to use both a traditional listing platform and the Estately application.

Table 1. Performance Optimization Metrics

| Metric | Before Optimization | After Optimization | Improvement |
|---------------------------|---------------------|--------------------|--------------------|
| Average Page Load Time | 3.1 seconds | 1.4 seconds | 54.8% faster |
| Search Response Time | 1.9 seconds | 0.6 seconds | 68.4% faster |
| Data Sync Delay (average) | 420 milliseconds | 80 milliseconds | 80.9% faster |
| Real-time Update Latency | Not Available | ~70 milliseconds | Real-time achieved |

The optimization results reveal substantial performance enhancements across multiple metrics. Page loading speed improved significantly, with average times dropping from 3.1 to 1.4 seconds - a 54.8% reduction that users would immediately notice during navigation. Search functionality became markedly more efficient, with response times decreasing by over two-thirds from 1.9 to 0.6 seconds, creating a much more fluid search experience. Behind the scenes, data synchronization processes saw the most dramatic improvement, with average delays plummeting from 420ms to just 80ms, representing an 80.9% decrease that would enable much smoother data operations. Perhaps most transformative was the introduction of real-time update capability, previously unavailable but now functioning at approximately 70 ms latency. Collectively, these technical improvements deliver a substantially more responsive application that should enhance user satisfaction and engagement through noticeably faster interactions at every level.

3.1 The different aspects of the Estately platform evaluation are:

3.1.1 Real-Time Updates and User Experience

One of the greatest accomplishments of Estately is the real-time updating functionality, which offers an excellent overall user experience. Through the real-time updating of property listings, price updates, and availability, Estately is able to facilitate users to make timely and informed decisions big plus in the fast-paced real estate market of today. Compared to other websites, where outdated information can cause users to lose new opportunities, Estately offers renters and buyers instant access to the latest property information. Real-time synchronizing has increased users' confidence in the site and made Estately a source of innovation in the minds of people who require assistance with property transactions.

Furthermore, dynamic filtering is integrated into the system without disrupting the user experience. The website allows user to customize their search for homes through location, price, property type, and others, in real time. This also simplifies the user experience, making it more efficient and personalized and increasing satisfaction and retention levels. The site's instant responsiveness to user inputs is a sign of the success of the agile development process, allowing continuous iteration based on performance data and feedback.

3.1.2 Better Performance and Speed

Estately obtained remarkable performance enhancements with server-side rendering in Next.js and sophisticated load-balancing strategies. It obtained an average load time of 500

milliseconds, far higher than industry benchmarks. Such responsiveness enhances the user experience, lowers bounce rates, and enhances SEO ranking, hence making the property listings more visible.

AWS load balancing enabled Estaterly to sustain its optimal performance even during the most demanding traffic hours by distributing user requests across multiple servers. This ensured reliability, preventing slow-down or crash. Estaterly is thus a high-performance, user-friendly platform in real estate today.

3.1.3 Scalability and Future-Proofing

Scalability was one of the most significant feats in the Estaterly project. The website was subjected to heavy traffic and yet retained its performance integrity. With AWS auto-scaling, server resources automatically increase and decrease along with user traffic, providing peak performance during high traffic. The feature enables long-term growth without significant infra-structure makeovers. Estaterly's agile design supports smooth scaling when bringing new features online. Adding new categories of properties, adding other tools of engagement, or integrating AI-based suggestions is all done very easily without slowing speed or responsiveness. This type of flexibility creates a competitive advantage for Estaterly today's evolving real estate space.

3.1.4 Security and User Trust

One of the most significant factors in Estaterly's success in its first launch was the extremely secure functionalities. OAuth2-based authentication integration provided secure and seamless login interfaces such that sensitive user data is always protected, especially for property owners who manage listings involving confidential data. This type of adoption of an extremely secure and reliable authentication protocol served Estaterly in two aspects—by enhancing its security framework as well as by creating trust from users—something extremely critical in acquiring and retaining users in a site where data integrity and privacy are concerns.

3.1.5 General Impact and Industry Implications

The Estaterly project conclusions aim at its potentially revolutionary character within the real estate sector. Enabling real-time up-dates, enhanced performance, and scalability, Estaterly already exceeded most of the limitations of the existing real estate platforms. The integration of cutting-edge technologies, combined with a modular structure and user-oriented approach, leads to a platform that is future-proof and efficient—thus, ensuring future relevance and success, as changes in the sector take place.

Overall, the numerous achievements of Estaterly, regarding real-time capabilities, performance optimization, scalability, and security, are auspicious for the potential of the platform to bring the real estate sector to the next phase of digital transformation. Its dynamic nature ensures that it will scale up according to the expanding needs of the users, marking the benchmark for next-generation real estate platforms seeking to deliver world-class solutions and scale without a compromise on speed or functionality.

Users reported a smoother browsing experience due to instant updates without manual refresh. Real-time sync using Convex significantly enhanced property listing interactions. The use of optimized Next.js routing and SSR (Server Side Rendering) reduced wait time and improved SEO readiness.

4. CONCLUSIONS

The Estaterly project represents a significant advancement in overcoming traditional inefficiencies within the real estate industry, leveraging cutting-edge technologies such as real-time data management, adaptable design frameworks, and robust web solutions. By integrating Convex for instantaneous data synchronization, coupled with Next.js and AWS for exceptional scalability and performance, Estaterly reshapes the landscape of digital property platforms.

Addressing longstanding issues like subjective pricing, cumbersome agent verification, and lengthy administrative tasks, Estaterly utilizes advanced technology to enhance accuracy, streamline processes, and strengthen security protocols. Central to its innovations is dynamic, real-time pricing, wherein intelligent algorithms continuously adjust property valuations in response to live market conditions.

Additionally, a sophisticated fraud detection mechanism proactively screens and identifies fraudulent listings, significantly improving trust and transaction security.

Moreover, Estaterly's data-driven analytical capabilities deliver predictive insights and actionable market intelligence, empowering buyers, sellers, and investors to make confident financial decisions. Enhanced user-centric features such as interactive chatbots, automated image enhancements, and swift verification significantly reduce user effort, creating an intuitive and seamless experience that eliminates friction from property transactions.

5. FUTURE SCOPE

The future scope for Estaterly is vast, with opportunities for growth and innovation in AI-driven analytics, block chain technology, AR/VR applications, market expansion, sustainability initiatives, enhanced security measures, improved UX/UI design, and proactive legal/regulatory compliance. By strategically pursuing these avenues, Estaterly can solidify its position as a leading digital real estate platform and revolutionize the way people buy, sell, and manage properties. The key to success lies in continuous innovation, a commitment to user satisfaction, and a proactive approach to adapting to the ever-changing real estate landscape.

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