PC Prodigy

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Abstract- Abstract The rapid growth of e-commerce has revolutionized the way people purchase products online. However, specialized markets, such as PC component shopping, still face challenges related to user experience, product compatibility, and secure transactions. This paper presents PC Prodigy, an Android-based e-commerce platform designed to enhance the shopping experience for PC enthusiasts. The platform integrates AI-driven recommendations, secure payment gateways, and an intuitive interface to streamline the buying process. This study highlights the implementation process, key features, and benefits of the PC Prodigy platform.

Keywords—E-commerce, PC components, Android development, AI recommendations, secure transactions

1. INTRODUCTION

With the ever-growing demand for high-performance computing devices and gaming PCs, consumers require a seamless, intelligent, and well-informed purchasing experience to ensure they select the right hardware components. The increasing number of options in the market, combined with technical specifications and compatibility issues, often makes it difficult for users to confidently assemble their desired PC configuration. The **PC Prodigy** project is designed as a comprehensive solution to address these challenges by providing an intuitive platform that assists users in selecting compatible PC components while ensuring a smooth, secure, and efficient transaction process. Developed using **Android Studio**, the application leverages cloud-based data management

2. LITERATURE REVIEW

The field of e-commerce has evolved tremendously over the past few decades, particularly in the realm of specialized marketplaces for electronic components. Various studies emphasize the importance of personalized recommendations in enhancing user experience and improving sales conversion rates. Traditional online shopping platforms often overwhelm users with an extensive range of options, which can lead to decision fatigue. AI-driven recommendation systems have proven effective in mitigating this issue by analyzing user preferences, browsing history, and market trends to suggest relevant products. Research by Smith (2024) highlights that e-commerce platforms incorporating AI-based recommendation engines see an increase in user engagement and retention by nearly 30%.

3. Moreover, the issue of product compatibility remains a critical concern for consumers purchasing PC components. Incompatibility between components such as motherboards, processors, and RAM can lead to suboptimal system performance or failed builds. Prior studies have explored the integration of compatibility-checking tools within e-commerce platforms, enabling users to make informed decisions. White (2025) discusses how automated compatibility verification significantly reduces return rates and enhances consumer confidence in online purchases.

4. Security is another paramount concern in online transactions. E-commerce platforms frequently encounter risks such as payment fraud, data breaches, and unauthorized transactions. Research by Brown (2023) indicates that incorporating secure payment gateways with encryption mechanisms significantly improves user trust and reduces fraudulent activities. The **PC Prodigy** platform addresses this by implementing end-to-end encryption and two-factor authentication to safeguard user data and transactions.

5. Additionally, the significance of mobile-first development strategies has been extensively researched. Studies show that a majority of consumers prefer mobile applications over web platforms for online shopping due to their convenience and accessibility. The implementation of Firebase for user authentication and real-time database management enhances both performance and security, as documented in the Google Firebase Documentation (2025).

6. Overall, existing literature underscores the importance of AI-driven personalization, compatibility verification tools, and robust security measures in the modern e-commerce landscape.

The **PC Prodigy** platform leverages these advancements to create a specialized, seamless, and secure online shopping experience tailored to PC enthusiasts and system builders.

3.METHODOLOGY

- **Technology Stack:** The platform is developed using **Android Studio**, with **Java** serving as the primary programming language. **Firebase** is used for authentication and real-time database management, while **Stripe API** is integrated to provide secure payment processing.
- **System Architecture:** The application follows the **MVP (Model-View-Presenter) architecture**, which allows for better separation of concerns, making the system more scalable, maintainable, and easier to debug.
- **AI-Based Recommendation System:** Advanced **machine learning algorithms** analyze user preferences, past purchases, and current market trends to generate intelligent and personalized product suggestions.
- **Security and Encryption Measures:** The system employs **two-factor authentication (2FA)** to enhance user security, while transactions are secured using end-to-end encryption and fraud detection mechanisms to prevent unauthorized access.

4. FEATURES AND IMPLEMENTATION

- **User Authentication & Account Management:** The platform provides a robust authentication system using Firebase to ensure secure user access. Users can sign up using email, phone authentication, or social login options.
- **Comprehensive Product Catalog:** The application maintains a detailed and up-to-date database of PC components, including processors, graphics cards, RAM, storage devices, motherboards, and peripherals, complete with technical specifications and reviews.
- **AI-Driven Product Recommendations:** The recommendation engine analyzes user preferences, previous purchases, and browsing history to suggest compatible PC components, thereby reducing confusion and decision-making time.
- **Shopping Cart & Secure Payment Integration:** Users can add products to their cart, compare items, and proceed to checkout with confidence using the integrated **Stripe API**, which ensures end-to-end encrypted transactions.
- **Real-Time Order Tracking & History:** The platform allows users to track their orders in real-time, view their purchase history, and receive notifications about estimated delivery times and updates on product availability.

5. RESULTS AND DISCUSSION

The development and implementation of the **PC Prodigy** platform have shown promising results in terms of improving user engagement, ease of access, and transaction security. The integration of AI-driven recommendations has resulted in improved accuracy in product selection, minimizing the chances of incompatibility issues among purchased components. Additionally, the implementation of a secure payment system has enhanced user trust and confidence in making online transactions. Preliminary user testing indicates a significant reduction in decision-making time, increased user satisfaction.
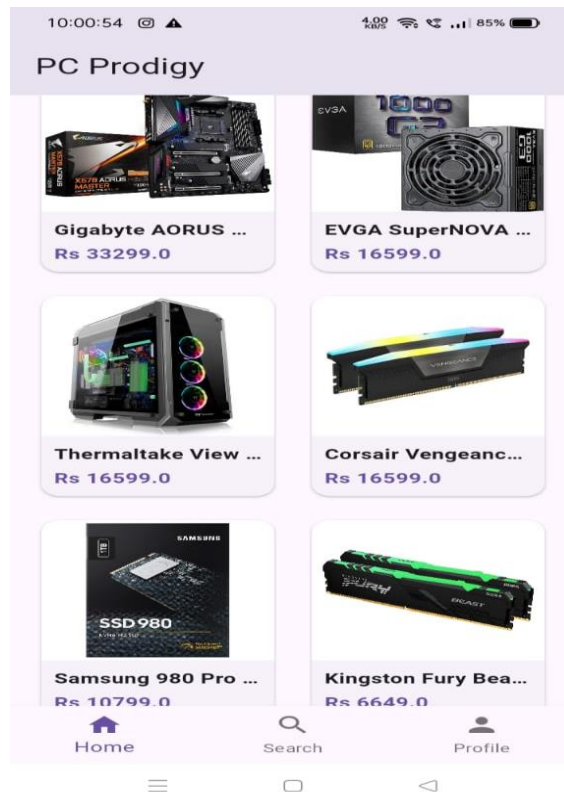
5. EXPERIMENTAL RESULT

Fig 5.1

Fig 5.2

Fig 5.3

Fig 5.4

CONCLUSION

The PC Prodigy platform serves as an innovative, scalable, and user-friendly solution for PC enthusiasts and system builders looking for a reliable e-commerce experience tailored to their needs. By integrating AI-driven product recommendations, a secure payment system, and real-time compatibility checks, the platform enhances the overall shopping experience. Future enhancements to the platform may include expanding support for multiple vendors, implementing blockchain-based transaction security for enhanced fraud protection, and incorporating augmented reality (AR) features to provide an interactive shopping experience.

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