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Design and Implementation of an E-commerce Android App for Seller, User, and Admin

Prathamesh R. Sawardekar

Abstract: ***The rise of e-commerce has led to increased demand for efficient mobile applications that streamline business operations for sellers, users, and administrators. This paper explores the design and implementation of an e-commerce Android application where the admin can manage product inventory by adding, updating, editing, and deleting products through the app. The proposed system enhances user experience, ensures seamless product management, and optimizes sales operations. This research highlights the key software engineering challenges encountered during development and suggests solutions for improved functionality and security.***

Index Terms: E-commerce, mobile application, product management, admin panel, Android development

I. INTRODUCTION

E-commerce has transformed the way consumers interact with businesses, necessitating efficient mobile applications for sellers, users, and administrators. The proposed e-commerce Android application provides a seamless shopping experience, allowing users to browse and purchase products, sellers to list their products, and admins to manage the entire catalog. Addressing key challenges such as security, performance optimization, and real-time product updates is crucial for the success of the platform.

II. KEY FEATURES OF THE E-COMMERCE ANDROID APP

A. Admin Panel for Product Management

The admin can add, update, edit, and delete products in real-time through the mobile application. This feature ensures seamless product catalog management without the need for a separate web-based interface.

B. User Experience Optimization

The application provides an intuitive interface for users, allowing them to search, filter, and purchase products effortlessly. A streamlined checkout process and secure payment gateway integration enhance customer satisfaction.

C. Seller Dashboard

Sellers can manage their product listings, track sales, and receive customer orders efficiently. The dashboard provides insights into revenue, product performance, and inventory levels.

D. Secure Authentication and Authorization

Security is a critical aspect of e-commerce applications. The system implements robust authentication mechanisms, including multi-factor authentication, role-based access control, and encrypted data storage to protect user information.

E. Performance Optimization

Efficient coding practices, caching mechanisms, and database indexing are used to enhance the application's performance, reducing load times and improving user engagement.

III. IMPLEMENTATION DETAILS

A. Technology Stack

The application is built using the following technologies:

1) Frontend: Android SDK, Kotlin, Jetpack Compose
2) Backend: Firebase
3) Database: Firebase Realtime Database
4) Authentication: Firebase Phone Authentication
5) Payment Gateway: Razorpay

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B. Database Schema

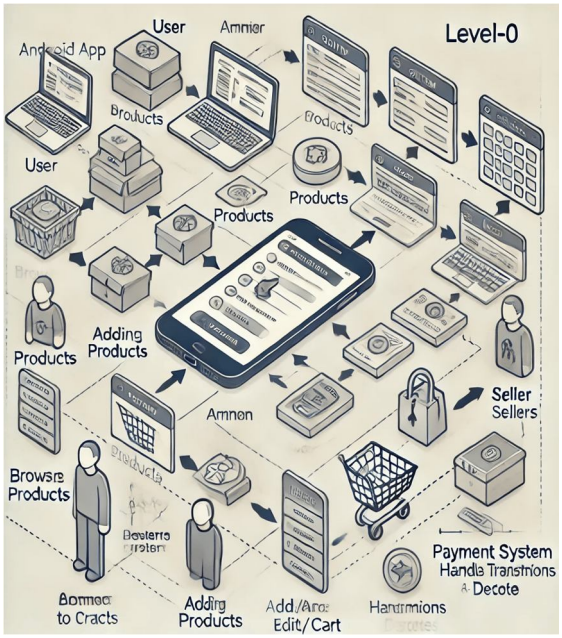
The database is designed to store product details, user information, seller details, and order transactions efficiently. The following tables are used:

1) Products: Stores product name, description, price, stock availability, images, and seller ID.
2) Users: Stores user credentials, purchase history, and payment details.
3) Sellers: Manages seller profiles, product listings, and sales data.
4) Orders: Tracks user purchases, payment status, and delivery details.

IV. DATA FLOW DIAGRAMS

The data flow diagrams to represent the system implementation are listed below:

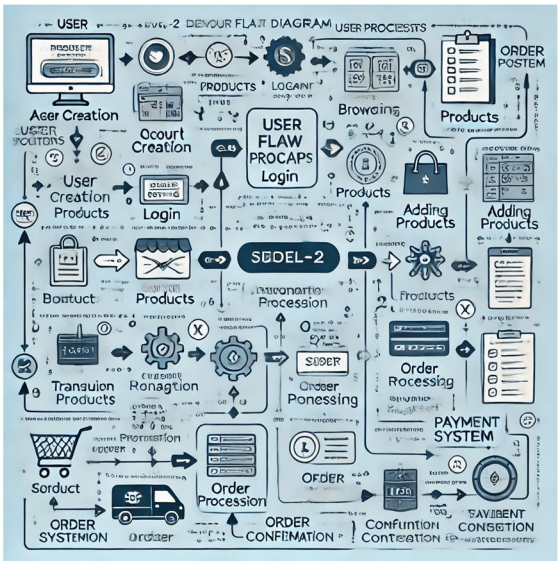
Level-0



Level-1



Level-2



V. TABLES

Below are the table structures for different entities within the e-commerce application:

A. Product Table

Field	Data Type
cat	String
discount	String
discountprice	String
isInStock	Boolean
isdiscountavail	Boolean
proddescription	String
prodid	String
prodimg	String
prodname	String
prodprice	String
prodquantity	String
rating	Float
subcat	String
timeStamp	String

B. Product Review Table

Field	Data Type
pid	String
rating	Float
review	String
reviewby	String
timestamp	String

C. Order Table

Field	Data Type
orderid	String
orderby	String
orderto	String
ordercost	String
orderstatus	String
ordertime	String
deliveryOption	String
payOption	String
Items	JSON

D. User Table

Field	Data Type
phoneno	String
firstname	String
lastname	String
email	String
password	String
useradd	String
usercurrloc	String

E. User Review Table

Field	Data Type
pid	String
rating	Float
review	String
reviewby	String
timestamp	String

F. Seller Table

Field	Data Type
phoneno	String
firstname	String
lastname	String
email	String
shopname	String
shopadd	String
delfee	String
password	String
isOpen	Boolean

VI. SYSTEM TESTING AND MAINTENANCE

A. Functional Testing

Unit testing and integration testing are conducted to ensure smooth operation across all modules, including product management, order processing, and payment transactions.

B. Security Testing

Penetration testing and data encryption verification are performed to safeguard user information from cyber threats.

C. Future Enhancements

Future updates may include AI-driven product recommendations, chatbot integration for customer support, and augmented reality (AR) for virtual product visualization.

VII. CONCLUSION

The proposed e-commerce Android application provides a comprehensive solution for sellers, users, and admins, streamlining product management and enhancing user experience. The integration of robust security measures, performance optimizations, and intuitive UI/UX ensures a scalable and efficient platform for digital commerce.

A. Data Availability

The code implemented for this research is an intellectual property. The data generated during this research is available on reasonable request.

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B. Acknowledgement

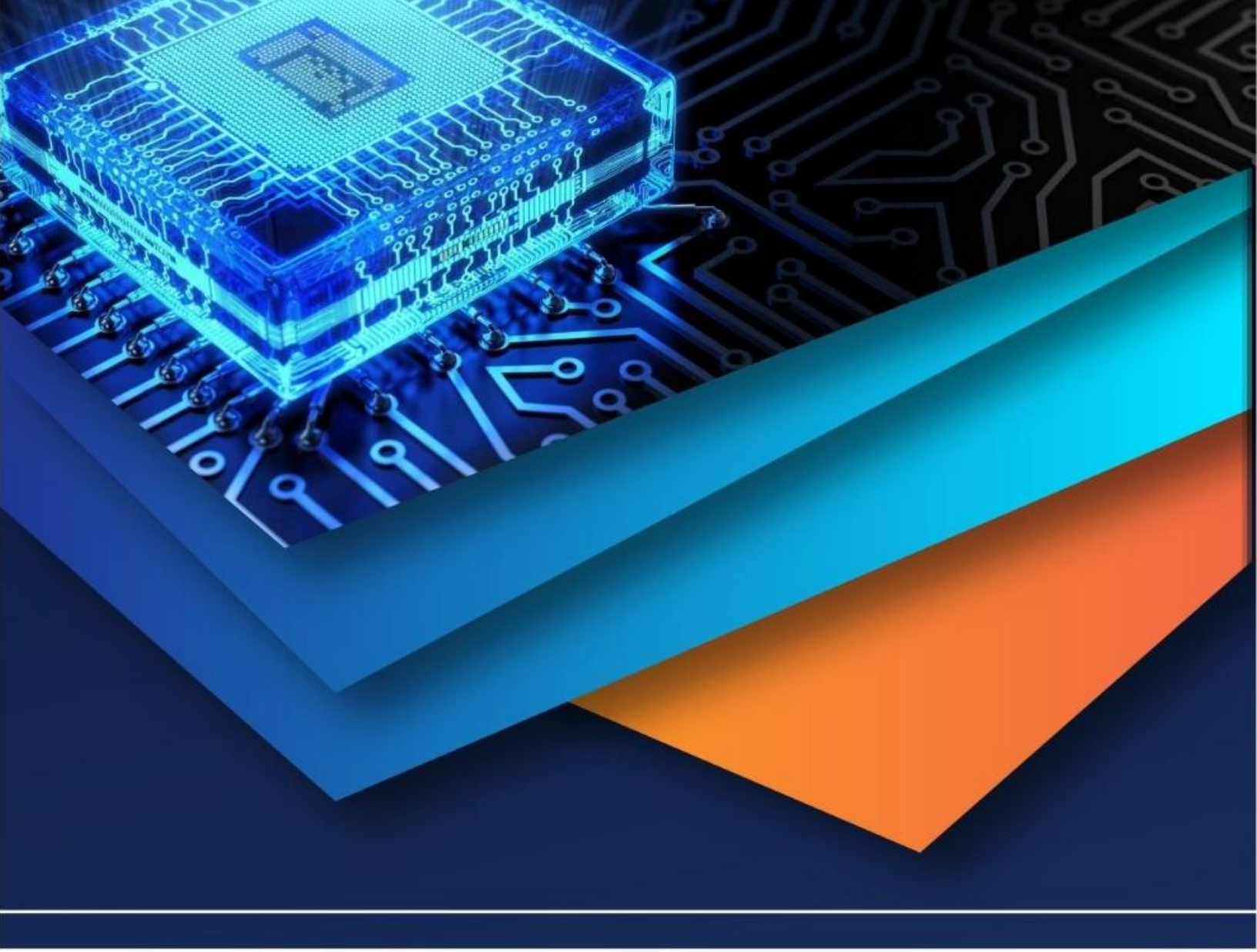
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