



North South University

Department of Electrical and Computer Engineering

Junior Design Project Report

**Project Title: Aureva – E-Commerce Cosmetics App
Using React Native**

Sheikh Mahpara Ema (ID: 2021784642)

Jeba Tabassum Urbi (ID: 2231034642)

Samia Islam (ID: 2231642042)

Faculty Advisor:

Mohammad Shifat-E-Rabbi

Professor ECE Department

Summer, 2025

Letter of Transmittal

August 2025

To,

Mohammad Shifat-E-Rabbi

Professor, Department of Electrical and Computer Engineering
North South University, Dhaka

Subject: Submission of Junior Design Project Report on “Aureva – E-Commerce
Cosmetics App Using React Native”

Dear Sir,

With due respect, we submit our Junior Design Project Report as part of our BSc program. This report presents the design and development of Aureva, a mobile-first e-commerce cosmetics application. We hope you will kindly accept our report and provide valuable judgment.

Sincerely Yours,

.....
Sheikh Mahpara Ema (ID: 2021784642)

ECE Department North South University, Bangladesh

.....
Jeba Tabassum Urbi (ID: 2231034642)

ECE Department North South University, Bangladesh

.....
Samia Islam (ID: 2231642042)

ECE Department North South University, Bangladesh

Approval

This is to certify that Sheikh Mahpara Ema (ID: 2021784642)
Jeba Tabassum Urbi (ID: 2231034642)
Samia Islam (ID: 2231642042) have completed their Junior Design Project under my
supervision and the work is accepted as satisfactory.

Supervisor's Signature

.....

Mohammad Shifat-E-Rabbi

Professor Department of Electrical and Computer Engineering

North South University

Dhaka, Bangladesh

Chairman's Signature

.....

Mohammad Abdul Matin

Professor

Department of Electrical and Computer Engineering

North South University

Dhaka, Bangladesh

Declaration

This is to declare that this project is our original work. No part of this work has been submitted elsewhere partially or fully for the award of any other degree or diploma. All project related information will remain confidential and shall not be disclosed without the formal consent of the project supervisor. Relevant previous works presented in this report have been properly acknowledged and cited. The plagiarism policy, as stated by the supervisor, has been maintained.

Students' names & Signatures

.....
Sheikh Mahpara Ema (ID: 2021784642)

ECE Department North South University, Bangladesh

.....
Jeba Tabassum Urbi (ID: 2231034642)

ECE Department North South University, Bangladesh

.....
Samia Islam (ID: 2231642042)

ECE Department North South University, Bangladesh

Acknowledgements

We would like to express their heartfelt gratitude towards their project and research faculty advisor, Mohammad Shifat-E-Rabbi Professor, Department of Electrical and Computer Engineering, North South University, Bangladesh, for his invaluable support, precise guidance and advice pertaining to the experiments, research and theoretical studies carried out during the course of the current project and also in the preparation of the current report. Furthermore, we would like to thank the Department of Electrical and Computer Engineering, North South University, Bangladesh for facilitating the research. The authors would also like to thank their loved ones for their countless sacrifices and continual support.

Abstract

Aureva – E-Commerce Cosmetics App Using React Native

Aureva is a cross-platform e-commerce application designed specifically for cosmetics shopping in Bangladesh. The app was developed using React Native, ensuring compatibility across Android and web platforms. The system supports intuitive browsing, intelligent product categorization, search functionality, cart management, and secure checkout with multiple payment methods including Bkash and credit card. The backend, built with Node.js and Express, provides REST APIs for dynamic data handling. Local persistence is ensured using AsyncStorage, which allows offline cart access. Through its design, Aureva not only demonstrates technical feasibility but also addresses key challenges in the cosmetics market such as counterfeit product risks, lack of centralized access, and poor user trust in online platforms. The project highlights both the technical and social importance of localized digital solutions.

Chapter 1: Introduction

Bangladesh's cosmetics market is expanding rapidly, with consumers increasingly demanding authentic beauty products. However, counterfeit goods, limited availability of international brands, and fragmented supply chains remain challenges. Customers often rely on unverified sellers, which raises safety and trust concerns. Globally, e-commerce solutions for cosmetics have gained traction, but these often fail to address regional challenges such as payment options, language preferences, and logistics. Our motivation was to create Aureva: a cosmetics-focused, user-friendly digital marketplace with secure checkout, local payment gateway integration, and product verification features. The goal is to provide not just an application, but a reliable ecosystem for cosmetics shopping in Bangladesh.

Chapter 2: Literature Review

Studies on mobile commerce adoption emphasize payment security and usability. Local prototypes show higher success when integrating Bkash. International platforms like Sephora adopt advanced features, but lack localization. Limitations include insufficient focus on cosmetics, weak product verification, and poor offline support.

Chapter 3: Methodology

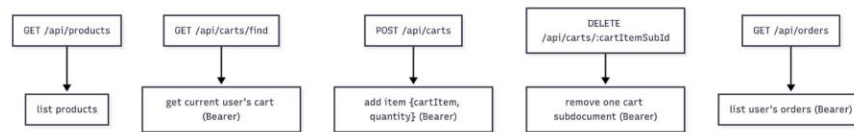
The system follows a layered architecture with separation between frontend, backend, and data storage. The frontend was implemented in React Native, leveraging reusable UI components to reduce redundancy and improve maintainability. Navigation within the app is managed by a combination of bottom-tab and stack navigators, ensuring smooth transitions between Home, Cart, Search, and Profile screens. The backend was built with Node.js and Express, providing REST APIs for handling products, cart operations, and order management. Axios was used for HTTP communication, while AsyncStorage handled local persistence of cart data and user sessions. Security was implemented via token-based authentication, stored securely in AsyncStorage. The app also validated payment flows, with mock implementations of Bkash and credit card payment systems.

Software Components:

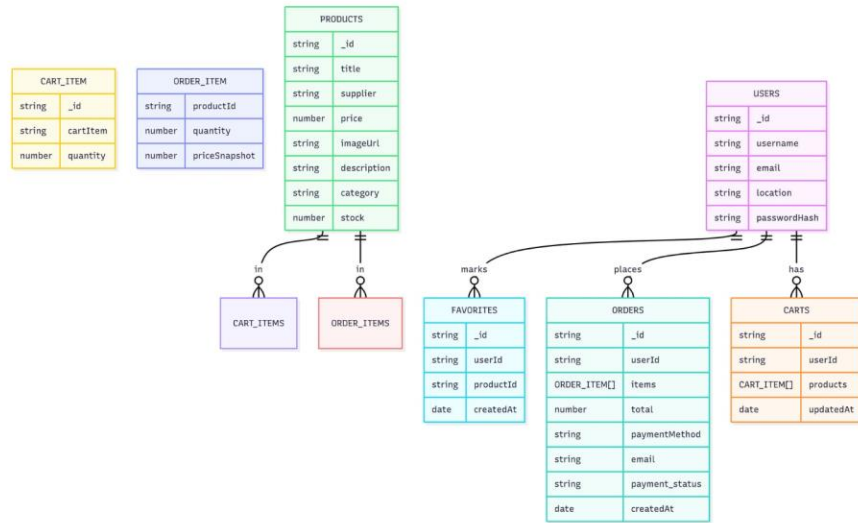
- React Native: Cross-platform mobile app development
- Expo: Development framework simplifying builds
- Axios: Data fetching from REST APIs
- AsyncStorage: Persistent storage for offline data

- Node.js/Express: Backend server implementation

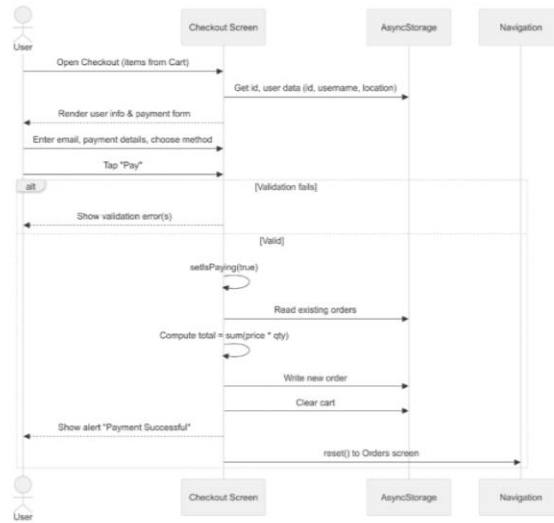
Implementation involved modular development. For example, ProductCard components displayed product details, while CartTile handled cart state. Checkout included input validation logic ensuring correct email formats, valid Bkash numbers, and proper credit card credentials. The system design allowed scalability and modular improvement in future iterations.



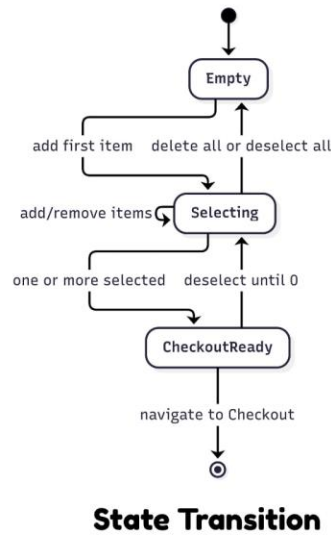
API Surface



Database Design



Checkout – Frontend Sequence Diagram



Chapter 4: Results & Analysis

Testing was performed extensively on both Android emulators and web browsers to ensure cross-platform performance. The app successfully fetched real-time products via backend APIs, handled user authentication tokens securely, and managed cart state consistently across sessions. FlatList was used to optimize performance when rendering large product datasets, preventing UI lag. Checkout validation correctly identified invalid inputs such as improperly formatted emails, short credit card numbers, and invalid Bkash numbers. User testing was also conducted with peers, who provided feedback on usability, navigation, and visual design. The application demonstrated smooth navigation, quick load times, and effective integration with backend APIs. Error handling mechanisms were also tested by simulating server failures and offline states, confirming that the app displayed meaningful error messages and allowed cart persistence offline. This validated the robustness of Aureva in real-world scenarios.

Below is the system architecture diagram:

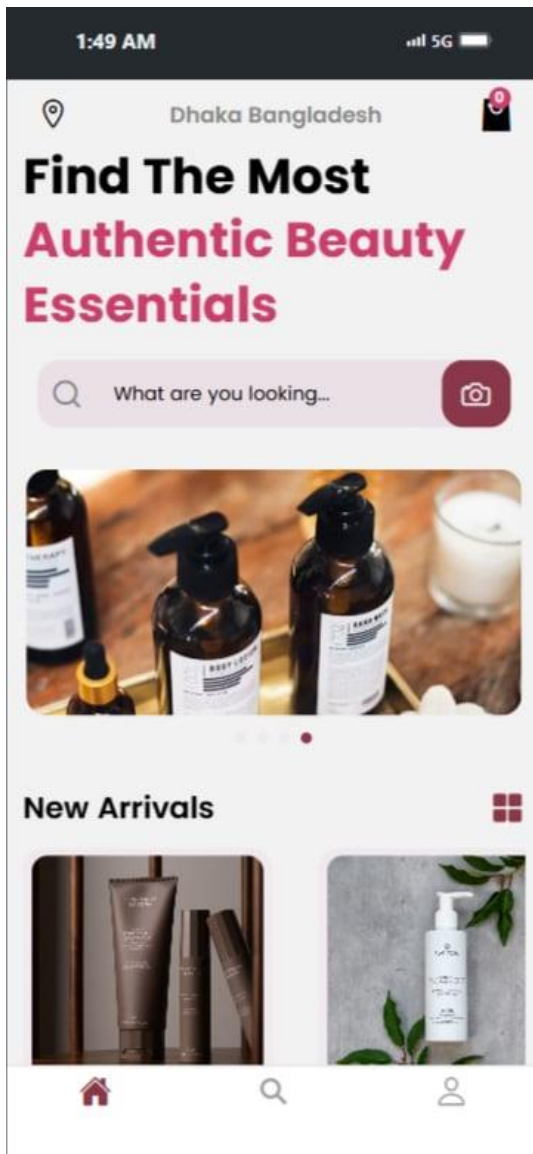


Figure 1: System Architecture of Aureva

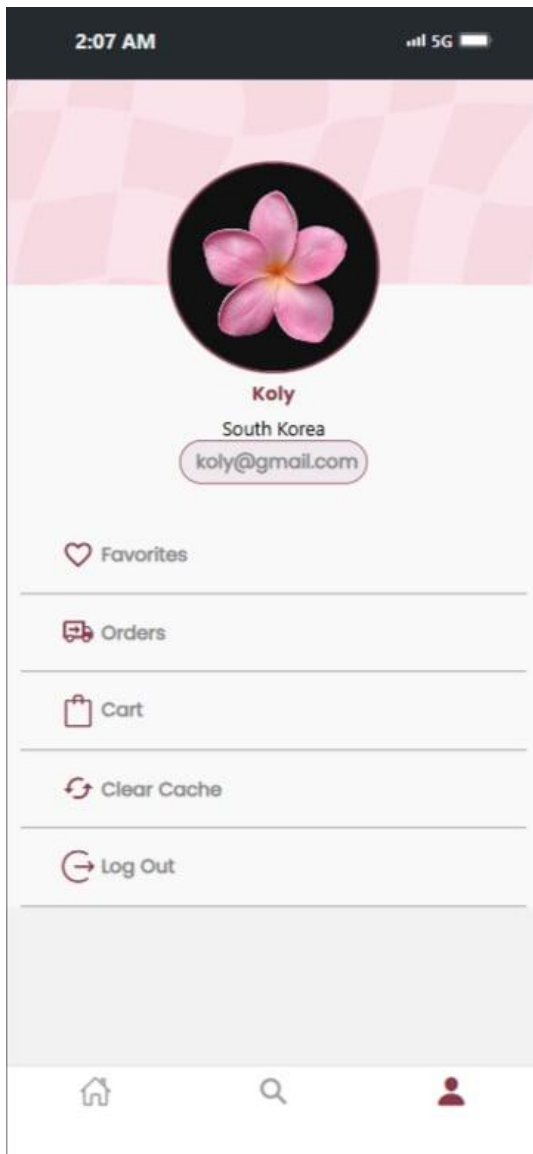


Figure2: Profile page

3:29 AM

5G



<

Koly

South Korea

Email

1234 1234 1234 1234



MM / YY

CVC

Name on card

Choose Payment Method

Credit Card/ Debit Card/ Visa

Pay

Figure3: Payment System

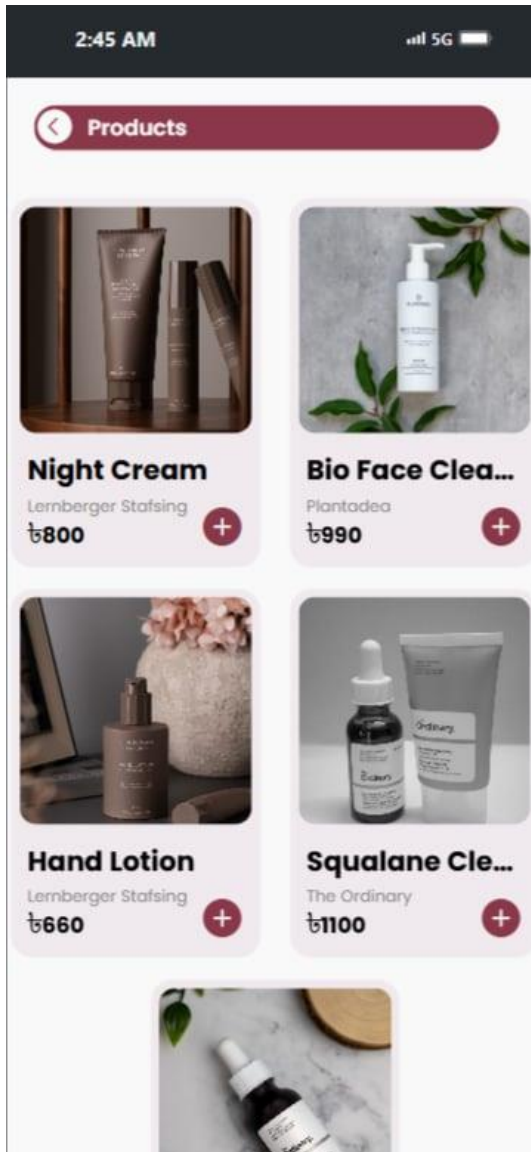


Figure4: Search System

Chapter 5: Impacts

Societal Impact: Aureva addresses counterfeit cosmetics by offering verified and authentic products through a digital platform. This increases consumer trust, improves safety, and reduces financial loss from counterfeit purchases. It also contributes to digital literacy by encouraging consumers to adopt secure mobile commerce.

Health & Safety: Counterfeit cosmetics pose significant health risks including skin damage and allergies. Aureva's verification model mitigates these issues by ensuring

only authorized brands are listed.

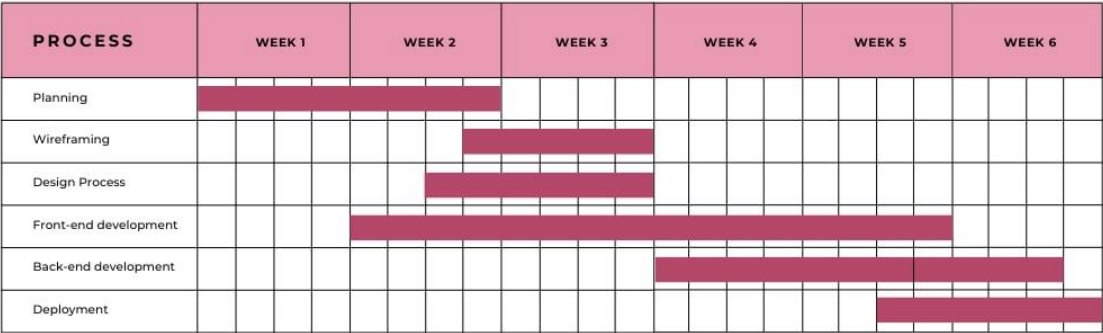
Legal & Cultural: By integrating local payment gateways like Bkash, Aureva aligns with Bangladesh’s financial ecosystem. It respects local purchasing habits and encourages cashless transactions, which are culturally relevant.

Environmental Impact: The app promotes digital-first shopping, reducing dependency on physical retail. This indirectly decreases transportation-related emissions and packaging waste.

Chapter 6: Planning

Timeline: 6 weeks (frontend, backend, integration, testing).
Budget: Minimal, using open-source tools only.

App Development Process (Aureva)
Gantt Chart



Chapter 7: Complex Engineering Problems

Challenges included integrating multiple payment methods, secure token handling, and ensuring responsive cross-platform design. Engineering activities involved backend API development, real-time synchronization, and system optimization.

Chapter 8: Conclusion

Aureva demonstrates a fully functional, secure, and user-friendly cosmetics e-commerce platform. The application provides an effective solution to counterfeit cosmetics and limited product availability in Bangladesh. Through React Native, the app ensures responsive design across multiple devices, while backend APIs enable dynamic updates and secure operations. However, limitations remain: the backend is not yet production-ready, and current payment gateways are mock implementations rather than live services. Future work should focus on integrating real-world payment providers, implementing AI-driven product recommendations, adding user review systems, and enabling order tracking through logistic APIs. These improvements would bring Aureva closer to a production-level system ready for large-scale deployment.

References

- [1] Alam et al., Mobile Commerce Adoption in Developing Countries.
- [2] Rahman et al., Fashion Retail Mobile App Prototype.
- [3] Lee & Kim, E-commerce Engagement via AR and Recommendations.