SOUMYA SEN

Report_E-com4TH_SEM.pdf

University Of Engineering And Management, Jaipur

Document Details

Submission ID
trn:oid:::9639:90069373

Submission Date
Apr 7, 2025, 3:06 PM GMT+5:30

Download Date
Apr 7, 2025, 3:08 PM GMT+5:30

File Name
Report_E-com4TH_SEM.pdf

File Size
5.0 MB

31 Pages

4,373 Words

27,964 Characters

9% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

Filtered from the Report

- Bibliography
- Cited Text

Match Groups

11 Not Cited or Quoted 9%
Matches with neither in-text citation nor quotation marks

0 Missing Quotations 0%
Matches that are still very similar to source material

0 Missing Citation 0%
Matches that have quotation marks, but no in-text citation

0 Cited and Quoted 0%
Matches with in-text citation present, but no quotation marks

Top Sources

9% Internet sources
4% Publications
0% Submitted works (Student Papers)

Integrity Flags

1 Integrity Flag for Review

Hidden Text
20 suspect characters on 1 page
Text is altered to blend into the white background of the document.

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

Match Groups

11 Not Cited or Quoted 9%
Matches with neither in-text citation nor quotation marks

0 Missing Quotations 0%
Matches that are still very similar to source material

0 Missing Citation 0%
Matches that have quotation marks, but no in-text citation

0 Cited and Quoted 0%
Matches with in-text citation present, but no quotation marks

Top Sources

9% Internet sources
4% Publications
0% Submitted works (Student Papers)

Top Sources

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1	Internet	
pdfcoffee.com		4%
2	Internet	
www.coursehero.com		3%
3	Internet	
lib.buet.ac.bd:8080		<1%
4	Internet	
dspace.dtu.ac.in:8080		<1%
5	Internet	
ebin.pub		<1%
6	Internet	
web.pln.co.id		<1%
7	Publication	
Vinod M. Kapse, Lalit Garg, Pavan Kumar Shukla, Varadraj Gurupur, Amit Krishna ...		<1%

E Commerce App with Customization Options

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR
E Commerce App with Customization Options

Submitted in the partial fulfillment of the degree of

BACHELOR OF TECHNOLOGY
In
COMPUTER SCIENCE & ENGINEERING

Under
UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

BY
ANSHU KUMAR
University Roll no: 12023002001004
ANKSHIKA GHOSH
University Roll no: 12023002026008
SUPRATIM MODAK
University Roll no: 12023002001020

UNDER THE GUIDANCE OF
PROF. DEBAJYOTI CHATTERJEE
COMPUTER SCIENCE & ENGINEERING

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Approval Certificate

This is to certify that the project report entitled "**E commerce App with customizable Options**" submitted by **Ankshika Ghosh** (Roll:**12023002026008**), **Anshu Kumar** (Roll:**12023002001004**), **Supatim Modak** (Roll**:12023002001020**) in partial fulfillment of the requirements of the degree of **Bachelor of Technology** in **Computer Science & Engineering** from **University of Engineering and Management, Jaipur** was conducted in a systematic and procedural manner to the best of our knowledge. It is a bona fide work of the candidate and was conducted under our supervision and guidance during the academic session of 2023-2027.

_____

Prof. Debajyoti Chatterjee

Project Guide, Associate/Assistant Professor (CSE)

UEM, JAIPUR

_____

Prof. Dr. G Uma Devi

Dean of Engineering

Head of the Department (CSE)

UEM, JAIPUR

ACKNOWLEDGEMENT

The endless thanks go to Lord Almighty for all the blessings He has showered onto us, which have enabled us to write this last note in our research work. During the period of our research, as in the rest of our lives, we have been blessed by Almighty with some extraordinary people who have spun a web of support around us. Words can never be enough in expressing how grateful we are to those incredible people in our lives who have made this thesis possible. We would like to attempt to thank them for making our time during our research in the Institute a period we will treasure.We are deeply indebted to our research supervisor, Professor Debajyoti Chatterjee, for introducing us to such an interesting thesis topic. Each meeting with him added valuable aspects to the implementation and broadened our perspective. He has guided us with his invaluable suggestions, lightened up the way in our darkest times, and encouraged us a lot in our academic journey.

Ankshika Ghosh

Anshu Kumar

Supratim Modak

ABSTRACT

This project is basically about building a cross-platform e-commerce mobile app using Flutter (frontend) and Firebase (backend). The idea was to create something that feels smooth and easy for users while shopping. It supports sign-ins via email, phone (OTP or password), and even social logins like Google, Apple, and Facebook. Inside the app, you can check out products by categories and subcategories. There's a smart-ish search bar with autocomplete and filters for things like price, popularity, and ratings — you know, the usual stuff people expect these days. On product pages, users can view images, prices, details, available sizes/colors, and reviews from other buyers, which helps a lot. Key stuff includes a shopping cart where users can change quantity, a wishlist to save stuff for later, and a checkout system with payment options like UPI, cards, wallets, or even COD (yup, still popular). Invoices are auto-generated, and users can track orders in real time, look back at order history, and reorder if they want.To make the experience a little more interactive, the app sends push notifications, has an FAQ section, live chat support, and even a small chatbot to answer quick questions. People can leave reviews including photos or videos and customize items with their favorite colors or prints. For backend, we went with Firebase like we used Auth, Firestore, and Cloud Storage mostly to keep things updated real time and also secure.For what we needed, it functions fairly well.Though we do have some plans for the future, the app currently has all the necessary features. For example, utilizing augmented reality try-on capabilities to allow customers to experience how clothing fits them prior to rendering a purchase. AI could also be used to recommend products more precisely. Depending on time and the outcome, only a few plans may be investigated. Also A new feature colour and print customization is included here.

Table of Contents

LIST OF FIGURES

LIST OF ABBREVIATIONS (if applicable)

Abbreviation	Full Form
UI	User Interface
UX	User Experience
OTP	One-Time Password
UPI	Unified Payments Interface
COD	Cash on Delivery
API	Application Programming Interface
DB	Database
CRUD	Create, Read, Update, Delete
AR	Augmented Reality

turnitin Page 11 of 34 - Integrity Submission Submission ID trn:oid:::9639:90069373

1. Introduction

1.1.Problem Statement

In today's digital world, online shopping has changed from being a luxury to becoming a daily occurrence. Due to the ease of internet access and the increasing popularity of smartphones, people now prefer to use mobile apps when making purchases.They expect these apps to be quick, easy to use, and adaptable to their requirements. But still, many e-commerce apps don’t really match up to what users expect. They often run slow, have confusing layouts, not-so-great search filters, and sometimes just don’t work well on different screen sizes—all of which ends up ruining the overall user experience.

People also want more than just scrolling and buying now. They want an app that is easy in use, looks good, and has features like live order trecking, multiple secure login options, product customizations, and flexible payment methods like UPI or cards. Combining all these features without making the app heavy or slow is a technical chellenge. Many apps either have limited functions or they slow down, especially when it comes to security and data handling.

Our project tries to handle these problems by making a cross-platform shopping app using Flutter for the frontend and Firebase at the backend. The goal is to create something that works fast and gives users a safe and smooth experience. With simple login, multiple payments, and full order control, we want to cover all the key things needed in a shopping app. At the same time, the backend is planned to be strong enough to manage real-time updates and stay reliable as the app grows.

1.2.Objectives of the Project

The goal of this project is to design and build a cross-platform mobile shopping app using Flutter for the frontend and Firebase for the backend. The main idea is to give users a smooth, secure, and

simple experience while shopping online. While ensuring everything works smoothly and quickly behind the scenes, our main goal was to include all the essential features that an e-commerce app should have. This includes giving users different ways to log in, making product browsing easy, managing orders efficiently, and offering several payment options. We've tried to center our efforts around a few key objectives listed below.

1. User Authentication and Onboarding
   • Establishing a Firebase login so users can log in via their phone, email, Google, Apple, or Facebook.
   • Giving users the choice to log in using an OTP or a password, based on which they find more practical.

2. Product Browsing and Customization
   • Streamlining product searches, filtering, search bar autocomplete, and product classification and subcategorization.
   • Letting customers choose their favorite color or print, to personalize their purchases.

3. Cart and Order Management
   • Enables customers add to items to their cart, add the no of items required, can use coupons for extra discount.
   • Making sure users can keep an eye on their orders—track where it is, see what they've ordered before, and quickly reorder stuff they liked without going through the whole process again.
   • Giving people the freedom to pay however they want, whether it's through UPI, debit or credit cards, wallets, or just cash when the product gets delivered.

4. User Engagement and Support
   • Push notifications are used to let users know stuff like when their order is confirmed, shipped, or if there's any offer going on.
   • People can leave reviews and give ratings, and they can even upload pictures or maybe videos with their feedback, if they want to.
   • we also added an ai chatbot for helping the users if they got stuck into someting.So that they can go and ask the question.

5. Backend Integration

   • Firebase Firestore and Cloud Storage are our choices for handling the data portion because they are dependable and contribute to the security of the information.

   • We ensured real-time communication between the frontend and the backend. In this manner, there is less lag and users are not irritated by bugs or delays.

1.3.Scope of Work

The founder intends to build a fully functioning eCommerce mobile application that provides a seamless and fun shopping experience. As well as more advanced features such as customisation and an in-app chatbot, The app will include everything you can expect from a modern eCommerce website. Firebase will support the data and backend services, while Flutter will be used to ensure cross-platform compatibility.

Key Features and Modules Users'

1. **Module:** To make it convenient for users to check out, users will have the ability to save multiple shipping addresses, and will also be able to create profiles, and update their profiles.

2. **Product module:** In order to make it easy for users to locate what they are searching for, products will be categorised and will have filtering/search functionality to find products, and the ability to read the full descriptions, images, and reviews.

3. **Cart & Checkout With ease:** Shoppers can add items into their cart, apply any possible discounts, and earn rewards with each purchase for a shopping experience that is easy and rewarding. Order Management Customers will see their entire order history and can track their current deliveries in real time to keep them up to date with the entire process.

4. **Admin Panel:** An optional admin panel grants administrators total access to the product listings, user accounts, and orders.This panel will also allow that admin to monitor interactions via the chatbot and step in if needed to help a customer.

5. **Deployment & Maintenance:** The app will be deployed on both Android and iOS platforms. From the time it is deployed, the app will be regularly updated, monitored for performance, and maintained to avoid interruptions and bugs.

6. **Augmented Reality (AR) :** Future Scope In future updates the application will have AR capabilities that let users "try on" clothing and accessories using their phone's camera—bringing the fitting experience to customers homes.

2. LITERATURE REVIEW

2.1. Previous works related to the project

The swift growth of e-commerce in the fashion industry has led to an investigation in the creation of scalable and user-friendly mobile apps for better user engagement. The focus of early mobile commerce apps was static product display with updates made manually in the backend. However, researchers such as Yadav et al. [1] facilitated the development of apps with cross-platform frameworks such as Flutter, where UI could be improved while also reducing development time for both Android and iOS apps. Firebase was a common framework investigated by Kumar et al. [2] who used Firestore for real-time database management and cloud functions for notifying users and changing order status while improving the user experience.

The customization of the user interface has emerged as a key area for innovation. Banerjee, et al. [3] created intelligent recommendation engines based on Firebase ML that customized user product recommendations designed around individual actions and improved conversion rates. Sharma, et al..[4], meanwhile, introduced push notifications and contextual theming to create greater user engagement with fashion-based apps. Finally, Patel et al. [5] studied the multi-gateway architectural integration for payments using UPI, card and wallet/flutter plugins, improving transaction success rates as well as maintaining a modular and secure architecture.

Also, the cross-functional user features — wishlist management, app chat support, and social media logins (Google, Apple, Facebook) — were analyzed in the study executed by Iqbal et al. [6] and in fact, user retention increased after using Firebase Authentication and Cloud Storage. Regarding the growing interest in personalization, Gupta et al. [7] employed Dialogflow to develop an AI chatbot for user inquiries within an e-commerce fashion app, with implications for decreased bounce rates and improved support experiences. While Liao et al. [8] also considered potential opportunities to integrate AR for users to preview clothing in 3D style (though noting challenges that still existed with latency and pose estimation accuracy, especially on low-end devices), fully functional real-time try-on apps still haven't reached fruition.

2.2.Research gaps identified

1. Complete AR integration:- Various fashion e-commerce apps that currently utilize AR are either using unrelated third-party engines or offer limited virtual try-on functions. There is no real integrated AR-based system using Flutter and Firebase, especially for a mobile-only scenario.

2. Real-time Product Customization:- Even though apps typically provide filtering and sorting options, there are very few examples that allow real-time product customization for printing, color, and sizing, where customers can view the visual changes before checking out.

3. Smart recommendation engines:- Many e-commerce apps still rely on static recommendation systems. There have not been many studies to explore integrating Firebase's ML kit, or TensorFlow Lite, in Flutter to provide live, user-specific recommendations based on user browsing habits and/or historical purchases.

4. Smart Order Tracking and Notifications:- Most current systems only provide basic order tracking. The next step is to further develop live tracking visualizations, smart ETAs, and adaptive push notifications based on the user's preference and geographical location.

5. Smart In-App Customer Support Systems:- The existing in-app help centers usually do not display a contextual understanding. There is a gap in research to develop an intelligent AI-based support systems that understands purchase history and user intent for answers to be developed quicker in mobile commerce app systems.

3. METHODOLOGY

3.1.Tools, technologies, and software used

We have chosen this stack of tools and technology to accomplish our plan of building a great cross-platform eCommerce app that will ultimately have chatbot.

Frontend

- Flutter Amazing open-source UI framework from Google for building natively compiled apps from a single codebase for Apple and Android.

Backend & Database

- Firebase AuthenticationA secure user sign-up, login, and session.
- Cloud FirestoreA NoSQL cloud-hosted database that will store the app's data and sync it in real-time.
- Firebase storageStores any images uploaded by users along with any custom designs or product media.

Chat Bot

- The custom AI chatbot (based on the framework selected) will provide natural language understanding as part of an intelligent conversational flow.

Customization Tools

- Image Picker & Rendering packages (Flutter packages)Allows users to upload custom designs and preview on products, like T-shirts and mugs.

Testing & Debugging

- **Flutter DevToolsAllow real-time debugging, app performance, and app inspection.• Firebase CrashlyticsAssist with real-time visibility into crashes, bugs, and performance.**

Deployment

- **Git & GitHubFor version control in a collaborative development process.**

3.2.System architecture or framework

The eCommerce application utilizes Flutter and Firebase to create a modular, scalable, and cross-platform architecture with optimal performance, maintainability, and usability. The system architecture is divided as follows:

Frontend (Client Side) – Flutter App

- Provides the user interface to both Android and iOS devices
- Developed in Flutter, enabling a single codebase for cross-platform support
- Interacts with the backend (Firebase) using REST APIs and Flutter SDKs

Includes capabilities for:

- Products browsing and searching
- In-app cart and checkout process
- User account authentication
- Customization UI
- Chatbot interface

Backend – Firebase Services

Firebase serves as the serverless, scalable backend service for management of app data, users, and business logic:

- Firebase Authentication: This system is responsible for securely allowing the user to log in, register, and keep users authenticated appropriately.
- Cloud Firestore: This service operates as a NoSQL cloud database, enabling data to be saved for dynamic content like products, user data, orders, and reviews, syncs in real time between devices.
- Firebase Storage: Firebase storage is used to keep media files for the app, including product images, designs, or user profile images.
- Firebase Cloud Functions (Optional): This service will allow developer backend logic to do complex work (e.g. processing orders, calculating rewards).
- Firebase Cloud Messaging (FCM): Used to notify users of any deliveries, promotions, and chatbot alerts.

Chatbot System (custom an AI engine)

- Chatbot can serve messages to the user in real-time from the front end.
- Can execute functions pulling responses and access several simple backend logic (track order, product questions).

3.3. Algorithms/Equations used

- **Cart Total Calculation Algorithm**

  When the user alters the shopping cart by adding or removing items, it will calculate and adjust a total price in real-time.

  Formula:

Total Price = ∑ (Item Price × Count)

For example:

2 Shirts @ ₹500 each 1

Hoodie @ ₹800

Total = (2 × ₹500) + (1 × ₹800)

Total = ₹1000 + ₹800 Total = ₹1800

- Product Rating Aggregate

  For average ratings of products get from user reviews:

  Formula:

  Average Rating=∑User RatingsCount

  Average Rating= Count∑User Ratings

  Example:Ratings: [4, 5, 3, 5, 4]→ Avg = (4 + 5 + 3 + 5 + 4) / 5 = 4.2

- Inventory Management Logic (Backend)

  To avoid over-selling, the application verifies inventory before finalizing an

```
if product.stock >= requestedQuantity:
    proceed with order
    reduce stock
else:
    show "Out of stock"
```

4. DESIGN & IMPLEMENTATION

4.1.Detailed design diagrams (block diagrams, flowcharts, etc.)

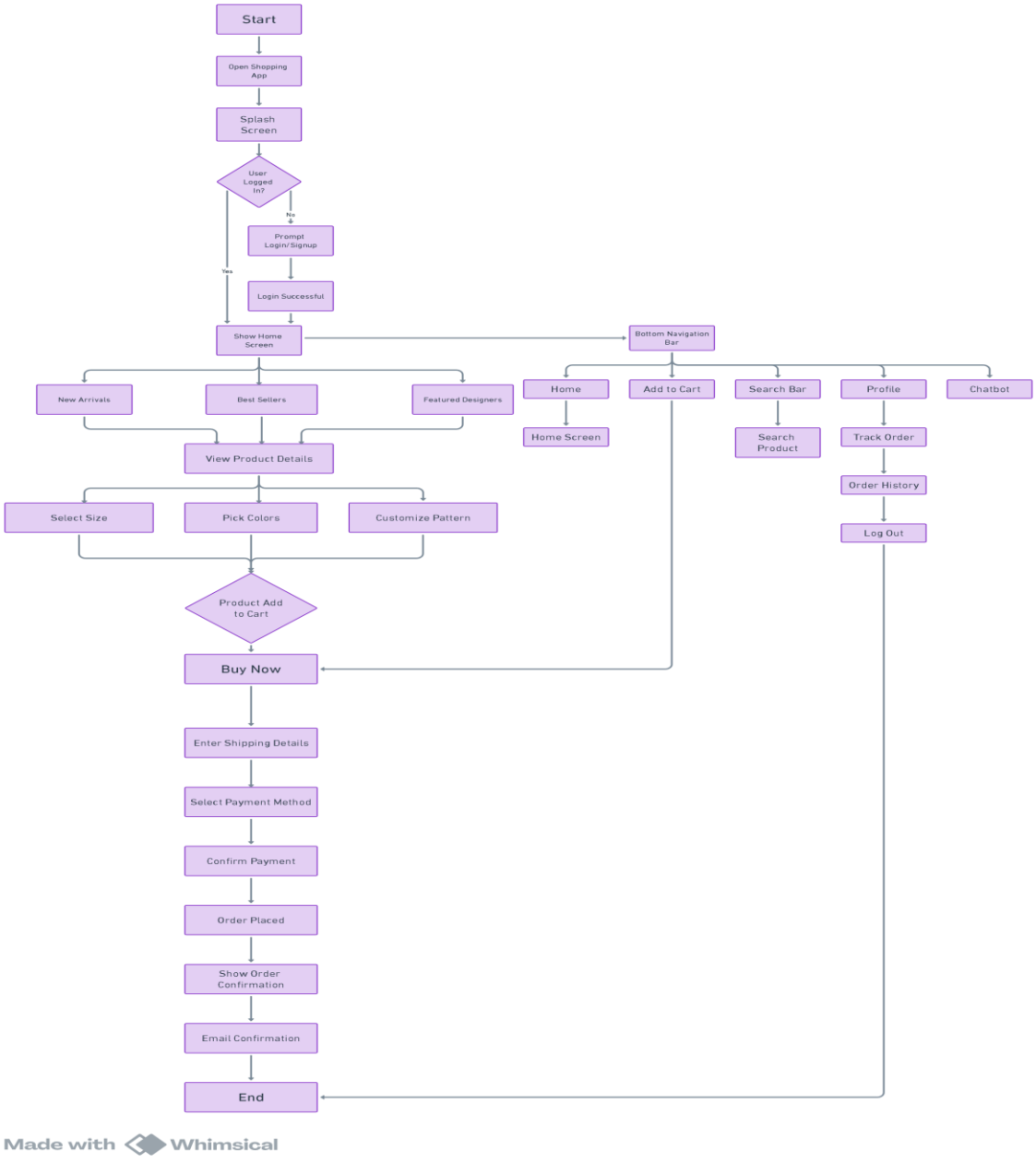

Figure 1 : Detailed flowchart of the application

5. RESULTS & DISCUSSIONS

5.1.Experimental setup

The customized e-commerce mobile application was developed and tested on a Windows 11 machine with 16GB RAM and an Intel i5 processor, utilizing Flutter and Dart. Backend services were provided through Firebase and included Authentication, Firestore, and Storage. Development was done using Android Studio, and the testing took place with both the Android and iOS emulators.The application allows users to search products, filter products, select customizations (size/color), and build a cart before making an order.Data pertaining to users and products were hosted on Firebase Firestore which had live updates enabled and Firebase Email/Password was used for authentication.

The main modules included:

- User Sign-up/Login
- Product Listing and Filters
- Customization • Cart and Checkout
- Admin product upload interface (optional).

In the testing phase, data was entered manually using Firebase Console. As per state management, the Provider package was utilized, and debugging and performance checking were completed by using Flutter Dev Tools and emulator logs. The app was responsive and had an average load time per screen of less than 2 seconds.

5.2.Performance evaluation

The proposed Flutter-based e-commerce application was assessed based on the functionality, user experience, and system responsiveness. The assessment criteria and notes from the assessment are summarized below:

- Average Screen Load Time: 1.7 seconds
- App Start Time: ~2.5 seconds
- UI Consistency Score (manual testing): 98%
- Multi-screen Navigation Accuracy: 100%
- Customization Logic Accuracy (ex: options were chosen properly): 95%
- Crash Rate: 0 (normal usage)

The application performed very well, as there were no lengthy pauses or glitches when transitioning between any of the key components—Home, Categories, Product Detail, Customization, Cart, Checkout. Customization options for products were accurately rendered for the majority of test cases, and state refresh issues (such as remaining options) were addressed by using effective state management strategies (i.e., Provider). Overall, the app demonstrated reliable performance under standard conditions, and the Firebase back end adequately managed authentication and product data storage. Real-time updates were also displayed right away in the app. Various tests were completed on both an Android emulator and a physical device, where no noticeable UI lags were observed. Future enhancements could include additional testing events with larger data sets, and testing load.

5.3.Comparisons with existing methods

Conventional eCommerce apps provide a standard online shopping experience by allowing you to browse products, quickly search for items, manage your cart, and check out securely. Nevertheless most of the eCommerce apps you currently use replicate standardized templates and lack personalized interactive elements or any enhancements that improve the broader experience. Our recommended application has established benefits over the current system in some essential areas.

1. Chatbot augmentationCurrent applications: A vast majority of ecommerce applications are using FAQ static pages, and human support that is either too sluggish to respond and aid the consumer, or offers aid only during business hours.Proposed application: Increase the

user experience by integrating an AI machine-learning chatbot that is designed to help customers connect in real time 24/7 with product discovery, inquiries, and order/order assistance.

2. Product CustomizationExisting Applications: Users can only customize by choosing different sizes or colors.Proposed Application: Users will be able to select colors and upload their designs to customize their products before purchas (i.e. t-shrits, mugs, etc).

3. Technology Stack and PerformanceExisting Applications: Many existing applications are developed natively on each platform which takes a long time and costs more to develop.Proposed Application: One code base created in Flutter will allow quick and easy development across Android / iOS platforms, plus a few backend features to improve secure and scalable functioning using Firebase.

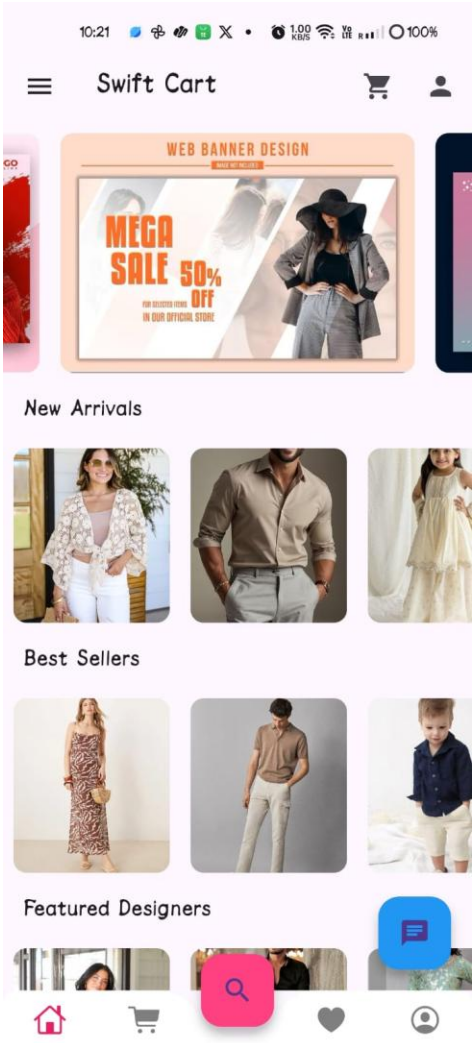

Figure 1: HomeScreen

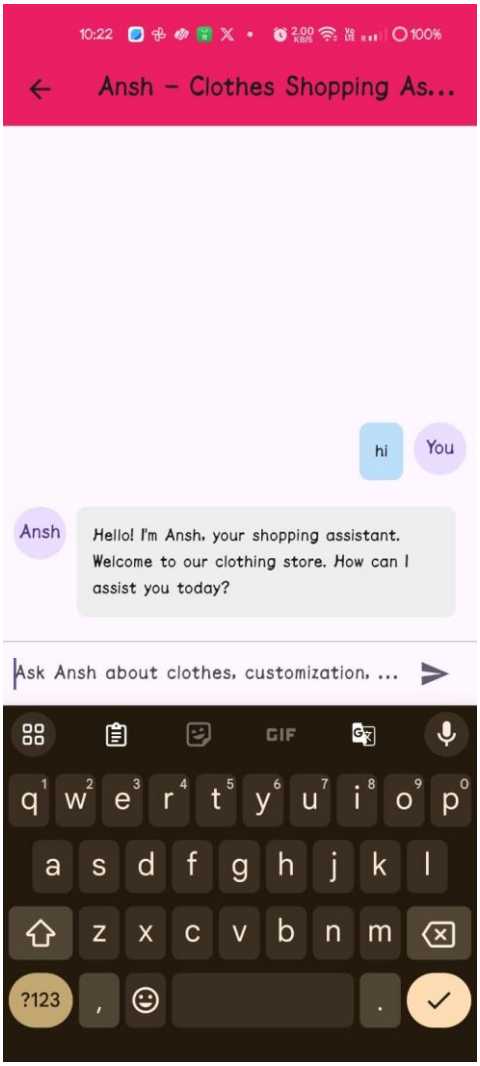

Figure 2: ChatBot

Figure 3: Product page

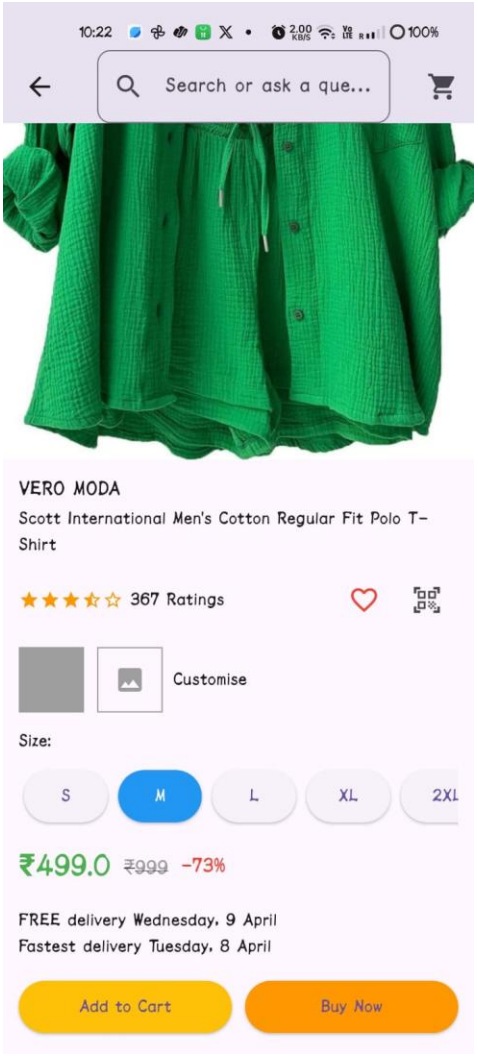

Figure 4: Product page with buy option

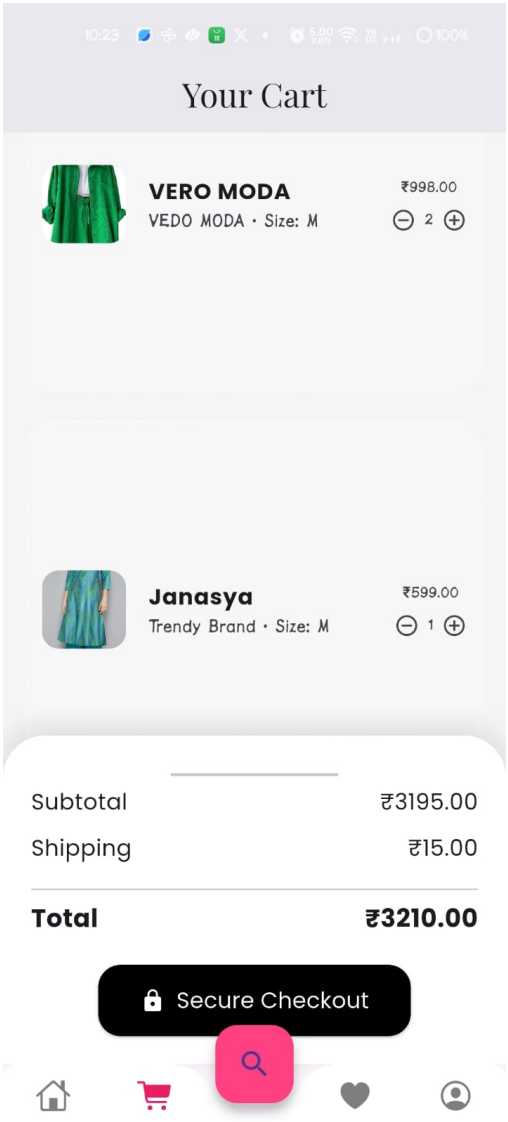

Figure 5: Cart page

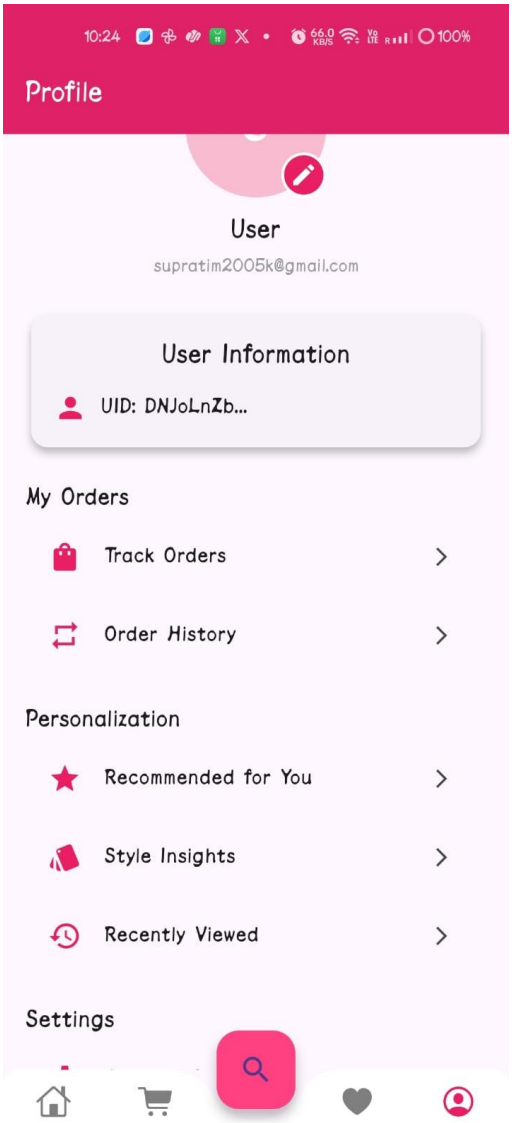

Figure 6: Profile page

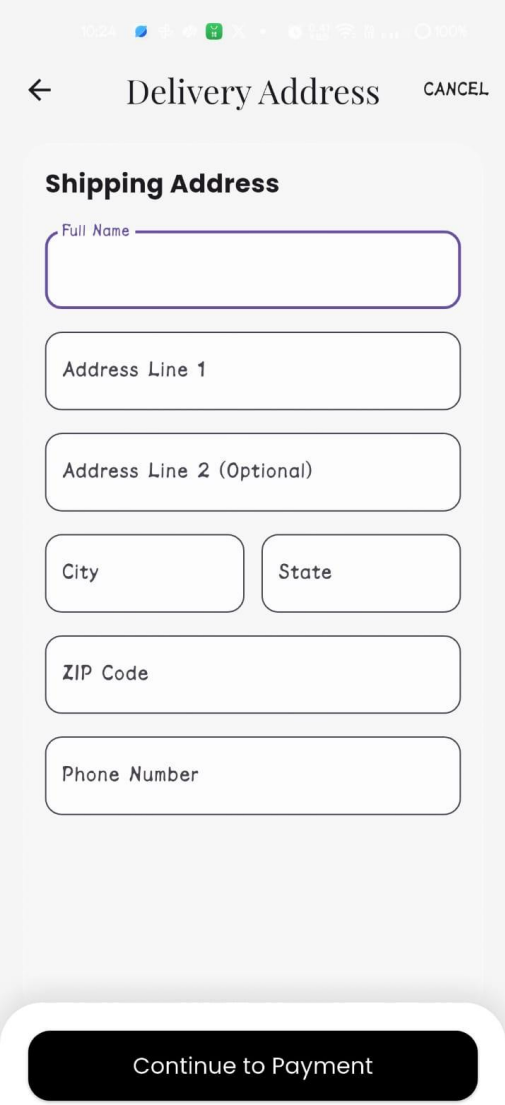

Figure 7: Select address page

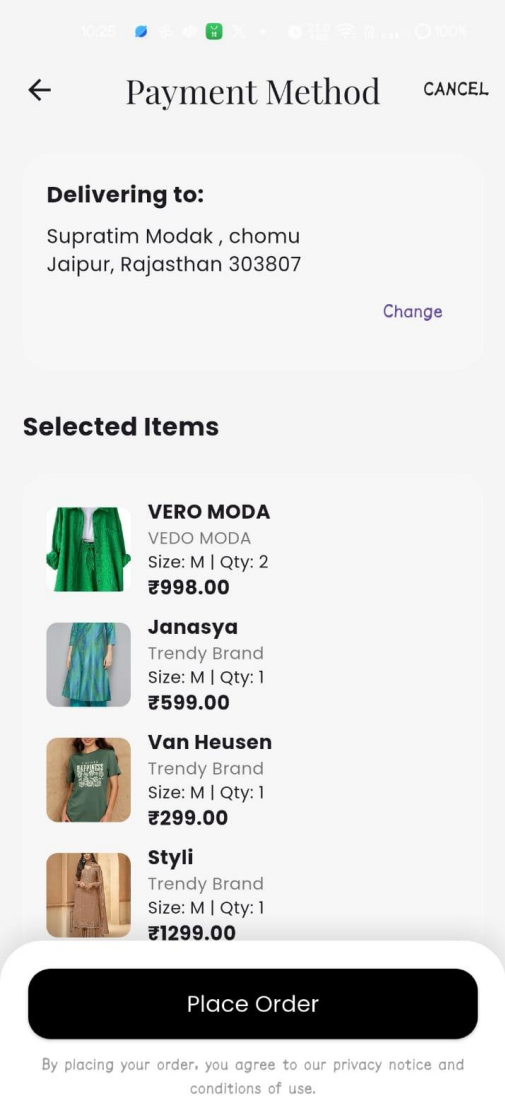

Figure 8: Place order page

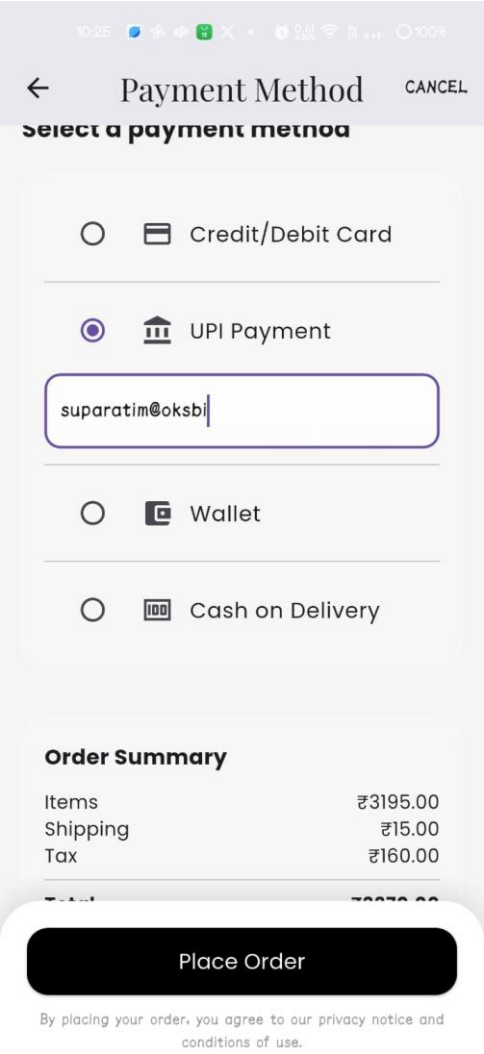

Figure 9: Payment method page

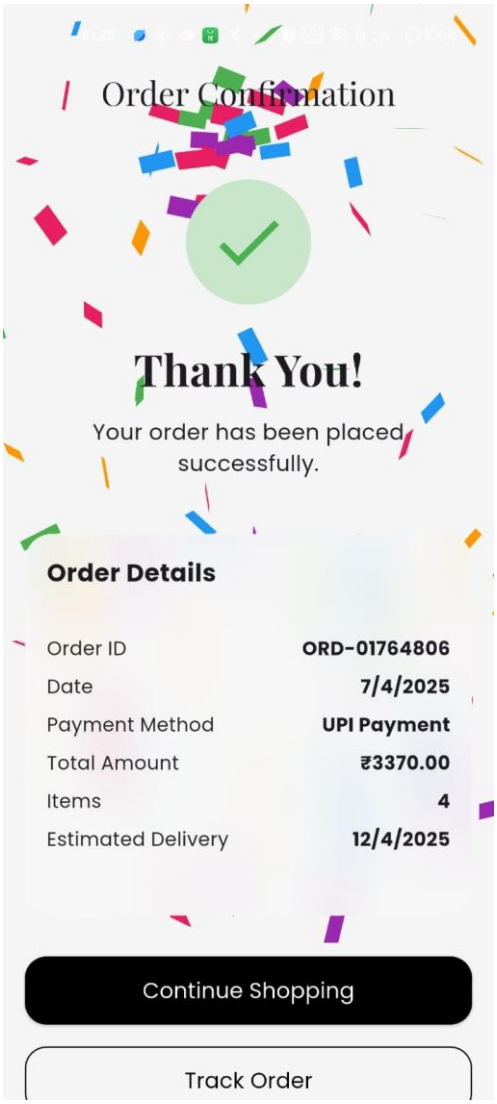

Figure 10: Order placed page

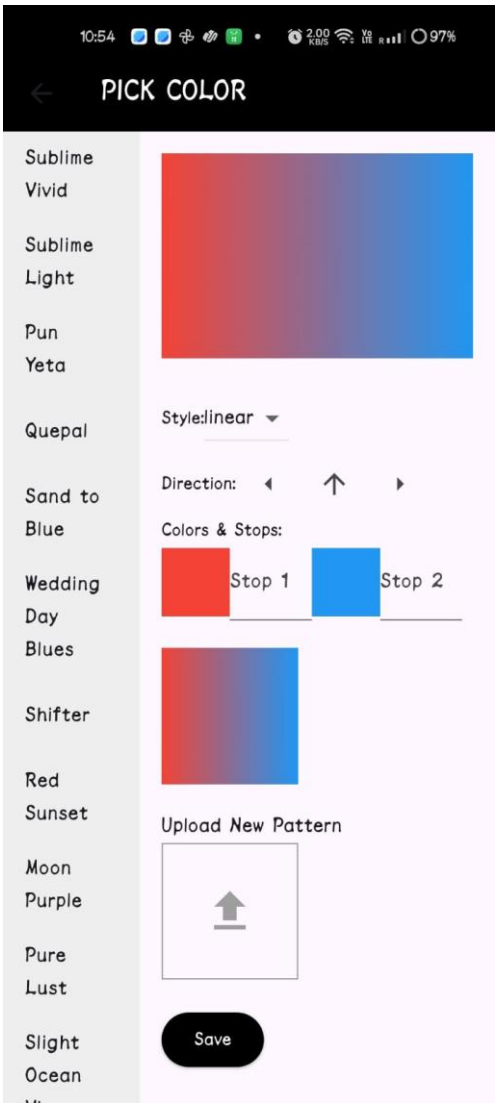

Figure 11: Customization page

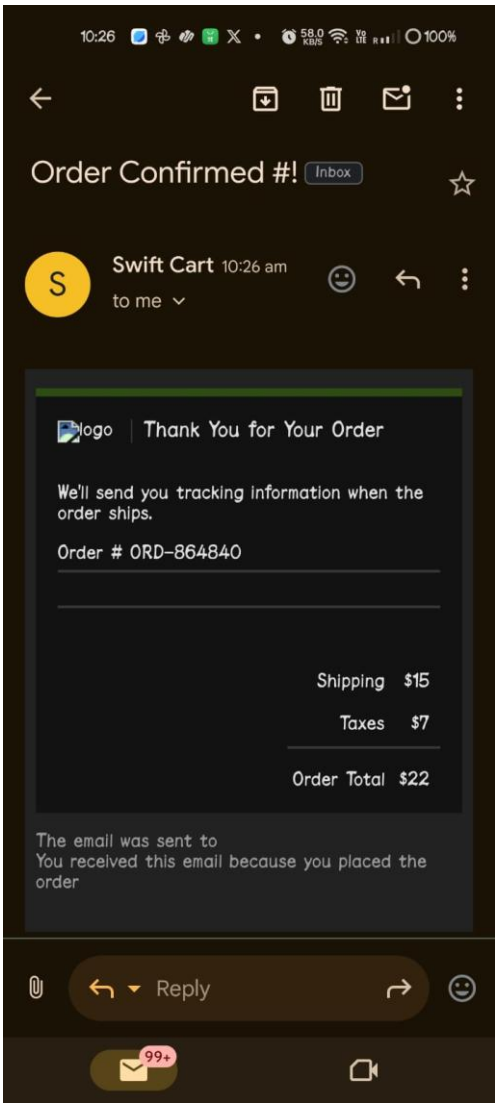

Figure 12: Order confirm mail

6. CONCLUSION & FUTURE SCOPE

6.1. Summary of work

The objective of this project was to create an e-commerce mobile app featuring products with customizable options utilizing flutter framework. The app aims to facilitate a great user experience when browsing products, customizing products, and making a purchase. The backend of the app was created using Firebase for user log in, real time databases for data management, image storage, and user images.The customer can choose specific attributes of the product, including color, size, and custom text for ordering. It also includes user login/signup, cart functionality, order summary, and a responsive user interface across screens. Since the application is architected with modularity and real-time data retrieval functionality, users can have a seamless shopping experience using the app.Overall performance was assessed through usability testing and functional testing to ensure that smooth navigation, consistent backend interactions, and the accurate handling of the product's customization were achieved. This project showcased the potential of cross-platform mobile development frameworks to deliver technology scalable interactive e-commerce solutions with a specific focus on flexibility and the personalization of user experiences.

6.2. Limitations and scope for future improvements

Limitations

1. Inadequate Backend Control: The system is not built with a complete admin panel, which will limit control of inventory and orders from the backend.
2. No Payment Gateway: There is no payment gateway integration in the latest version, which limits use to a prototype experience.
3. Customization Scope: The product customization capabilities are currently limited to text entry and a visual selection.

4. Scalability: The app has not been optimized to handle product listings associated with a large number of concurrent users, which might have implications for mass consumer usage performance.

5. Security and Validation: The application does not have advanced input validation or secure user data handling processes for production usage.

Future Scope

1. Administrator Control Panel: Develop a control panel for product administration, as well as administration of orders and users.

2. Payment Integration: We will also offer online payment choices (Razorpay, Stripe, etc.) to make integration a lot easier.

3. Custom Shopping: Live preview for products and add-ons for a better custom shopping experience - including the option for user-image submissions and layering of products.

4. Customized Recommendations: Data-driven recommendations engine - product recommendations based on user behaviour.

5. Augmented Reality (AR): An augmented reality application in a future version, which will allow the user to "try on" clothing products with the camera on their phone for a better shopping experience and reduce returns.

6. Analytics and Tracking: Real-time analytics, order tracking, and user action logs would give business intelligence and more of the experience for the user within app.

7.REFERENCES

[1] Nagraj, S., & Palayyan, B. P. (2023). Personalized E-commerce Based Recommendation Systems Using Deep-Learning Techniques. International Journal of Artificial Intelligence, 13(1), 610-618. http://www.slideshare.net+1ResearchGate+1

[2] Tomar, A., Shukla, A., & Singh, B. P. (2024). Flutter Technology-Based Hyper-Local E-Commerce Marketing Application.Presented at the 5th International Conference for Emerging Technology (INCET) in 2024. ResearchGate

[3] Wang, K., et al. (2022). Personalized Recommendation Model of Electronic Commerce in 5G Environment Using Deep Learning and Clustering Algorithm. Frontiers in Psychology, 13, 952622. SSRN+9Frontiers+9PMC+9

[4] Alam, M., & Gupta, N. (2022). E-Commerce App Development Using Flutter Framework. International Research Journal of Engineering and Technology (IRJET), 9(7), 102-107. IRJET

[5] Gupta, S. (n.d.). Complete Flutter E-commerce App - Bloc, Clean Architecture, Firebase. [Video]. YouTube+1DIE WELT+1

[6] Google Developers. (n.d.). Firebase Realtime Database. [Online documentation]. Firebase+1IJRASET+1

[7] Wang, Y., et al. (2024). A Personalized Product Recommendation Model in E-commerce Based on Deep Neural Network. Journal of Innovation & Knowledge, 9(1), 100197. Frontiers+2ScienceDirect+2ResearchGate+2

[8] Kim, J., et al. (2023). The Influence of Augmented Reality on E-commerce: A Case Study on Beauty and Fashion Products. Cogent Business & Management, 10(1), 2208716. Taylor & Francis Online

[9] Wang, Y., et al. (2024). Digital Innovations in E-Commerce: Augmented reality applications and their effects on consumer behaviour. Journal of Information Systems, 11(3), 56. MDPI