

E-Shop Android Application

Rishabh Jaiswal¹, Amaan Jambura², Shrutika Karanjekar³, Mihir Karira⁴, Meena Talele⁵

¹CO student, Dept. of Computer Engineering from VESP Mumbai, Maharashtra, India.

²CO student, Dept. of Computer Engineering from VESP Mumbai, Maharashtra, India.

³CO student, Dept. of Computer Engineering from VESP Mumbai, Maharashtra, India.

⁴CO student, Dept. of Computer Engineering from VESP Mumbai, Maharashtra, India.

⁵CO professor, Dept. of Computer Engineering from VESP Mumbai, Maharashtra, India.

Abstract - Using a device with very small screen size is not appropriate since the web shop's functionalities are not optimized to be accessed from these devices. E-Shop will be an android and E-Commerce App built from Flutter & Dart using Android Studio. For the database, we plan to use Firebase. Through this application, you can order your required item via cash on delivery payment option. This app will have a lot of scopes in present as well as in the future as e-commerce applications are something that can never get outdated and work upon the business. Whether it be a common person or a wealthy person, everyone may need to buy products conveniently and these apps may help for the same as well as faster access too.

Key Words: ecommerce mobile app, android application, flutter SDK, dart, Firebase

1. INTRODUCTION

Using a smartphone, which has a small screen, for browsing an online store is not an enjoyable experience. Using a device with a very small screen size is not appropriate since the web shop's functionalities are not optimized to be accessed from these devices. E-Shop will be an android and E-Commerce App built from Flutter & Dart using Android Studio. For the database, we plan to use Firebase. Through this application, you can order your required item via cash on delivery payment option. e-commerce app using Flutter with Firebase Firestore as the backend for storing user id, password, items in the cart, etc. This app will have user login functionality which will lead them into their account details, past orders, addresses, cart, etc.

This application will have a special functionality of admin login where admin can log in and verify the product which has been checked out by the user. Once the admin has confirmed the order, the order will be out for delivery. In the future, for further updates, we can add more payment options and add some more features for managing your account. This app will have a lot of scopes in present as well as in the future as e-commerce applications are something that can never get outdated and work upon the business. Whether it be a common person or a wealthy person, everyone may need to buy products conveniently and these apps may help for the same as well as faster access too.

2. LITERATURE SURVEY

E-commerce brings convenience for customers as they do not have to leave home and only need to browse websites online, especially for buying the products which are not sold in nearby shops. It could help customers buy a wider

range of products and save customers' time. Consumers also gain power through online shopping. This preference toward mobile apps is not surprising. Ecommerce applications are much more convenient to use while shopping, especially if you're not making a one-off visit to an online store. E-Commerce has improved business methods by giving the businesses the opportunity of selling goods and services on a universal basis. To give the customers not only the advantage of buying anytime, but also the advantage of buying anywhere, using a mobile device for E-commerce has become an alternative. Progression of wireless technology made mobile devices more popular. From the customer's point of view on one hand, it is advantageous to use mobile devices such as smartphones and take advantage of their mobility while surfing an online store, while on the other hand the shop owners benefit from fulfilling the customers desires. This new method of purchasing, which is more convenient for the consumers and more profitable for the shop owners, is called mobile commerce or in abbreviation m-commerce.

Buying goods and services via E-Commerce allows consumers the freedom to choose when and where to shop and the opportunity to research the product, the seller, and any other available options. Shopping has been revolutionized through the availability of online information. Just about anything that can be bought in a merchandise store can be bought via E-commerce, even perishables like groceries. And consumers have embraced these possibilities around the globe.[1]

The project is a basic e-commerce application. To make the android application, we used android studio. Android Studio offers a single platform in which you can create applications for Android phones, tablets, Android Wear, Android TV, and Android Auto. Structured code modules allow you to separate the project into functional units that you can create, evaluate, and debug separately. With the support of the Android Studio, we can easily build Android Studio for various Android models and screen sizes.

The rapid developments in the communication technologies result in crucial transformations in human life. One of these transformations is related to the changes in shopping styles. Along with the improvements in the internet, online shopping has been more popular among users. Consumers can shop from online stores that allow them to shop without physically going into shops (Dündar et al., 2007). Nowadays, the internet has been an essential business platform for the product trade of products between organizations and consumers and even between consumers themselves.[2]

3. EXPERIMENTAL SETUP

For this project java programming language is used and is built from Flutter & Dart libraries using Android Studio. For the database we have used Firebase to store user details and item information. Their short information is noted below:

- **Android Studio:** Android Studio provides a unified environment where you can build apps for Android phones, tablets, Android Wear, Android TV, and Android Auto. Structured code modules allow you to divide your project into units of functionality that you can independently build, test, and debug. With the help of the android studio, we can easily develop android studio for different android versions and screen sizes.
- **Flutter SDK:** To overcome the problem, where different languages are required to build apps for different operating systems, Google developed Flutter SDK, what Flutter does is, that you have to write only one piece of code, for desktop applications android applications, and IOS applications. Flutter is Google's portable UI toolkit for crafting beautiful, natively compiled applications for mobile, web, and desktop from a single codebase. Flutter works with existing code, is used by developers and organizations around the world, and is free and open source.
- **Firebase:** Firebase is a Backend-as-a-Service (Baas). It provides developers with a variety of tools and services to help them develop quality apps, grow their user base, and earn profit. It is built on Google's infrastructure. Firebase is categorized as a NoSQL database program, which stores data in JSON-like documents.
- **Dart:** supports most of the common concepts of programming languages like classes, interfaces, functions, unlike other programming languages. Dart language does not support arrays directly. It supports collection, which is used to replicate the data structure such as arrays, generics, and optional typing.

4. PROJECT PROCEDURE AND FLOW

- We start by downloading an android studio on our personal laptops. We installed it with the following given configurations with an android emulator to test the app while building it. We also installed Flutter SDK on our laptop.
- Then we started building the application by first building up the login and signup pages UI and connected it to backend software which we were using as Firebase. Thus we completed user verification for logging the application.
- Then we started building the admin module i.e its login page and its home screen. We first started designing the UI of the login page for admin and connected it to the backend i.e to Firebase so the admin can be verified and logged in successfully.

- Then we designed the home screen for the admin module and added its feature to add new items to the application. Once the admin adds the item it will be added to the backend table which is made in Firebase.
- After finishing the admin module, We added and designed AppBar and drawer in our application.
- Then we connected the home screen to the firebase and displayed the item on the home screen.
- Then we added the cart functionality i.e a user can add items into the cart, delete items, and view items from the cart.
- Then we added the address screen once the user clicks the checkout option.
- And then we added the functionality to place the order via selecting the “Cash on Delivery” option and other features like the user can view their old orders, arriving order, etc.
- In the end, we added admin functionality to confirm the user's order, and that order may proceed for delivery and complete the application.

5. What is Flutter SDK?

Flutter is a free and open-source mobile UI framework created by Google and released in May 2017. In a few words, it allows you to create a native mobile application with only one codebase. This means that you can use one programming language and one codebase to create two different apps (for iOS and Android).

Flutter is a new cross-platform technology that promises high-performance apps that feel natural on different platforms[3]. It provides widgets for Android and iOS that deliver a highly native experience. This new technology could therefore be a good candidate to create cross-platform apps that provide high user satisfaction.

Flutter consists of two important parts:

- **An SDK (Software Development Kit):** A collection of tools that are going to help you develop your applications. This includes tools to compile your code into native machine code (code for iOS and Android).
- **A Framework (UI Library based on widgets):** A collection of reusable UI elements (buttons, text inputs, sliders, and so on) that you can personalize for your own needs.

To develop with Flutter, you will use a programming language called Dart.

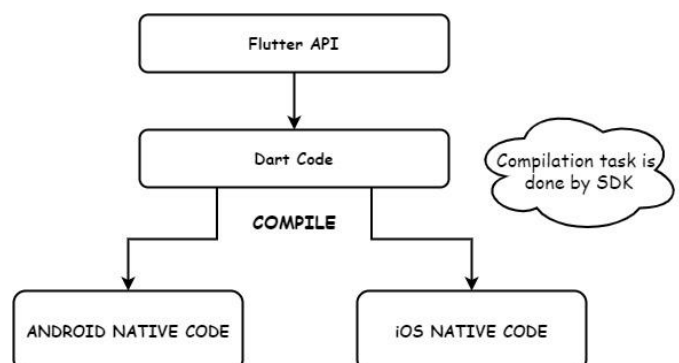


Fig1. Working of Flutter

6. Dart Programming Language

Dart is a programming language designed for client development, such as for the web and mobile apps. It is developed by Google and can also be used to build server and desktop applications.

Flutter apps are using the Dart programming language. Dart is developed and maintained by Google. It was developed as a successor to Javascript and incorporates many of the features in the ES7 Javascript standard [4].

As mentioned before, Dart is compiled ahead of time. This allows for faster execution and avoids the Javascript bridge. The code still needs an interface to communicate with the platform code. This is however much faster than the Javascript bridge. Flutter also do not utilize the platform OEM widgets, reducing the number of times communication with the platform occurs [5].

Dart is an object-oriented, class-based, garbage-collected language with C-style syntax. Dart can compile to either native code or Javascript. It supports interfaces, mixins, abstract classes, reified generics, and type inference.

7. What is Firebase?

Firebase is a toolset to “build, improve, and grow your app”, and the tools it gives you cover a large portion of the services that developers would normally have to build themselves, but don’t really want to build, because they’d rather be focusing on the app experience itself. This includes things like analytics, authentication, databases, configuration, file storage, push messaging, and the list goes on.

Firebase real-time database feature is very easy to use. Once the Firebase and database dependency is added to the app, unstructured data can be added to database by the following code [6]:

```
//Write a message to the database
FirebaseDatabase database = FirebaseDatabase.getInstance();
DatabaseReference myref=database.getReference("node");
myRef.setValue ("Hello, World");
```

When I say “hosted in the cloud”, I mean that the products have backend components that are fully maintained and operated by Google. Client SDKs provided by Firebase interact with these backend services directly, with no need to establish any middleware between your app and the service. So, if you’re using one of the Firebase database options, you typically write code to query the database in your client app.

This is different from traditional app development, which typically involves writing both frontend and backend software. The frontend code just invokes API endpoints exposed by the backend, and the backend code actually does the work. However, with Firebase products, the traditional backend is bypassed, putting the work into the client. Administrative access to each of these products is provided by the Firebase console.

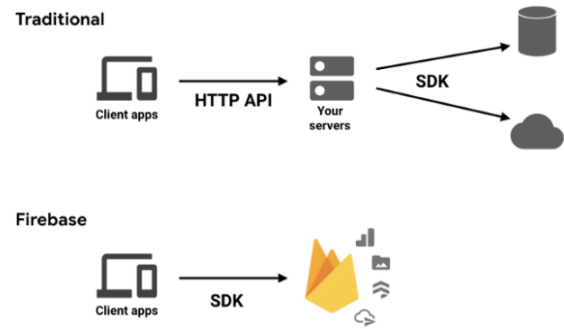


Fig2. Advantage of Firebase over other database

8. Basic Flow of the Application

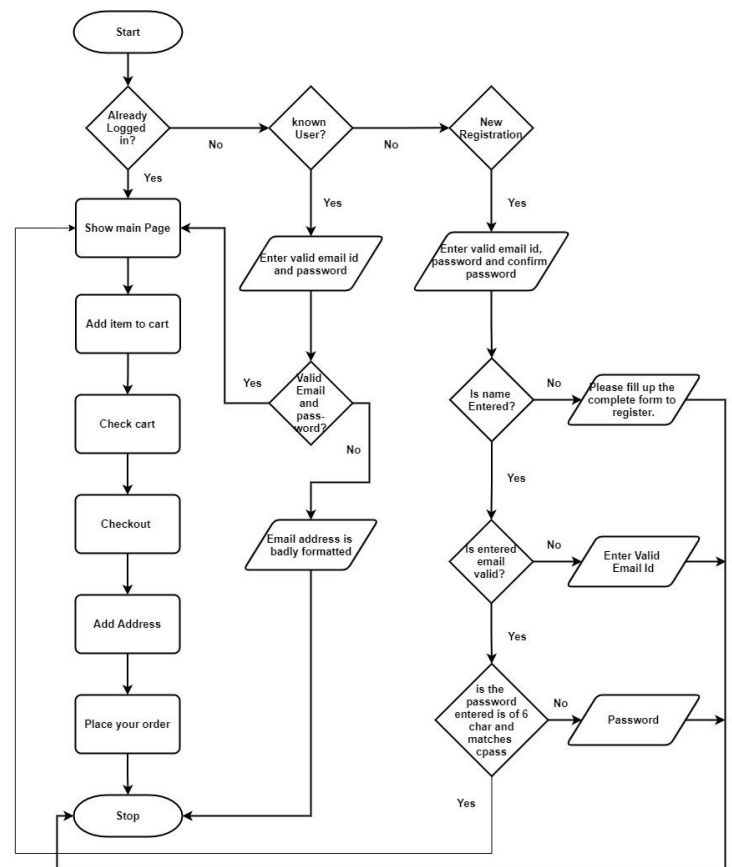


Fig3. Flowchart for user login

The algorithm for user login :

- Start i.e Open the app
- Access to your E-Shop account. If you don't have an account, create one by signing into the app
- Add the product in your cart.
- Proceed for checkout.
- Select cash on delivery option and wait for confirmation.
- Stop.

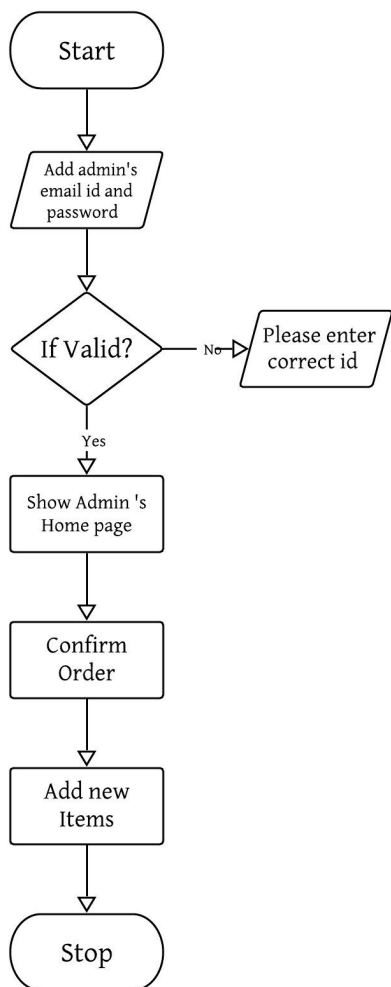


fig4. Flowchart for admin login

The algorithm of admin login:

- Start i.e Open the app
- Click on 'i am Admin' option
- Enter valid username and password and click on LOGIN
- Confirm the orders received by the users.
- Add some products in the store
- Stop i.e Logout.

9. CONCLUSION

From the research we understood that, people are moving more towards ordering items via application, as it saves time of going and buying the items physically and much faster than shopping from the websites..

From the application we made during a pandemic time, we can also say e-commerce applications can be more helpful for door to door services and saves a lot of time with more of such advantages:

- Faster buying process
- Store and product listing creation
- Cost reduction
- Affordable advertising and marketing
- Flexibility for customers
- No reach limitations
- Product and price comparison
- Faster response to buyer/market demands

10. FUTURE RESEARCH

This app will have a lot of scope in present as well as in future as e-commerce applications are something that can never get outdated and work upon the business . Whether it be a common person or a wealthy person, everyone may need to buy products in a convenient way and these apps may help for the same as well as faster access too. In the future, further updates, we can add more payment options and add some more features for managing your account.

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