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(Polytechnic), Chopda**



[Year 2020-2021]

Department of Computer Engineering

**Capstone Project Report
On
Hyperlocal Digital Market
(AapanaVypar)**



**Maharashtra State Board Of Technical Education,
Mumbai**

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Chapter-1

Introduction

1. Aim/Objective

To promote micro, small and medium enterprises to achieve the mission of AtmaNirbhar Bharat.

2. Introduction

In today's world there is increasing growth and attraction towards online shopping in which lock down gives it more boost so that more and more people are now preferring online shopping rather than traditional shopping way because these shops which are already selling online earn more profit than ever and shops which don't tend towards extinction.

This leads towards poverty and unemployment so to prevent this disaster we got an innovative idea to make a platform which provides business to local sellers and service providers. This enables them to sell their goods and get some business online this leads towards increase in profit.

3. Identification and Justification of Problem

The widespread closing of stores and businesses in India and around the world due to the coronavirus is unprecedented. Stores, factories, and many other businesses have closed by policy mandate, downward demand shifts,

health concerns, or other factors. Many of these closures may be permanent because of the inability of owners to pay ongoing expenses and survive the shutdown. The impact on small businesses around the world is likely to be severe.

4. Proposed Methodology

We are enabling local sellers to sell goods online. Consider the situation where the user uses the application to search for a particular product, then the platform will provide the best result based on the user's location, as a result the user will receive the list of shops with the details of available products so that the user will be able to get whatever he wants from a single platform.

5. Organization

To bring this project live, We have a deadline of 3 months. So we decided to divide this project into modules which helps us to easily manage this project and these modules are assigned to a particular team member with a responsibility to complete and test that module in a decided time period so that all members can work coordinately to bring this project live in specified duration of time. We are working in a great manner, that's why we hope our project will be best in class

Chapter-2

Literature Survey

1. Existing System

We Survey over different apps and websites which provide similar types of service. Some of which are listed below -

- **Google Maps :**

Provides location of shop along with info.

- **Bajar App :**

Provides location and information about the shop.

- **Flipkart :**

We can buy products from it.

- **Amazon :**

We can buy products from it.

- **Zomato :**

Provide Location based food delivery service.

- **Swiggy :**

Provide Location based food delivery service.

2. Refining Idea

As we were about to start the development of our final year project (Capstone Project), we surveyed different digital platforms And the businesses like Amazon, Google Maps, Bazaar, Flipkart, Amazon, Swiggy, Zomato, Shopify and few more. We studied their whole idea and identified the things they are providing with their platforms. We found that every platform is doing their best to provide a better experience to their customers And reaching their commitments. Every platform is giving reliable services.

Following is the list of the platforms, with their work mode:

a) Amazon : Amazon Business is a service that provides registered business owners with a consolidated platform for buying products and supplies from Amazon. Business users have access to shipping benefits, discounts on eligible products, purchase analytics, and price comparisons from different sellers.

b) Swiggy : Swiggy is India's largest online food ordering and delivery platform providing location based food delivery service.

c) Google Maps : Google Maps is a web mapping platform and consumer application which Provides location of stores, banks, buildings, halls, or any landmark along with info.

d) Flipkart : It works as a marketplace which means that it is a middle platform that connects all interested sellers to various customers and assists in making the sale.

e) Zomato : Zomato provides information, menus and user-reviews of restaurants as well as food delivery options from partner restaurants in select cities. provide Location based food delivery service.

After considering and analysing the main ideas implemented by these popular business holders, We got inspired and we decided to design a single platform,which will serve reliable service to the customers and provide the platform for shopkeepers to make their products available to the people digitally.

Our System provides location based search results and indicates the nearest shops on google map from where a user can view a shop profile and make the required orders.

3. Software Requirement Specifications

Following are software requirements that we have,

- UI components should be provided to create his profile.
- Easy and simple UI should be provided for logIn and SignUp to the system.
- All the interactions of users with the platform should be done in a secure way.
- If a user forgets his/her password then there should be a way so that they can recover their account. (Password Recovery).
- A location specific view should be provided to the user based on his location
- Users should be able to select/view products based on the selected category.
- Users should be able to see the available quantity of products as well as the status of the shop whether they are available or not.
- Payment methods should be provided so that users can buy the product.
- Users should be able to apply filters to the products so they can find their required one easily EX - (Products having price between 5000-10000).
- Users should be able to pin their favourite shops.
- User should be able to see his/her purchase history.
- Product specific views should be provided for each product.

- User's location wise suggestions for the nearest shop.
- Application should be able to understand the user's intent for the query and provide results based on that.
- Location based calculation of delivery charges
Map based location and details of the shop should be provided.
- UI component in app to show nearby shops
Available discounts offers should be listed for particular shops.
- Users should be able to track their order status.
Special days offers should be listed on the user interface.
- Users should be able to add items to the cart.

Chapter-3

Technologies Used

1. Android - Java :

Java is the technology of choice for building applications using managed code that can be executed on mobile devices.

Android is an open source software platform and Linux-based operating system for mobile devices. The Android platform allows developers to write managed code using Java to manage and control the Android device. Java has been widely popular the world over, primarily because of a vast array of features it provides.

Android applications can be developed by using the Java programming language and the Android SDK. So, familiarity with the basics of the Java programming language is a prerequisite for programming on the Android platform.

2. Go Language for backend :

Go is a statically typed, compiled programming language designed at Google by Robert Griesemer, Rob Pike, and Ken Thompson. Go language makes an ideal choice for backend web development, particularly for high-performing concurrent services on the server side.

Go is syntactically similar to C, but with memory safety, garbage collection, structural typing, CSP-style concurrency and has a low memory footprint.

Go has all of these great features along with great community, framework and documentations so the Go language is the best choice for backend.

3. PASETO :

PASETO is a new specification (currently a draft RFC) that allows you to create secure and stateless tokens that can be safely shared over the web. Essentially, PASETO allows you to take JSON data and condense it into a single token you can easily share over the internet in a safe, tamperproof way. This is useful in a number of different circumstances.

PASETO provides security as needed and it has standard implementations across many popular languages so it is not going to create any hurdles while development so it is a great choice for token standard.

4. Token Exchange Mechanism :

A token exchange mechanism is used for authorization, authentication and to identify the individual.

In the heart of token exchange mechanism there are two tokens one is refresh token and second one is auth token. These tokens have expiry, access specifier and user identifier to make these tokens unique for all users every time.

In this mechanism, every time when a user logins to the system a set of refresh token and auth token are granted to the user. These tokens are used by the user to access protected resources. When the auth token expires, at that time the exchange of the token happens. The user sends his refresh token and then server validates the token and if all seems good to the server then it returns a new auth token to the user for accessing the resources and this cycle repeats until the refresh token gets expired.

5. Docker And Docker-Compose :

- i. Docker : Docker is a tool for defining and running single-container Docker applications.

- ii. Docker-Compose : Docker Compose is a tool for defining and running multi-container Docker applications.

6. PostgreSQL :

Postgres, is a free and open-source relational database management system (RDBMS) emphasizing extensibility and SQL compliance.

PostgreSQL features transactions with Atomicity, Consistency, Isolation, Durability (ACID) properties, automatically updatable views, materialized views, triggers, foreign keys, and stored procedures. It is designed to handle a range of workloads, from single machines to data warehouses or Web services with many concurrent users.

7. MongoDB :

MongoDB is a source-available cross-platform document-oriented database program. Classified as a NoSQL database program, MongoDB uses JSON-like documents with optional schemas. MongoDB is developed by MongoDB Inc. and licensed under the Server Side Public License (SSPL).

MongoDB offers faster query processing but with an increased load and system requirements. So it will be a little experiment to test the capability of mongoDb.

8. Redis :

Redis is an open source (BSD licensed), in-memory data structure store, used as a database, cache, and message broker. Redis provides data structures such as strings, hashes, lists, sets, sorted sets with range queries, bitmaps, hyperloglogs, geospatial indexes, and streams.

a) Redis Streams : The Stream is a new data type introduced with Redis 5.0, which models a log data structure in a more abstract way.

b) Redis Search : RediSearch is a Redis module that provides querying, secondary indexing, and full-text search for Redis.

c) Redis as a cache : Redis is a NoSQL key-value cache that stores the information in a hash table format, providing the possibilities to store different types of structured data like strings, hashes, lists, sets, sorted sets, bitmaps and hyperloglogs.

9. GRPC :

GRPC stands for gRPC Remote Procedure Calls is an open source remote procedure call (RPC) system initially developed at Google in 2015 as the next generation of the RPC infrastructure Stubby. It uses HTTP/2 for transport so it inherits some great features that HTTP/2 offers, such as binary framing, which is high performance and robust, lighter to transport and safer to decode compared to other text-based protocols, Protocol Buffers as the interface description language, and provides features such as authentication, bidirectional streaming and flow control, blocking or nonblocking bindings, and cancellation and timeouts.

GRPC is roughly 7 times faster than REST when receiving data & roughly 10 times faster than REST when sending data for this specific payload.

It generates cross-platform client and server bindings for many languages. Most common usage scenarios include connecting services in a microservices style architecture, or connecting mobile device clients to backend services. gRPC uses protocol buffers by default as the definition language and message format.

10. Microservice Based Architecture :

It is a variant of the service-oriented architecture (SOA) and its structural style arranges an application as a collection of loosely coupled services. In a microservices architecture, services are fine-grained and the protocols are lightweight. Microservice architecture structures an application as a collection of services that are

- Highly maintainable and testable
- Loosely coupled
- Independently deployable
- Organized around business capabilities

The microservice architecture enables the scale, rapid / frequent development of applications and the reliable delivery of large, complex applications. It also enables an organization to evolve its technology stack.

Chapter-4

System Level Design

1. Details

The Architecture of AapanaVyapar is based on microservice based architecture in which work is distributed over many microservices where each microservice has a certain set of responsibilities which they have to perform. The microservice architecture is highly efficient in handling loads at the scale and providing stable performance. In this project we distributed our workload across 9 different microservices where each of these services is designed for a specific purpose and can scale to sky.

The Architectural diagram shows how different services are connected with each other; every service works with / for another service to maintain the sync of the system and provide reliable response to the user. The system is architect in a way that it provides endurance against some common failures like database failure.

a) General Data Flows

1. The First service is an authentication service where the user first requests. With an authentication service the user first creates an account and receives the auth and refresh token.
2. After receiving tokens user requests to the viewprovider service which then validates the token and based on that stores the user's identity and provides data to the user.

Whenever a user adds or deletes likes to products or adds or removes products from cart at that time the request is fulfilled by viewprovider service by adding data to redis streams and then worker service update database with that.

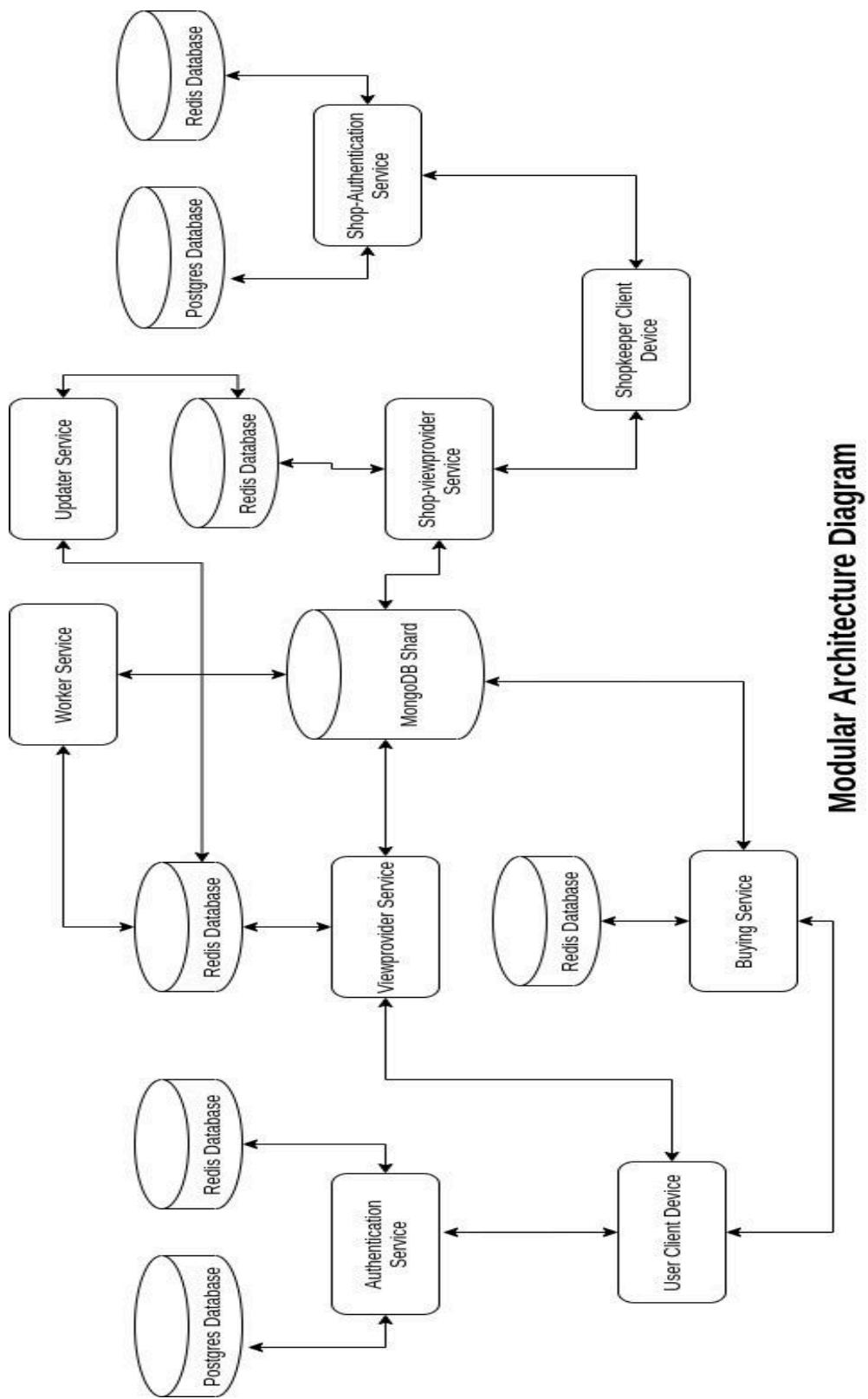
3. In case when the user wants to buy products then the user requests the buying service and then communicates with the buying service until order gets successfully placed.
4. Whenever any new product or shop gets added or data of product gets updated at that time shop-viewprovider adds data to database and redis stream so that updater service receives data from stream and then updates the cache of viewprovider so that all cache will be in sync with database.

b) Highlights

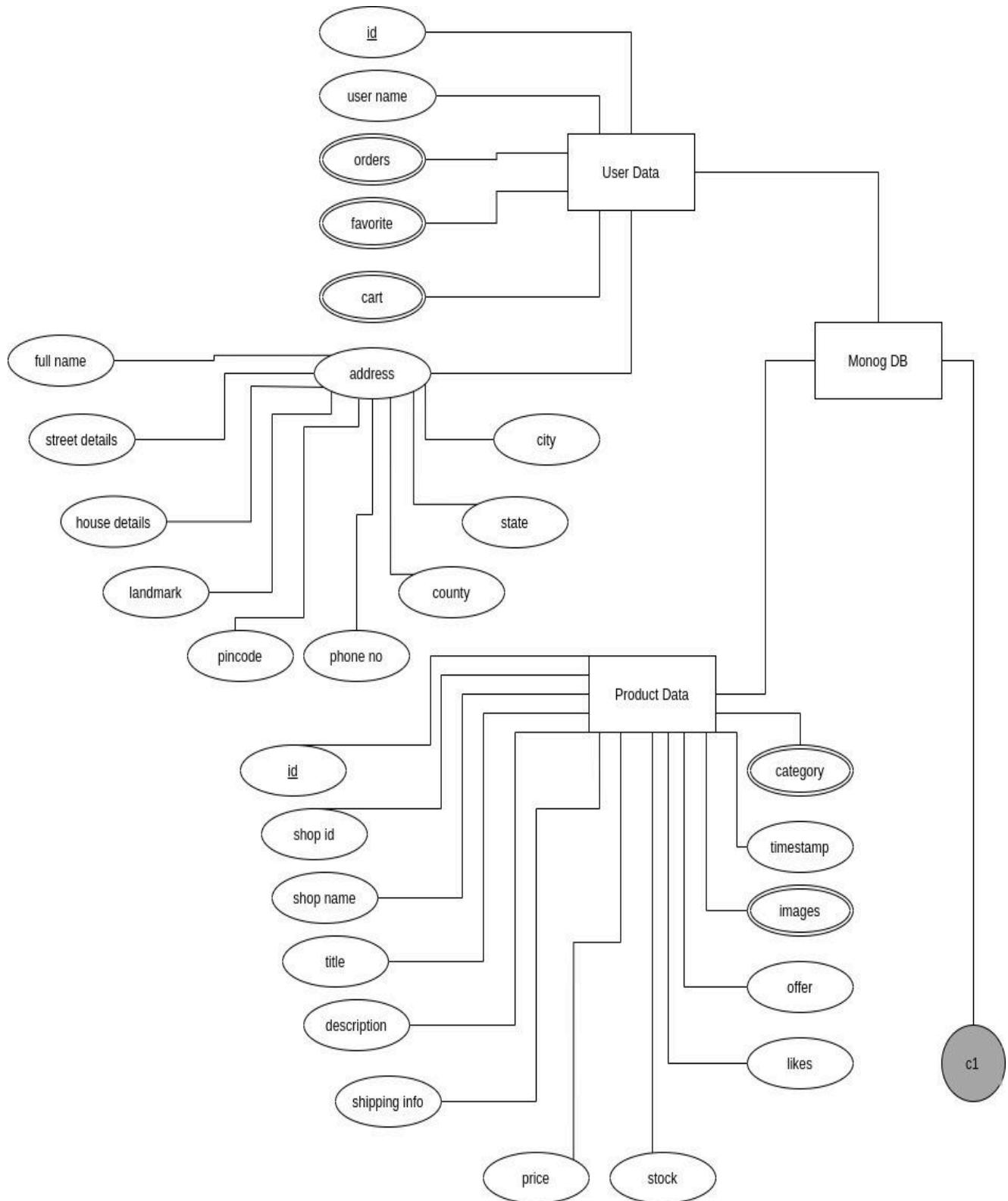
1. Each service is designed by taking scale and performance in mind.
2. Each service has zero local storage.
3. Each service has a low memory footprint within their respective container.
4. Each service has its own redis cache which enables scale and performance.
5. Service never directly communicates with each other which ensures security and scale when service are deployed on geographically distinct places.
6. System is capable of serving general requests for some amount of time when the database goes down.
7. In case any shopkeeper wants to register/login with a system that communicates with the shop-authentication service and gets an auth and refresh token for further processing.
8. Whenever any shopkeeper performs any shop related task at that time it communicates with the shop-viewprovider service.
9. System uses redis streams for most general requests like add-like, add-to-cart, remove-like, remove-from-cart to enable high speed response.

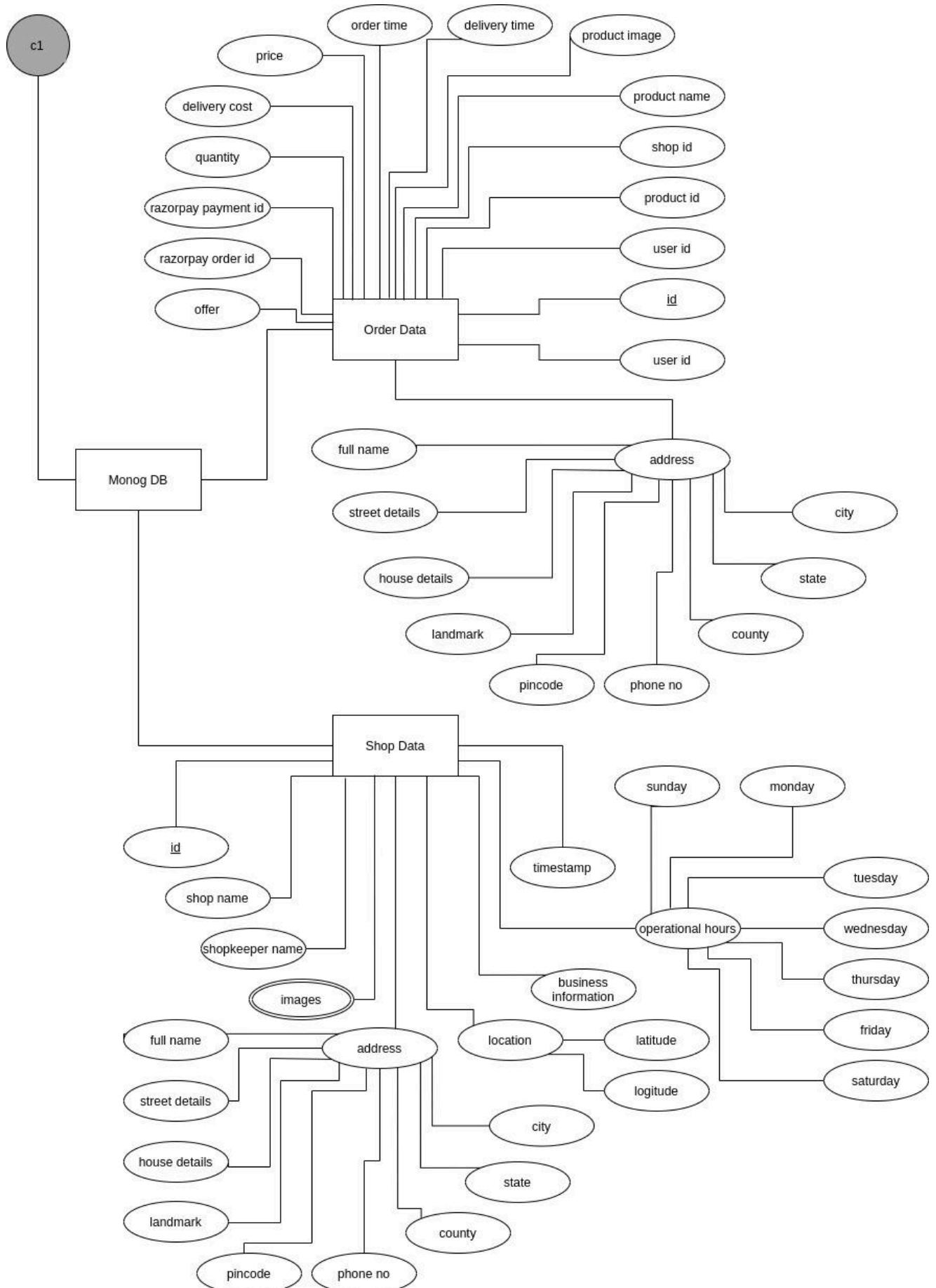
2. Diagrams

a) Modular Architecture Diagram



b) ER Diagram





Chapter-5

Module Level Design

1. Authentication :

What is Authentication ?

Authentication is the process of recognizing a user's identity. It is the mechanism of associating an incoming request with a set of identifying credentials. The provided credentials are compared to those in a database within an authentication server and results are provided accordingly. Three categories in which someone may be authenticated are:

1. Something the user knows.
2. Something the user is.
3. And something the user has.

- * Authentication is used by a server when the server needs to know exactly who is trying to access information.
- * In authentication, the user has to prove his identity to the server.
- * Usually, authentication by a server entails the use of a Password and Username, mobile number or email .

- * Authentication does not determine what tasks the individual can do or what files the individual can see. Authentication merely identifies and verifies who the person or system is.

a) User-Authentication Service

User Authentication Service is used in order to authenticate the user, After login the token returned by the server contains the userId which is unique to the user and that token is only valid for the user-related operations.

During the process of authentication the user-authentication service sends different tokens for different purposes and those are only valid for that particular use.

b) Shop-Authentication Service

Shop-Authentication Service is used in order to authenticate the shop. After login the token returned by the server contains the shopId which is unique to the shop and that token is only valid for the shop-related operations.

During the process of authentication the shop-authentication service sends different tokens for different purposes and those are only valid for that particular use.

c) Authentication RPC's :

01. SignUp :

At the Sign Up stage, User is completely anonymous to the system. In order to get him familiar with the system, User needs to give his identity by filling in the fields like username, email, mobile number and password (for his security). As user submit these details, server checks if provided details matches with existing users. If any match is found, userside receives a message showing "User Already Exists". As the user enters correct details which don't lead to any error, the user is added to the system.

Fig-1.1 includes flow diagram.

02. Confirm OTP :

After filling details in signup form, the user has to confirm his identity with the server. For that, an OTP is sent to the user on his contact number and then the user has to confirm that OTP with the server to successfully create an account.

If the user fails to confirm OTP, either he can use the resend OTP option or the account gets automatically deleted after some time.

Fig-1.2 includes flow diagram.

03. SignIn :

User has to submit his phone number and password in order to get signed in. After submission of credentials, the server starts the authentication process in order to know if the user trying to access the system is genuine or legal. If a user's credentials match with the record stored in the database, only then the user gets access to the system otherwise he is rejected by showing the error messages pertaining to wrong input.

Fig-1.3 includes flow diagram.

04. Resend OTP :

If there is any problem while receiving the OTP sent by the server, the user has an option to make a request to server for new OTP, if the user uses resend OTP function more than twice then time count is added depending upon number of tries until limit gets exhausted.

Fig-1.4 includes flow diagram.

05. Forgot Password :

If a user forgets the password then he can make a request to reset the password by providing his contact number, in order to get access to the system. Here an OTP is sent to the user's contact number if it exists and the forgot password process starts, else error is returned.

Fig-1.5 includes flow diagram.

06. Forgot Password Confirm OTP :

User receives otp for resetting the password and that OTP is compared with the OTP generated by the system. If both OTP's match only then the user is able to reset the password otherwise the user is stuck on the same page and can request for resending the new otp.

Fig-1.6 includes flow diagram.

07. Set New Password :

Here the user has two fields, first one is Enter Password and second one is Confirm Password. both fields must contain the same password content, otherwise the user gets an error. if both fields contain the same password only then the password gets updated.

Fig-1.7 includes flow diagram.

08. Get New Token :

When the auth token expires at that time to get access to the resources, the user needs a new auth token in order to get that user to make a request using refresh token to get auth token. If the refresh token is valid then the auth token is sent back else the user needs to sign in again.

Fig-1.8 includes flow diagram.

d) Diagrams

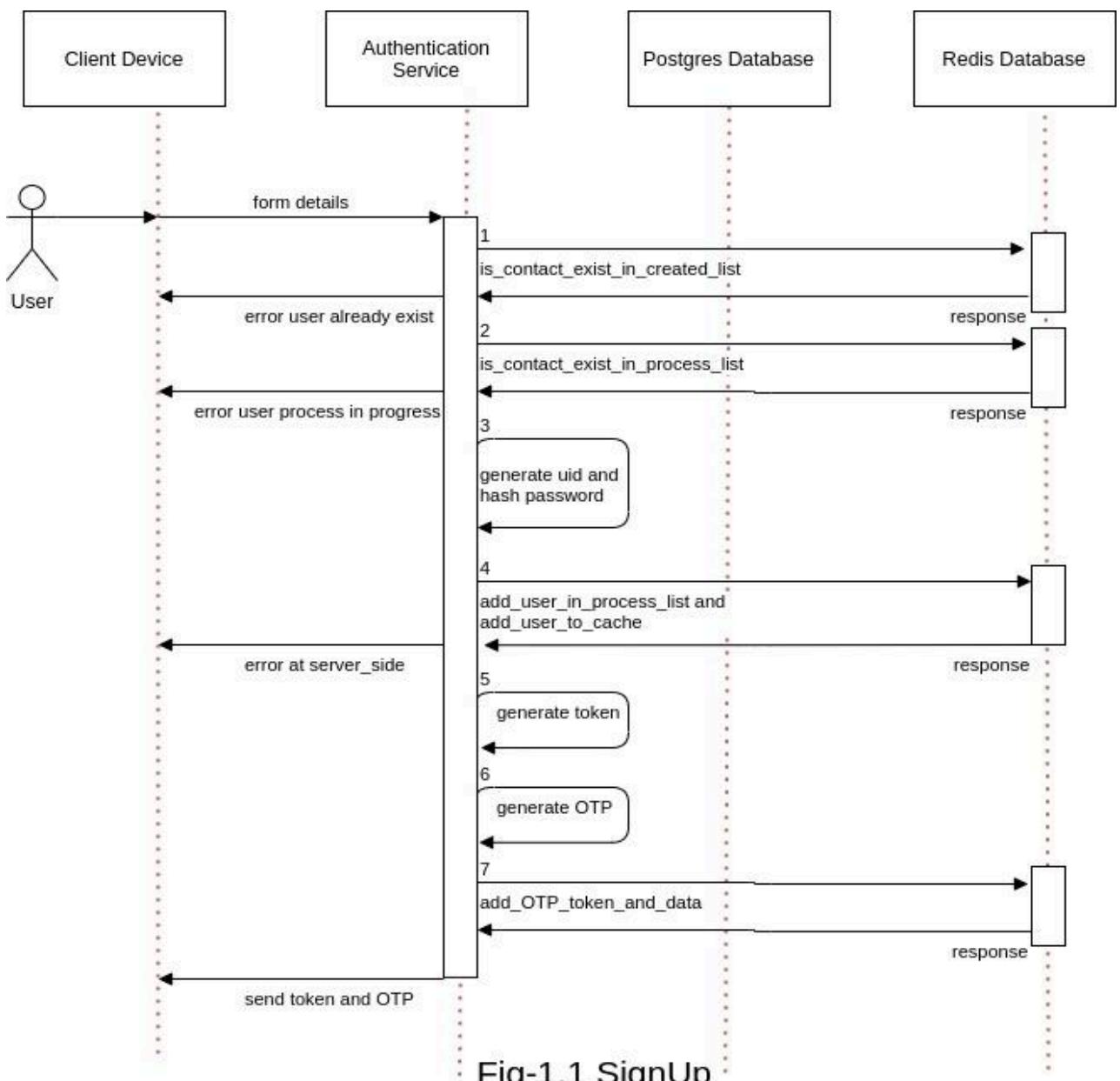
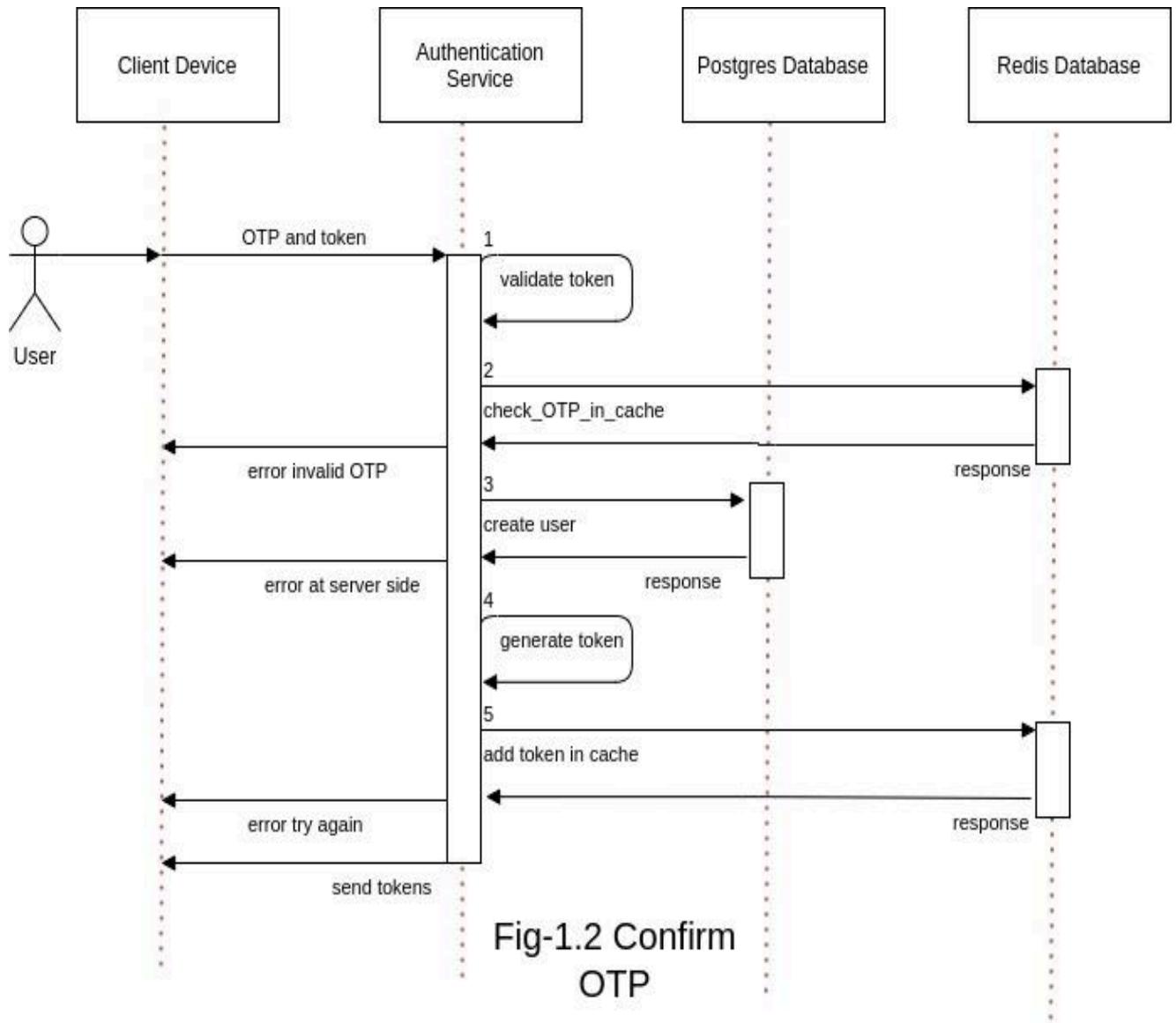


Fig-1.1 SignUp



**Fig-1.2 Confirm
OTP**

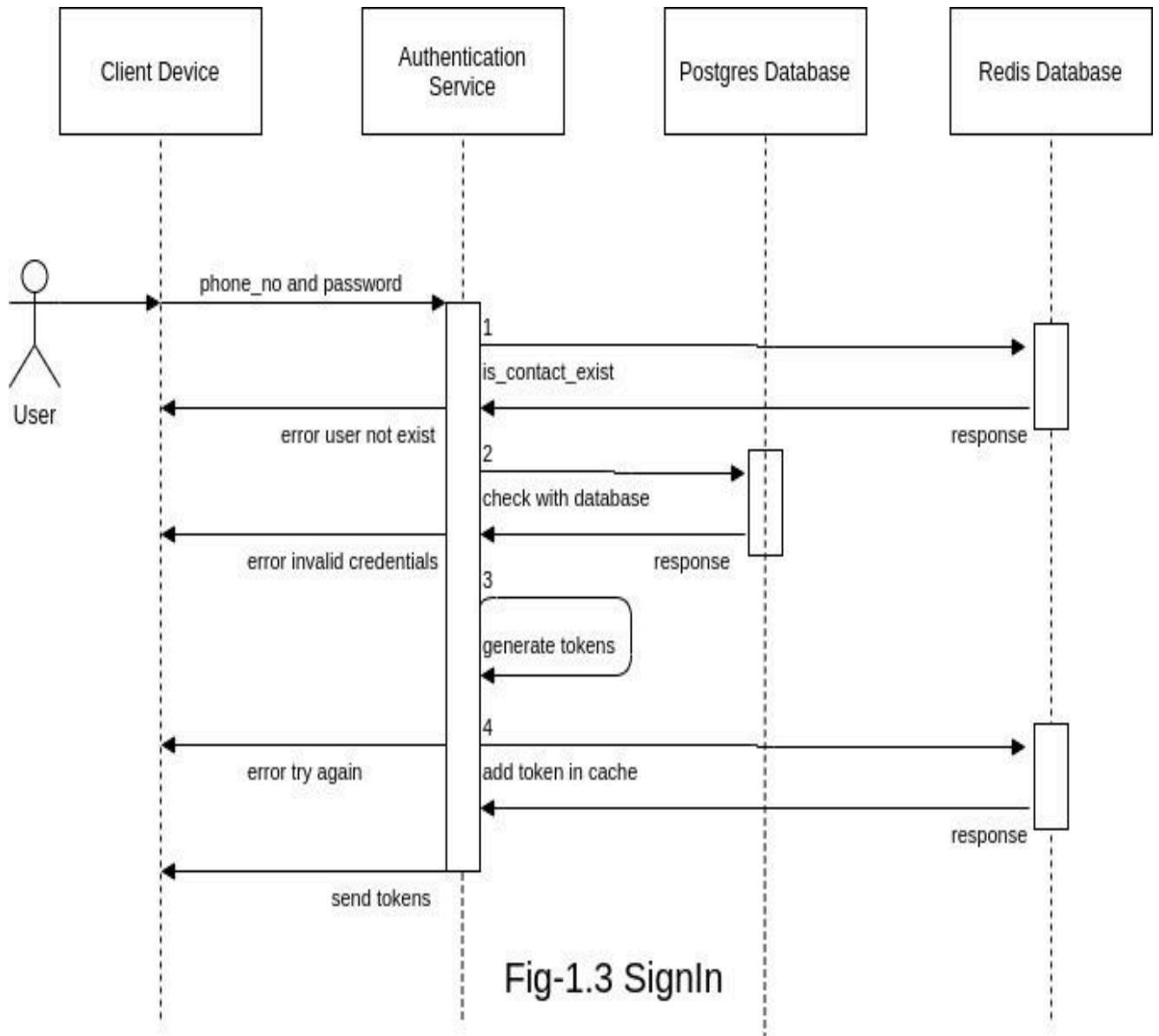


Fig-1.3 SignIn

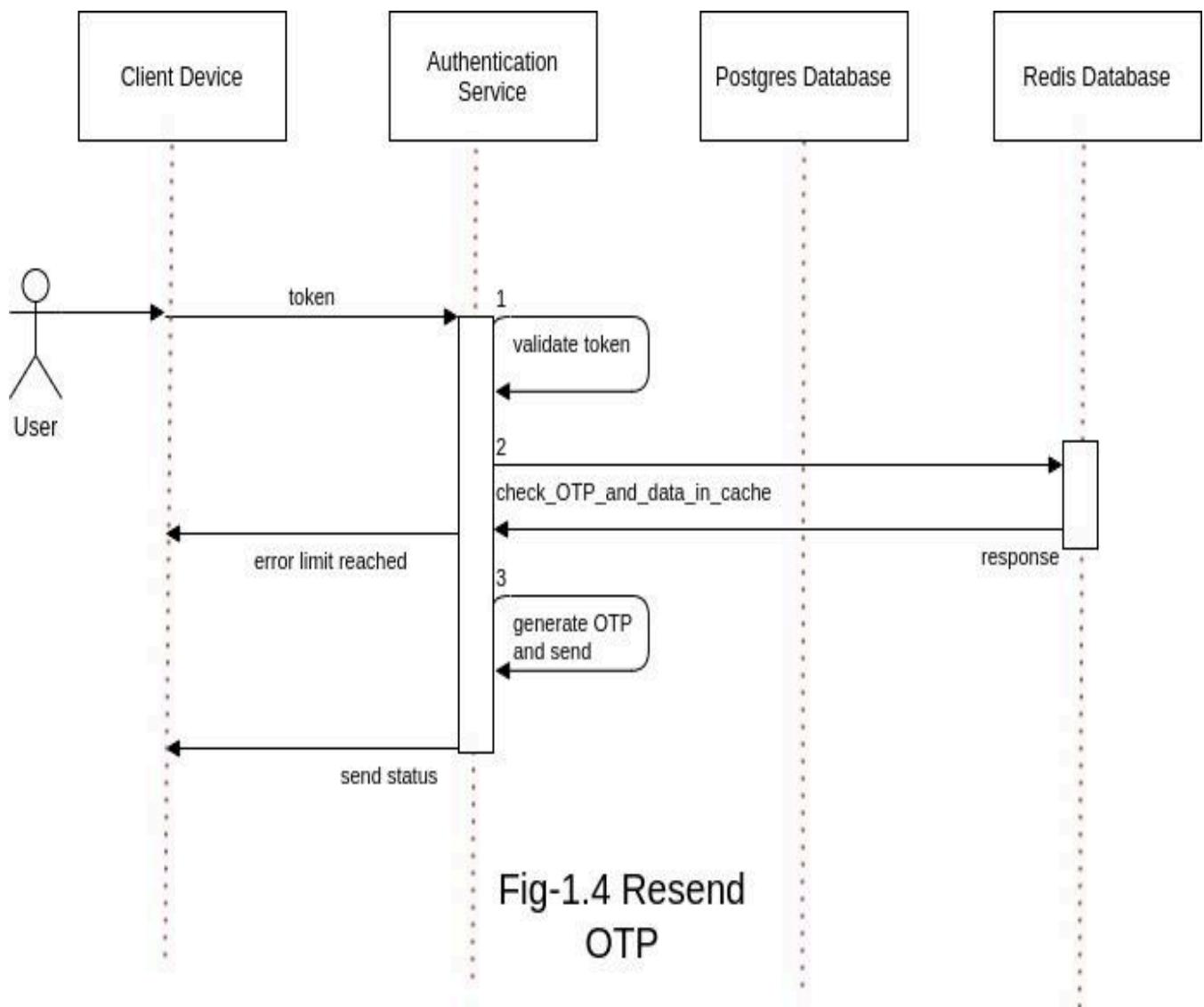


Fig-1.4 Resend
OTP

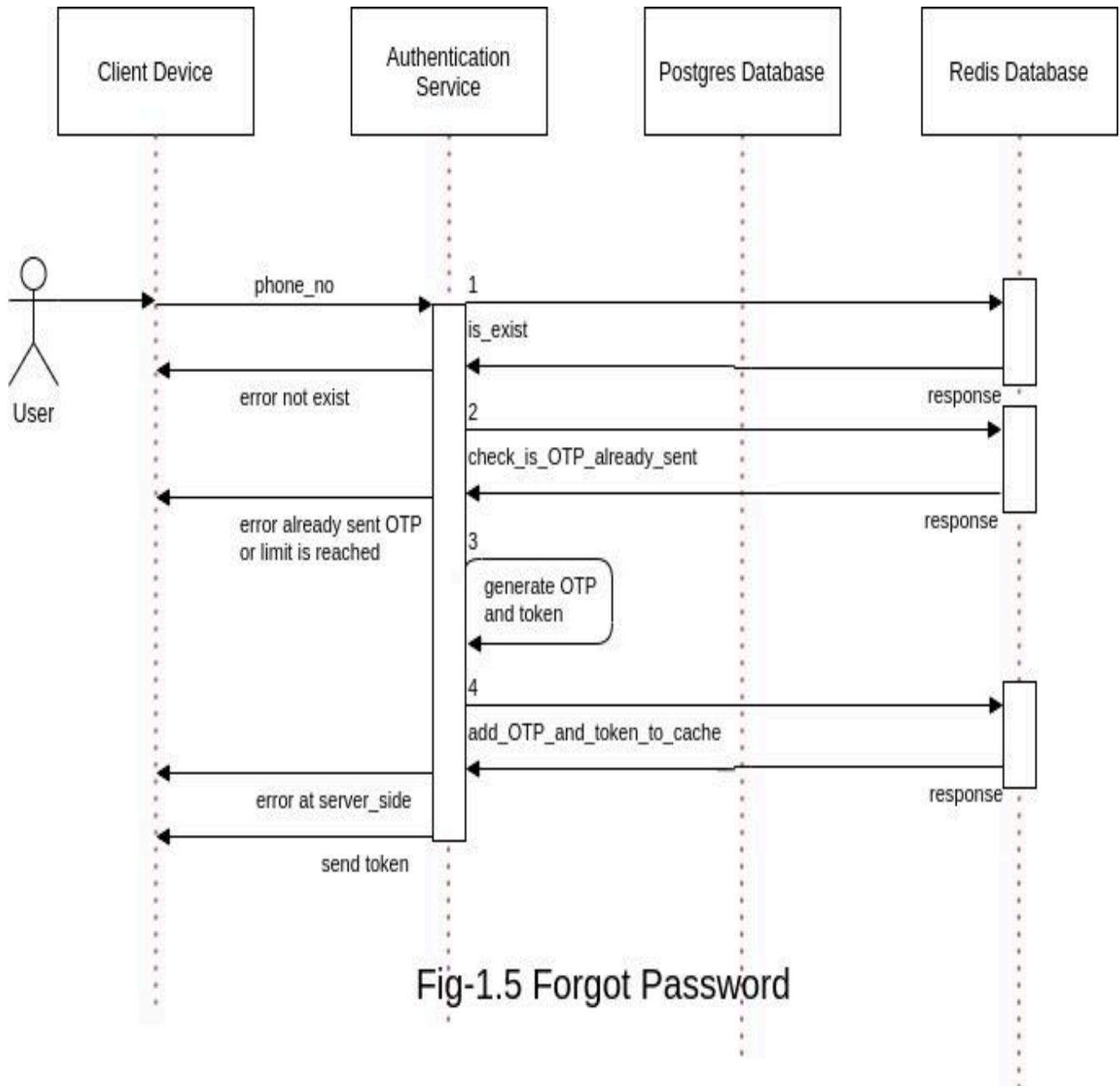


Fig-1.5 Forgot Password

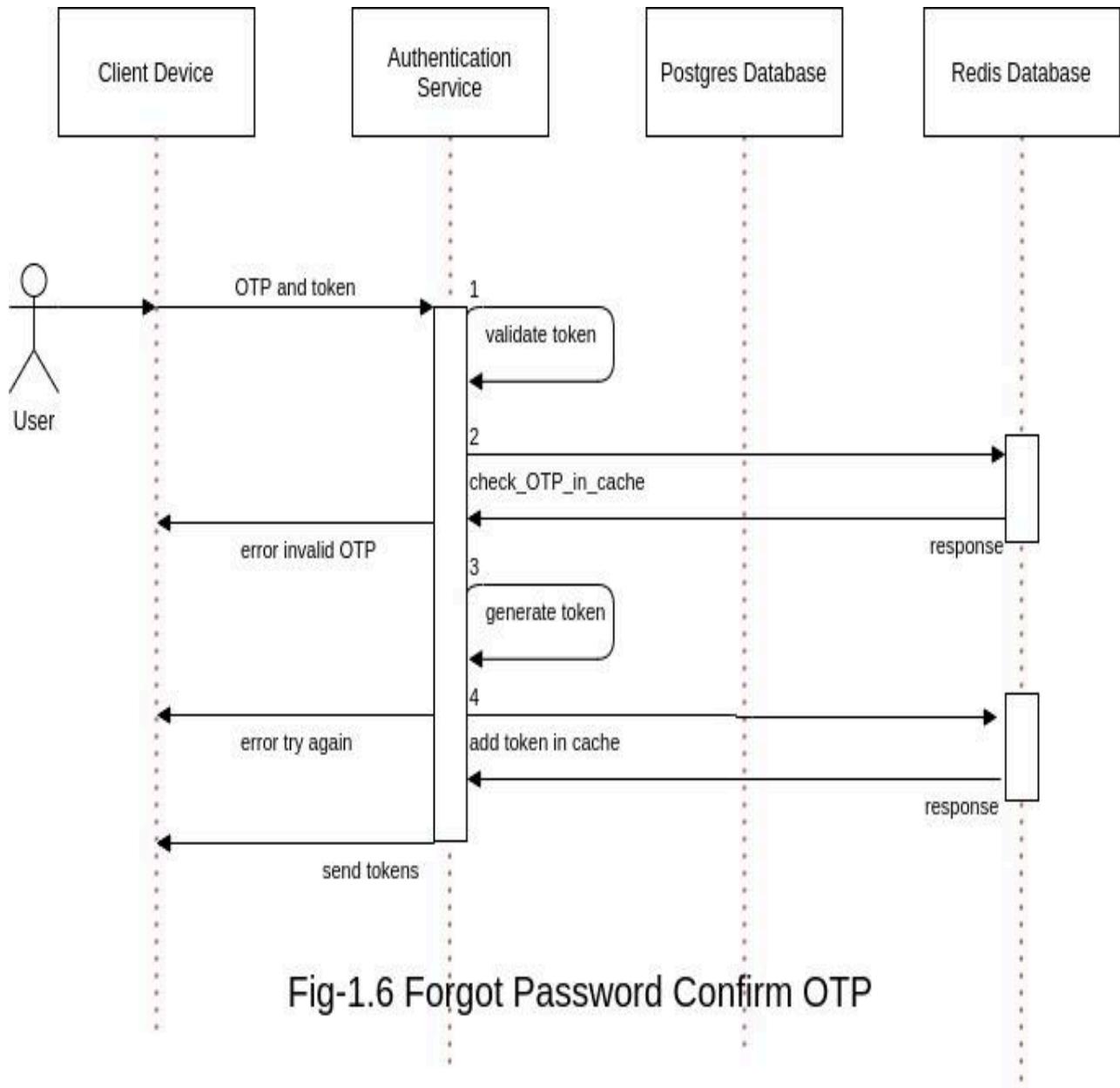


Fig-1.6 Forgot Password Confirm OTP

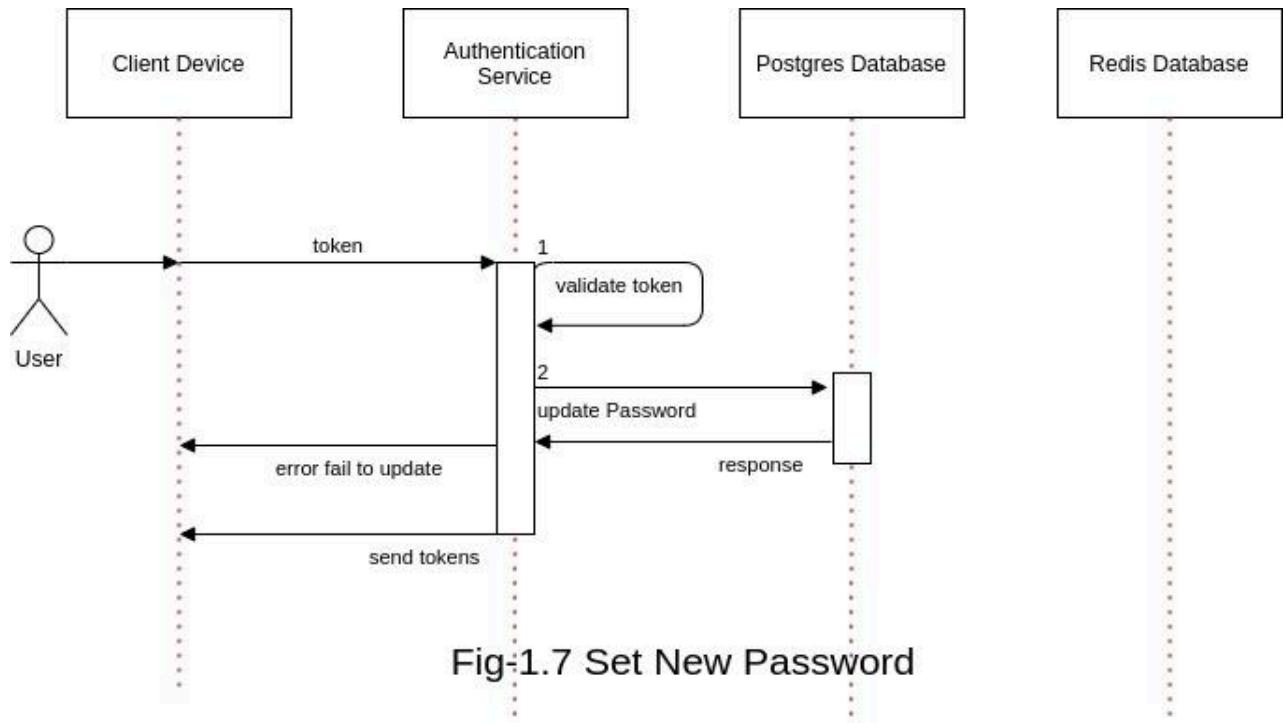


Fig-1.7 Set New Password

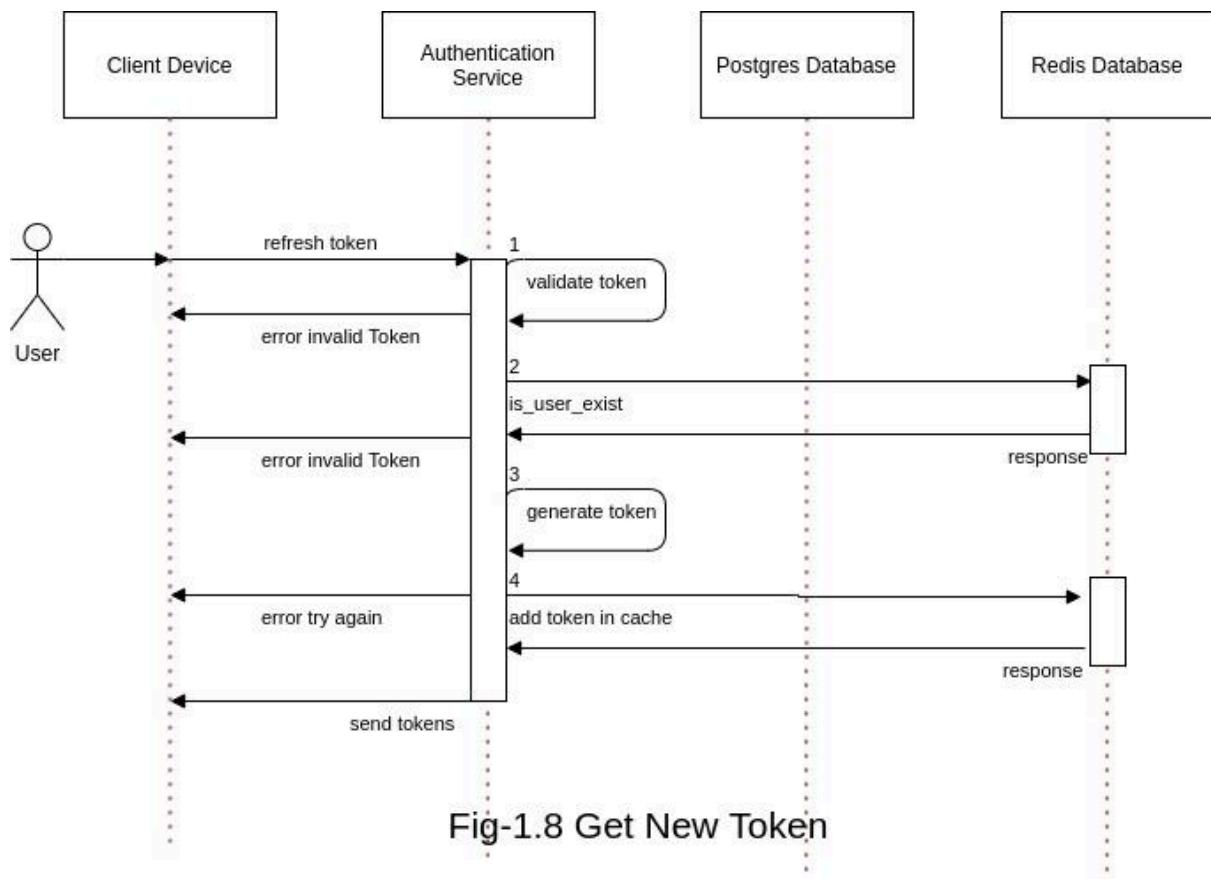


Fig-1.8 Get New Token

e) Highlights

- A token generated by a rpc (function) can only be utilized by the specified rpc's.
- All the requests are first sanitized and then processed.
- The token is encrypted before sending to the user.
- OTP is confirmed on the server side.
- Security in structure.
- The allocated tokens are valid upto certain time period depending upon authorized and unauthorized user.
 - Refresh token expire for authorized user in 2 weeks
 - Refresh token expire for unauthorized user in 1 day
- Only for a specific time, OTP resides in cache. After that, it gets automatically deleted.
- All the end points / rpc's are protected with API Key to prevent various attacks.
- One can only use refresh tokens for 12 times only. After that the user needs to signIn.
- The token generated for password reset is different from a token generated for other rpc's this increases security.
- password token is valid only for 5 min from generation.

2. Viewprovider Service :

a) Details

01. Introduction :

Its name itself tells everything about its function, Viewprovider provides the data to render the user's screen. Whenever a user wants something to get done from the interface/app, the job is done by the view Provider service except buying part.

Viewprovider service is the most important service because it provides view data. When viewprovider service starts at first it creates and loads the data in redis database so that it will be able to respond to the users requests.

As an example we consider a situation where there is a card showing the details of a product on screen, when the user clicks on that card, then the details of the product are requested to viewprovider service then viewprovider service sends the details of the product to the user.

02. Working :

• Add / Delete Product Likes :

When a user gives a like to a particular product, then the request is sent to the viewprovider service then viewprovider service adds the like request to redis stream and sends a response to the user. That request is

received by Worker service and then it processes that request accordingly.

- **Add / Delete Products From Cart :**

Whenever a user adds or deletes some product from the cart at that time the request is sent to the viewprovider service and then viewprovider service adds the request to the redis stream and sends the response back to the user. That request is received by Worker service and then it processes that request accordingly.

- **Get Product/Shop Details :**

Whenever a user requires detailed information about a product or shop at that time request is sent to the viewprovider service. viewprovider service gets the detailed information about the product / shop from the database and sends it back to the user.

- **Get Orders / Get Cart / Update Address :**

All of these operations are performed by viewprovider service by direct communication with the database to receive or update user related information.

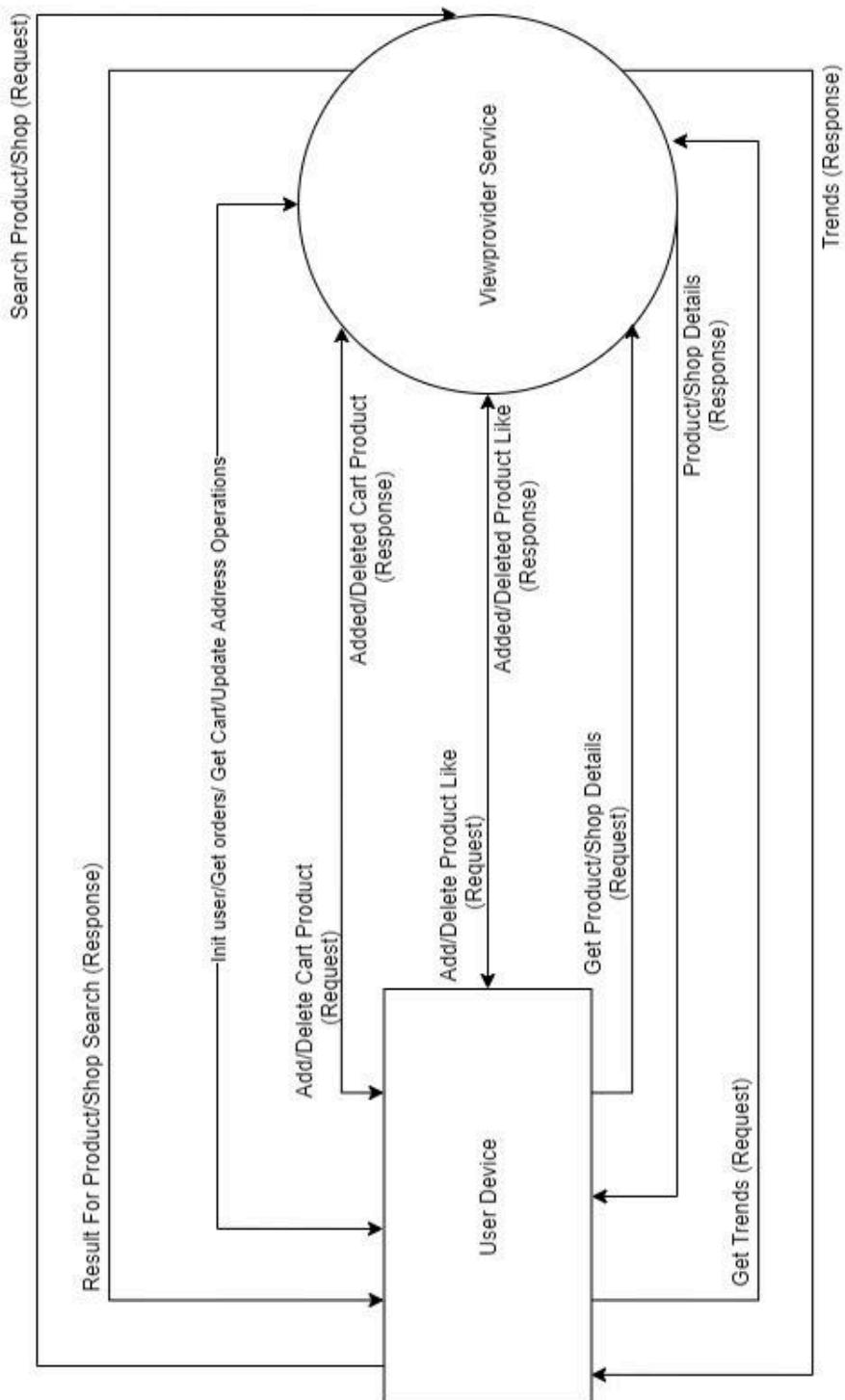
- **Search Product / Shop :**

Whenever a user searches for any product or shop by its name at that time viewprovider service query to the redis search for the particular product / shop with specified search radius (Generally search radius is 100m from current location) and provide the result to the user accordingly.

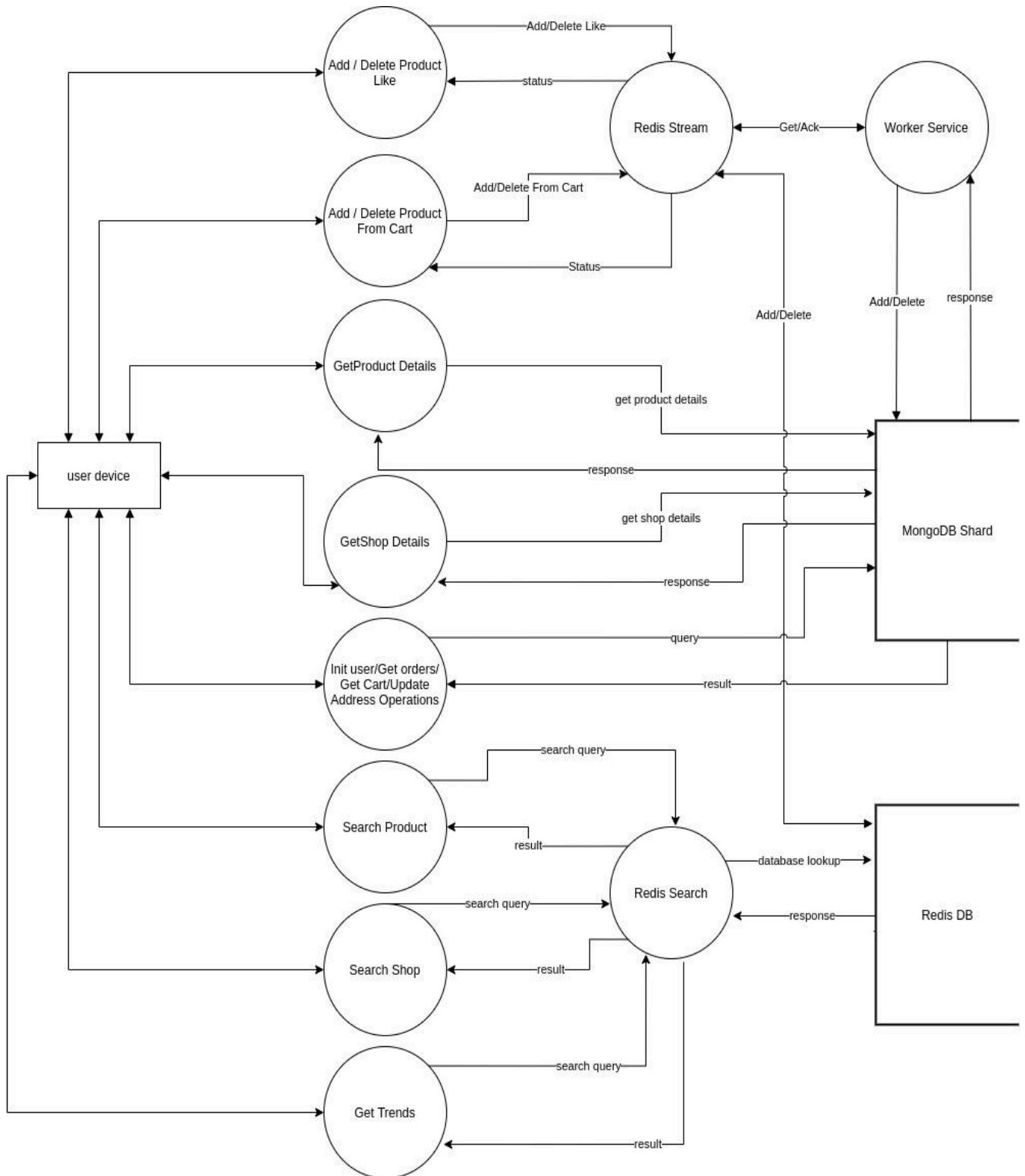
- **Get Trends :**

Trends depend on the rating of the shop and likes of the product. Viewprovider service fulfills this request of the user by applying filters to the query and giving the best products of nearby shops to the user as a result of the request.

b) Diagrams



Viewprovider Service DFD Level - 0



Viewprovider Service DFD Level - 1

3. Buying Service :

a) Details

The buying service lets the user buy some goods from an online store. The buying service has two important rpc's one is to create an order and another is to capture the payment.

01. Create Order

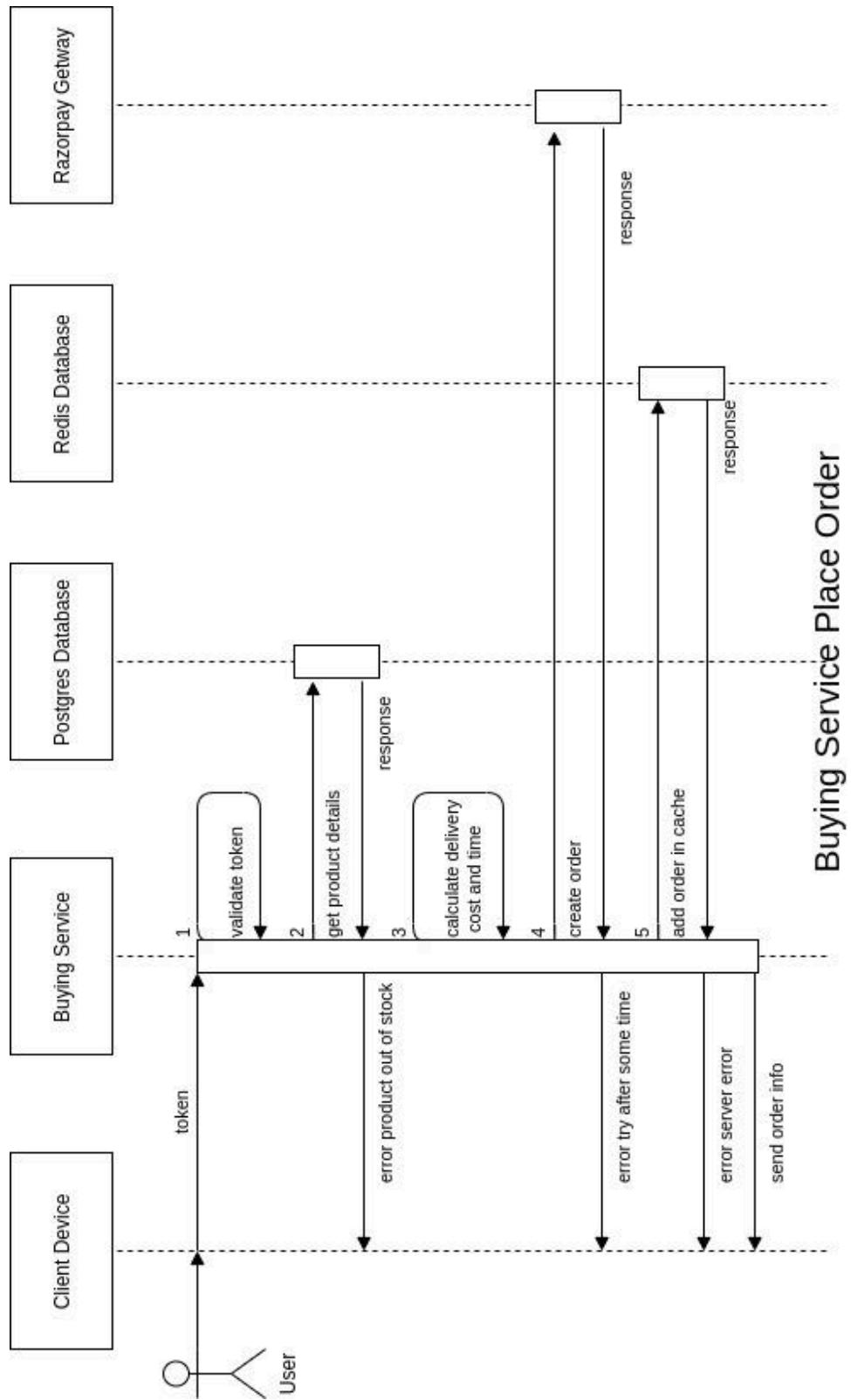
In place order a user requests to buy some product and to fulfill the request the order gets created on service with razorpay orders API and the resulting order ID is stored in cache of service and sent to the user. Then at the user side we use the razorpay client SDK to show the checkout form so that the user can proceed to buy.

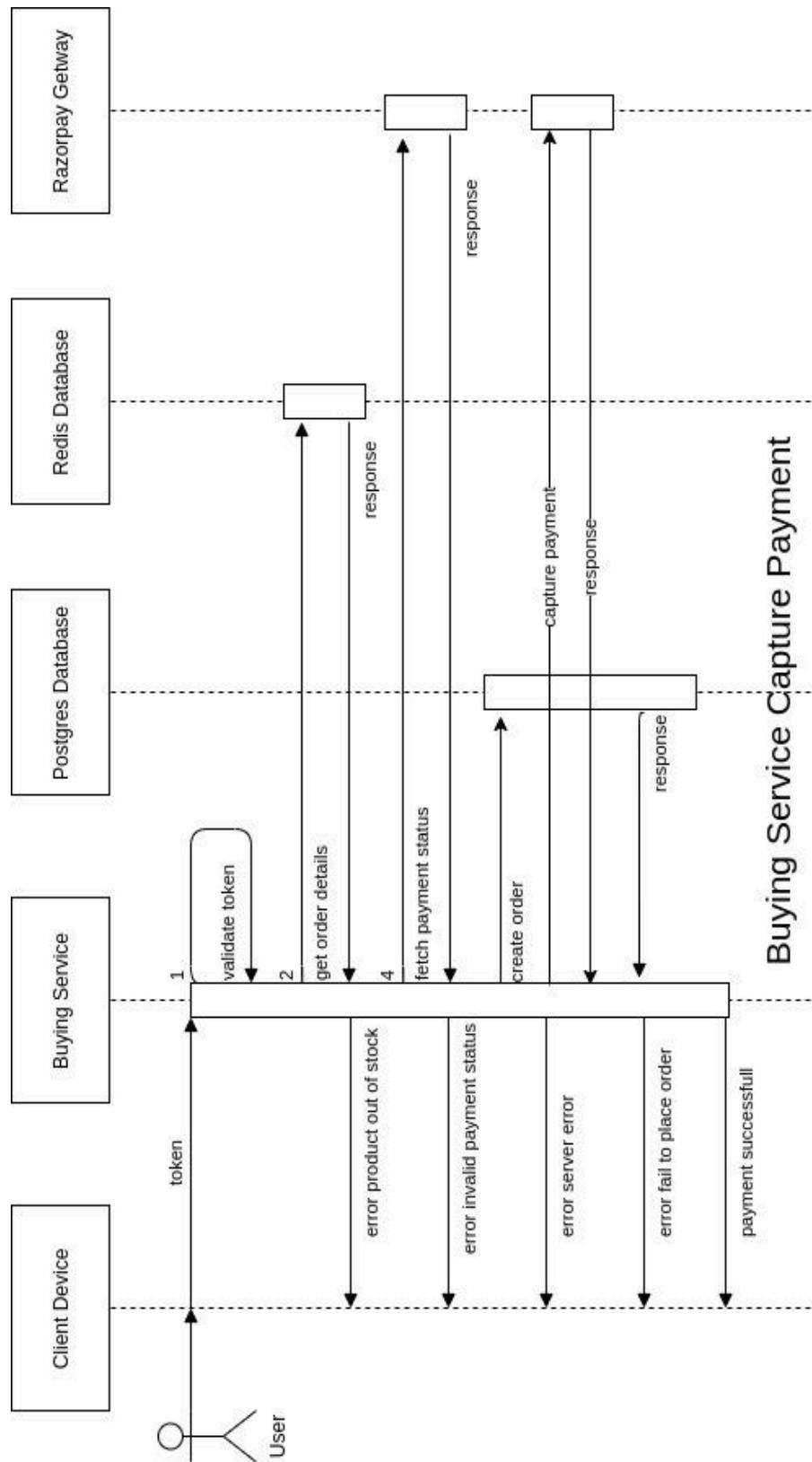
02. Capture Payment

Whenever payment gets successful at a time captured payment rpc gets called by client to acknowledge payment get captured so that server can confirm order and capture payment from clients account.

If some problem occurs and the client fails to acknowledge the payment capture within the given period of time at that time payment fails and if the amount is dispatched from the client's account then the amount will be automatically refunded within 7 working days.

b) Diagram





4. Worker Service

a) Details

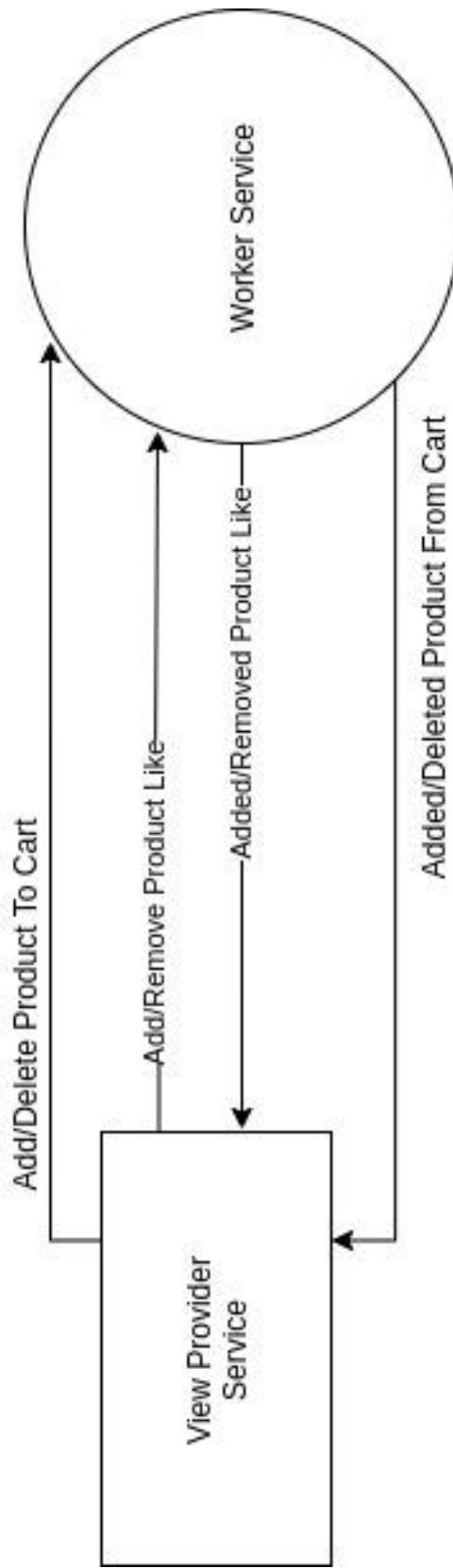
The worker service is responsible for adding likes and cart data in the database, So that the database is in sync with the redis database and it also reduces direct database operations.

The worker service runs two goroutines, one for likes and second for cart. When worker service starts, it first checks for the old pending requests and if some are there then it processes them and after that worker service looks for new requests.

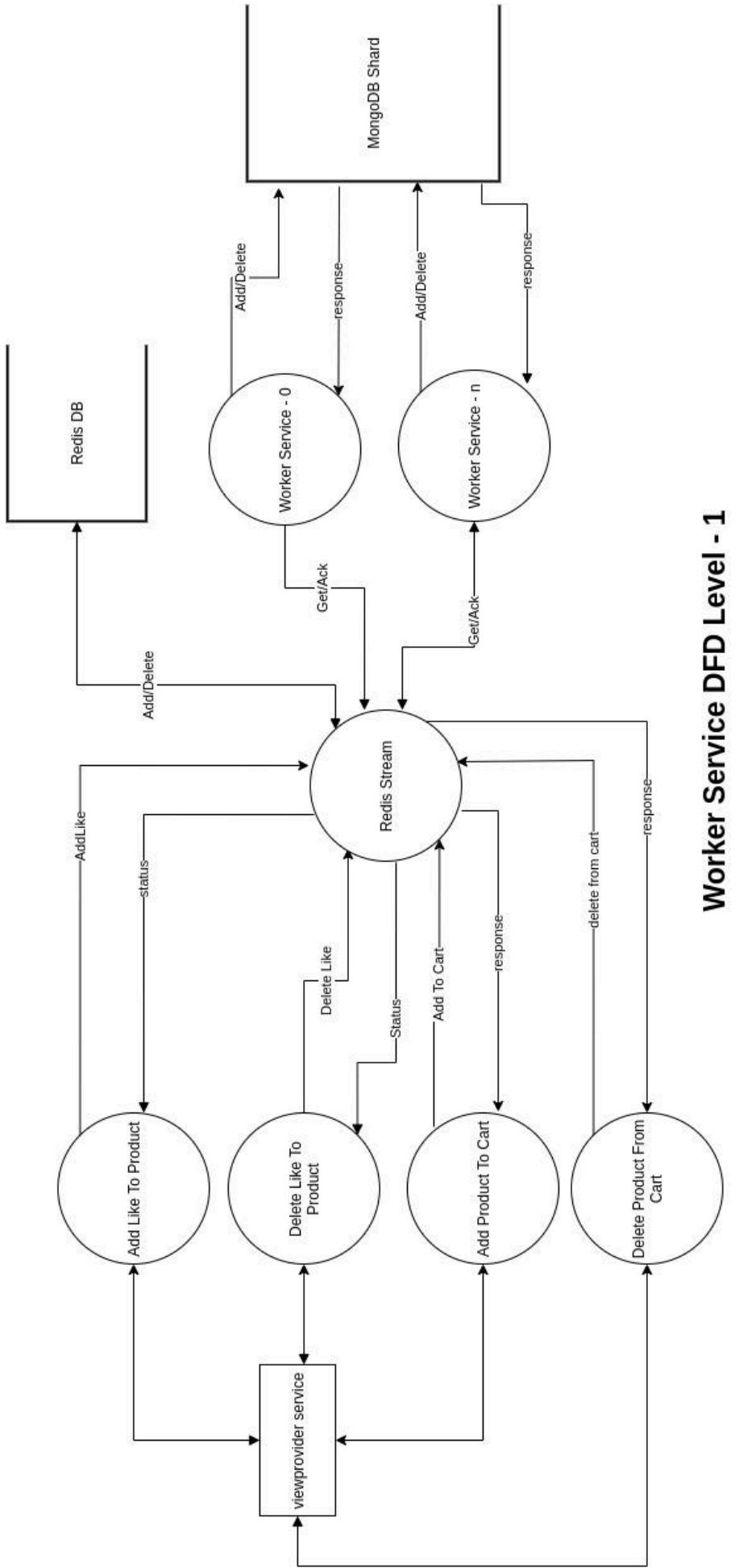
Consider the situation where a user adds a product into his cart, at that time the request is first transmitted to the viewprovider service. The viewprovider service adds data of request to the streams in redis database. Then the worker receives that data and processes it accordingly, And updates the database and cache.

By the introduction of the worker service we reduced the direct database calls significantly and this helps in reducing the response time significantly.

b) Diagram



Worker Service DFD Level - 0



Worker Service DFD Level - 1

5. Updater Service

a) Details

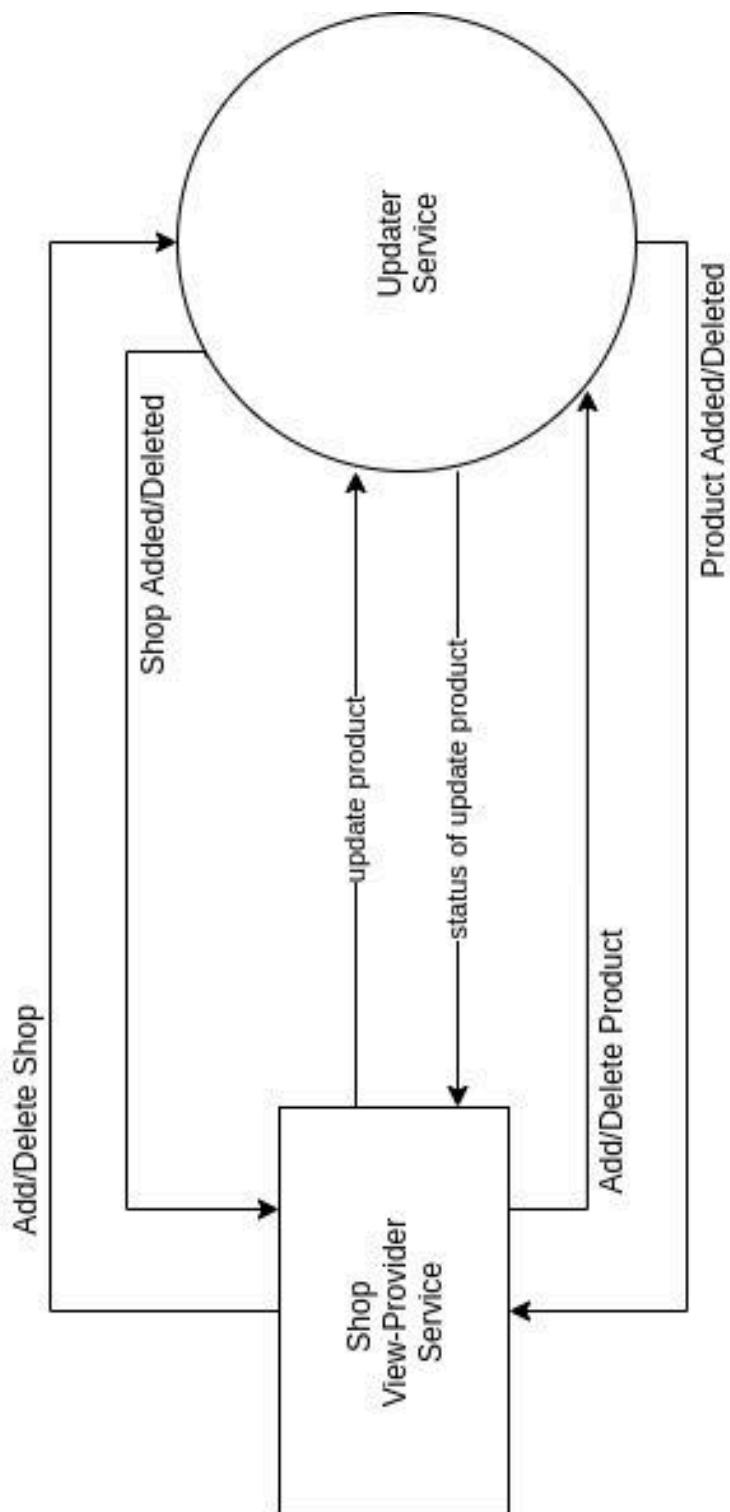
The updater service is very important in maintaining the sync of the system. It has an important responsibility to add, delete and update products and shops in the cache of viewprovider service to maintain synchronisation.

The updater service has three goroutines one is for shop creation and deletion, second is for product creation and deletion and third is for updating the product. When updater service starts, it first checks for the old pending requests. And if some requests are there, then it processes them and after that the updater service looks for new requests.

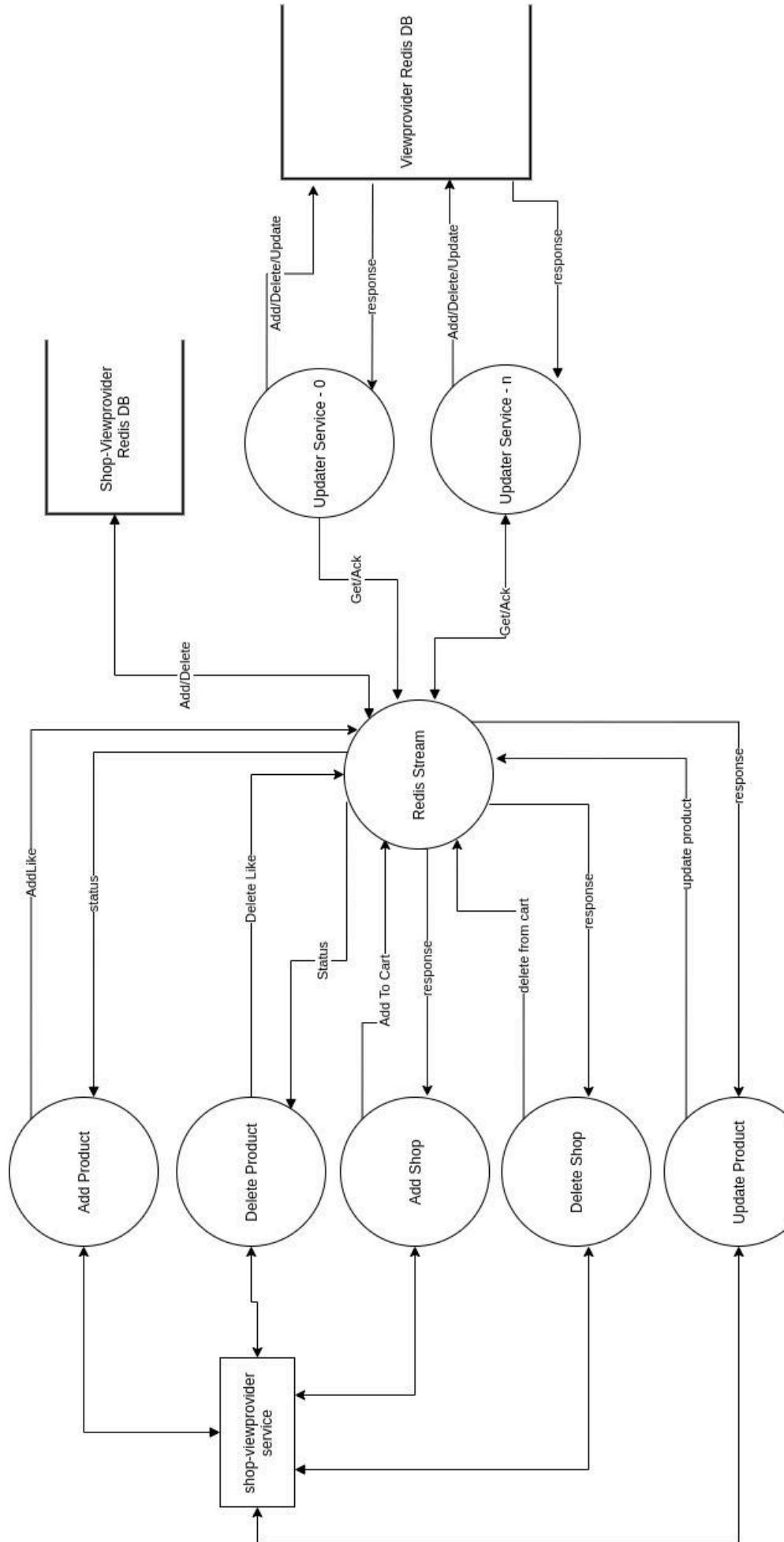
Consider the situation, where the shopkeeper updates the product. At that time the request is sent to the shop-viewprovider service and then the shop-viewprovider service updates the database accordingly. Also adds the request of updating the cache of viewprovider service to the redis streams and then that request is received by Updater service and then Updater service updates product accordingly.

We can run as many instances of updater service as we want to increase performance of the system.

b) Diagram



Updater Service DFD Level - 0



Updater Service DFD Level - 1

6. Shop Viewprovider Service

a) Details :

01. Introduction :

Shop Viewprovider is a service responsible to show the results of every action performed by the shopkeeper side. Whatever shopkeeper requests for, is requested to Shop Viewprovider service And it generates the results accordingly.

02. Internal Structure :

When a shopkeeper adds or deletes the shop, or products in the shop or some other things he does on his device, He indirectly communicates with the View Provider to make these things done. The Shop Viewprovider service gives the reaction to every interaction of a shopkeeper. It provides the results as per shopkeeper requests.

03. Working :

This part describes the complete idea of the shopkeeper side of the system,

- Create Or Delete Shop :**

When a shopkeeper adds his shop or deletes his existing shop from his device, all changes are reflected to the database and early after this, Shop Viewprovider

service makes these changes to the user screen.

- **Add Or Delete Products In Shop :**

Shopkeeper adds new products (with their details) to his shop or in minor cases added products can also be removed by the shopkeeper.

- **Get Orders :**

In this section, all the orders made from a shop are displayed with the details of the product being ordered.

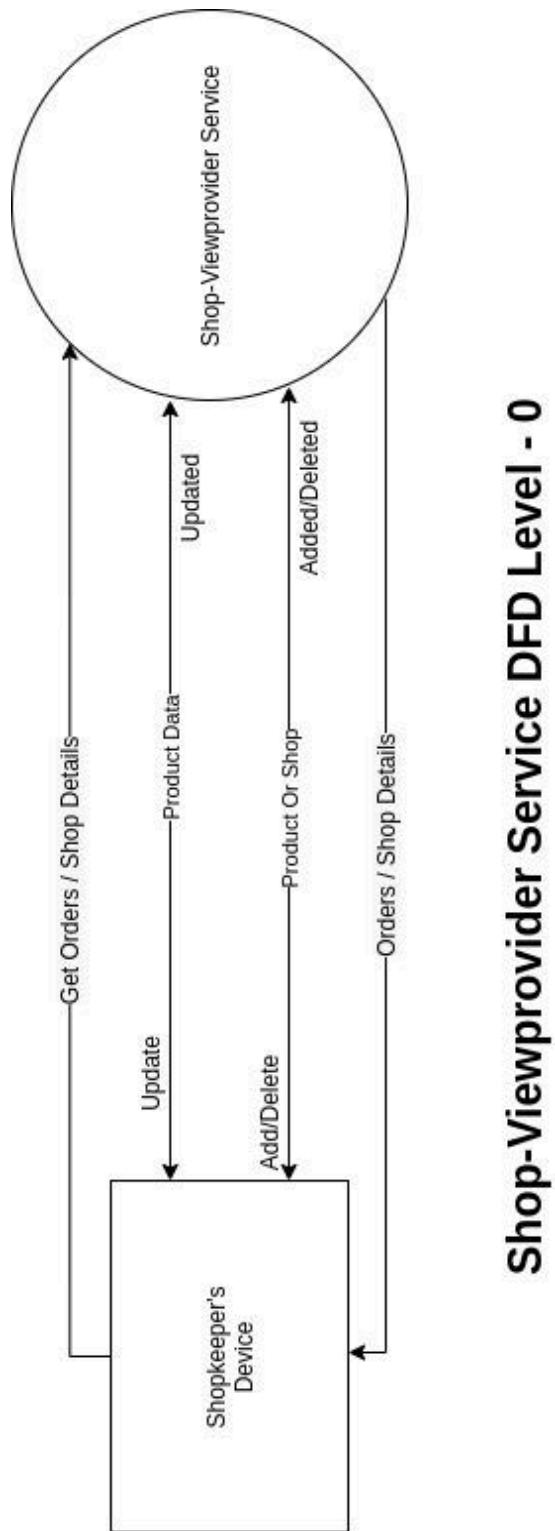
- **Get Shop Details :**

Shop details will include shop name, category, products categories, address, contact details of shopkeeper and other details which are provided by the shopkeeper for his shop. Shopkeeper can update these all details whenever he needs.

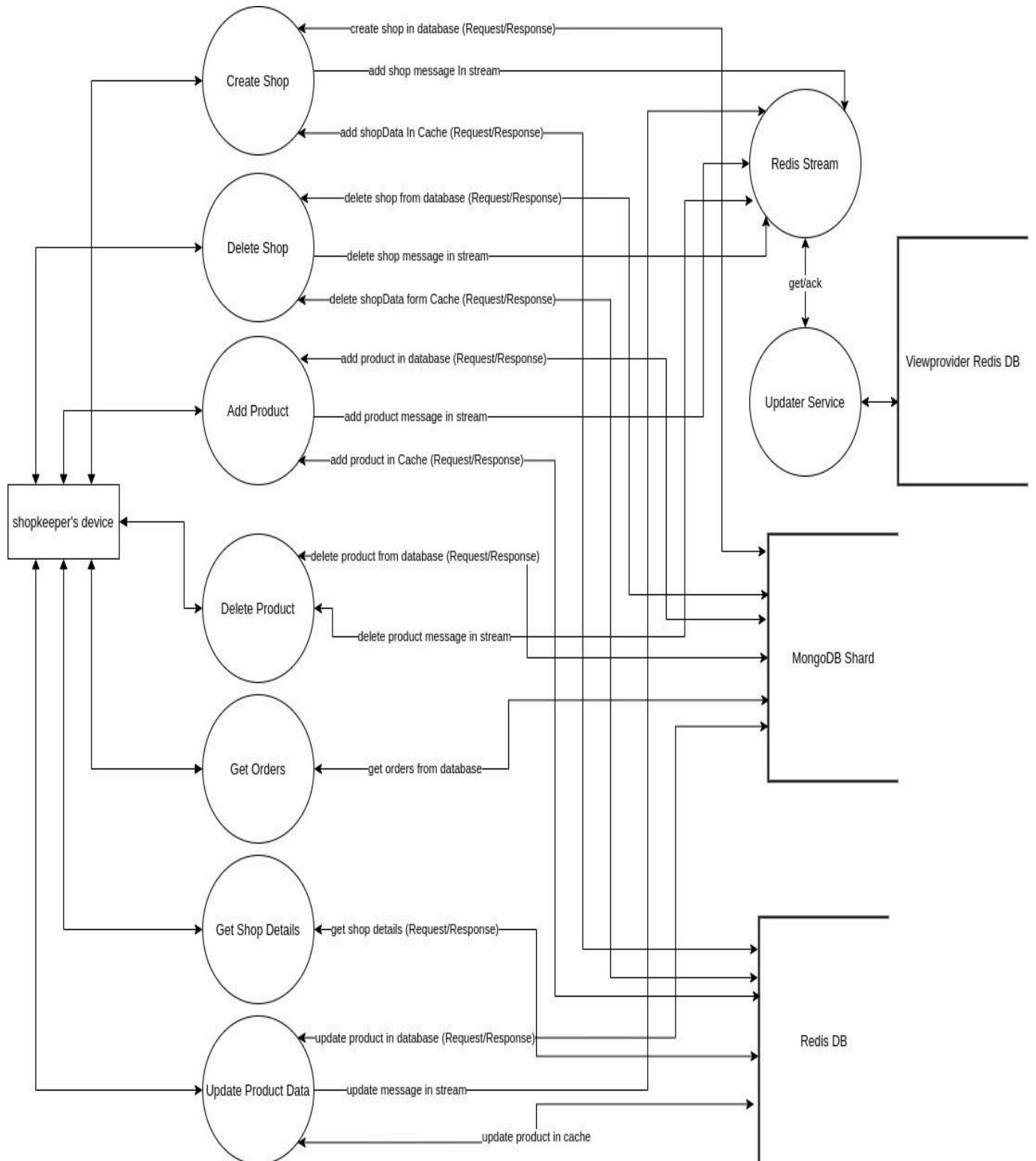
- **Update Products Data :**

Shopkeeper is free to update all the details of each product added to his shop. Whenever he updates product data all changes done by the shopkeeper are reflected to the database.

b) Diagram



Shop-Viewprovider Service DFD Level - 0



Shop-Viewprovider Service DFD Level - 1

Chapter-6

Client-Side Implementation

1. User App

System mainly focuses on the user side. User App is designed for general users to see and buy the products from the different shops.

The User App mainly has four tabs, As below,

1. Trending :

This tab will contain all the trending products which are evaluated on the basis of likes of the product and the rating of corresponding shop.

2. Search :

This tab helps users to find the products and shops for which they search, based on their current location.

3. Order :

This tab lets the user know about their purchases and their shopping cart.

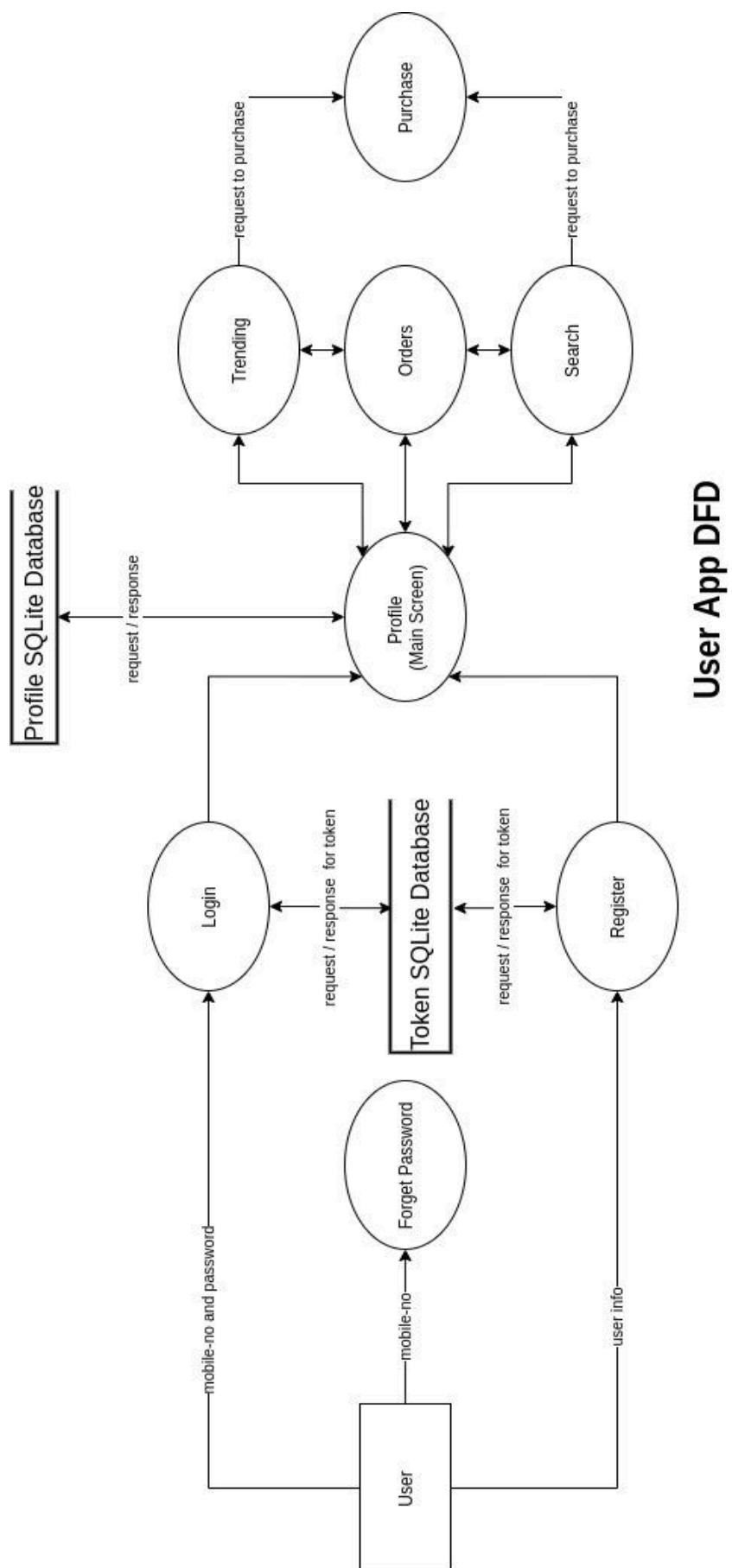
4. Profile :

In the profile tab the address and the username of the user are shown.

a) Components Used :

- To make a request to the server, we need a grpc plugin.
- We used Google's Material UI, To make the app look great.
- We used the recyclerview of the android-x package to show a list of cards.
- We used a navigation component to easily navigate from one fragment to another in the authentication part.
- We used a bottom navigation bar to easily navigate from one fragment to another in the main interface.
- We used the Glide package to load the images in the shop card and product card.
- We used SQLite database to store the data locally so that we can use it when the app gets restarted.
- We used Google map API to show the location of the shops on the map.
- We used different android UI components to make the app functional and look great.
- We used the ViewModel of android to store application data at run time.
- We used razorpay SDK for payment.

b) DFD Diagram :



2. Shopkeeper App

Shopkeeper App is designed for the shopkeepers, where they work with their digital shop. Shopkeeper needs to register his shop on the system to get access to the main dashboard. It is very easy to register a shop with the app, so that anyone can create their own digital shop. Shopkeeper App has a comfortable user interface (UI) with which.

Following are the main four tabs Shop App has,

1. Add Product :

This tab will contain an option to add the new product in the shop

2. Orders :

This tab allows the shopkeeper to see orders made by customers to his shop.

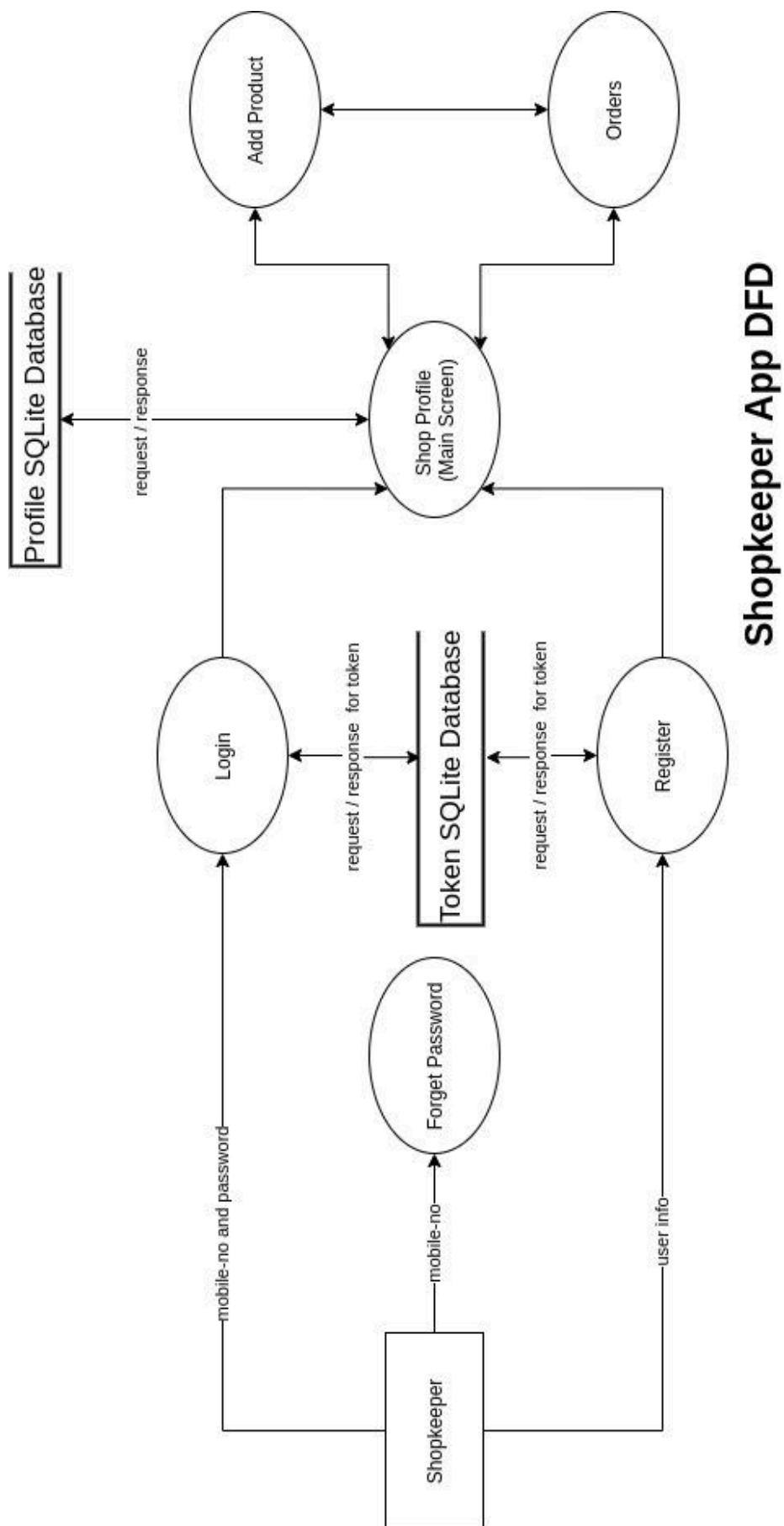
3. Shop Profile :

This tab allows the shopkeeper to see his shop details.

a) Components Used :

- To make a request to the server, we need a grpc plugin.
- We used Google's Material UI, To make the app look great.
- We used the recyclerview of the android-x package to show a list of cards.
- We used a navigation component to easily navigate from one fragment to another in the authentication part.
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- We used the Glide package to load the images in the shop card and product card.
- We used SQLite database to store the data locally so that we can use it when the app gets restarted.
- We used Google map API to show the location of the shops on the map.
- We used different android UI components to make the app functional and look great.
- We used androids ViewModel of android to store application data at run time.

b) DFD Diagram :



Chapter-7

Testing

1. Unit Testing

Unit testing is a type of software testing where individual units or components of a software are tested. The purpose is to validate that each unit of the software code performs as expected. Unit Testing is done during the development (coding phase) of an application by the developers. Unit Tests isolate a section of code and verify its correctness.

In SDLC, STLC, V Model, Unit testing is the first level of testing done before integration testing. Unit testing is a WhiteBox testing technique that is usually performed by the developer. Though, in a practical world due to time crunch or reluctance of developers to test, QA engineers also do unit testing.

Considering the scale of application and testing feasibility we decided to test our individual services in the unit testing.

a) Authentication Service

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Status(Pass /Fail)
1.	Check response when valid phone number and password is entered	Mo = 9956778923 Pass = Abc@1234	SignIn should be successful	SignIn successful	Pass
2.	Check response when invalid phone number or invalid password is entered	Mo = 9945432 Pass = abc123	Error Should be occur	Error occurred	Pass
3.	Check response when valid username, valid email, valid phone number and password is entered	UserName = Abc Mail = Abc@gmail.com Mo = 9956778923 Pass = Abc@1234	SignUp should be successful	SignUp successful	Pass
4.	Check response when invalid username,invalid email, invalid phone number and password is entered or the field will be empty	UserName = Abd Mail = Abdgamil.com Mo = 9945432 Pass = abc123	Error should be occur	Error occurred	Pass
5.	Check response when the valid OTP is entered to signUp	token OTP = 1234	OTP should be confirmed	OTP confirmed	Pass
6.	Check response when the invalid OTP is entered	token OTP = 121	Error should occured	Error occurred	Pass
7.	Check response if the OTP will expired and user click on Resend OTP	token OTP = 4567	New OTP should generated	New OTP generated	Pass
8.	Check response to reset new password, enter valid phone number to send OTP	token Mo = 9956778923	OTP should be send	OTP was send to user	Pass
9.	Check response to reset new password if user entered invalid phone number to send OTP	token OTP = 9945432	Error should occured	Error occurred	Pass
10.	Check response when the valid OTP is entered to reset password	token OTP = 7891	Should give access to reset password	Access is given to reset password	Pass
11.	Check response when the invalid OTP is entered to reset password	token OTP = 342	Error should occurred	Error occurred	Pass
12.	Check response if the OTP get expired and user click on Resend OTP	token OTP = 8543	New OTP should generated	New OTP generated	Pass
13.	Check response for reset password user should enter valid password	token Pass = Mno@1234	Password reset successfully	Password successfully reseted	Pass

b) Viewprovider Service

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Status(Pass /Fail)
1.	Make request for product search	query, token, location	Searched product should be provided	As expected	Pass
2.	Make request for product search	invalid token, query, location	Error should be given	As expected	Pass
3.	Make request for shop search	query, token, location	Searched shop should be provided	As expected	Pass
4.	Make request for shop search	query, location invalid token	Error should be given	As expected	Pass
5.	Make request for trends	location, token	Trending product should be displayed	As expected	Pass
6.	Make request for trends	location, invalid token	Error should be given	As expected	Pass
7.	Add/Delete product from cart	token, product id	Added/Deleted cart products	As expected	Pass
8.	Add/Delete product from cart	invalid token, product id	Error should be given	As expected	Pass
9.	Add/Remove product like	token, product id	Added/Removed product like	As expected	Pass
10.	Add/Remove product like	invalid token, product id	Error should be given	As expected	Pass
11.	Get shop details	shopId, token	Shop details should be provided	As expected	Pass
12.	Get shop details	invalid token shopId,	Error should be given	As expected	Pass
13.	Get Product Details	product id, token	Products details should be provided	As expected	Pass
14.	Get Product Details	invalid token product id,	Error should be given	As expected	Pass

c) Buying Service

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Status(Pass /Fail)
1.	Make an order	product Id, token	Order should be placed if the product exists in stock.	As expected	Pass
2.	Make an order	invalid product id, invalid token	Error should be given	As expected	Pass
3.	Error if product does not exists in stock	product id, token	Error should be occurred if product does not exists in stock	As expected	Pass
4.	Error if product does not exists in stock	invalid product id, invalid token	Error should be given	As expected	Pass
5.	Capture Payment	payment id, order id, token	Payment should get captured.	As expected	Pass
6.	Capture Payment	payment id, order id, invalid token	Payment capture failed.	As expected	Pass
7.	Check for refund if any error occurred	remove battery	Refund will done successfully in 7 working days	As expected	Pass
8.	If payment fails	-	Error should be given	As expected	Pass

d) Worker Service

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Status(Pass /Fail)
1.	Add to cart	cart request, valid product id	Added to cart	As expected	Pass
2.	Add to cart	invalid product id	Error should be given	As expected	Pass
3.	Remove from cart	cart request, valid product id	Removed from cart	As expected	Pass
4.	Remove from cart	invalid product id	Error should be given	As expected	Pass
5.	Add like	like request,valid product id	Added to like	As expected	Pass
6.	Add like	invalid product id	Error should be given	As expected	Pass
7.	Remove from like	like request, valid product id	Removed from like	As expected	Pass
8.	Remove from like	invalid product id	Error should be given	As expected	Pass

e) Updater Service

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Status(Pass /Fail)
1.	Add shop	add shop request	Shop should be added	As expected	Pass
2.	Delete shop	delete shop request token	Shop should be deleted	As expected	Pass
3.	Delete shop	invalid shop request	Error should be given	As expected	Pass
4.	Add shop	invalid add shop request	Error Should be thrown	As expected	Pass
5.	Add product	invalid add product request	Error should be given	As expected	Pass
6.	Delete product	invalid delete product request	Product should be deleted	As expected	Pass
7.	Add product	add product request	Product should get added	As expected	Pass
8.	Delete product	delete product request	Product should be deleted	As expected	Pass
9.	Update product	valid update product request	Product should get updated	As expected	Pass
10.	Update product	invalid valid update product request	Error should be given	As expected	Pass

f) Shop-Viewprovider Service

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Status(Pass/Fail)
1	Create shop	shop data	Shop should be added	As expected	Pass
2	Delete shop	token	Shop should be deleted	As expected	Pass
3.	Delete shop	invalid token	Error should be given	As expected	Pass
4.	Add Products	token, product data	Product should get added	As expected	Pass
5.	Add products	invalid token	Error should be given	As expected	Pass
6.	Delete Products	token, product id	Products should get deleted	As expected	Pass
7.	Delete Products	invalid product id, token	Error should be given	As expected	Pass
8.	Update product data	token, update details	Product data should be updated	As expected	Pass
9.	Update product data	token, invalid data	Error should be given	As expected	Pass
10.	Get orders	token	Should provide placed orders to shopkeeper	As expected	Pass
11.	Get orders	invalid token	Error should be given	As expected	Pass
12.	Get shop details	token	Provide shop details	As expected	Pass
13.	Get shop details	Invalid token	Error should be given	As expected	Pass

2. Integration Testing

Integration testing is the phase in software testing in which individual software modules are combined and tested as a group. Integration testing is conducted to evaluate the compliance of a system or component with specified functional requirements. It occurs after unit testing and before validation testing.

Unit testing uses modules for testing purpose, and these modules are combined and tested in integration testing. The Software is developed with a number of software modules that are coded by different coders or programmers. The goal of integration testing is to check the correctness of communication among all the modules.

In this testing we tested different services together to figure out their compatibility with other system services. We tested authentication service of user with viewprovider service, we tested authentication service of user with buying service, we tested shop-authentication service with shop-viewprovider service to test the token acceptance between them. Also we tested updater service and worker service to test their compatibility with respective database, redis streams and services.

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Status(Pass/Fail)
1.	Token generated by authentication service and pass to viewprovider service	valid token	Viewprovider service should be provided	As expected	Pass
2.	Token generated by authentication service and pass to viewprovider service	invalid token	Error should be given	As expected	Pass
3	Token generated by authentication service and pass to buying service	valid token	Buying service should be provided	As expected	Pass
4.	Token generated by authentication service and pass to buying service	invalid token	Error should be given(Buying service should not be provided)	As expected	Pass
5.	Generating token from shop-Authentication service and pass to shop-viewprovider service	valid token	Shop-view provider service should be provided	As expected	Pass
6.	Generating token from shop-Authentication service and pass to shop-viewprovider service	invalid token	Error should be given(shop-viewprovider service should not provided)	As expected	Pass
7.	Request added by viewprovider service to increase likes in database is received by worker service	like request	Likes should be added in database	As expected	Pass
8.	Request added by viewprovider service to decrease likes in database is received by worker service	remove like request	Like should be removed from database	As expected	Pass
9.	Request added by viewprovider service to add products in cart in database is received by worker service	cart request	Product should added to cart	As expected	Pass

10.	Request added by viewprovider service to remove products from cart in database is received by worker service	remove product from cart request	Product should removed from cart	As expected	Pass
11.	Request added by shop viewprovider service in stream to update product data for updater service	request to update data	Product data should update	As expected	Pass
12.	Request added by shop viewprovider service in stream to add product data for updater service	request to add product data	Product data should be added	As expected	Pass
13.	Request added by shop viewprovider service in stream to delete product data for updater service	request to delete product data	Product data should be deleted	As expected	Pass
14.	Request added by shop viewprovider service in stream to delete shop data from updater service	request to delete shop	Shop should be deleted	As expected	Pass
15.	Token generated by shop authentication service and pass to shop viewprovider service	valid token	Shop-Viewprovider service should be provided	As expected	Pass
16.	Token generated by shop authentication service and pass to shop viewprovider service	invalid token	Shop-Viewprovider service should provided (Error should be given)	As expected	Pass

3. System Testing

System Testing is a level of testing that validates the complete and fully integrated software product. The purpose of a system test is to evaluate the end-to-end system specifications. Usually, the software is only one element of a larger computer-based system. Ultimately, the software is interfaced with other software/hardware systems. System Testing is actually a series of different tests whose sole purpose is to exercise the full computer-based system.

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Status (Pass/Fail)
1.	Open app and show welcome page	open app	Open app successfully, and show welcome page	As expected	pass
2.	Sign In page	-	Open Sign In page after welcome page	As expected	Pass
3.	Open Sign Up page by clicking on Sign Up button	click on Sign Up button	Open Sign Up page	As expected	Pass
4.	Create account by clicking on Sign Up button after providing required details	username, mail, phone number, password	OTP should be send for confirmation	As expected	Pass
5.	Confirm OTP	valid OTP	Account should be created	As expected	Pass
6.	Confirm OTP	invalid OTP	Account should not be created	As expected	Pass

7.	Sign In process	valid phone number,valid password	Sign In should be done, and move to view-provider	As expected	Pass
8.	Sign In process	invalid phone number,invalid password	Error should be occurred	As expected	Pass
9.	Forgot Password process	phone number	OTP should be send	As expected	Pass
10.	Reset password	new password, confirm password	Password should be reseted	As expected	Pass
11.	Check response after signedIn	phone number,password	Open View provider	As expected	Pass
12.	Show trending products based on user's location in Trending section	visit trending page	Should show the trending products according to product's likes and shop rating.	As expected	Pass
13.	Show the selected chip related products	select chip	Should show the products of the chosen category.	As expected	Pass
14.	Show product details by clicking on card click	click on card	Should show all details of product after clicking on particular card of product	As expected	Pass
15.	Add product to cart by clicking add to cart option in product details page	click on cart option	Should add product to cart	As expected	Pass
16.	Add product like	click on like option	Should add product like	As expected	Pass

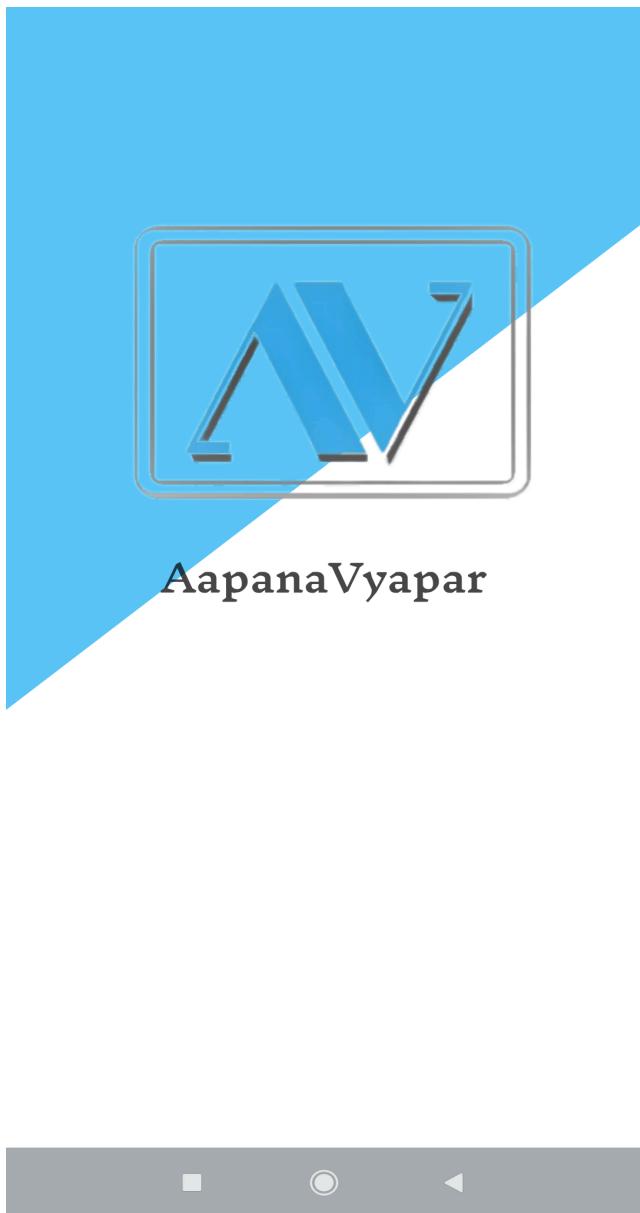
17.	Show shop related product details by clicking on shop card	click on shop card	Should show shop products details	As expected	Pass
18.	Display search section after clicking search option	visit to search page	Should display search section	As expected	Pass
19.	Show the searched product	search product name	Should show the searched products	As expected	Pass
20.	Show the searched shop	search shop name	Should show the searched shops	As expected	Pass
21.	Show the searched shop on map	search shop name	Should show searched shop location on map	As expected	Pass
22.	Show the shop details after clicking on shop card	click on shop's card	Should show the shop details after clicking on shop card	As expected	Pass
23.	Adding reviews and ratings for shop	provide reviews,ratings	Reviews and ratings should be added.	As expected	Pass
24.	Show the searched product details after clicking on product card	click on product's card	Product details should be shown after clicking on product card	As expected	Pass
25.	Order section is shown after clicking order option	visit order page	All orders should be listed after clicking order option	As expected	Pass
26.	Display ordered products	-	Ordered products should be shown if the order is placed	As expected. If the any order didn't placed then will show blank	Pass

27.	Display products added to cart by clicking on cart button in the order section	click on cart button in order page	Products should be shown which were added to cart	As expected	Pass
28.	Show User Profile	visit profile page	Should show complete profile of the user	As expected	Pass
29.	Update details of user after clicking update button	updated details	Should update the details	As expected	Pass
30.	Move to buying process by clicking on buy now button presenting buying details page	click on buy now button	Buying details page should open	As expected	Pass
31.	Buying details page	valid details	Checkout form should be get displayed	As expected	Pass
32.	Buying details page	invalid details	Checkout form should not be get displayed	As expected	Pass

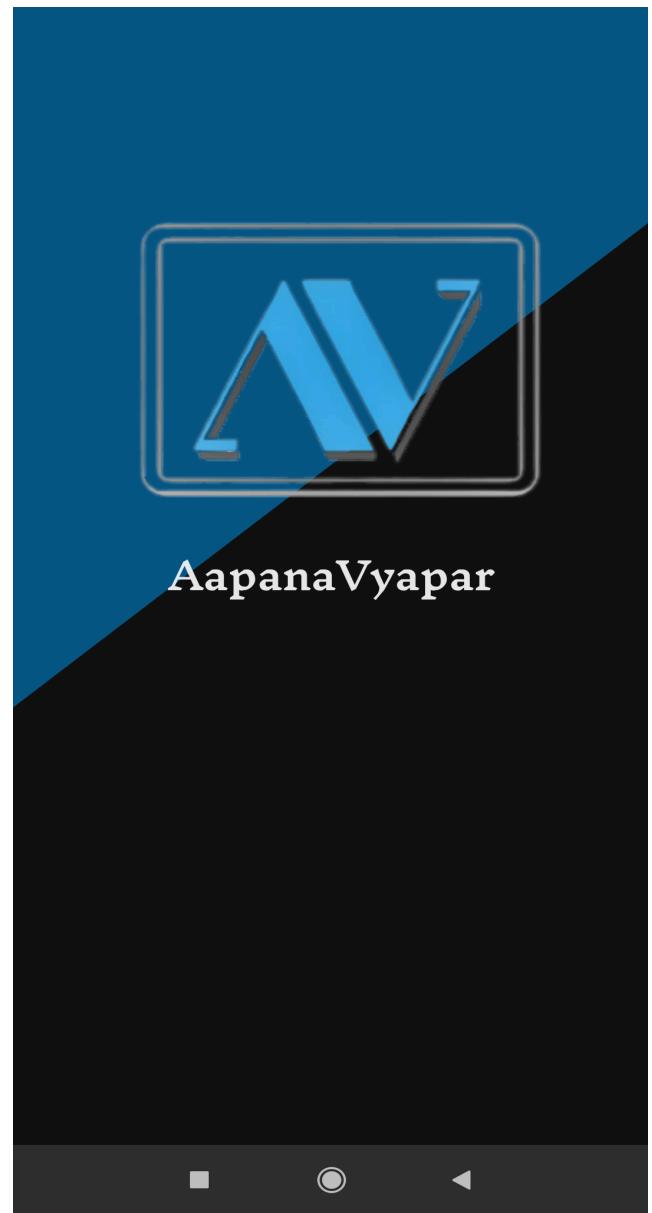
Chapter-8

ScreenShots

Splash Screen [User App]



Light Mode



Dark Mode

SignUp Page [User App]



AapanaVyapar

Sign Up

Fill The Form To Join

UserName

Email

Mobile No.

Password

SIGN UP >>



Light Mode



AapanaVyapar

Sign Up

Fill The Form To Join

UserName

Email

Mobile No.

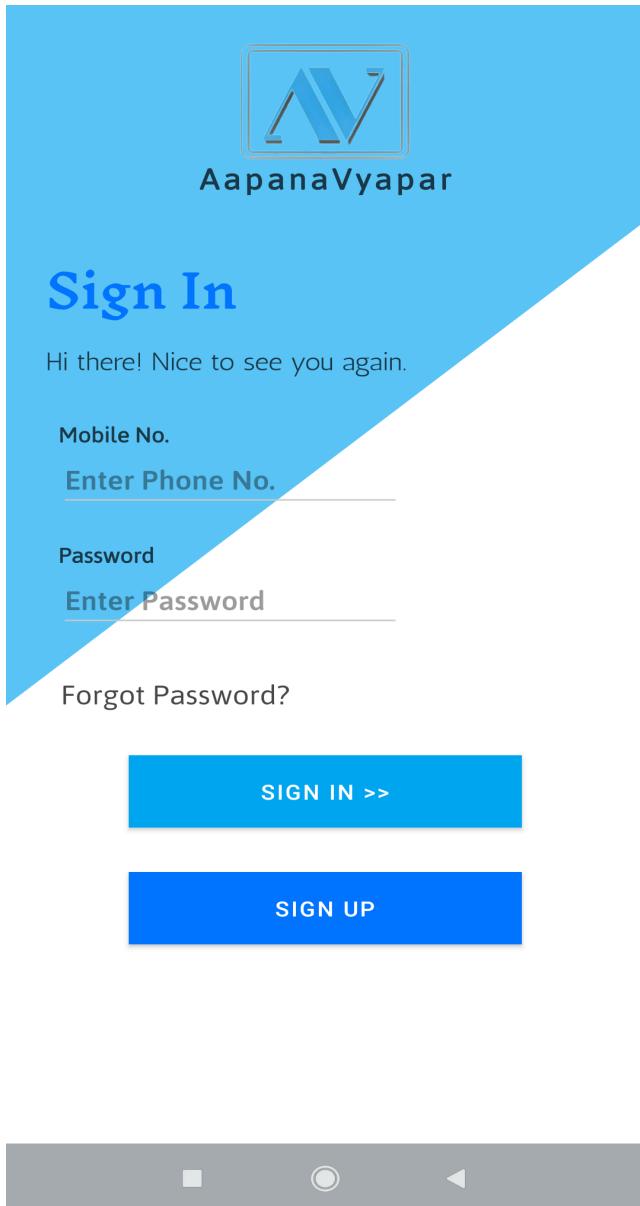
Password

SIGN UP >>

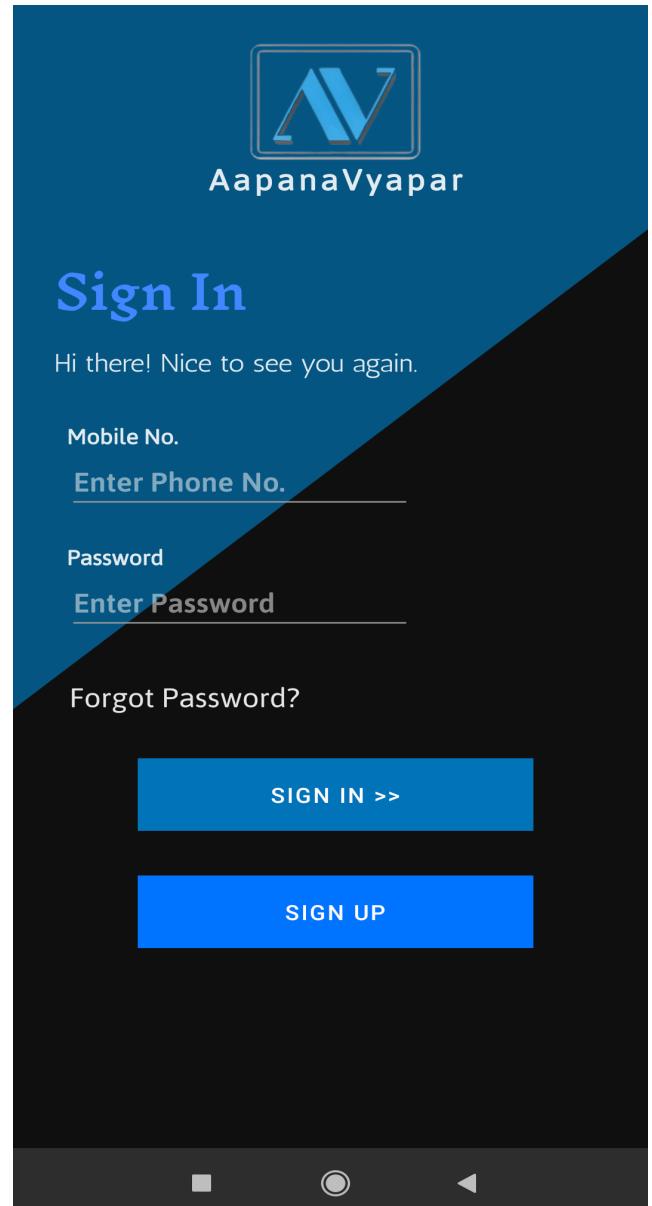


Dark Mode

SignIn Page [User App]

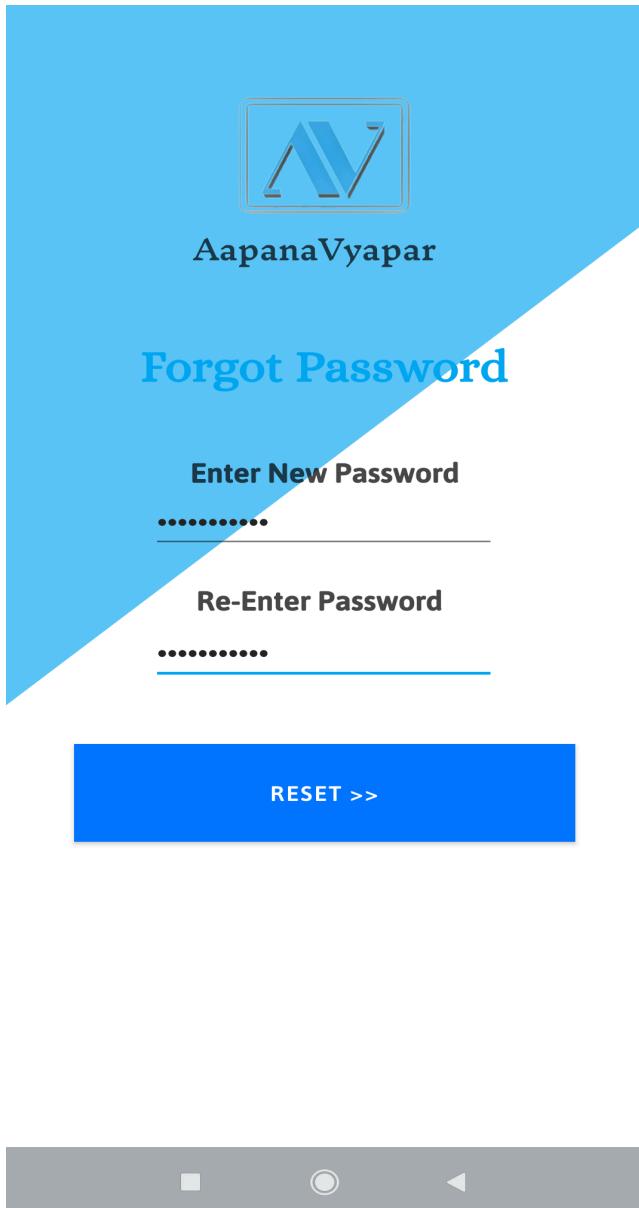


Light Mode

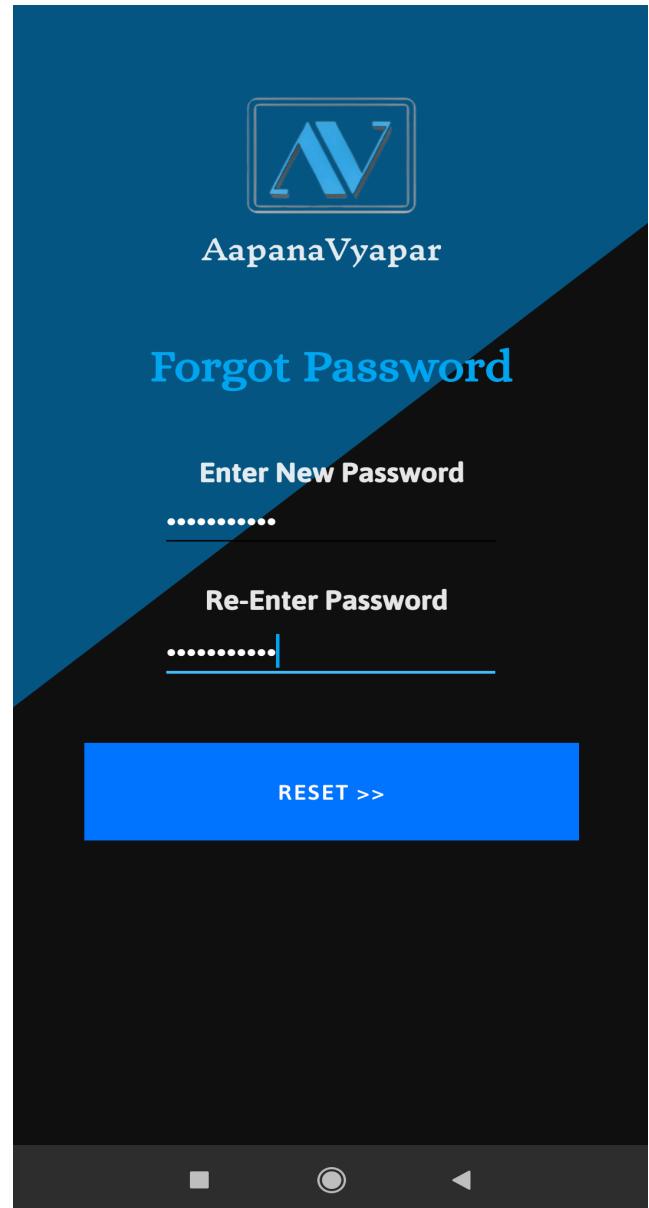


Dark Mode

Forgot Password Page [User App]

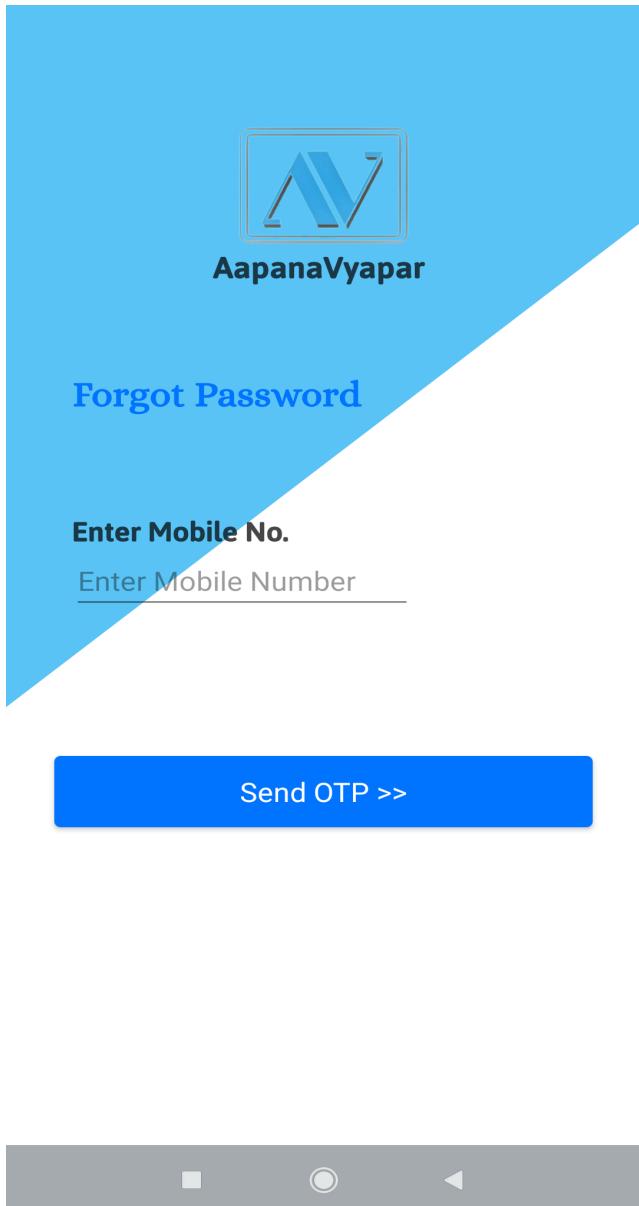


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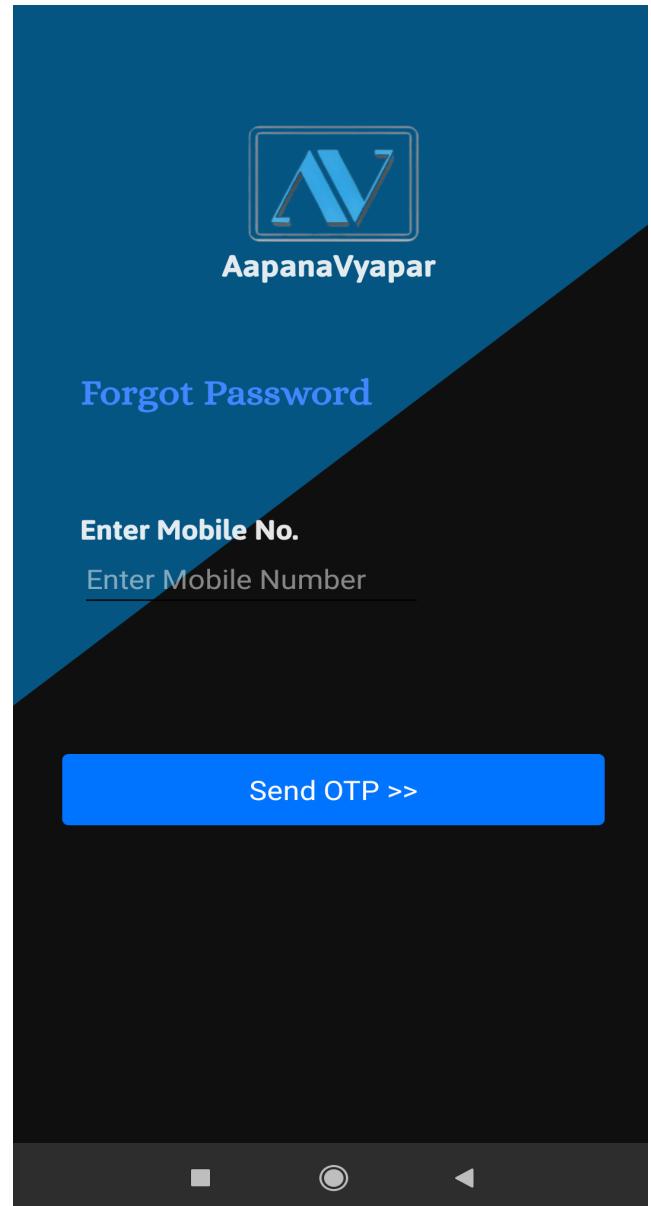


Dark Mode

Send OTP Page [User App]

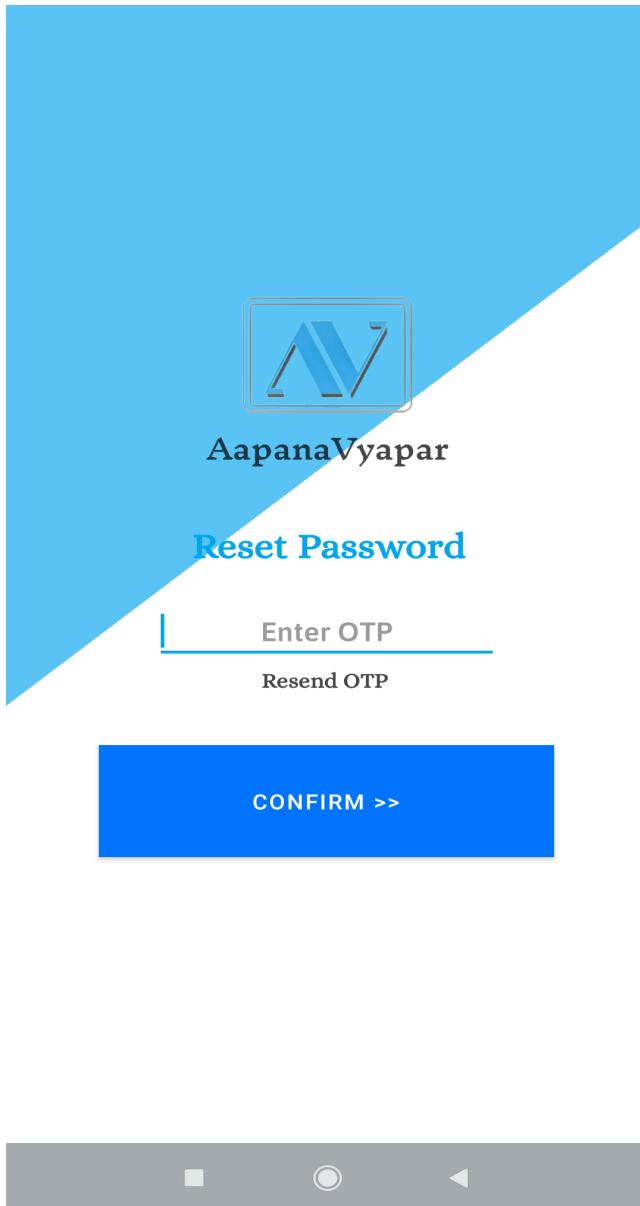


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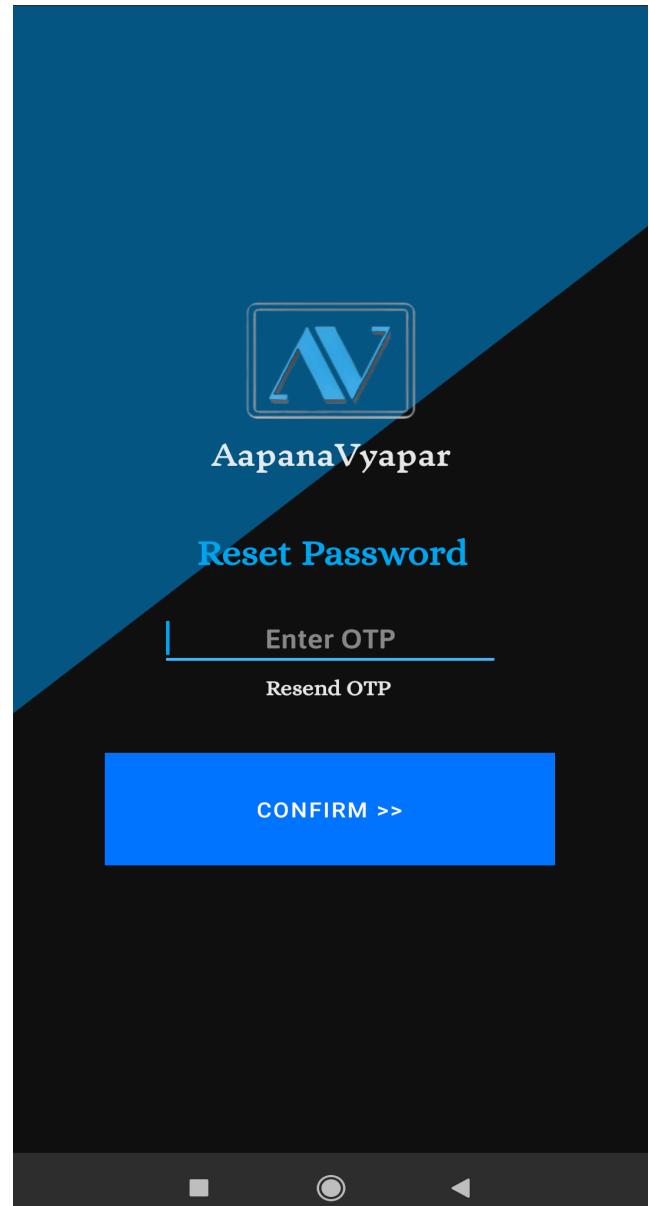


Dark Mode

Reset OTP Page [User App]

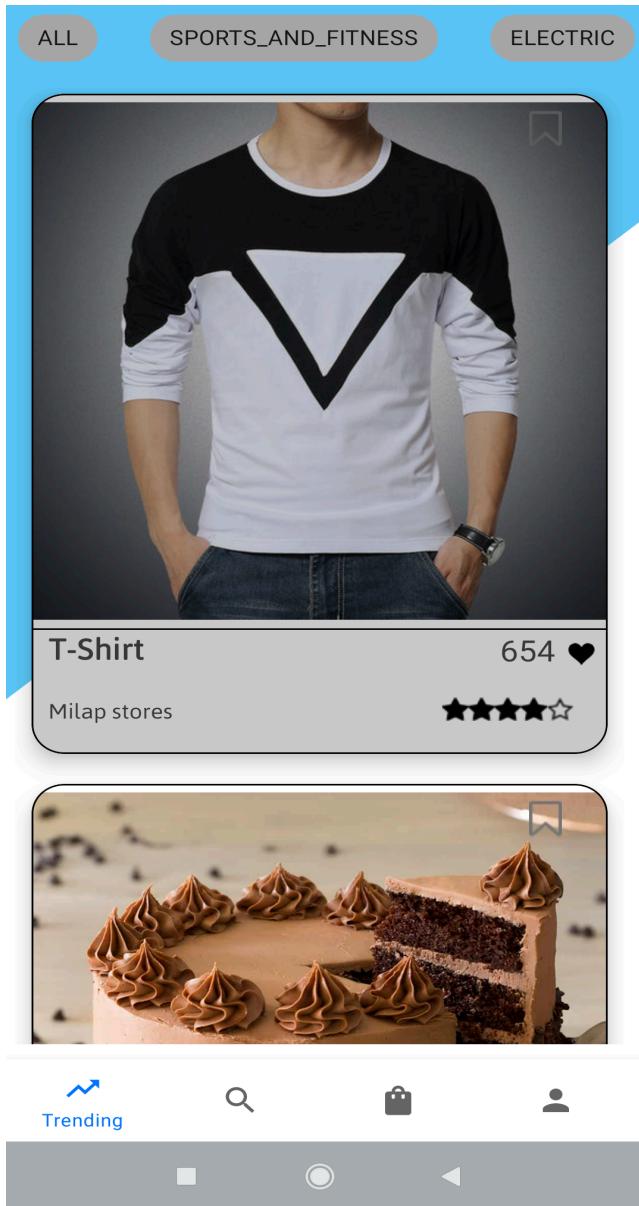


Light Mode

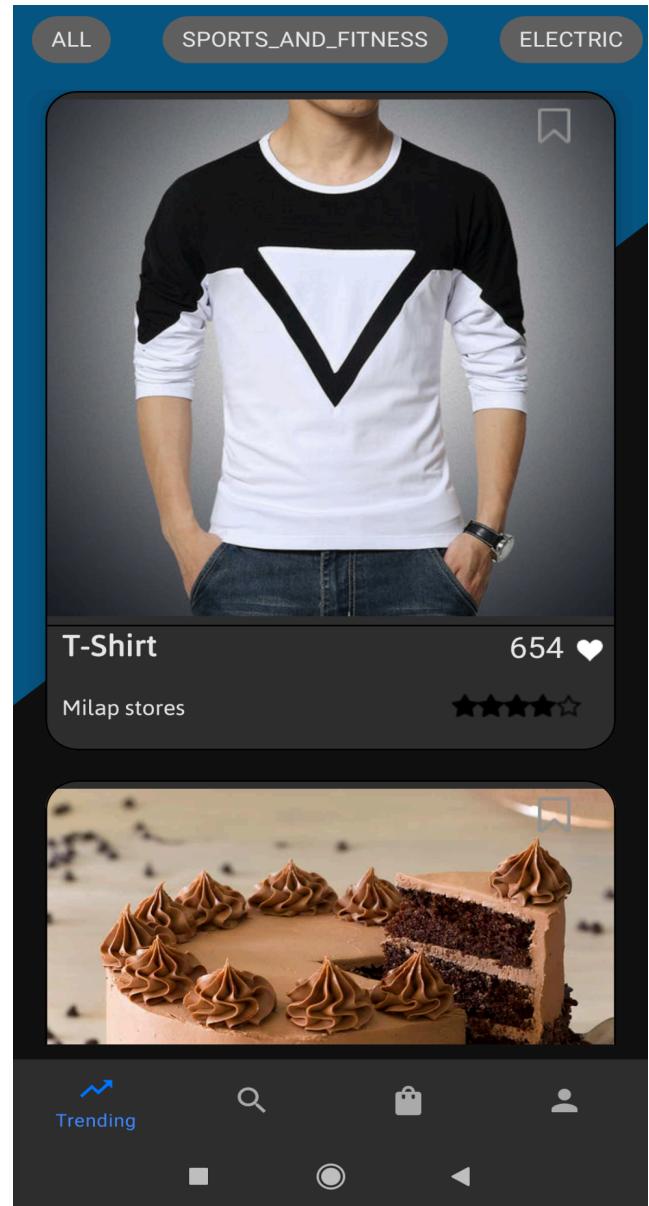


Dark Mode

Trending Products Page [User App]

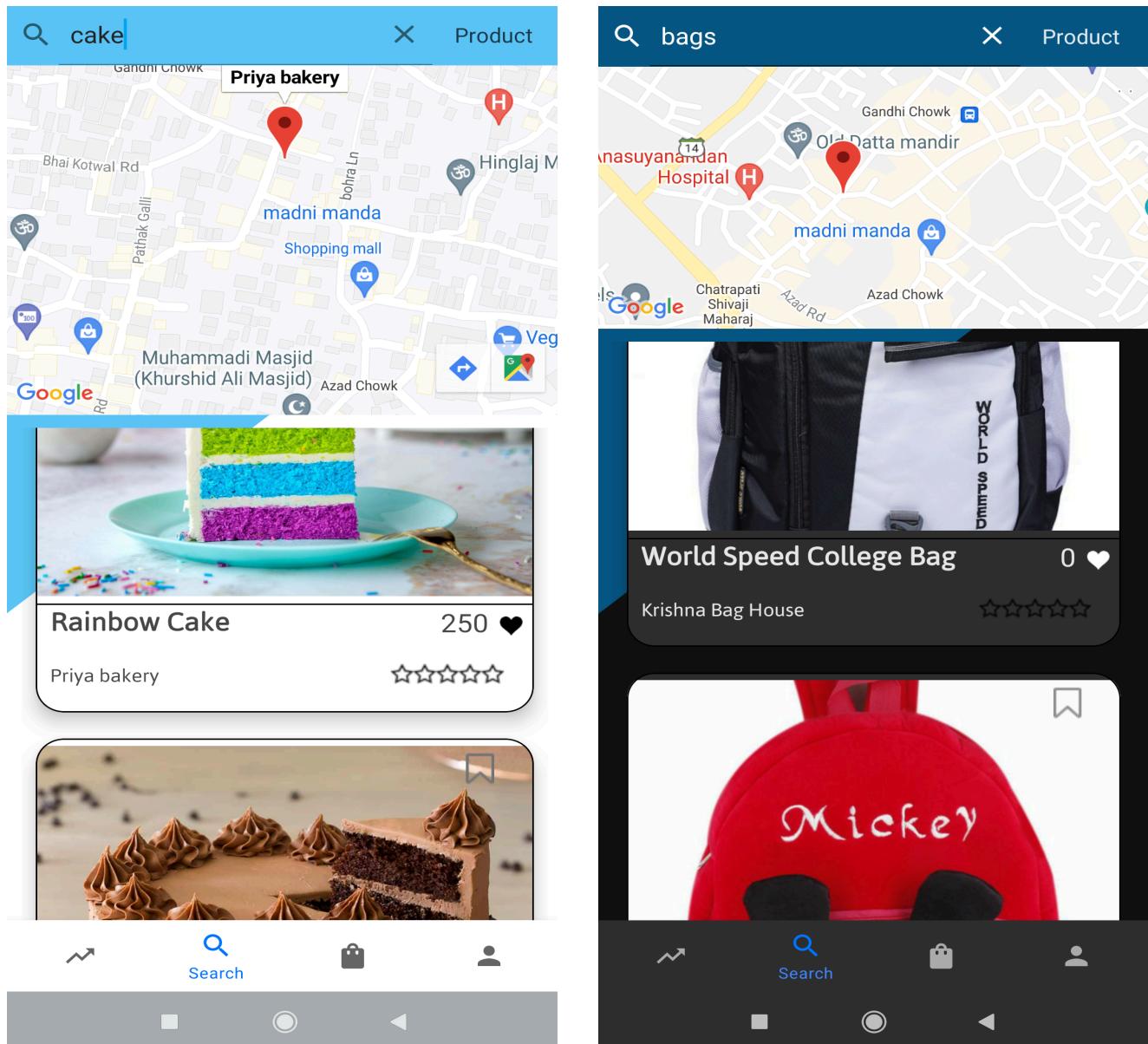


Light Mode



Dark Mode

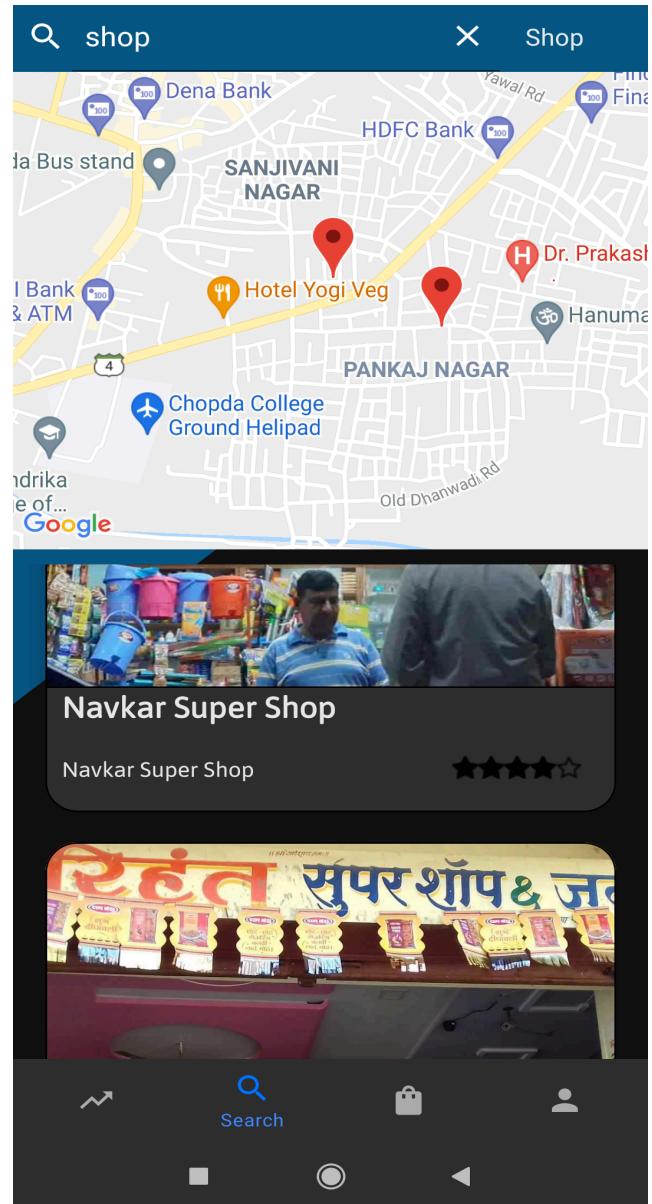
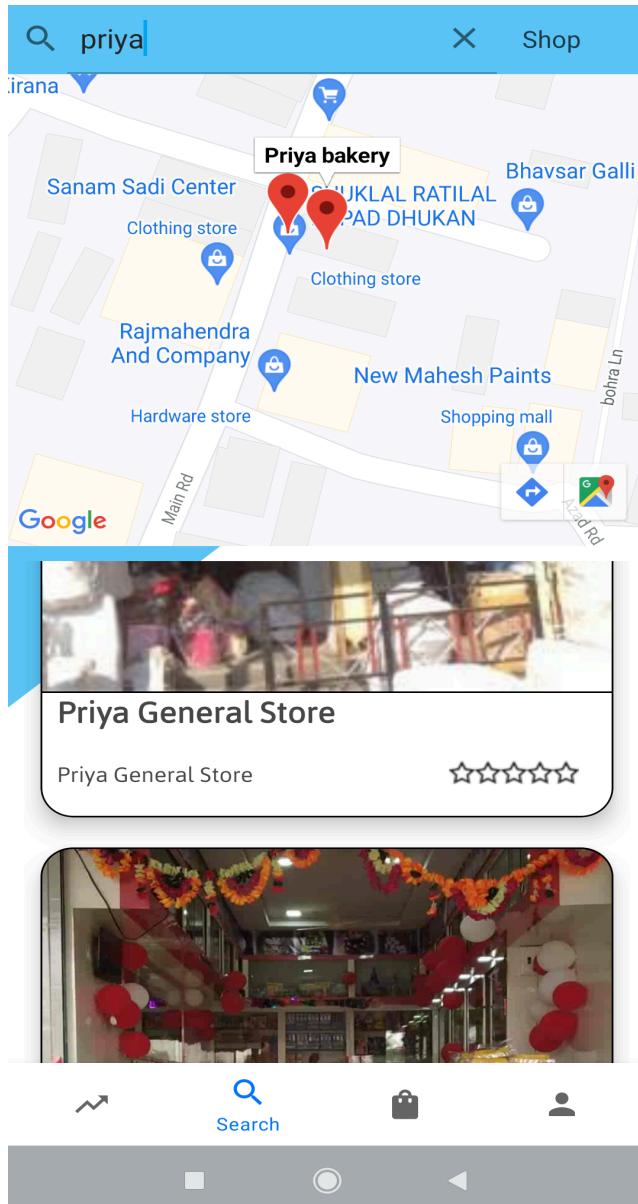
Product Search [User App]



Light Mode

Dark Mode

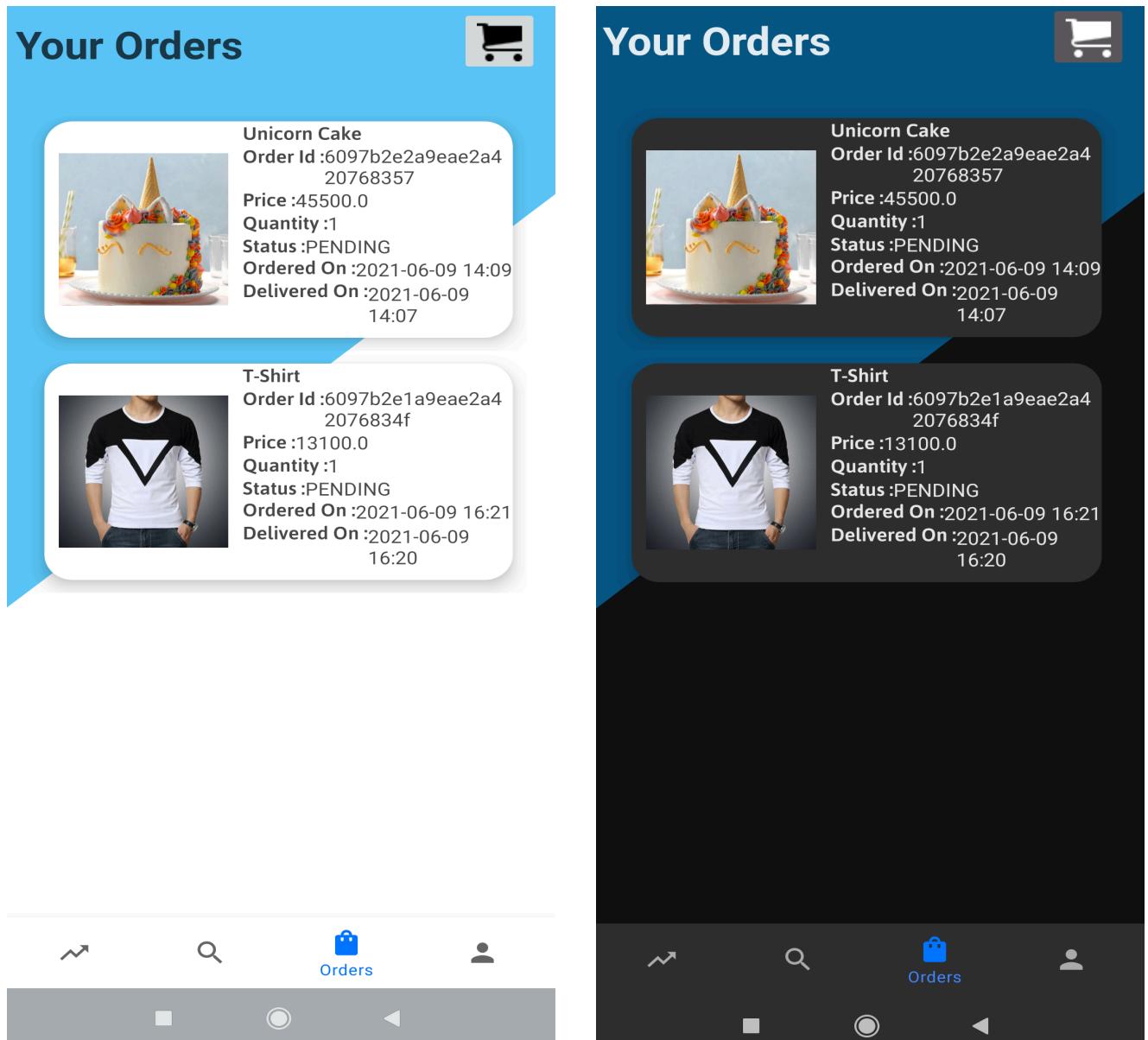
Shop Search [User App]



Light Mode

Dark Mode

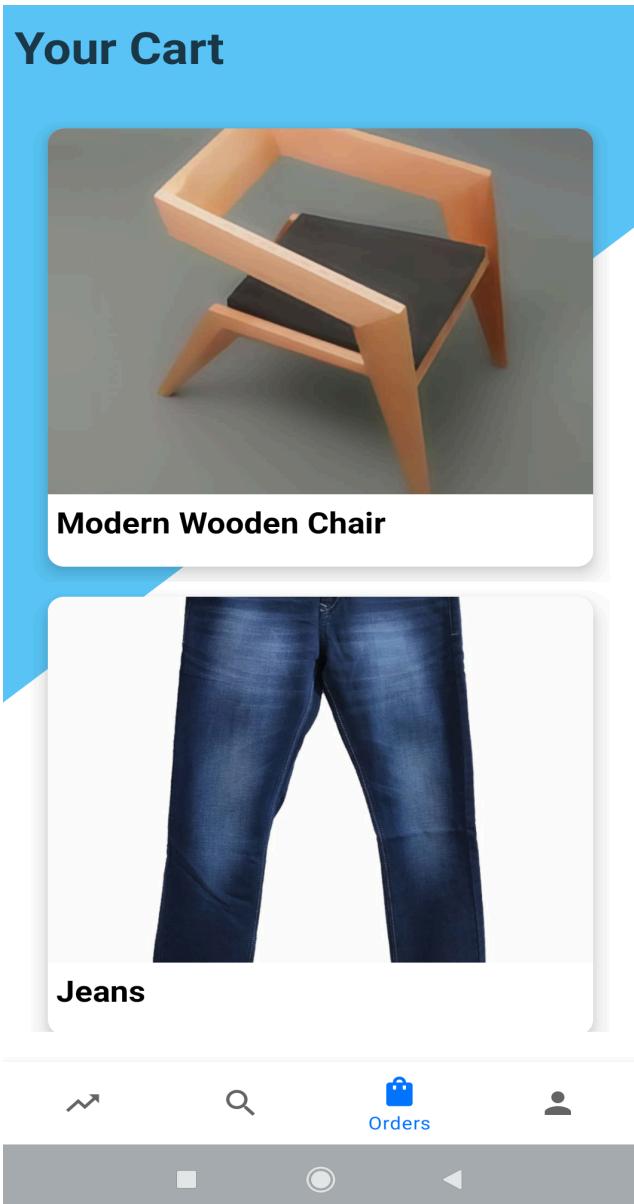
Orders Page [User App]



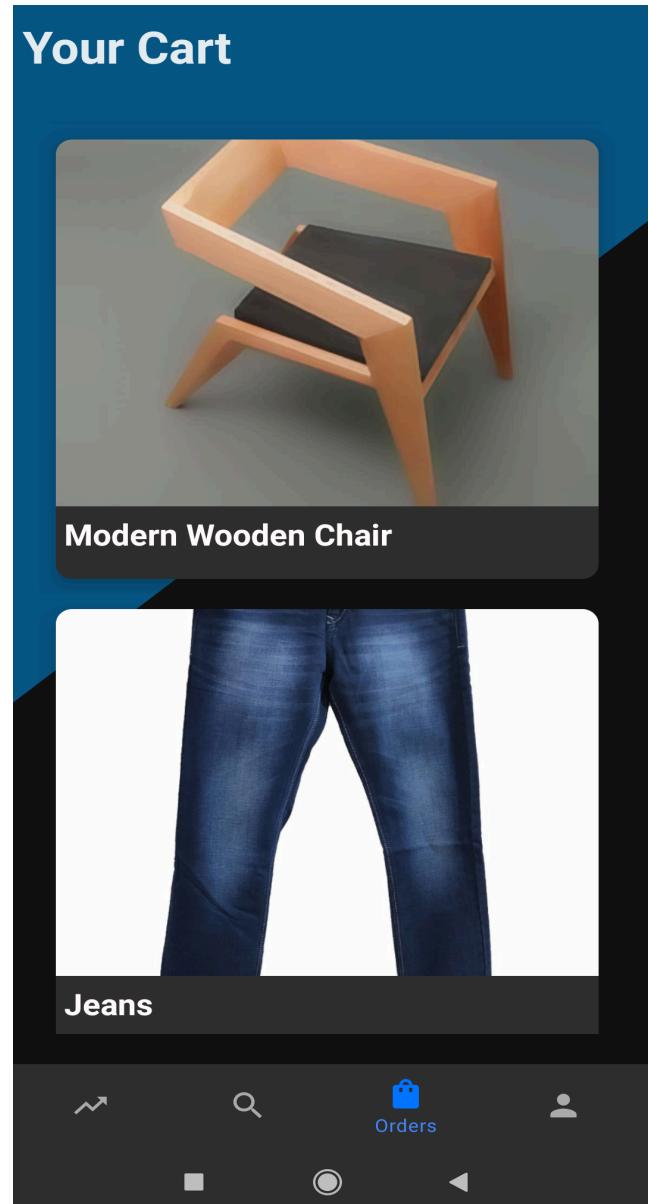
Light Mode

Dark Mode

Cart Page [User App]

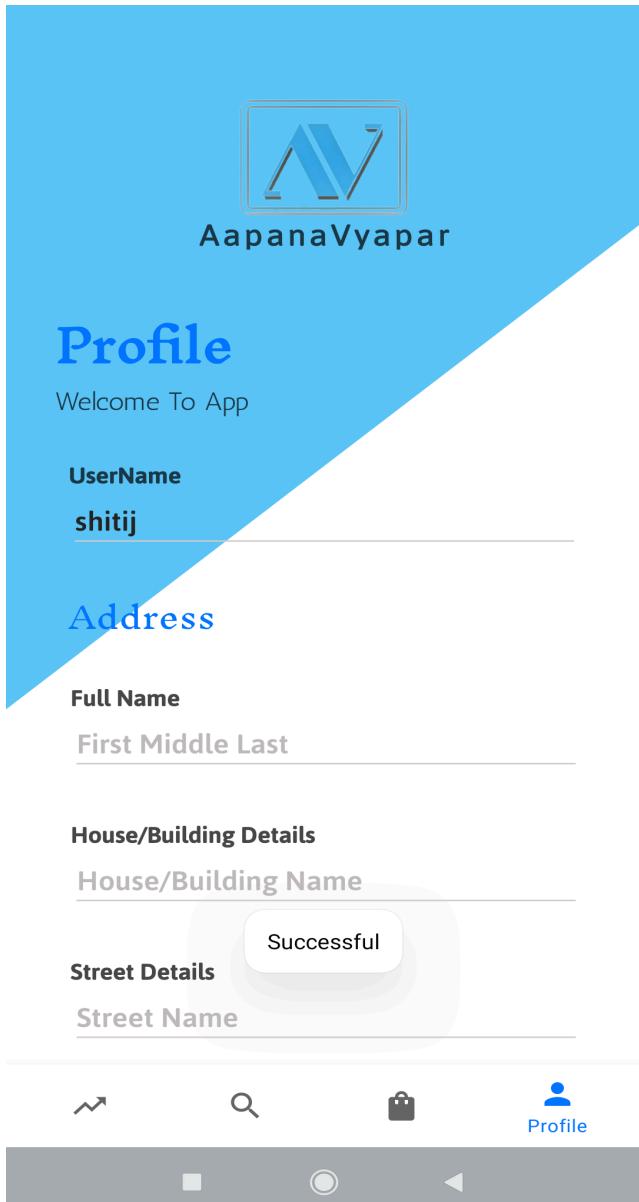


Light Mode

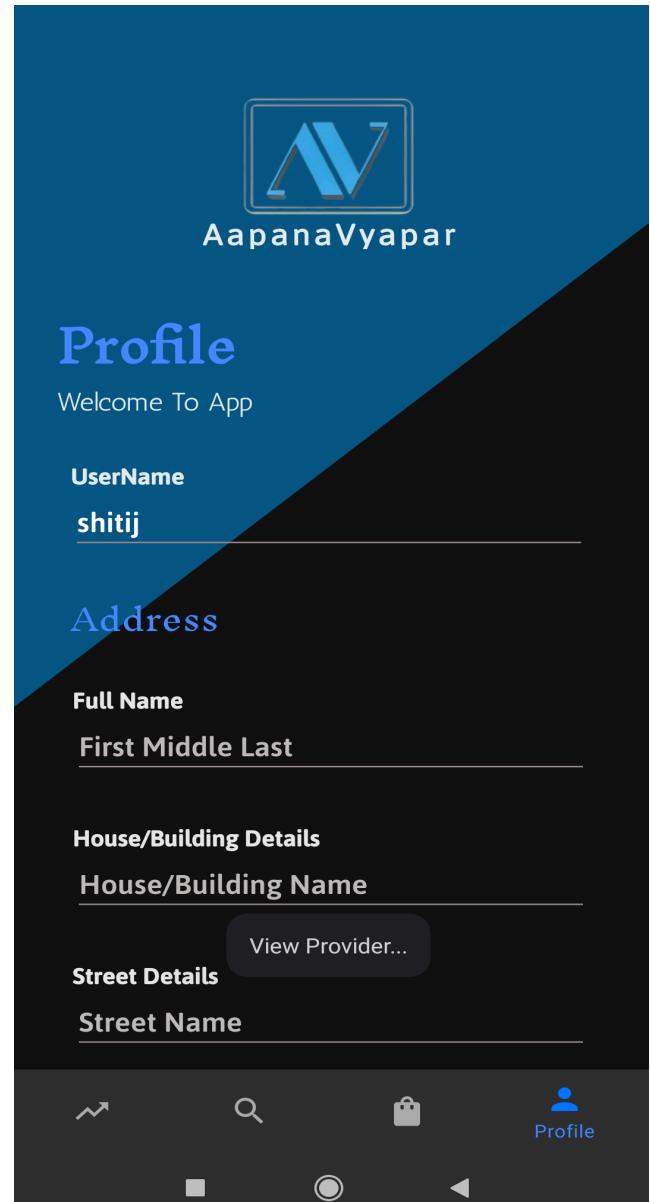


Dark Mode

Profile Page [User App]



Light Mode



Dark Mode

Profile Page [Shop App]

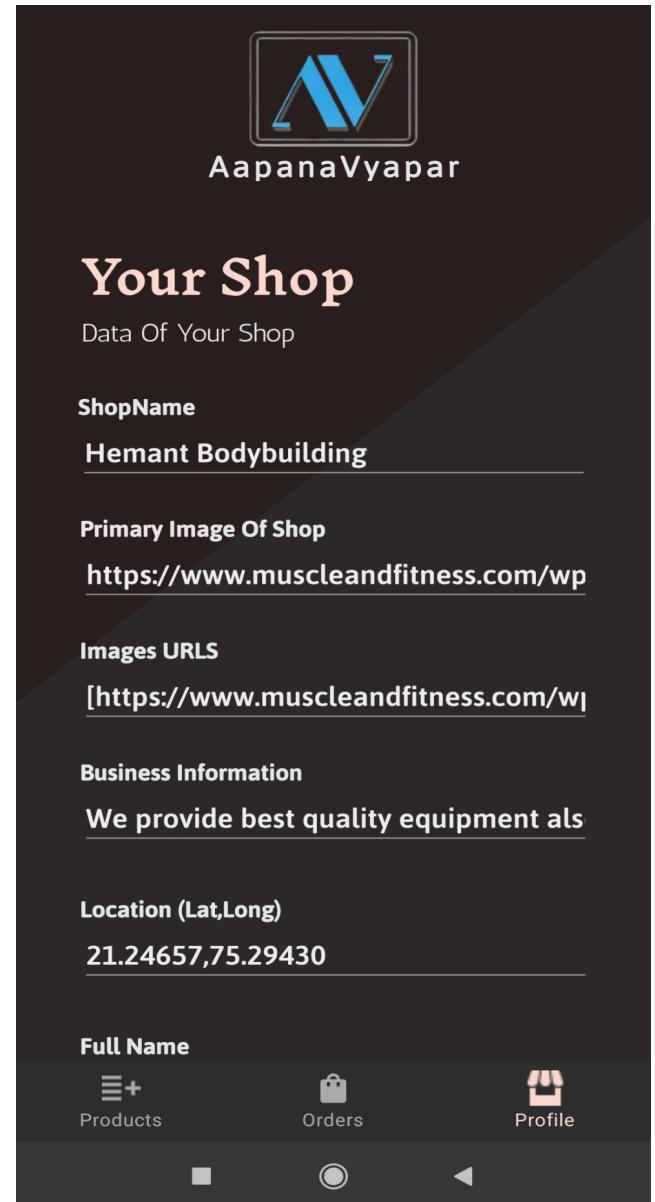


The screenshot shows the profile page of a shop in light mode. At the top is the AapanaVyapar logo and name. Below it, the title "Your Shop" is displayed in a large, bold, reddish-brown font. Underneath, the subtitle "Data Of Your Shop" is shown in a smaller, dark gray font. The main content area contains several input fields and their corresponding values:

- ShopName**: Ram Super Shop
- Primary Image Of Shop**: <https://www.muscleandfitness.com/wp>
- Images URLs**: <https://www.muscleandfitness.com/w>
- Business Information**: We provide best quality equipment als
- Location (Lat,Long)**: 21.24657,75.29430

At the bottom, there is a navigation bar with four items: "Products" (with a plus icon), "Orders" (with a shopping bag icon), "Profile" (with a storefront icon), and three small navigation icons (square, circle, triangle).

Light Mode



The screenshot shows the profile page of a shop in dark mode. The layout is identical to the light mode version, featuring the AapanaVyapar logo and name at the top. The title "Your Shop" is in a large, bold, reddish-brown font, and the subtitle "Data Of Your Shop" is in a smaller, dark gray font. The main content area contains the same input fields and their values:

- ShopName**: Hemant Bodybuilding
- Primary Image Of Shop**: <https://www.muscleandfitness.com/wp>
- Images URLs**: <https://www.muscleandfitness.com/w>
- Business Information**: We provide best quality equipment als
- Location (Lat,Long)**: 21.24657,75.29430

At the bottom, there is a navigation bar with four items: "Products" (with a plus icon), "Orders" (with a shopping bag icon), "Profile" (with a storefront icon), and three small navigation icons (square, circle, triangle).

Dark Mode

Landmark
landmark

Pin Code
425104

City
Chopda

State
Maharashtra

Country
India

Business Phone No.
1234567890

Selected Categories Of Your Shop
[SPORTS_AND_FITNESS, FOOD]

UPDATE >>


Products


Orders


Profile









Light Mode

Landmark
landmark

Pin Code
425104

City
Chopda

State
Maharashtra

Country
India

Business Phone No.
1234567890

Selected Categories Of Your Shop
[SPORTS_AND_FITNESS, FOOD]

UPDATE >>


Products


Orders


Profile









Dark Mode

Create Product Page [Shop App]



AapanaVyapar

Create Product

Fill The Form To Publish

Product Name
Enter Product Name

Product Description
Enter Your Product Description

Shipping Info
Enter Shipping Info

Stock
10

Price In Rupees
10

 Products

 Orders

 Profile

□ ○ ◀

Light Mode



AapanaVyapar

Create Product

Fill The Form To Publish

Product Name
Enter Product Name

Product Description
Enter Your Product Description

Shipping Info
Enter Shipping Info

Stock
10

Price In Rupees
10

 Products

 Orders

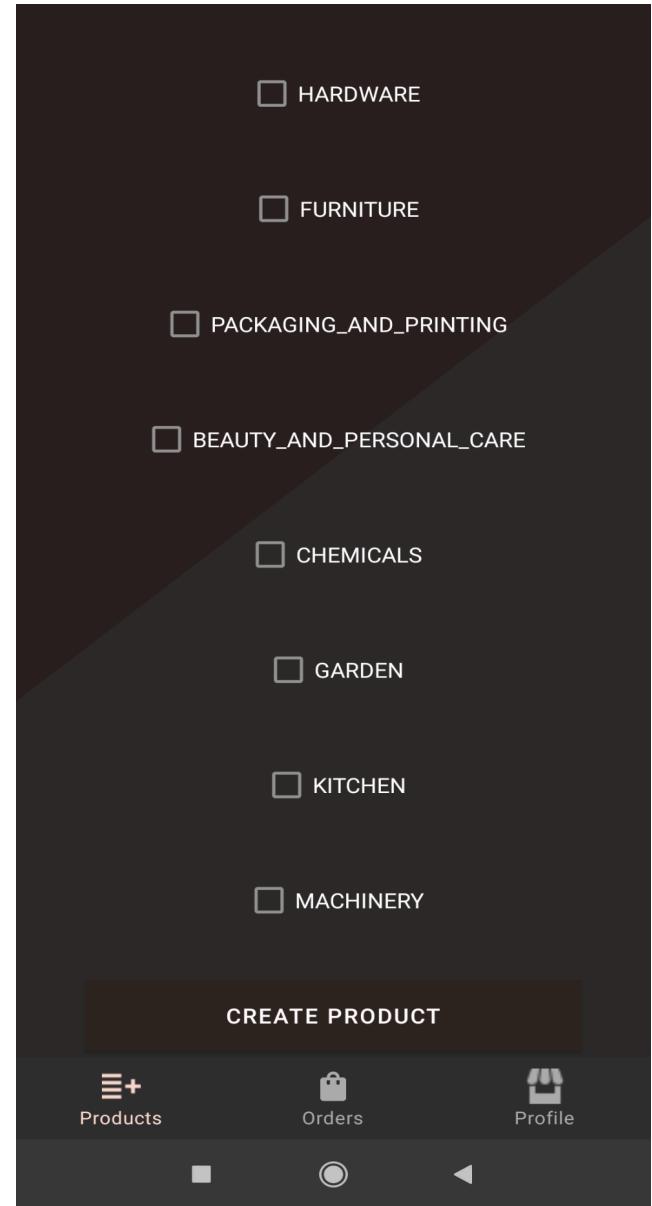
 Profile

■ ○ ◀

Dark Mode



Light Mode



Dark Mode

Your Products Page [Shop App]

Your Products

+



Monster Coldrink Offer : 5%

Stock : 98 Price : 500.0 Rupees

Category : [SPORTS_AND_FITNESS, FOOD]
Description
Best Energy Drink
Shipping Info
10x30x60



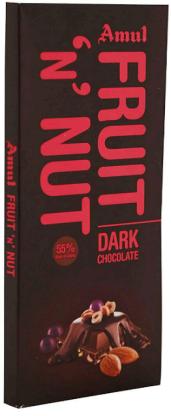
Products **Orders** **Profile**

□ ◯ ◀

Your Products

+

Best Energy Drink
Shipping Info
10x30x60



Amul chocolate Offer : 0%

Stock : 494 Price : 10.0 Rupees

Category : [FOOD, SPORTS_AND_FITNESS]
Description
teasty
Shipping Info
10x10x10

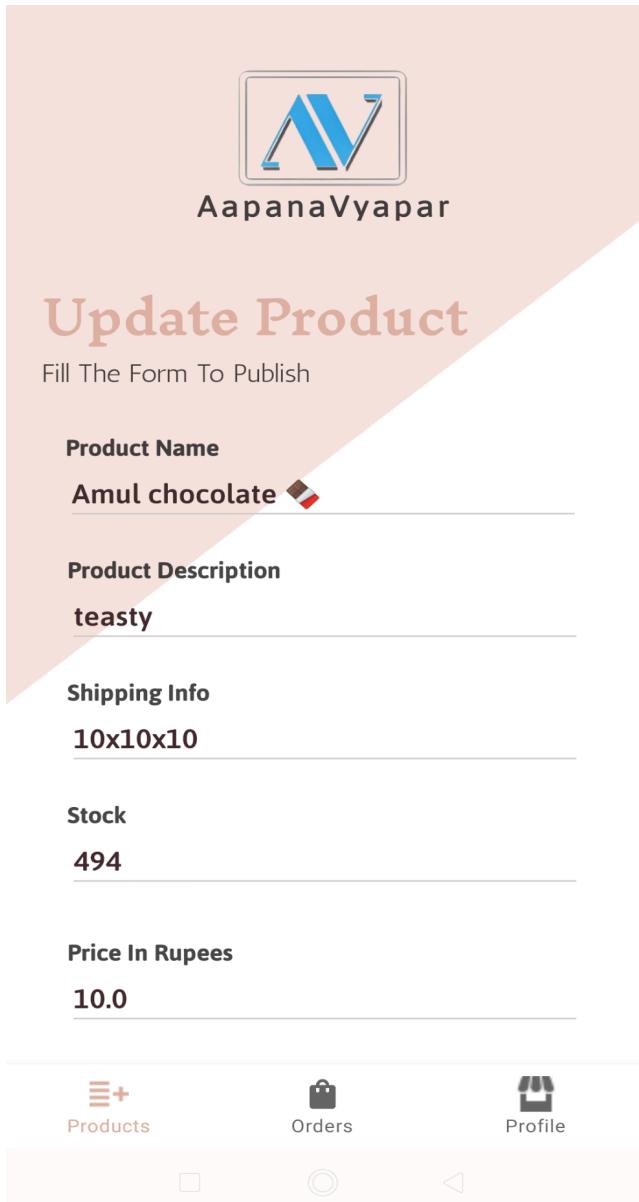
Products **Orders** **Profile**

□ ◯ ◀

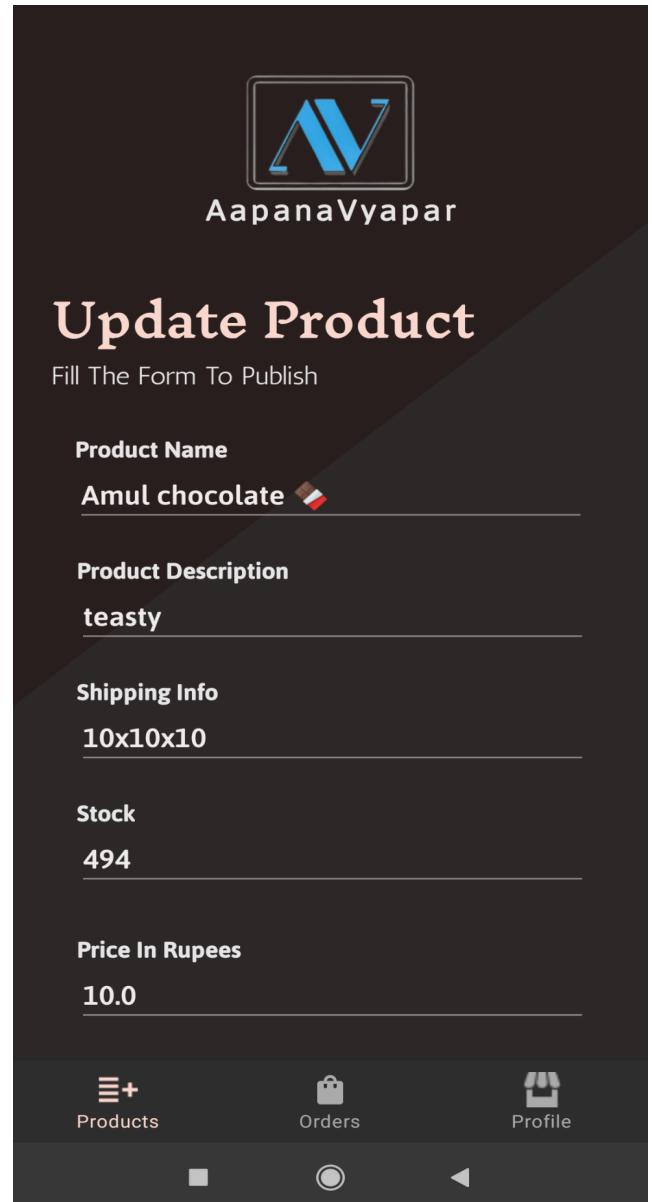
Light Mode

Dark Mode

Update Product [Shop-App]



Light Mode



Dark Mode

Orders Page [Shop App]

Your Orders



Amul chocolate 🍫

Order Quantity : 2

Order Price : 25.0

Order Id : 60c36175cafdbf26b8661ac

Order Status : PENDING

Order Ordered Time : 2021-06-11 13:13:25.434
+0000 UTC

Order Delivery Time : 2021-06-11 13:12:46.896
+0000 UTC

Delivery Address

Full Name : Ram Sham

House Details : House

Street Details : Maharashtra

Landmark : Landmark

Pin Code : 425107

City : Chopda

State : Maharashtra

Country : India

Phone No : 1234567890

Your Orders



Amul chocolate 🍫

Order Quantity : 2

Order Price : 25.0

Order Id : 60c36175cafdbf26b8661ac

Order Status : PENDING

Order Ordered Time : 2021-06-11 13:13:25.434
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Delivery Address

Full Name : Ram Sham

House Details : House

Street Details : Maharashtra

Landmark : Landmark

Pin Code : 425107

City : Chopda

State : Maharashtra

Country : India

Phone No : 1234567890



Products



Orders



Profile



Light Mode

Dark Mode



Products



Orders



Profile



Chapter-9

Advantages And Disadvantages

1. Advantages :

- a) Users can make purchases from local shops, while staying at home.
- b) Shopkeepers can sell their goods digitally.
- c) Increase in recognition of shops by digital medium.
- d) A shop with the most loved products gets more popularity.
- e) Increase user's convenience.
- f) Minimum mobile data required for requests to the server.
- g) Shopkeepers has an opportunity to grow their business.
- h) Faster and accurate response from the server.

2. Disadvantages :

- a) Cannot open an account without getting registered.
- b) Cannot run on PC and web browser.
- c) Shopkeeper has to manage delivery by himself.
- d) Custom location can not be selected.
- e) Internet connection is mandatory.

Chapter-10

Conclusion And Future Scope

1. Future Scope :

- a) Instead of making deliveries by the shopkeeper himself, Delivery service can be provided.
- b) Improvements can be done in the UI of users-app to make it more user friendly.
- c) Users' wallets can be added.
- d) The Coupen system can be added.
- e) Users can be awarded for their purchase in the form of virtual coins.
- f) Based on purchases, users can be awarded with special ranks such as gold, silver, bronze, platinum etc.
- g) Support for web and desktop.

2. Conclusion :

While working with this project we learnt different technologies, communication skills, how to work in a team, leadership, learn to distribute tasks, dedication, consistency in work, work in discipline, control temper and much more.

References

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- <https://www.docker.com/>
- <https://developer.android.com/>
- <https://material.io/components?platform=android>
- <https://razorpay.com/docs/payment-gateway/android-integration/standard/>