DESIGN AND DEVELOPMENT OF A CO-OPERATIVE SOCIETY SYSTEM

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

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APPROVAL

This Project titled **"Design and Development of a Co-Operative Society System"**, submitted by Jannatul Nayem Himel, ID No: 163-15-8538 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on Thursday, 09 September 2021.

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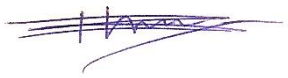

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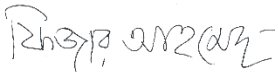

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I hereby declare that, this project has been done by me under the supervision of **Md. Tarek Habib, Assistant Professor, Department of CSE** Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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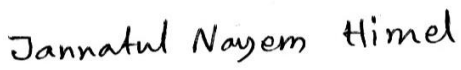

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Finally, I must acknowledge with due respect the constant support and patients of my parents.

ABSTRACT

With almost everything going digital, Cooperative Societies are not getting the advantages that technology offers. They are still following the traditional way of pen and paper. This project is based on "**CO-OPERATIVE SOCIETY SYSTEM**". This system helps its users to deposit and pay installment from a remote location.

Cooperative Societies are very important for the rural areas. They provide great support to farmers and local small businesses. Cooperative Societies provides deposit schemes and loans to their members so they can grow and improve their quality of life. In this project I have developed a secure online system for the Cooperative Societies. With this project I can ensure that the system is reliable and easy to use.

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CHAPTER 1

Introduction

1.1 Introduction

A co-operative society is a voluntary association of individuals having everyday needs who join hands to achieve common economic interest. It aims to serve the interest of the poorer sections of society through the principle of self-help and mutual help. The main objective is to provide support to the members. Nobody joins a co-operative society to earn profit. People come forward as a group, pool their resources, utilize them in the best possible manner, and derive some common benefit out of it [1].

This project named as **"Somobay"**. I developed this system for co-operative society to make it more accessible to people. The goal of developing this project was to make an online system for the Cooperative Societies that they can manage their transactions remotely without the need to go to the office location. They are more open towards the people versus the Banks but Banks tend to be more accessible in terms of technology. This project aims to reduce the technological gap between Banks and Cooperative societies and make people more inspired to participate in such organizations. I hope that the scope of the knowledgeable popularity of this system is extensive and can play a significant role in the future.

1.2 Motivation

If a person wants to start a small business or expand his business he needs money. If he doesn't have the money he can ask family and friends to lend him some money or he can go to a bank for a loan. Bank will ask him for collateral, if he cannot provide collateral his loan application would be refused. Here Credit Cooperative Societies can help him.

In the past, in the rural areas, people had to go to money lenders for loans and their interest rates were so high that most of the people could not pay off their debts and lose everything they had. Credit Cooperative Societies are also helping these people developing their lives.

Cooperative Societies are lagging behind, for one thing, and that is technology. They haven't been caught up with technology like Banks and Mobile Banking services. This project aims to make Cooperative Societies technologically more accessible so people can be more benefited from them.

1.3 Objective

The objective of this project is to develop an online system for the Cooperative Societies including a client-side web application for the admin where he can manage the members and their transactions, a cross-platform mobile application for the members where they can deposit, apply for a loan, pay instalments and receive nonfictions for the upcoming deposit or instalment dates and a server-side application to manage all the data and serve the client with the desired data.

1.4 Expected Outcome

- 24/7 online system
- Manage members data remotely
- Approve deposit payments and installments remotely
- Pay deposits or installments with online financial services
- Get notified upcoming deposit dates and installment dates
- Get notified on missed deposit dates and installment dates

CHAPTER 2

BACKGROUND STUDY

2.1 Introduction

The presence of the internet has changed the world in every way. In this current world, we are becoming more and more dependent on online-based technology. We count on the internet for each and everything in life. We made an online application named “Somobay” by which it will be easy to connect with Cooperative Societies that they can manage their transactions remotely without the need to go to the office location**.**

2.2 Related Works

Actually, SOMOBAY is an application which is implemented to help people for getting online services. This project is useful for management and members. In Bangladesh there's no app like SOMOBAY. But some of the features of SOMOBAY are partially similar to other online application. They are:

- Somity Keeper [2]
- Micro-Credit System-Loan Management Software [3]
- Microfinance Software [4]

2.3 Comparative Studies

Comparatively, there are very few applications like SOMOBAY is available in the market. The available applications are not fully featured and not fully active. Most of them are web-based application for managing the data. They do not give any functionality to the general users. Some have mobile apps support but the also do not provide the app to the general users.

2.4 Scope of the Problem

The main scope of the problem is usefulness and availability of connectivity. We are trying to make our application easy to use and user friendly. The userbase of this application will be mostly village people. So, making the user interface simple and easy will be necessary.

2.5 Challenges

During development of this application, I have faced a lot of challenges and tried my best to overcome them. They are listed below:

1. Lack of internet connection might be our main challenge as SOMOBAY is an online application.
2. We have to develop and build our application properly and make sure that all of its functionality works and it is convenient to use.
3. Making the system, member, cooperative society and admin data proper secured.
4. Privacy of data is one of the most challenging issue for us.

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Business Process Modeling

In this section, we will discuss the main structure by the business process model of SOMOBAY where admin and users remain. The task of each roles show how they are connected with each other.

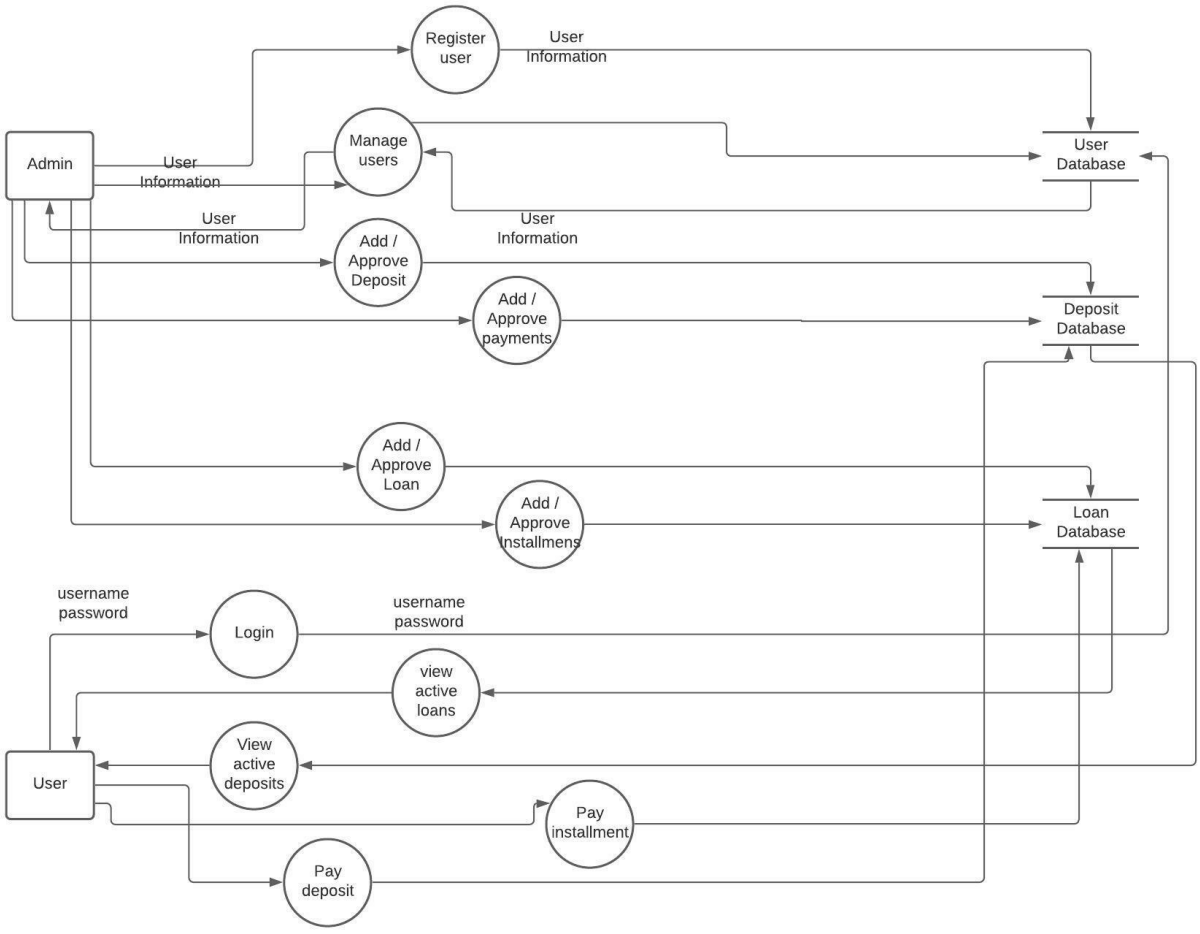

Figure 3.1: Data Flow Diagram

3.2 Requirement Collection Analysis

Admin has the highest power and this role connects to all other sections. Only Admin can create data like new user, user deposit, user loan. After taking payment input from the member, it will be forwarded to admin for approval. The admin will verify and approve the payment and it will be added to members account.

Functional Requirements: In this project there are many functional requirements. There is secure login, role-based authentication and account validation.

Nonfunctional Requirements: Nonfunctional requirements usually include user-friendly UI. The UI should be easy to interact for an excellent user experience.

3.3 Use Case Modeling and Description

User can log in, see active deposit, see active loan, pay deposit, pay installment, check account status, get notification of upcoming deposit and installment and get alert on delayed deposit and loans. Admin can log in, add new user, add deposit to a user's account, add loan to a user's account, add or approve deposit payments from user, add or approve installments from user and activate or deactivate users account.

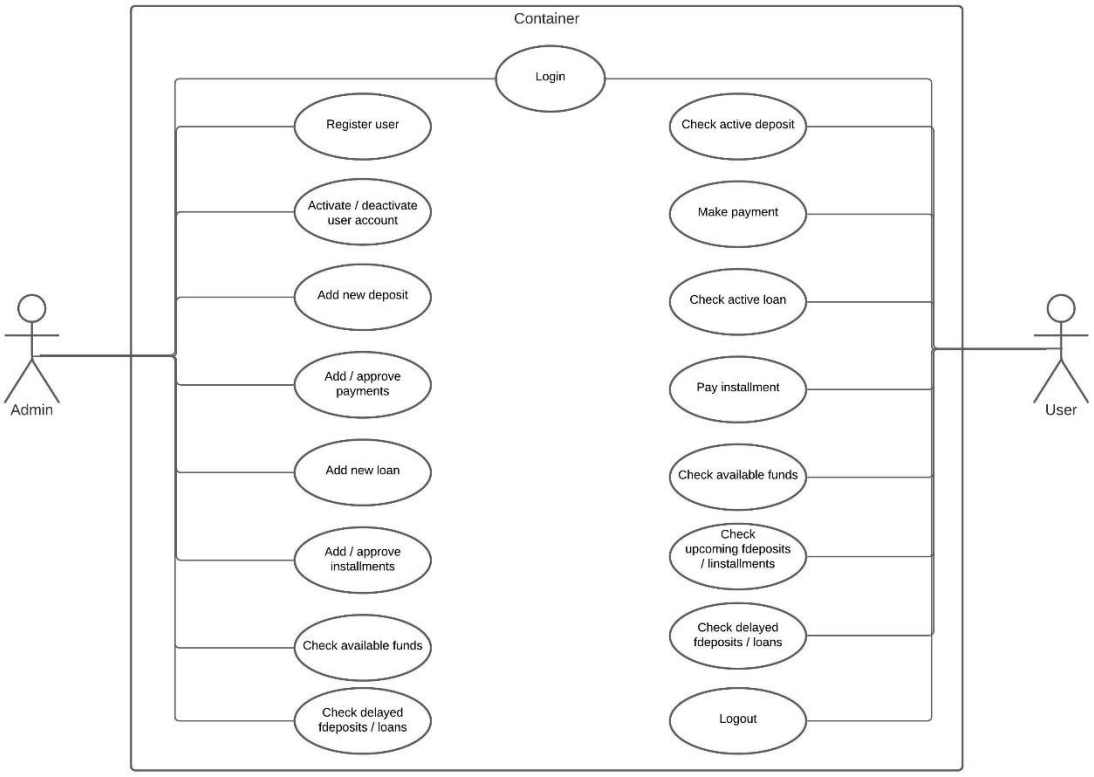

Figure 3.2: Use Case Diagram

3.4 Logical Data Model

An entity-relationship diagram (ERD) shows the relationship of the entities stored in a database. An entity in this context is an object, a component of data. An entity set is a collection of similar entities. These entities can have attributes that define its properties. The logical data model presents the Entity-relationship diagram called the ER diagram. An entity is a piece of data-an object or concept about which data is stored. The ER diagram of our system is given below.

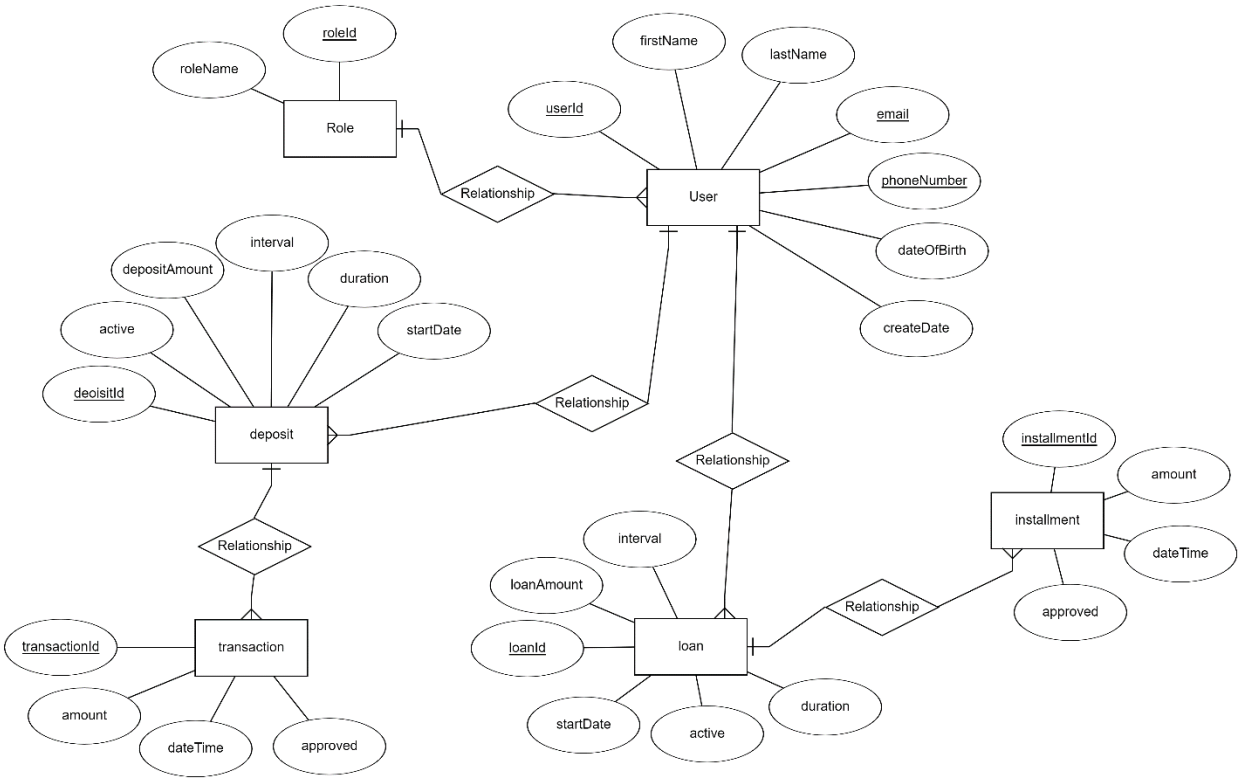

Fig. 3.3: Entity Relationship Diagram

3.5 Design Requirements

Requirements for design is very important for both website and mobile application. To convince the user to use the application, the application user interface must be attractive and convenient to use. So, in order to complete the design, we will require web application and mobile application design skills. For this, we need to know various types of programming languages. We need to design the database properly so that it works appropriately and easily.

Some extra features:

- There are two types of users: Admin, User.
- Admin can add new user, user deposit and user loan.
- Admin can manage all other account information.
- User can pay deposit and installment

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-end Design

Front-end is the part which the user can see and interact with. For the front end of this system, the web application is developed using Angular [5] framework with Material UI [6] and the mobile app is developed with Flutter [7] framework which gives us the ability to make apps for Android and iOS platform from a single code base.

Both the web app and the mobile app has a simple and user-friendly user interface. Following the Material UI design language, the user experience has been excellent with its elegant UI components and intuitive animations.

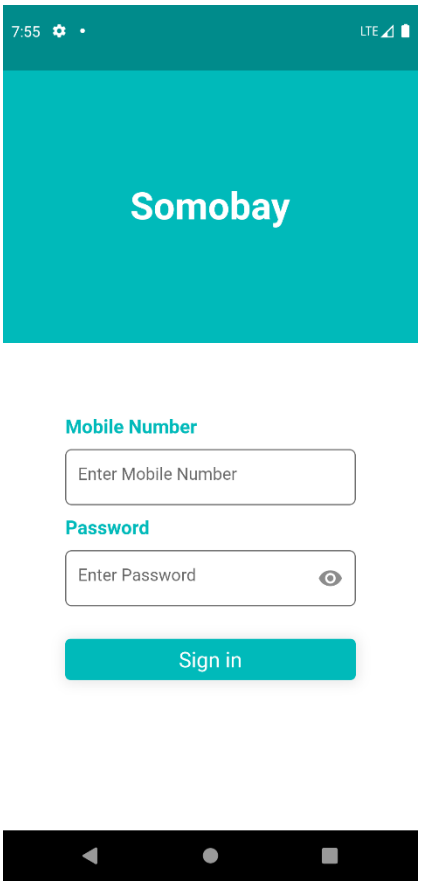

Figure 4.1: User Login View

Figure 4.1: Shows the user's login screen. User will log in with their phone number and password. If they provide wrong phone number or password or try logging in with general user's credentials they will be notified else the will login successfully

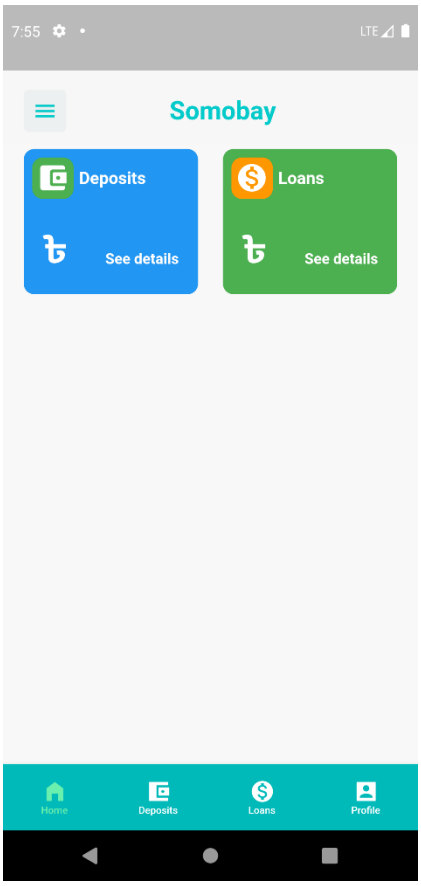

Figure 4.2: User Dashboard View

Figure 4.2: Shows the Dashboard screen of the user app. Provides with direction to other pages.

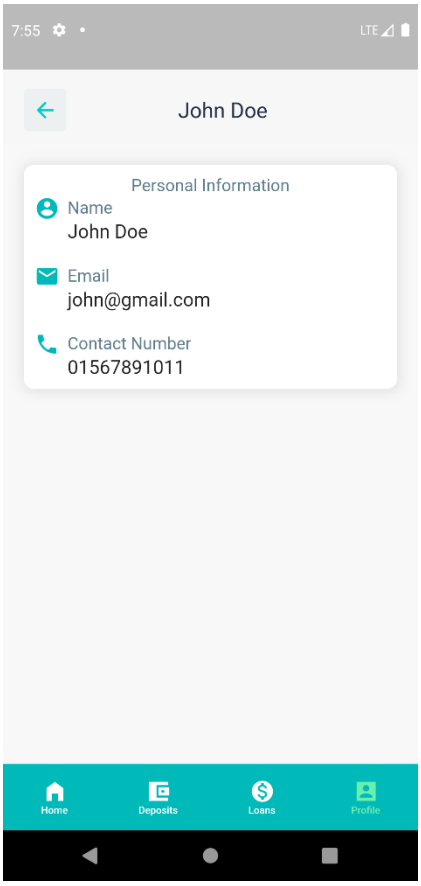

Figure 4.3: User Profile View

Figure 4.3: Shows the brief overview of user account information.

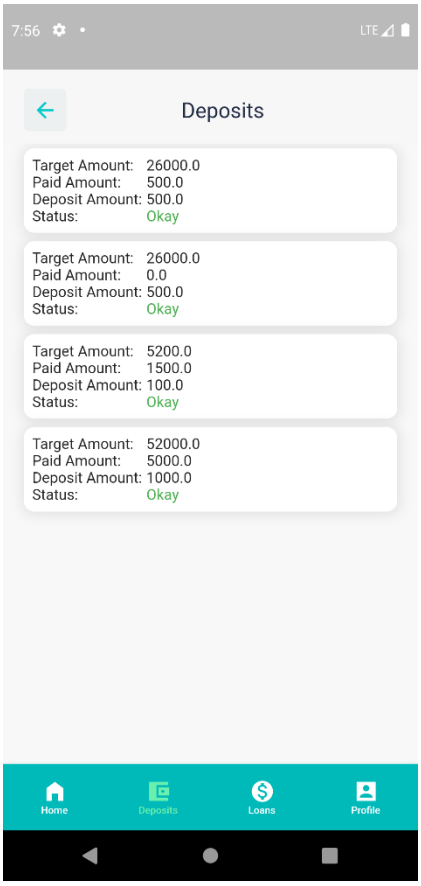

Figure 4.4: User Deposits List View

Figure 4.4: Shows the list of deposits associated with users account.

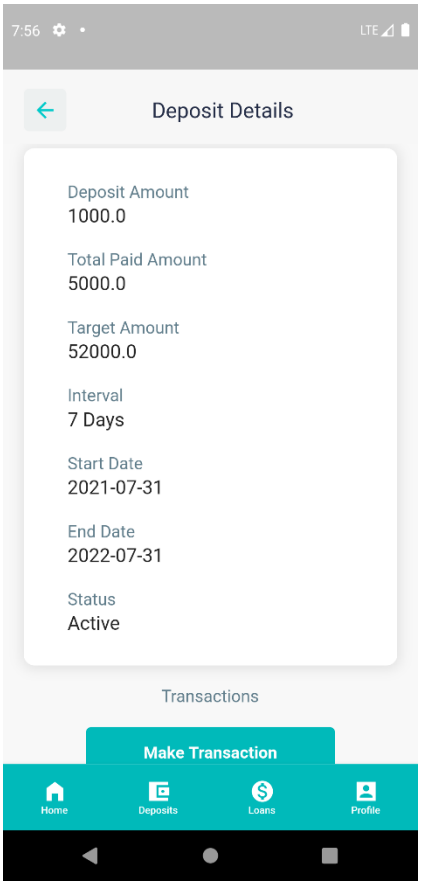

Figure 4.5: Deposit Details View

Figure 4.5: Shows detailed information about a deposit plan.

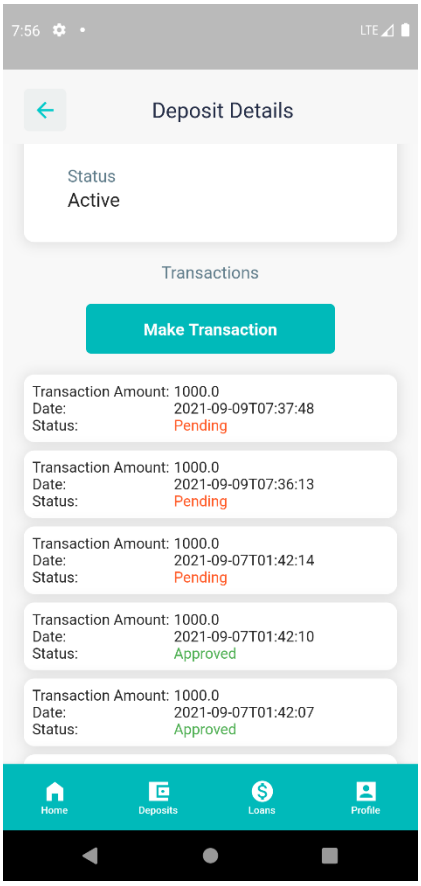

Figure 4.6: User Deposit Transactions View

Figure 4.6: Shows the list of transactions of a deposit and provides with an option to make transaction using online payment gateway if the deposit status is active.

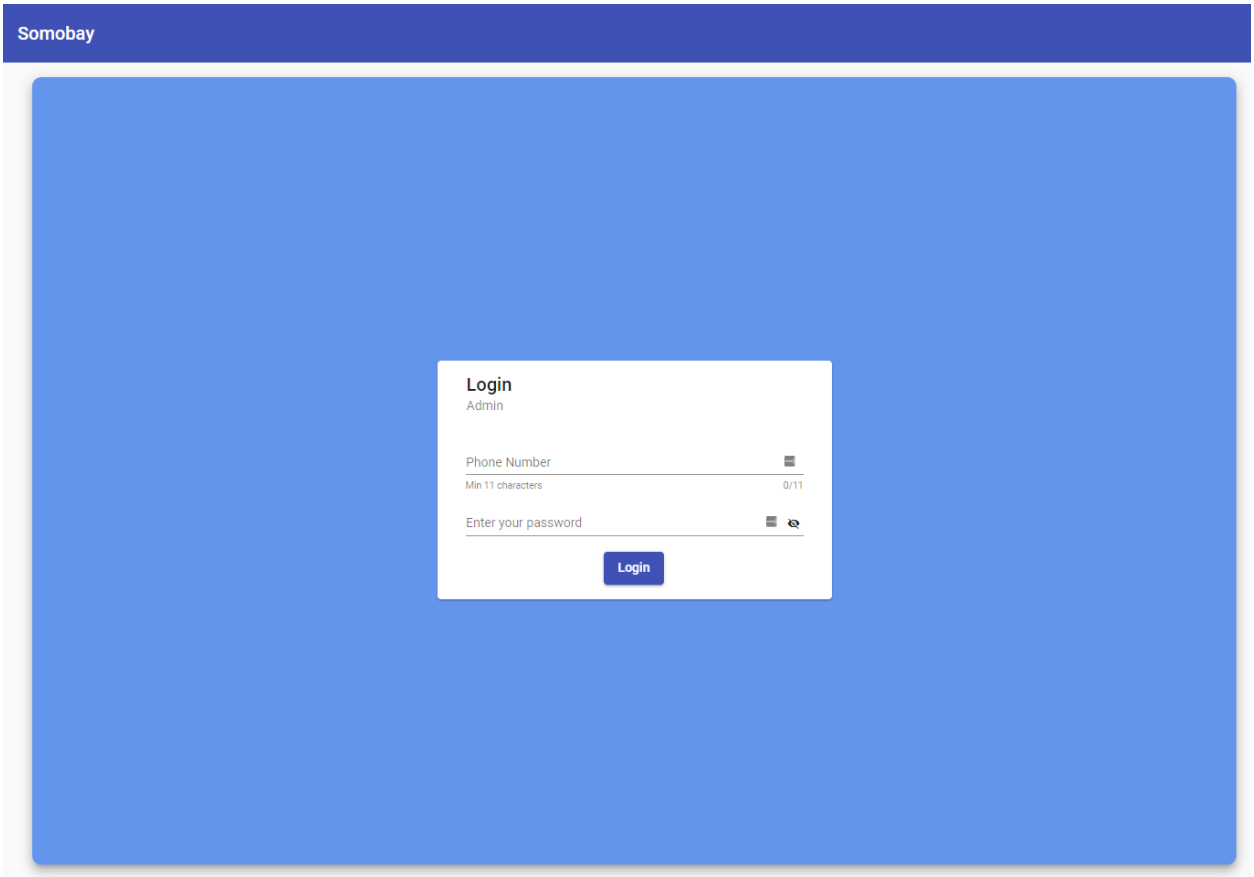

Figure 4.7: Admin Login View

Figure 4.7: Shows the admin's login page. Admin will log in with his phone number and password. If they provide wrong phone number or password or try logging in with general user's credentials they will be notified else the will login successfully

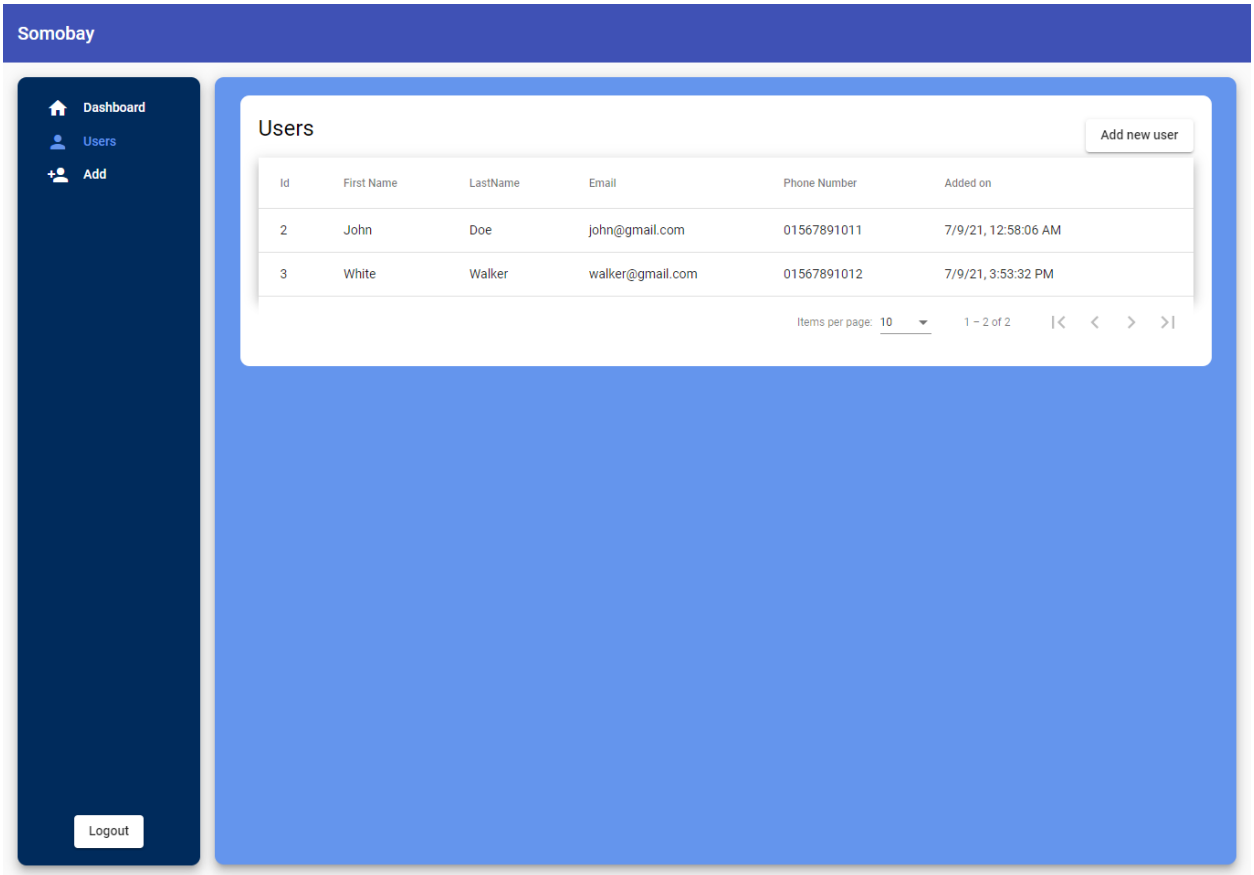

Figure 4.8: Admin User List View

Figure 4.8: Shows the users list. Clicking on a user row will navigate to user's profile page. Table is dynamic with sorting and pagination.

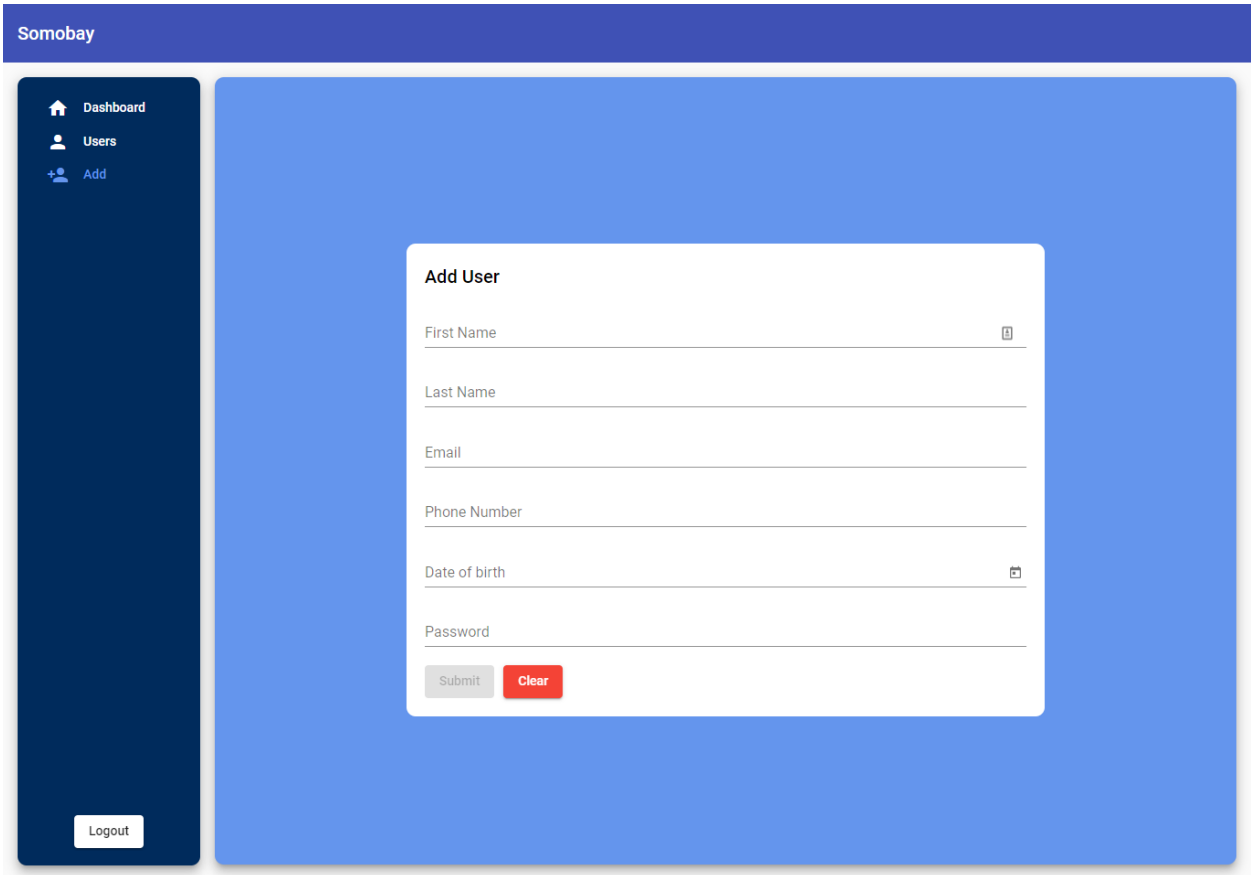

Figure 4.9: Admin Add New User

Figure 4.9: Provides a new user form to the admin. Admin can insert the user information and register a new user. The form has validation check on the fields and prompt for the correct type of value to be inserted.

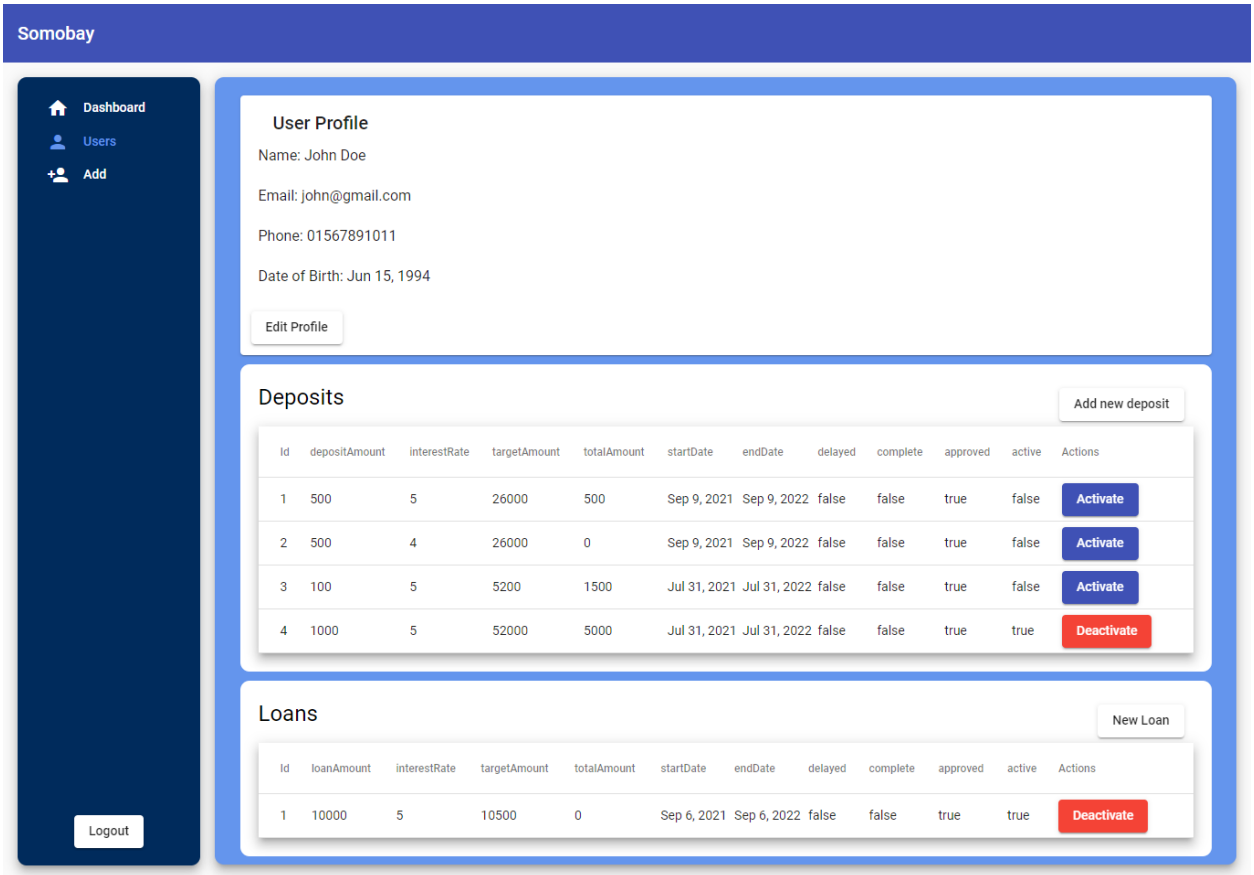

Figure 4.10: Admin User Profile View

Figure 4.10: Shows user profile and their associated deposits and loans with some brief information. From this page the admin can add new deposit/loan, activate and deactivate them.

Clicking on a row of deposit or loan will navigate to their respective detailed information page.

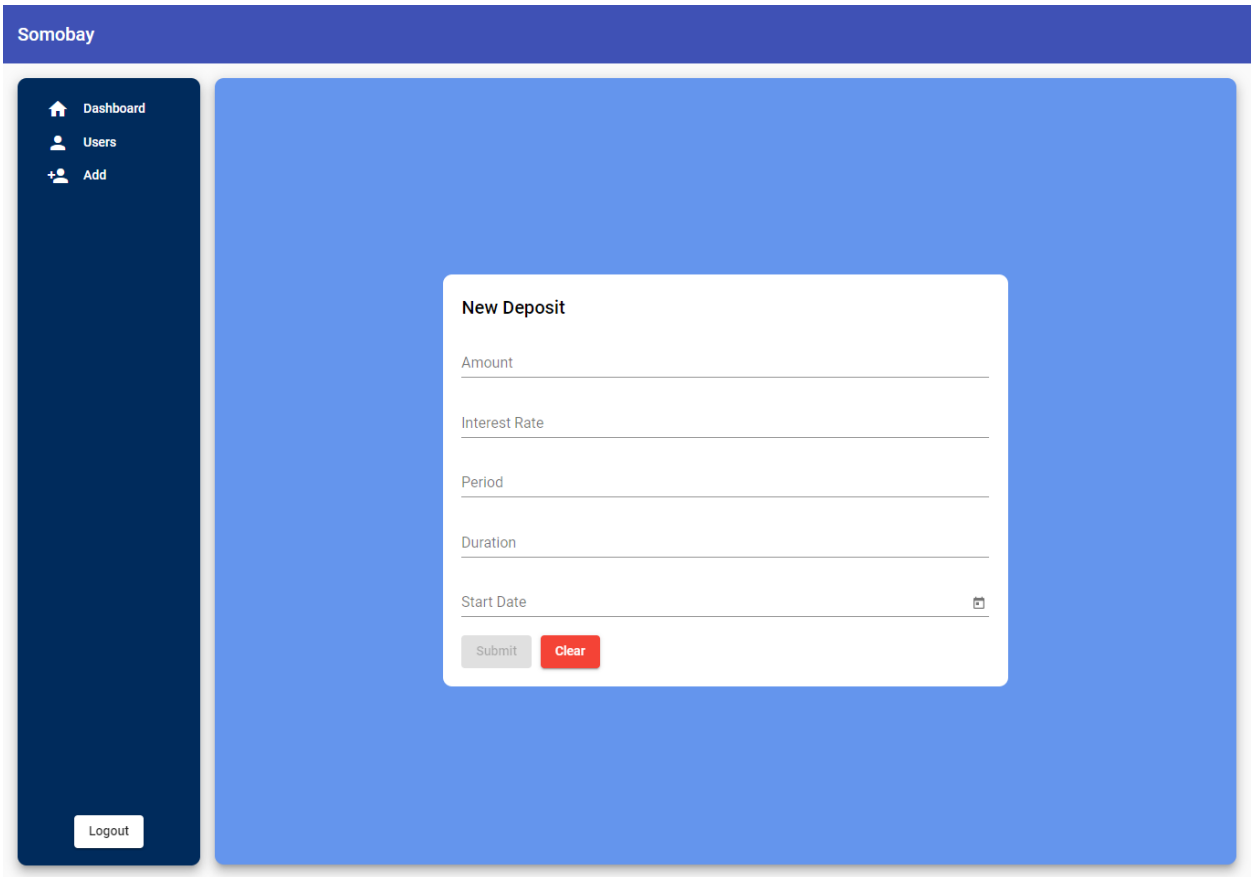

Figure 4.11: Admin Add New Deposit

Figure 4.11: Provides the admin with a deposit form. Here to make a new deposit The admin has to enter the amount the user will pay at deposit payment, the interest rate the user will receive after the successful completion of the deposit, how frequently the user will deposit the duration the user continue to pay at the deposit and the start date.

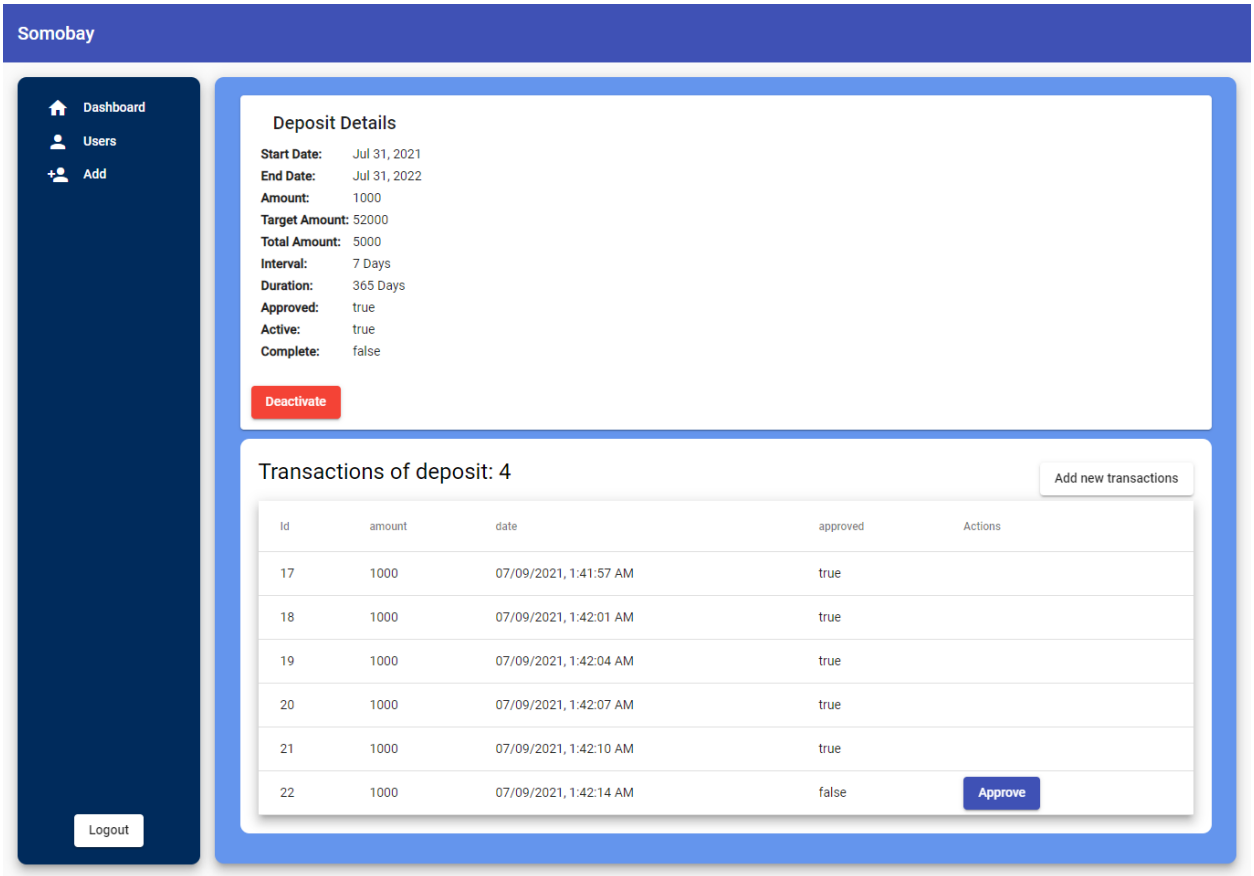

Figure 4.12: Admin Deposit Details

Figure 4.12: Provides details information about the deposit plan and its status along with the transaction under the deposit. Admin can add new transaction for the deposit and approve transactions made by the user.

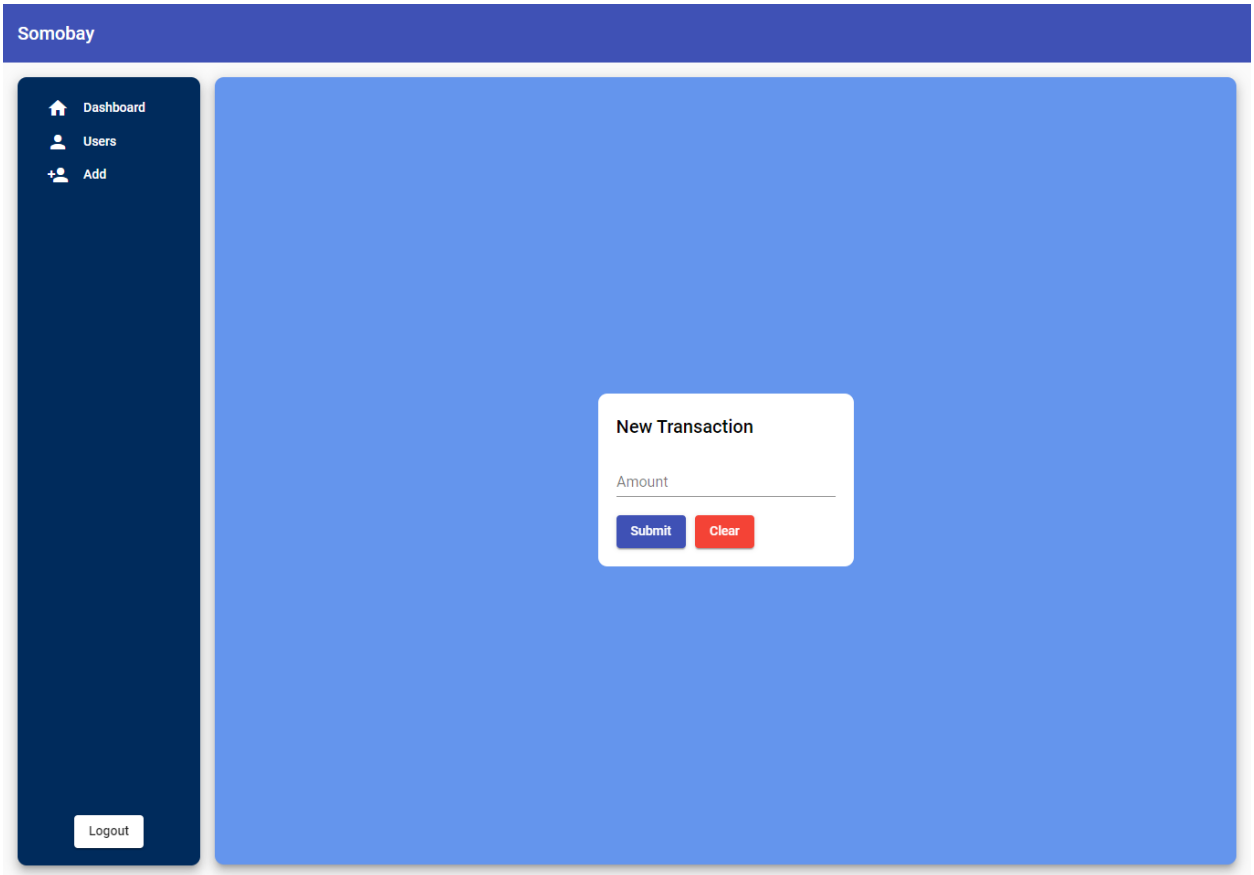

Figure 4.13: Admin Add Transaction

Figure 4.13: Provides a form to make a new transaction for a deposit. Admin has to enter the transaction amount.

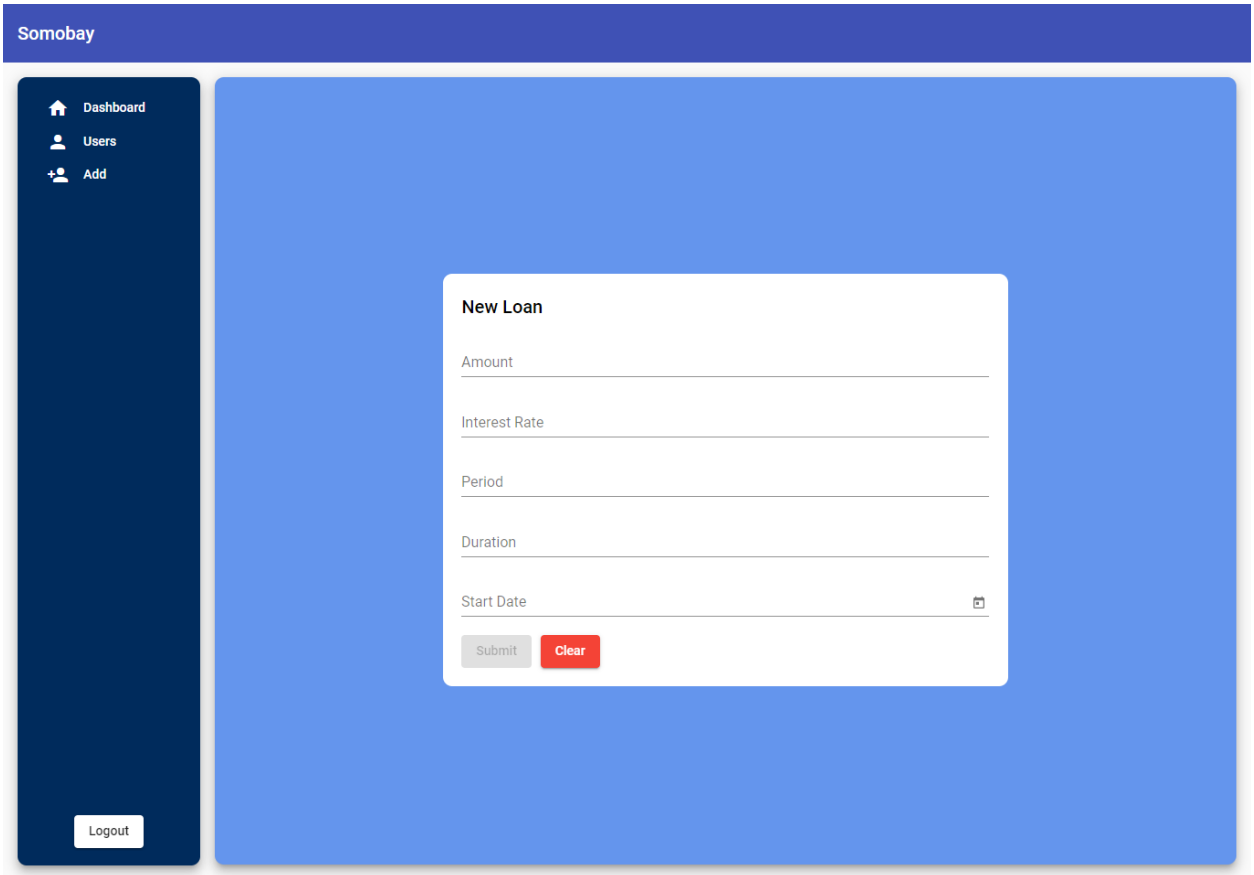

Figure 4.14: Admin Add New Loan

Figure 4.14: Provides the admin with a Loan form. Here to make a loan the admin has to enter the amount the user wants to borrow, the interest rate, how frequently the user will pay the installments. The duration of time the user want to borrow the fund for and the start date of the loan.

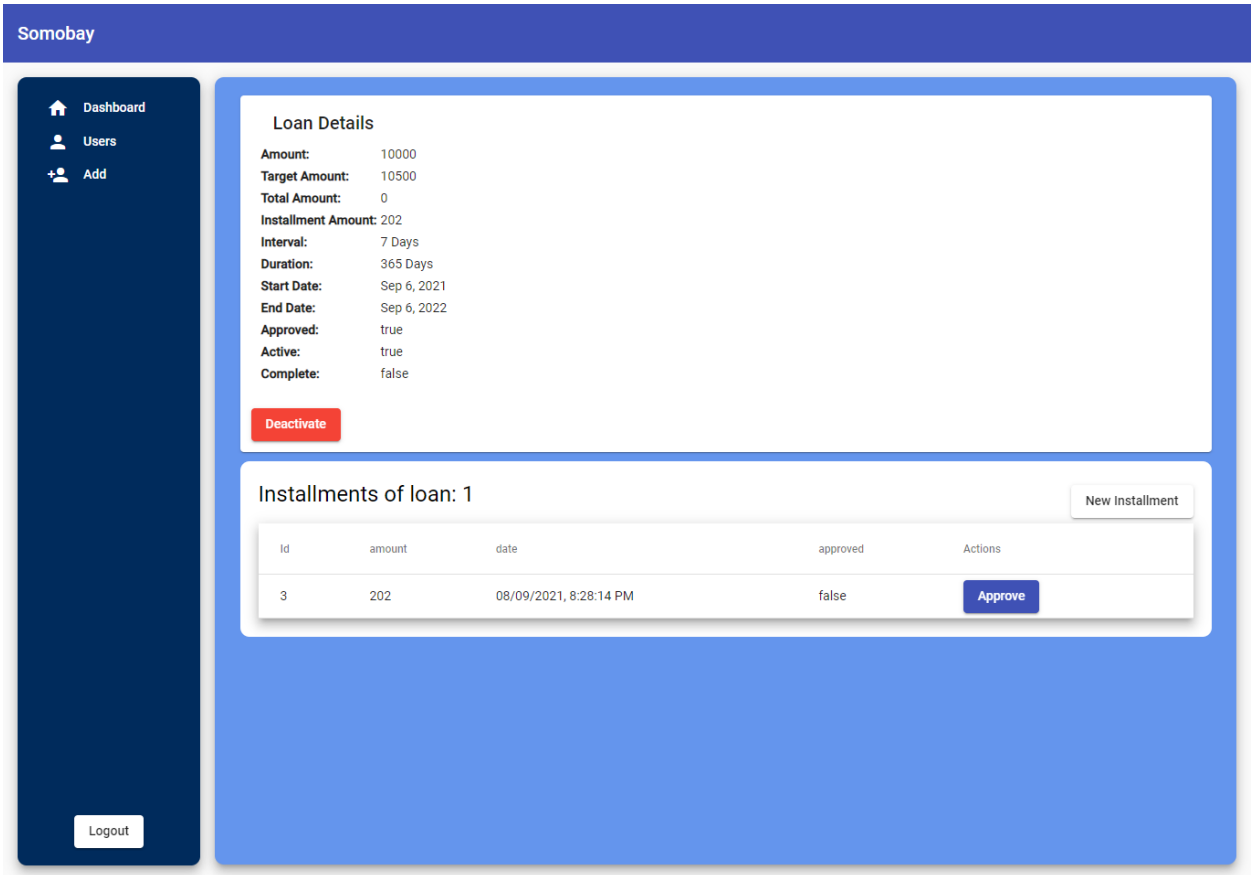

Figure 4.15: Admin Loan Details

Figure 4.15: Provides details information about the loan and its status along with the installments under the loan. Admin can add new installment and approve installment made by the user.

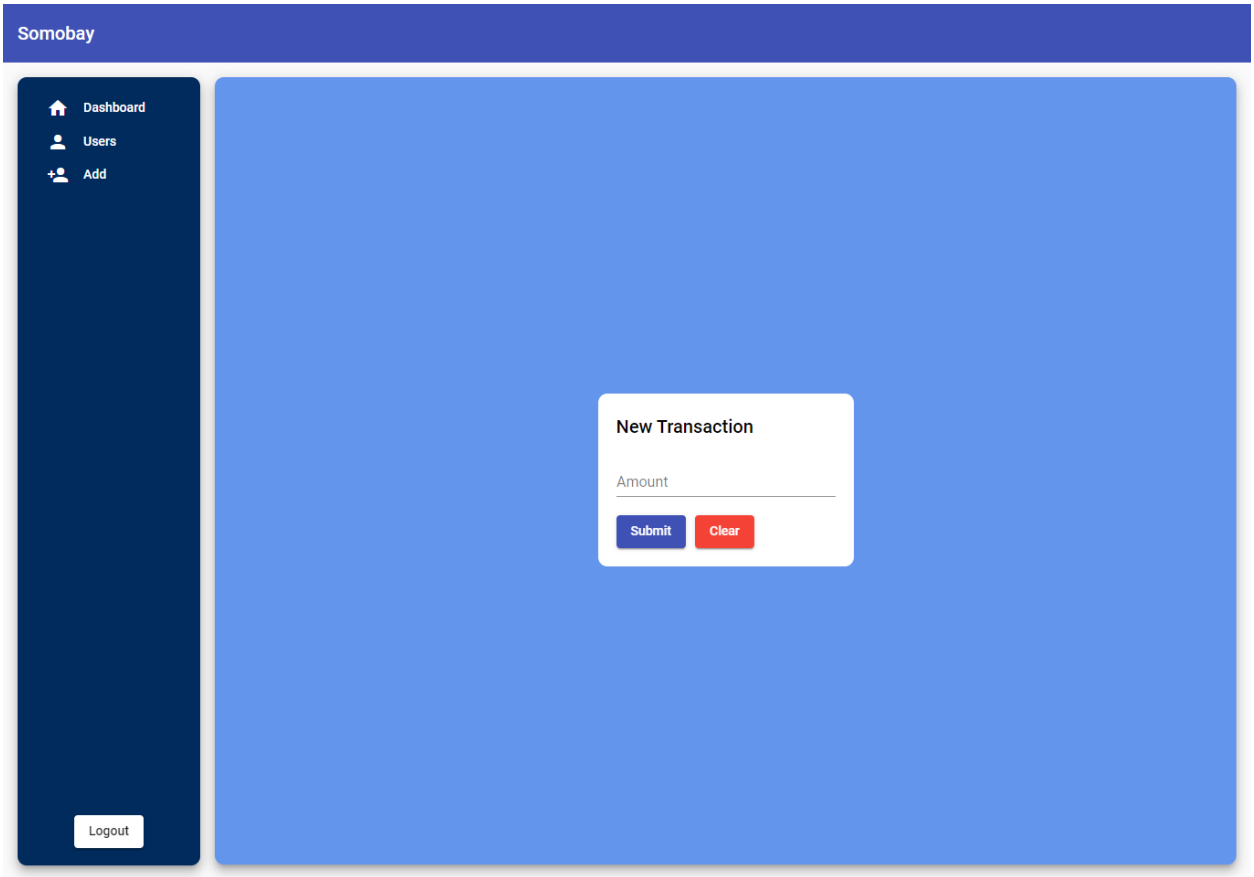

Figure 4.16: Admin Add Installment

Figure 4.16: Provides a form to make a new installment for a loan. Admin has to enter the installment amount.

4.2 Back-end Design

The back-end server-side application is developed in Java with Spring Boot Framework [8]. I have followed clean code architecture for developing the project so that the maintenance doesn't become complex in the long run. Spring framework along with Spring Data JPA and Spring Security has made the application efficient, performant and secured.

4.3 Interaction Design and UX

User experience is one of the most important aspects of a system. If the user doesn't have a pleasant experience using the system, the target of the system cannot be fulfilled completely. So, the user experience has been a priority in this project. Both the web application and the mobile application is developed following the Material UI design. With proper information and validation in the correct places the experience has been improved.

4.4 Implementation Requirements

To implement this project, I needed to work on three different platforms and each of them had their unique requirements.

Web Application: For developing the web application I used Visual Studio Code as the IDE, Node Package Manager and Angular Framework.

Mobile Application: When developing the mobile application, I used Android Studio as the IDE, Dart programming language Flutter framework**.**

Server-side Application: The server-side application is developed with Java Programming Language with Spring Boot, Spring Data JPA and Spring Security.

CHAPTER 5
Implementation and Testing

5.1 Implementation of Database

Database is user to store and provide data. I used MySQL [9] as the database in this project. The database tables and their relations are managed with java classes and JPA.

We used query to save and get data from the database. We used relations to associate deposit and loan with user accounts, transactions and installments with deposits and loans. We connected the server-side application to the database and exposed the REST API endpoints for the web application and mobile application for communication with the database to save, update, retrieve data and user information.

5.2 Implementation of Front-end Design

Front-end design is very important because the visualization really matters to the users. Developing a design for both site and an android application, we always have to consider a smooth and user-friendly front-end. It is quite difficult to make the perfect design that attracts all as taste and choice differs from person to person. However, we have tried to make our front-end as convenient as possible.

5.3 Testing Implementation

The system is tested for ensuring the security and privacy of user data. Testing is an important part of developing a system. The test cases for the application are:

Table 01: A Test Case for The System

Test Case	Test Input	Expected Outcome	Obtained Outcome	Result (Pass/Fail)
1. Create account	Create account with correct info	Create account successfully	Account Created	Pass
2. Create account	Create account with incorrect info	Create account unsuccessfully	Account not created	Pass
3. Login	Login with a valid phone number and password	Login successfully	Successful Login	Pass
4. Login	Login with an invalid phone number and password	Login Failed	Login Failed	Pass
5.Make Transaction	Make transaction to an active and approved deposit	Transaction successful	Transaction successful	Pass
6. Make Transaction	Make transaction to a deactivated deposit	Transaction Failed	Transaction Failed	Pass

CHAPTER 6

Conclusion and Future Scope

6.1 Discussion and Conclusion

As time is passing we are becoming more dependent on information technologies. As everything going digital the systems that still use the traditional ways seem less attractive to us and we tent to avoid them as much as we can. Almost every financial organizations offers some form of digital functionality and service to their customers. Cooperative Society in this context are falling behind and losing the appeal. The cooperative society system is the solution to the technological gap. The application can be effective for managing the data as well as providing services to the users remotely. We hope to make Cooperative Society more accessible and useful to people.

6.2 Scope for Further Developments

There is a huge scope for further develop this project. Some plans for the system are given below:

- Integrate payment gateway
- Add digital wallet function
- Add Maps API support

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