PROJECT REPORT

ON

Cashback Calculator

in partial fulfillment for the award of the degree of

MASTER'S IN SCIENCE(MS)

IN

COMPUTER SCIENCE (CS)

At

Submitted To-:
Prof. Lesh miraj
(Adjunct Faculty)

Submitted By-:
Yakshita Rakholiya(U01875270)
Bansariben Sorathiya(U01874134)
Jinit Desai(U01850641)
Pankti Desai(U01873972)
Ritika Chougala(U01870204)
Krushil Sheladiya(U0859841)
Filippo Zallocco(U01869001)
Britanny Benjamin(U01514313)

Acknowledgement:

This section is the best section since it allows to give personal acknowledgment to those who helped me and this project bringing it to the stage it is at.

"The dream begins with a teacher who believes in you, who tugs and pushes and leads you to the next plateau, sometimes poking you with a sharp stick called 'truth' ".

The above quotes specifies that teachers are the ones who make you to see a dream and motivates you so when you feel love and get struck in middle they will help you in getting out of it. So I would like thank Teachers:-

To Prof. Lesh Miraj for all his encouragement and appreciation that has given us and this project the much needed enthusiasm, strength and confidence. He has been more of a friend then a teacher and has motivated throughout the project.

As we say that "Little things matter much" we would also like to thank our friends who helped us in their own ways they could do .They had always been there to inspire us and all help we needed.

Last but not least to all those who have rendered help to this project directly as well as indirectly, a little word with a never ending meaning – "Thank You".

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Abstract

This black book report delves into the intricacies of Cashback Calculators, shedding light on their functionality, applications, and impact on consumer finance. The report explores the underlying mathematics of cashback calculations, providing insights into how users can optimize their benefits. It also examines various cashback models, dissecting their strengths and limitations. Additionally, the report discusses the evolving landscape of cashback programs in the financial industry, highlighting emerging trends and potential future developments. Through a comprehensive analysis, this report aims to empower readers with a deeper understanding of cashback calculators, enabling informed decision-making in the realm of personal finance.

Introduction

In the dynamic world of personal finance, where every penny holds significance, the Cashback Calculator emerges as a pivotal tool, offering individuals a strategic means to optimize their financial returns. This report embarks on a comprehensive exploration of Cashback Calculators, delving into the intricacies that define their functionality and shedding light on the profound impact they have on consumer financial decisions.

The concept of cashback has revolutionized the way consumers approach their spending habits, introducing a dynamic where a percentage of the purchase amount is returned to the buyer. Cashback Calculators, in this context, act as the unsung heroes, providing users with a methodical approach to understand and maximize the benefits embedded in their financial transactions. As financial landscapes continue to evolve with rapid technological advancements, these calculators have become indispensable tools for those navigating the complexities of modern personal finance.

The Cashback Calculator App is designed as a React Native application integrated with Firebase services, providing users with a convenient platform to calculate rewards based on their spending and efficiently manage card information. This introduction should briefly highlight the app's purpose, emphasizing its focus on cashback calculations and efficient card management.

Project Objectives

Outline the specific goals and objectives of the Cashback Calculator App. This may include features such as:

1. Real-time Cashback Calculation:
    - Enable users to receive instant and accurate cashback calculations based on their purchases, providing real-time insights into potential earnings.
2. Secure Card Information Storage:
    - Implement robust security measures to ensure the safe storage of user card information, prioritizing data privacy and protection.
3. Intuitive User Interface:
    - Design a user-friendly interface for effortless interaction, allowing users to navigate the Cashback Calculator App seamlessly and access features without complexity.
4. Seamless Firebase Integration:
    - Integrate seamlessly with Firebase services to enhance app functionality, enabling features such as cloud storage, authentication, and real-time updates for an improved user experience.

Technologies Used

Specify the technologies utilized in your project:

Frontend: React Native, JavaScript, Expo, HTML, CSS.
Backend: Firebase (Realtime Database or Firestore for data storage), Node.js
Authentication: Firebase Authentication for user security.

Architecture Overview

Detailed Description of Frontend and Backend Components:
The Cashback Calculator App is structured with a modular and scalable architecture, utilizing a combination of frontend, backend, and authentication components to deliver a seamless and secure user experience.

1. Frontend Architecture:

React Native:

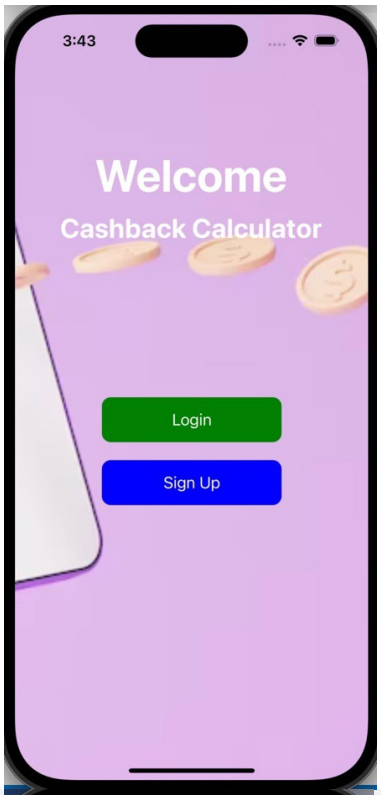
The frontend is built using React Native, a popular framework for developing cross-platform mobile applications. This ensures the app's consistency and performance across iOS and Android devices.

JavaScript and Expo:

JavaScript is employed for building dynamic and responsive user interfaces. Expo, an open-source framework, streamlines the development process by providing tools for deployment, testing, and debugging.

HTML and CSS:

HTML and CSS are integrated into the React Native components for structuring and styling the user interface, enhancing the app's visual appeal and user interaction.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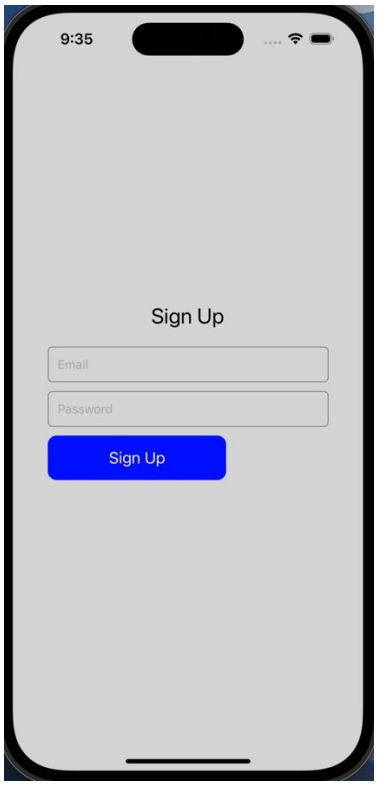
Welcome
Cashback Calculator
Login
Sign Up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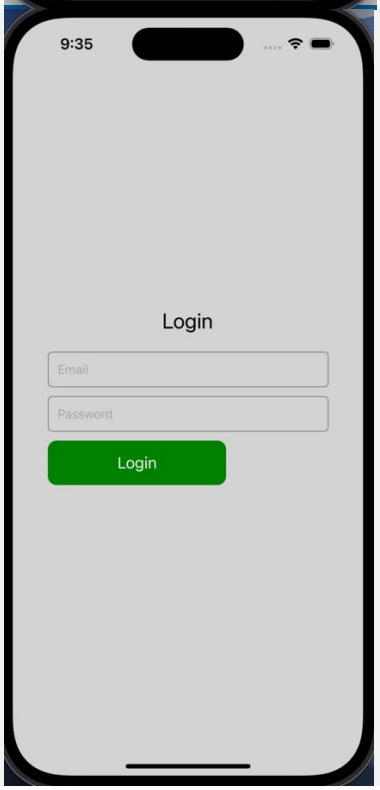
Sign Up
Email
Password
Sign Up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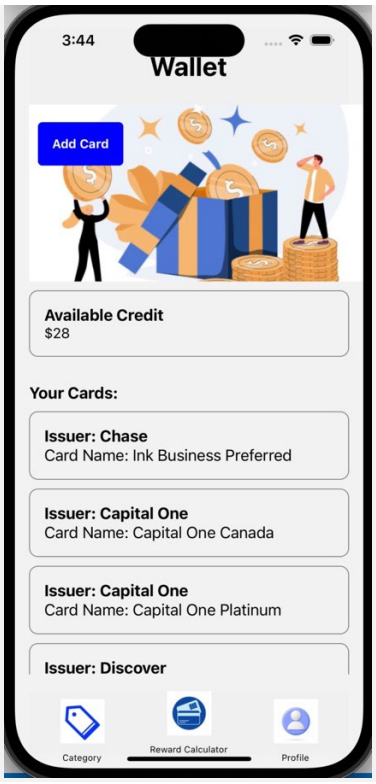
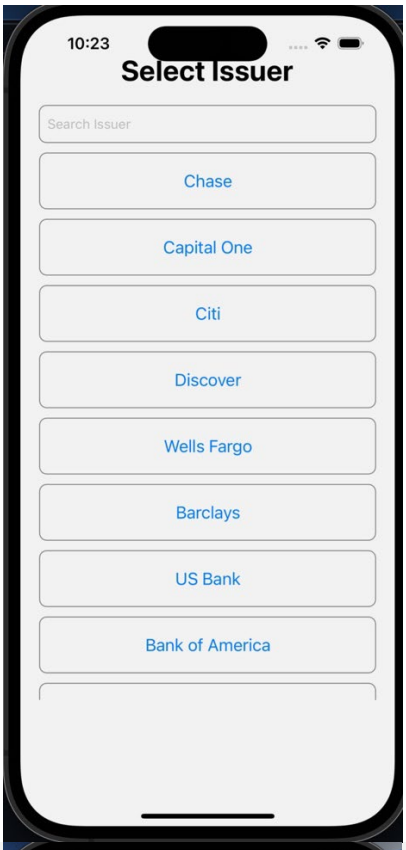

3:44
Wallet
Add Card
Available Credit
$28
Your Cards:
Issuer: Chase
Card Name: Ink Business Preferred
Issuer: Capital One
Card Name: Capital One Canada
Issuer: Capital One
Card Name: Capital One Platinum
Issuer: Discover
Category
Reward Calculator
Profile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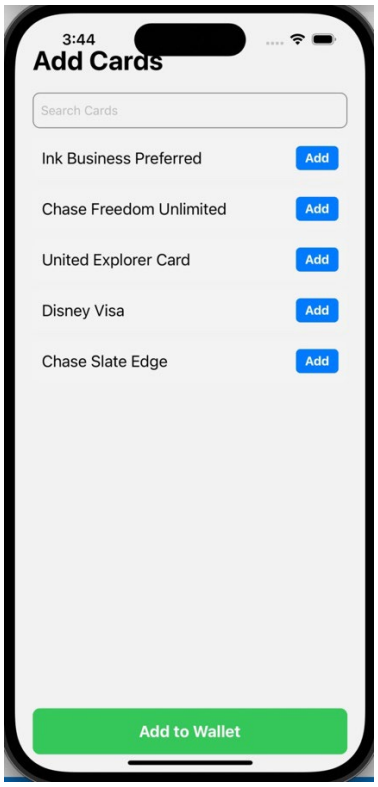
Search Issuer
Chase
Capital One
Citi
Discover
Wells Fargo
Barclays
US Bank
Bank of America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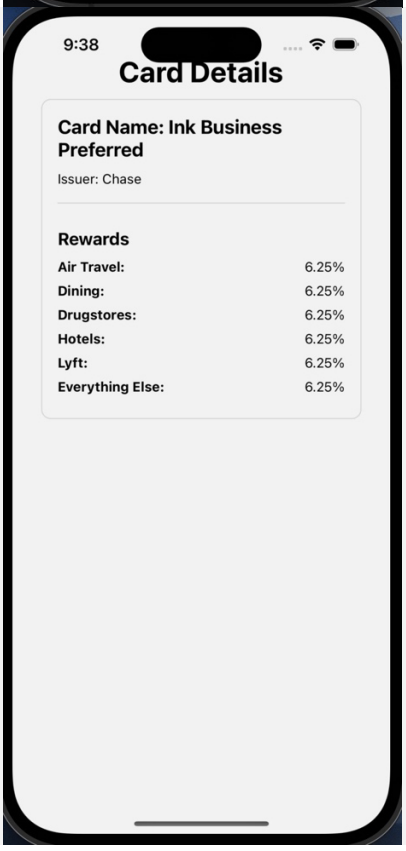
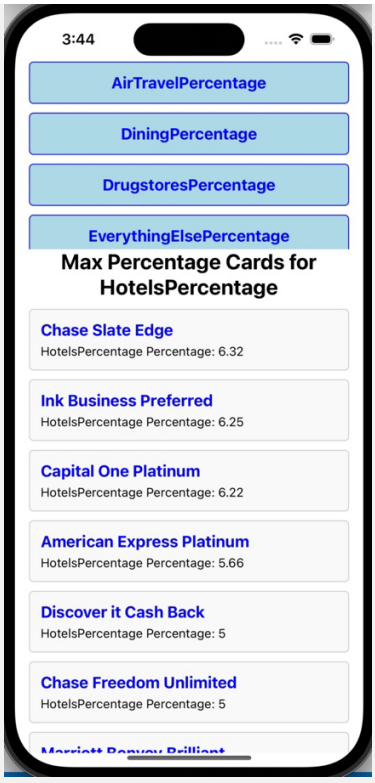
Ink Business Preferred
Add
Chase Freedom Unlimited
Add
United Explorer Card
Add
Disney Visa
Add
Chase Slate Edge
Add
Add to Wallet


9:38
Card Details
Card Name: Ink Business Preferred
Issuer: Chase
Rewards
Air Travel: 6.25%
Dining: 6.25%
Drugstores: 6.25%
Hotels: 6.25%
Lyft: 6.25%
Everything Else: 6.25%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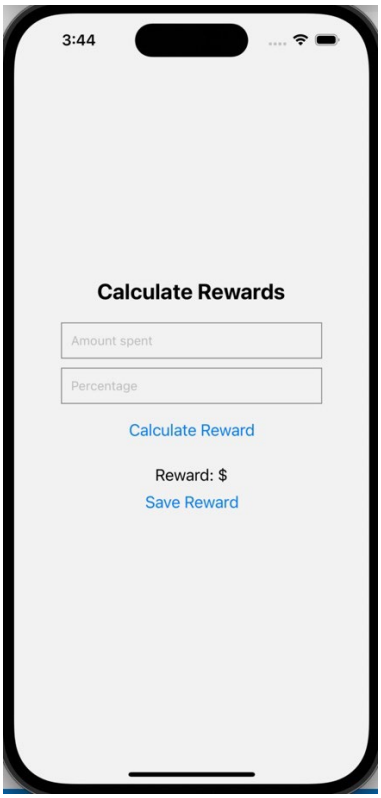
AirTravelPercentage
DiningPercentage
DrugstoresPercentage
EverythingElsePercentage
Max Percentage Cards for HotelsPercentage
Chase Slate Edge
HotelsPercentage Percentage: 6.32
Ink Business Preferred
HotelsPercentage Percentage: 6.25
Capital One Platinum
HotelsPercentage Percentage: 6.22
American Express Platinum
HotelsPercentage Percentage: 5.66
Discover it Cash Back
HotelsPercentage Percentage: 5
Chase Freedom Unlimited
HotelsPercentage Percentage: 5


3:44
Calculate Rewards
Amount spent
Percentage
Calculate Reward
Reward: $
Save Reward

2. Backend Architecture:

Firebase Realtime Database or Firestore:

The backend relies on Firebase as the database solution. Developers can choose between Firebase Realtime Database and Firestore based on project requirements. Realtime Database enables live updates, crucial for real-time cashback calculations, while Firestore offers scalability and a flexible data model.

Node.js:

Node.js serves as the server-side scripting environment, facilitating communication between the frontend and Firebase backend. It ensures efficient data exchange and processing.

3. Authentication Architecture:

Firebase Authentication:

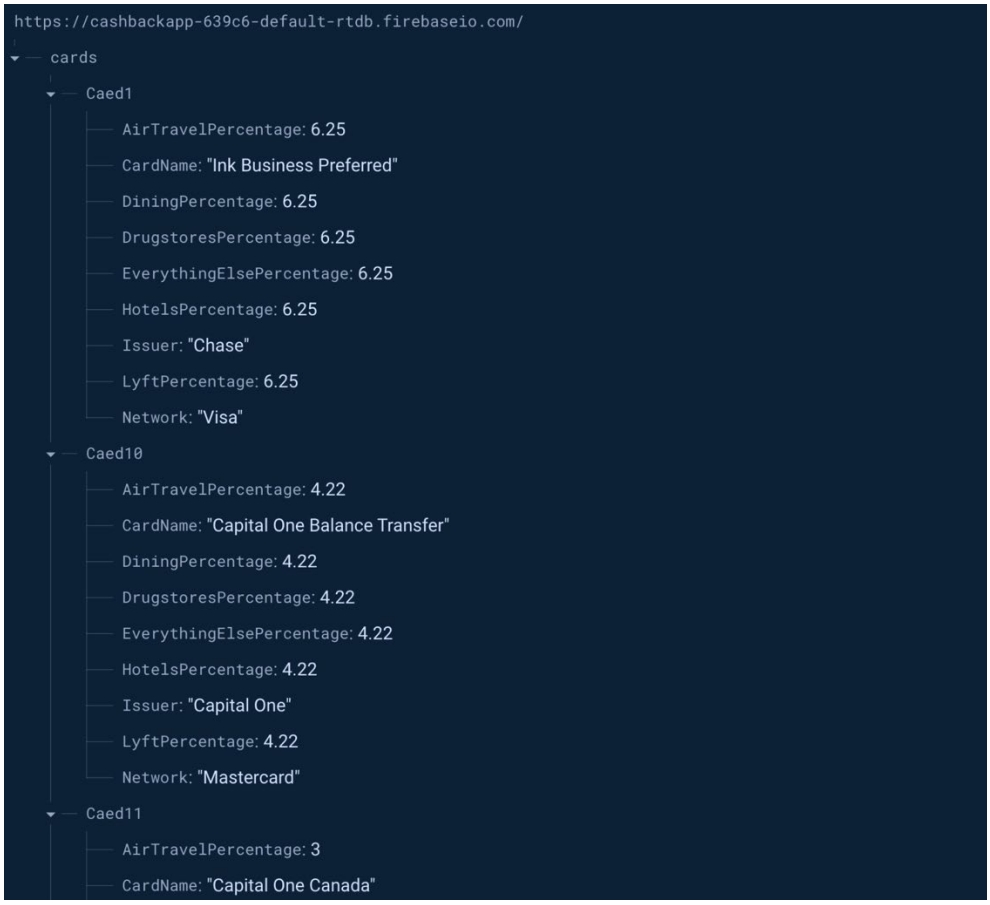
Firebase Authentication is integrated for robust user security. It provides various authentication methods, including email/password, social media logins, and secure token-based authentication. This ensures that user accounts are protected while maintaining a seamless login experience.

```
import React, { useState } from 'react';
import { View, Text, TextInput, Button, StyleSheet, Alert } from 'react-native';
import { getFirestore, doc, getDoc, collection, addDoc, updateDoc } from 'firebase/firestore';
import { db } from '../firebaseConfig';

export default function RewardsCalculation({ route }) {
  const { userUID } = route.params;

  const [amountSpent, setAmountSpent] = useState('');
  const [percentage, setPercentage] = useState('');
  const [reward, setReward] = useState('');

  const calculateReward = () => {
    const spent = parseFloat(amountSpent);
    const percent = parseFloat(percentage);
    const calculatedReward = (spent * percent) / 100;
    setReward(calculatedReward.toFixed(2));
  };
```



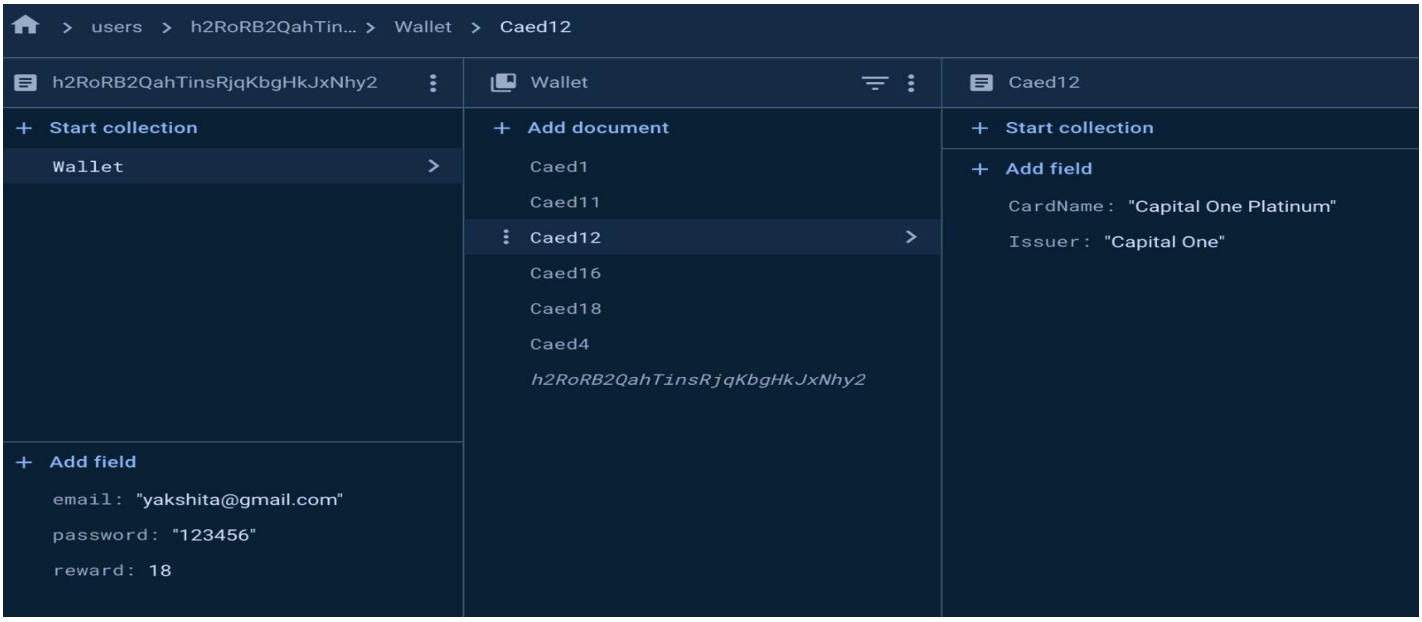
```jsx
import React, { useState } from 'react';
import { View, Text, TextInput, Button, StyleSheet, Alert } from 'react-native';
import { createUserWithEmailAndPassword } from 'firebase/auth';
import { doc, setDoc, collection } from 'firebase/firestore';
import { getAuth } from 'firebase/auth';
import { getFirestore } from 'firebase/firestore';

export default function SignupScreen({ navigation }) {
  const [email, setEmail] = useState('');
  const [password, setPassword] = useState('');

  const handleSignup = async () => {
    try {
      const auth = getAuth();
      const userCredential = await createUserWithEmailAndPassword(auth, email, password);
      const userUID = userCredential.user.uid;

      const emailToLowerCase = email.toLowerCase();
      const userData = {
        email: emailToLowerCase,
        password: password, // Include the password in the userData object
        // Add more user properties as needed
      };

      const db = getFirestore();
      const usersCollection = collection(db, 'users');
      const userDocRef = doc(usersCollection, userUID);
      await setDoc(userDocRef, userData);
```



Interaction Flow

User Interaction:

Users interact with the intuitive user interface developed using React Native and Expo, inputting their purchase details for cashback calculation.

Frontend Processing:

JavaScript processes user inputs and communicates with the backend through Node.js, initiating the cashback calculation request.

Backend Processing:

Node.js handles the communication between the frontend and the chosen Firebase database (Realtime Database or Firestore), retrieving and processing data to generate real-time cashback calculations.

Authentication Flow:

Firebase Authentication ensures secure user authentication during the login process, protecting user accounts from unauthorized access.

Secure Data Storage:

User data, including purchase history and cashback details, is securely stored in Firebase, ensuring data integrity and privacy.

Scalability and Flexibility:

The architecture is designed to be scalable, allowing for easy adaptation to increased user loads and future feature expansions. The flexibility of Firebase, combined with the modular structure of React Native, facilitates ongoing updates and enhancements.
By combining these frontend and backend components, the Cashback Calculator App delivers a user-friendly interface while efficiently processing complex calculations on the backend, providing users with a reliable and secure tool for managing spending and maximizing cashback rewards.

Challenges Faced and Solutions

The implementation of the Cashback Calculator App was not without its share of challenges, reflecting the complexity of integrating diverse technologies and ensuring a seamless user experience. Here are some key challenges faced during the development process:

1. Real-time Data Synchronization:
   - Ensuring real-time synchronization between the frontend and Firebase Realtime Database posed a challenge. Achieving instant updates for cashback calculations required meticulous handling of data changes and synchronization delays.
2. Cross-Platform Consistency:
   - Maintaining consistent performance and appearance across both iOS and Android platforms using React Native presented challenges. Device-specific nuances required careful consideration to avoid discrepancies in user experience.
3. Security Measures:
   - Implementing robust security measures for user authentication and data storage was paramount. Overcoming potential vulnerabilities and ensuring the safety of sensitive user information demanded rigorous testing and validation.
4. Firebase Integration Complexity:
   - Integrating Firebase services, including the Realtime Database or Firestore, along with Firebase Authentication, required meticulous attention to detail. Configuring and managing these services seamlessly was a nuanced process.
5. User-Friendly Data Presentation:
   - Designing an intuitive and user-friendly interface for presenting cashback data posed challenges. Balancing simplicity with comprehensive information required iterative design adjustments to meet user expectations.
6. Testing and Validation:
   - Thorough testing of the app's functionality across various scenarios, especially concerning different purchase amounts and cashback rates, was crucial. Ensuring accuracy in cashback calculations and validating the app's reliability demanded comprehensive testing protocols.
7. Integration with Expo:
   - While Expo streamlines development, its limitations in certain advanced features posed challenges. Customizing components beyond Expo's capabilities required creative solutions to maintain a smooth development workflow.
8. User Authentication Flow:

- Crafting a seamless user authentication flow with Firebase Authentication while providing various login methods presented challenges. Ensuring a secure and user-friendly login experience required thoughtful design considerations.

9. Deployment and Update Challenges:
    - Deploying updates and ensuring a smooth transition for existing users without disrupting their experience posed challenges. Managing version compatibility and providing backward compatibility required meticulous planning.
10. Adaptability to Future Enhancements:
    - Building an architecture that is adaptable to future enhancements and scalability was a continual consideration. Ensuring that the app remains flexible to accommodate evolving features and technological advancements required careful planning.

Despite these challenges, the development team approached each hurdle as an opportunity for improvement. Collaborative problem-solving, frequent communication, and iterative development cycles were instrumental in overcoming challenges and delivering a Cashback Calculator App that aligns with user expectations and industry standards. The lessons learned during implementation have contributed to refining the app's functionality and ensuring a robust, user-centric financial tool.

Future Scope and Recommendations

1. Enhanced User Profiles:
    - Implement personalized user profiles where users can track their transaction history, view cumulative cashback earnings, and receive personalized cashback recommendations based on their spending patterns.
2. Predictive Analytics:
    - Integrate machine learning algorithms to analyze user behavior and predict potential future purchases. This feature could provide users with proactive suggestions to maximize cashback earnings.
3. Multi-Currency Support:
    - Expand the app's usability by incorporating multi-currency support, allowing users to input and track transactions in different currencies. This feature would cater to a diverse user base with varied currency preferences.
4. Expense Categorization:
    - Implement smart categorization of expenses to offer users insights into their spending habits. This could involve automatic categorization of transactions and the provision of detailed expense reports.
5. Budgeting Features:
    - Integrate budgeting tools to help users set spending limits and receive notifications when approaching or exceeding predefined budgets. This feature enhances financial planning and encourages responsible spending.
6. Cashback Redemption Options:
    - Provide users with diverse options for redeeming earned cashback, such as direct cash transfers, gift cards, or discounts on future purchases. Offering flexibility in redemption enhances user satisfaction.
7. Social Integration:
    - Incorporate social features, allowing users to share their cashback achievements or favorite deals with their social network. This not only enhances user engagement but also serves as a marketing tool for the app.
8. Localized Offers and Deals:
    - Implement location-based services to provide users with personalized cashback offers from local merchants. This could involve partnerships with businesses to promote their products and services.
9. Gamification Elements:

- Introduce gamification features, such as challenges, badges, or levels, to make the cashback experience more engaging. Users could be incentivized to achieve certain milestones, fostering a sense of accomplishment.

10. Advanced Security Measures:
    - Stay ahead of cybersecurity threats by continuously enhancing security protocols. Implement biometric authentication options, encryption upgrades, and periodic security audits to ensure user data remains protected.
11. Educational Resources:
    - Provide users with educational content on personal finance, cashback strategies, and optimizing credit card usage. This feature aims to empower users with financial knowledge and promote responsible financial practices.
12. Integration with Financial Apps:
    - Collaborate with other financial apps or services, such as budgeting apps or investment platforms, to offer users a holistic financial management experience. Seamless integration can provide users with comprehensive insights into their financial health.
13. Feedback Mechanism:
    - Implement a user feedback mechanism to gather insights into user preferences and areas for improvement. Regularly analyzing user feedback can guide future updates and feature enhancements.

By expanding the Cashback Calculator App with these features, it can evolve into a comprehensive financial management tool, catering to a broader audience and providing users with a holistic approach to optimizing their finances. Continuous innovation and responsiveness to user needs will be key to ensuring the app remains relevant in the ever-changing landscape of personal finance applications.

Conclusion

The development and implementation of the Cashback Calculator App have ushered in a new era of user-centric financial tools, providing individuals with a practical means to optimize their spending and maximize cashback rewards. The journey from conceptualization to execution involved overcoming various challenges, refining the architecture, and ensuring a seamless user experience.

The app's architecture, combining React Native for a responsive frontend, Firebase for secure backend services, and Firebase Authentication for user security, exemplifies a robust technological foundation. Challenges, such as real-time synchronization, cross-platform consistency, and security considerations, were addressed through iterative development and collaborative problem-solving.

Looking ahead, the Cashback Calculator App holds immense potential for further evolution. Features like enhanced user profiles, predictive analytics, and multi-currency support can elevate the app's functionality, providing users with a more personalized and comprehensive financial tool. The scope for integrating gamification, localized offers, and advanced security measures ensures the app remains engaging, relevant, and secure.

In a dynamic financial landscape, the app stands as a testament to the synergy between technology and personal finance. It not only empowers users to make informed decisions but also fosters financial literacy through educational resources. The collaborative nature of the development process, involving continuous user feedback, positions the app as a responsive and user-centric solution.

As the Cashback Calculator App continues to adapt and expand, it contributes to reshaping how individuals approach and understand their finances. The journey doesn't end here; it's an ongoing commitment to innovation, user satisfaction, and financial empowerment. Through continuous updates, feature enhancements, and a commitment to security, the Cashback Calculator App is poised to remain a valuable companion in the ever-evolving landscape of personal finance applications.