

CacheBook: A Smart Personal Finance Tracker with OCR-Based Expense Logging and Visual Reporting

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Abstract- “CacheBook” is a mobile application designed to simplify personal finance management by integrating real time expense tracking with automated receipt scanning. Built using React Native and Firebase, the application enables users to log daily expenses, set financial goals, and visualize spending through reports. A key innovation of “CacheBook” is the use of Optical Character Recognition (OCR) technology, which allows users to scan physical receipts by reducing manual entry and enhancing data accuracy. The app categorizes expenses, provides visual summaries via charts, and alerts users when spending goals are exceeded.

Keywords—*OCR, Personal Finance Tracker, Mobile, React Native*

I INTRODUCTION

“CacheBook” is a mobile application that simplifies personal financial management by allowing users to record expenses, set financial goals, and generate graphical reports. One of the most unique features of the system is its ability to scan and read data from receipts using Optical Character Recognition (OCR), reducing manual input and enhancing accuracy.

Managing Personal finances has become increasingly difficult in today’s fast, digitally driven world. Many individuals struggle to keep track of where their money goes, stick to budget, or identify spending patterns. These challenges are often made worse by the lack of accessible, user-friendly financial tools.

The development of “CacheBook” was initiated in response to these issues, with the goal of offering a practical solution that empowers users to take control of their finances through real-time tracking and data-driven insights. The system provides users with features to classify their expenses, monitor daily or monthly budgets, and receive alerts when spending exceeds set targets. Ultimately, the aim is to improve financial literacy and decision making with an easy-to-use interface and intelligent automation.

II LITERATURE REVIEW

Managing personal finances has become more complex in today’s fast paced digital environment, prompting the rise of numerous technological solutions designed to help individuals budget, track expenses, and make informed financial decisions. Tools like Optical Character Recognition (OCR), real time alerts, and AI based categorization have transformed how users interact with their financial data.

Automated Bill Scanning using OCR technology allows users to extract itemized data from receipts, minimizing manual entry and increasing accuracy. Applications like Expensify use this technology effectively, although challenges such as poor handwriting and low-quality images still affect data reliability.

Customizable Categories improve personalization. Many applications like Mint and YNAB offer predefined categories, but users often prefer flexibility to create and manage their own. This customization supports more relevant and organized budgeting experiences.

Dynamic Budgeting and Real Time Notifications help users stay within financial limits. Apps like PocketGuard and Goodbudget allow users to set budgets and send alerts when thresholds are exceeded. However, over notification can reduce user engagement, so timing and relevance must be carefully designed.

Visual Expense Reporting is essential for users to understand their financial behavior. Applications like QuickBooks and Wave provide charts and summaries, but complex layouts or overly technical language can hinder usability. Simplified, color coded reports are more effective for general users.

Despite the existence of many apps, common issues such as limited customization, poor user interface, and lack of integration between features remain. Tools like Mint,

YNAB, Goodbudget, and Expensify provide useful functionality but fall short in delivering a fully integrated, flexible and user-friendly experience.

“CacheBook” aims to bridge these gaps by integrating all these features into a single, easy to use mobile application. By addressing usability and functionality shortcomings found in current systems, “CacheBook” contributes to the evolving field of smart personal finance tools.

Theoretical Background and Research Gap

Financial literacy has been widely recognized as essential for improving personal financial behavior (Lusardi & Mitchell, 2014). Existing applications often focus on budgeting or expense tracking in isolation, without integrating automation and budgeting or expense tracking in isolation, without integrating automation and customization in a user-centered design. While tools like Mint and Goodbudget offer basic tracking, they lack real-time OCR data capture and personalization. “CacheBook” addresses this gap by combining automated receipt processing, flexible categorization, and dynamic budgeting within a single platform tailored to diverse user needs.

III METHODOLOGY

The development of the “CacheBook” mobile application followed the Agile Software Development Life Cycle, which emphasizes flexibility, iterative progress, and regular user feedback. Agile was chosen to ensure that each feature could be developed, tested and refined in short cycles called sprints, improving responsiveness to user needs and technical challenges.

The process began with requirement gathering, which included competitor analysis and a user survey with 42 participants. The survey helped identify key user expectations such as receipt scanning, customizable categories, and budget alerts. Based on these findings, the system’s features were prioritized and organized across multiple sprints.

Design and development were carried out using:

Frontend: React Native with Expo for cross platform compatibility.

Backend: Firebase services including Firestore (database), authentication, and storage.

OCR Integration: Mindee API

Development Tools: Visual Studio Code, Android Studio, Expo CLI

UI Styling: Tailwind CSS

The implementation focused on key features such as secure user authentication, manual and OCR based expense logging, goal tracking with alerts, and report generation with export to PDF. Real-time database updates ensured that financial data remains consistent and accessible.

Each sprint included testing, UI refinement, and feedback collection to ensure high usability and functionality. This approach allowed “CacheBook” to evolve into a reliable, user centered financial tracking application aligned with its core objectives.

OCR Evaluation and Accuracy Measurement

To evaluate OCR performance, nearly 100 sample receipts were collected, including printed, low resolution, and handwritten receipts. The Mindee API extracted line items, and outputs were manually validated against ground truth data. Accuracy was measured as the percentage of correctly identified line items. Results showed an average accuracy of 91% printed receipts and 58% for handwritten receipts.

Firebase Implementation Details

Firebase Authentication handled user login and session management. Firestore rules were configured to access by user ID, ensuring that users could only access their own data. Real time syncing was tested by simulating simultaneous expense entries on multiple devices. Error handling routines displayed notifications in case of network failures, invalid data input, or storage errors.

User Study Process

Usability testing involved 21 participants who used “CacheBook” over a two-week period. Participants were asked to record expenses manually and use OCR, set budget goals, and generate reports. Data collected included task completion time, number of errors, and subjective satisfaction ratings. Feedback was gathered via structured questionnaires and analyzed to identify usability issues and feature effectiveness.

IV RESULTS AND DISCUSSION

The “CacheBook” mobile application was successfully implemented, with all major features functioning as intended. The system provides secure user authentication, receipt scanning via OCR, customizable expense categories, dynamic budget goal tracking, visual expense reporting, and PDF export functionality.

Key Results:

OCR based Receipt Scanning: User can scan receipts using the device camera. The Mindee API extracts line-item data such as item names, prices, and quantities, which are then

categorized automatically using a keyword matching algorithm.

Custom Expense Logging: User can manually add expenses, create new categories, assign color codes, and set custom dates.

Spending Goal Alerts: Daily and weekly goals can be set and are monitored in real time. Users receive notifications when their expenses exceed the set threshold.

Visual Reports and Export: The app displays expenses in pie charts grouped by week, month, or year. Reports can be exported as PDF files, enabling users to share or store their financial summaries.

User Interface Snapshot:

Index Page: Clean and welcoming start screen with pastel gradients and finance related items.

Signup/Login: User friendly form layouts with password visibility toggle and optional Google Sign-In (Partially implemented).

Home Page: Figure 1 shows the personalized greeting, goal slider, and a list of today's expenses.

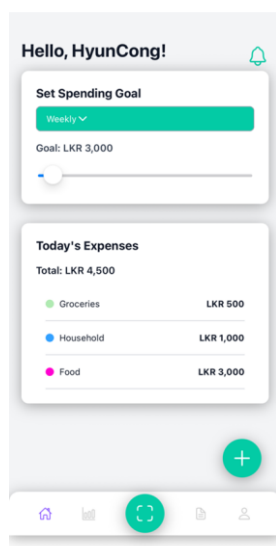


Fig 1 Image of Home Page

Add Expense Page: Manual entry interface with category selection and color assignment.

Bill Scan Page: Figure 2 shows the bill scanning with real time OCR extraction and auto categorization.

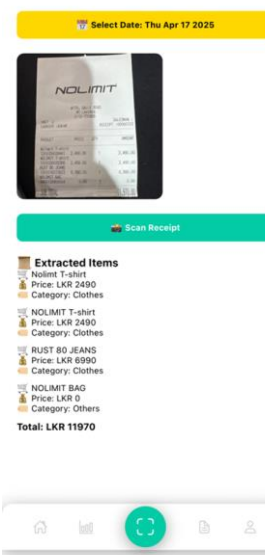


Fig 2 Image of bill scanning function

Report Page: Figure 2 shows interactive charts with a download button for PDF reports.

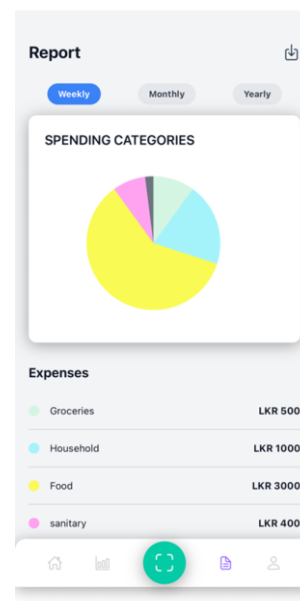


Fig 3 Image of Report Page

Profile Page: Editable user information with change password and logout options.

User Feedback Summary:

95.2% found the bill scanning feature helpful.

90.5% found the report page easy to understand.

71.4% would recommend the app to others.

58.7% rate the navigation as easy.

Quantitative Results and Benchmarking

OCR accuracy testing demonstrated that 91% of printed receipt items were correctly recognized, while handwritten receipts achieved 58% accuracy. During usability tests, the average time to record an expense was 1-2 minutes and 40-60 seconds with OCR scanning. User satisfaction rating averaged 4.4 out of 5 for overall ease of use.

Comparative Analysis

Table I Comparison of CacheBook with Existing Financial Management Applications

Feature	Cache Book	Mint	Goodbudget	Expensify
OCR Receipt Scanning	Yes	No	No	Yes
Custom Categories	Yes	Limited	Limited	Limited
Budget Goal Notifications	Yes	Yes	Yes	Limited
Visual Reports & PDF export	Yes	Yes	No	Yes
Cross platform Support	Android/ios	Android/ios/Web	Android/ios/Web	Android/ios/Web
Free Plan	Yes	Yes	Yes	Limited

Compared to existing tools, “CacheBook” offers a unique combination of OCR scanning and full customization in a free, mobile focused platform.

Challenges Observed:

- OCR performance was less accurate for blurry or handwritten receipts.
- Google Sign In could not be completed due to Firebase authorization issues.
- Current version only supports English.

Despite these limitations, “CacheBook” received highly positive feedback, especially for its automation, simplicity, and financial visualization capabilities. The application met all major functional goals and proved to be a valuable tool for encouraging better spending habits and financial awareness.

V CONCLUSION

The “CacheBook” mobile application was developed to address common challenges in personal financial management, such as manual expense logging, lack of real time tracking, and limited visualization tools. Through the integration of OCR technology, Firebase backend services, and a user friendly React Native interface, “CacheBook” enables users to record expenses efficiently, set financial goals, and visualize spending behavior through dynamic reports.

All key objectives of the system were achieved. The Mindee OCR API allowed accurate receipt scanning, budget alerts helped users manage their spending limits, and users could generate clear, categorized reports in both visual and PDF formats. Usability testing and user feedback confirmed that the application was intuitive, functional, and effective for day-to-day financial tracking.

Although limitations such as incomplete Google Sign In integration and OCR accuracy for handwritten receipts were identified, these do not significantly hinder core functionality. Future improvements will focus on multilingual support, enhanced OCR performance, and expanded features like savings tracking and financial insights.

Overall, “CacheBook” demonstrates the value of combining automation with simple design to promote better financial habits and support personal money management.

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