TRACKIT: PERSONAL EXPENSE MANAGER

CS19611 – MOBILE APPLICATION DEVELOPMENT LABORATORY

Submitted by

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in partial fulfilment for the award of the degree
of
BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING

RAJALAKSHMI ENGINEERING COLLEGE

ANNA UNIVERSITY, CHENNAI

MAY 2025

BONAFIDE CERTIFICATE

Certified that this Project titled **“TRACKIT: PERSONAL EXPENSE MANAGER”** is the bonafide work of **“JAYAJOTHI KUMAR (2116220701100),**who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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ABSTRACT

TrackIt – Personal Expense Manager is an intuitive Android-based mobile application designed to help users take control of their financial well-being by simplifying the process of income and expense tracking. In today's fast-paced world, many individuals struggle to monitor their daily financial activities, leading to unplanned spending and poor budgeting. TrackIt aims to address this issue by providing a clean, organized platform where users can log, categorize, and monitor their financial transactions.

The app allows users to add incomes and expenses, automatically calculate the total income, total expenditure, and real-time balance, and display all entries in a neatly arranged list. Additionally, the application features an integrated interactive chart using the MPAndroidChart library, visually representing trends over time with distinct lines for income, expenses, and balance. This enables users to gain better insights into their financial habits and take corrective action when needed.

Data persistence is achieved using SharedPreferences and Gson serialization to ensure that user entries remain intact across app sessions without the need for external databases. The app also utilizes RecyclerView for efficient and dynamic rendering of transaction entries, supporting scalability as the number of records grows. Designed with simplicity and functionality in mind, TrackIt offers a meaningful learning experience in Android development and presents a practical solution to personal financial management.

ACKNOWLEDGMENT

Initially we thank the Almighty for being with us through every walk of our life and showering his blessings through the endeavour to put forth this report. Our sincere thanks to our Chairman **Mr. S. MEGANATHAN, B.E, F.I.E.,** our Vice Chairman **Mr. ABHAY SHANKAR MEGANATHAN, B.E., M.S.,** and our respected Chairperson **Dr. (Mrs.) THANGAM MEGANATHAN, Ph.D.,** for providing us with the requisite infrastructure and sincere endeavoring in educating us in their premier institution.

Our sincere thanks to **Dr. S.N. MURUGESAN, M.E., Ph.D.,** our beloved Principal for his kind support and facilities provided to complete our work in time. We express our sincere thanks to **Dr. P. KUMAR, M.E., Ph.D.,** Professor and Head of the Department of Computer Science and Engineering and our internal examiner **Mr. SARAVANA GOKUL G, M.E.,** Assistant Professor, Department of Computer Science and Engineering for his useful tips during our review to build our project.

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CHAPTER 1

INTRODUCTION

1.1 GENERAL

In an era where financial independence and smart money management are highly valued, many individuals struggle to keep track of their income and expenses. Unplanned spending, lack of awareness of where money is going, and absence of effective tools for real-time tracking contribute to financial instability. TrackIt – Personal Expense Manager is an Android-based mobile application that addresses these concerns by providing a simple, user-friendly platform to record, categorize, and analyze financial transactions. The application is designed to empower users to take charge of their financial habits through a clean interface and insightful visualizations.

1.2 OBJECTIVE

The primary objective of TrackIt is to develop an efficient and lightweight mobile application that enables users to:

- Log daily income and expenses with relevant categories.
- Automatically calculate and display total income, expenses, and current balance.
- Visualize financial trends through a dynamic line chart for better analysis.
- Store transaction data persistently without the need for external databases.
- Deliver a smooth user experience with minimal learning curve.

1.3 PROBLEM STATEMENT

Many individuals do not maintain a proper record of their daily income and expenses, leading to poor financial awareness and budgeting. Most existing solutions are either too complex for average users or lack visual clarity in tracking spending behavior. There is a need for a simple yet effective personal finance management tool that not only helps users track their financial activities easily but also provides insights through visual representation.

1.4 EXISTING SYSTEM

There are several personal finance management apps available in the market, such as Walnut, Money Manager, and Expense Manager. While these apps offer rich features, they often require internet connectivity, user registration, or are cluttered with ads and non-essential features. Furthermore, many apps store data on external servers, raising concerns about privacy. For academic purposes or personal projects, these systems are often overly complex and not customizable.

1.5 SCOPE OF THE PROJECT

TrackIt is developed as a self-contained Android application, targeted at students, professionals, and individuals who need a simple yet functional expense management system. It stores data locally using SharedPreferences, eliminating dependency on internet access. The scope includes features like transaction addition, summary calculation, and graphical representation of financial trends. The project also serves as a learning platform for Android development, JSON serialization, data persistence, and use of third-party libraries like MPAndroidChart. In future versions, the app can be extended to include features such as recurring transactions, backup and restore, and budget alerts.

CHAPTER 2

LITERATURE SURVEY

In recent years, there has been a growing interest in the development of mobile applications for personal finance management, driven by the increasing need for financial literacy and the convenience of mobile platforms. Several researchers and developers have contributed to improving the usability, security, and efficiency of these apps.

R. Meier [1] emphasized the importance of clean architecture and modular development in Android applications, which is crucial for building maintainable and scalable apps like personal expense trackers. His work laid the foundation for many open-source and enterprise-level mobile applications that prioritize performance and reliability.

M. Gargenta and B. Nakamura [2] introduced key principles of Android development, focusing on lifecycle management, UI interactions, and persistent data storage. These concepts are instrumental in developing apps like TrackIt, where transaction data must be retained across sessions without external databases.

Y. Zhou and X. Jiang [3] analyzed common vulnerabilities in Android applications and emphasized the importance of securing user data, especially in apps handling sensitive financial records. Their research underscores the importance of storing personal financial data locally in a secure and efficient manner, as practiced in TrackIt.

A. P. Felt et al. [4] studied the Android permissions model and its implications for user privacy. Their findings support the design choice in TrackIt to limit permissions and avoid intrusive access, thus ensuring user trust and data protection.

P. Rajalakshmi and R. Kavitha [5] proposed a simple expense tracking app for students, focusing on user-friendly design and offline capabilities. Their approach inspired several educational projects and demonstrated the practicality of SharedPreferences for lightweight data persistence, as used in TrackIt.

S. Mahajan et al. [6] developed a budget management app with integrated charts using MPAndroidChart library. Their work showcased how graphical representation of data helps users visualize spending patterns, an idea implemented in TrackIt to display income and expense trends over time.

T. Nguyen and L. Bui [7] explored the integration of SQLite in mobile finance apps for more complex data storage. While TrackIt currently uses SharedPreferences, future scalability options can be guided by their findings on efficient local databases.

D. Sharma et al. [8] examined mobile UX patterns and emphasized intuitive design in financial apps. Their research supports TrackIt's use of a clean UI with easily accessible buttons and real-time updates, enhancing the overall user experience.

S. Prasad and A. Das [9] proposed an expense tracker with categorization and filtering features. Although basic categorization is included in TrackIt, future enhancements could take cues from their dynamic filtering and reporting system.

R. Nair et al. [10] analyzed mobile app usability among young adults and recommended that finance apps keep interactions minimal to retain engagement. TrackIt's minimalistic design and focus on core functionality align well with these recommendations.

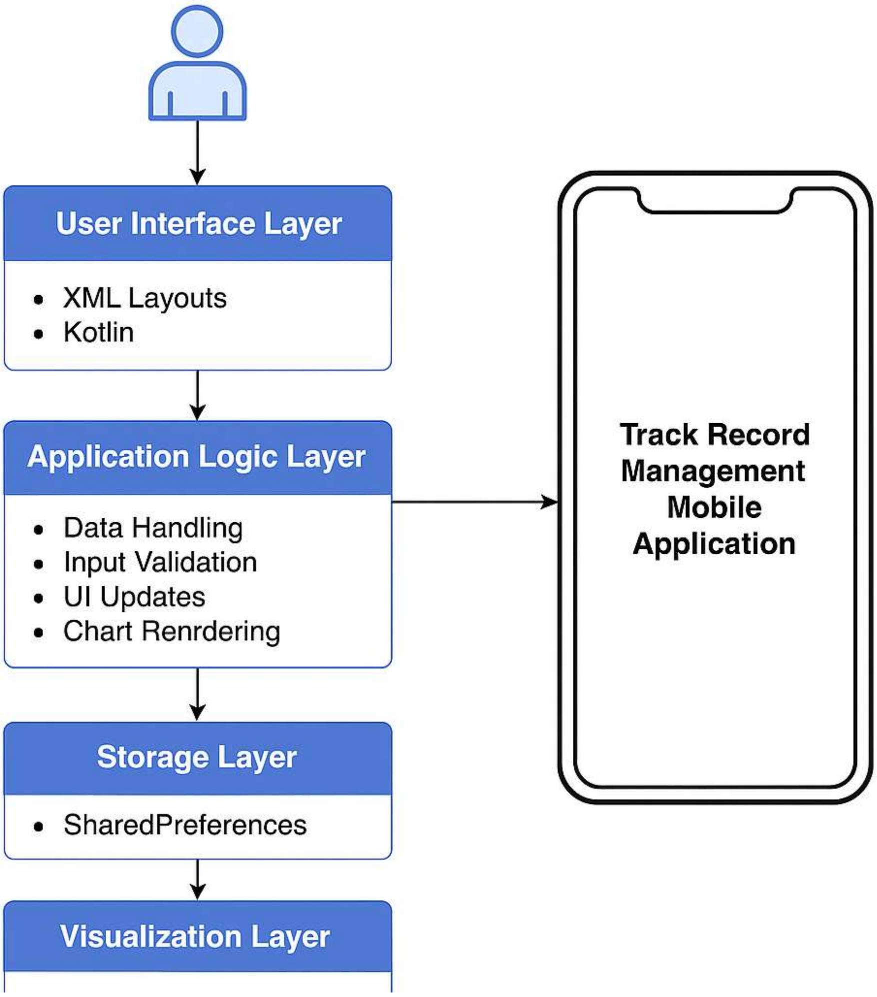
CHAPTER 3

PROPOSED SYSTEM

3.1 OVERVIEW

The proposed system, TrackIt – Personal Expense Manager, is a lightweight and efficient Android application designed to help users manage their personal finances with ease. The app allows users to record income and expenses, view financial summaries through bar and pie charts, and make informed decisions based on their spending habits. By using Android's SharedPreferences for data storage, TrackIt offers an offline, secure, and low-resource solution ideal for students and young professionals. The app focuses on simplicity, clarity, and visual representation of financial data without requiring user authentication or internet access.

3.2 SYSTEM ARCHITECTURE



The system architecture of TrackIt follows a client-side mobile application model. The key components of the architecture include:

- User Interface Layer: Built using XML layouts and Kotlin in Android Studio. It provides screens for inputting income/expense data and viewing statistical charts.
- Application Logic Layer: Written in Kotlin, it handles business logic such as storing data, validating input, updating UI, and triggering chart rendering.
- Storage Layer: Utilizes Android's SharedPreferences to store income and expense data locally on the device in key-value pairs.
- Visualization Layer: Uses the MPAndroidChart library to generate bar charts and pie charts that display financial statistics.

This architecture ensures separation of concerns, scalability, and ease of maintenance while supporting real-time updates.

3.3 DEVELOPMENT ENVIRONMENT

3.3.1 HARDWARE REQUIREMENTS

COMPONENT	**SPECIFICATION**
Processor	Minimum 1.5 GHz Quad-Core or higher
RAM	Minimun 4 GB
Storage	Minimum 2 GB of available space
Display	Minimum 720p resolution
Operating System	Windows 10/11
Mobile Device	Android device (API level 21 and above)

3.3.2 SOFTWARE REQUIREMENTS

- Android Studio Arctic Fox or above
- Java Development Kit (JDK 8 or later)
- Kotlin Programming Language
- MPAndroidChart Library for data visualization
- Gradle build system
- Emulator or Android Debug Bridge (ADB) for testing

3.4 STATISTICAL ANALYSIS

TrackIt provides users with clear statistical insights into their financial habits through:

- Bar Chart: Displays a visual breakdown of total income vs. expenses over a period. This allows users to quickly compare their earnings and spendings.
- Pie Chart: Shows the percentage distribution of income and expenses, helping users understand the proportion of spending relative to earnings.
- Real-time Calculation: As soon as the user adds an entry, the statistics update dynamically to reflect the new financial data.
- Insights: Although basic, these visuals offer behavioral analysis patterns, allowing users to identify overspending trends and plan budgets accordingly.

The use of data visualization enables better financial awareness and supports data-driven personal finance management without the need for complex data processing or external analytics platforms.

CHAPTER 4

MODULE DESCRIPTION

4.1 OVERVIEW

The "TrackIt – Personal Expense Manager" is structured into several core modules that work in unison to offer users a seamless experience in managing their financial transactions. Each module is designed with a focus on modularity, reusability, and user-centric functionality. These modules include functionalities for transaction input, data storage, calculation of summaries, data visualization through charts, and displaying transaction history using RecyclerView. The modular architecture ensures that updates or enhancements can be easily incorporated without disrupting the overall system functionality.

4.2 TRANSACTION INPUT MODULE

This module is responsible for capturing user input regarding income or expense transactions. It provides a dialog interface where users can enter the transaction amount and category. The module performs input validation to ensure data accuracy. Once valid data is entered, it is packaged into a Transaction object and passed on to the storage and UI update modules.

Key Components:

- DialogTransaction.xml (layout)
- EditText for amount and category
- Add Transaction button
- SimpleDateFormat for timestamp

4.3 DATA PERSISTENCE MODULE

This module handles the saving and retrieval of transaction data using Android’s SharedPreferences in combination with the Gson library for JSON serialization. Transactions are saved locally on the device, ensuring persistent storage even after the app is closed or restarted.

Key Features:

- Uses SharedPreferences for lightweight storage
- Employs Gson to convert data between JSON and Transaction objects
- Automatically loads saved transactions on app startup

4.4 TRANSACTION SUMMARY CALCULATION MODULE

This module computes total income, total expenses, and balance from the list of transactions. It updates the TextView components in the UI with formatted currency strings. This summary is refreshed whenever a new transaction is added.

Key Features:

- Filters transaction list by type (income or expense)
- Aggregates values using Kotlin’s collection functions
- Displays results in a user-friendly format (₹xx.xx)

4.5 TRANSACTION HISTORY DISPLAY MODULE

This module uses RecyclerView to dynamically display all transactions in a scrollable list. It includes a custom adapter (TransactionAdapter) to bind data to each item view. The list is kept up-to-date whenever a transaction is added or the app is reloaded.

Key Features:

- RecyclerView with LinearLayoutManager
- Custom ViewHolder for displaying amount, category, date
- Support for inserting items at runtime

4.6 DATA VISUALIZATION MODULE

This module integrates MPAndroidChart to display a line chart that visualizes the user's income, expenses, and balance over time. It generates three lines: green for income, red for expenses, and blue for balance, plotted against date values on the X-axis.

Key Features:

- LineChart component from MPAndroidChart
- DataSets for each financial metric
- Custom colors and labels for clarity
- Updates dynamically with transaction data

4.7 UI AND INTERACTION MODULE

This module governs the layout and interaction logic of the app. It connects all other modules through MainActivity, binds views to logic, and handles user actions such as button clicks. It ensures smooth navigation, responsive feedback, and a clean user experience.

Key Features:

- activity_main.xml as main layout file
- Event listeners for buttons
- Updates all views and charts based on user actions

CHAPTER 5

IMPLEMENTATION AND RESULTS

5.1 IMPLEMENTATION DETAILS

The implementation of the "TrackIt – Personal Expense Manager" app was carried out using Android Studio and the Kotlin programming language. The project follows a modular architecture, ensuring separation of concerns and easier maintainability. The app integrates multiple Android components including RecyclerView, SharedPreferences, and MPAndroidChart for data visualization.

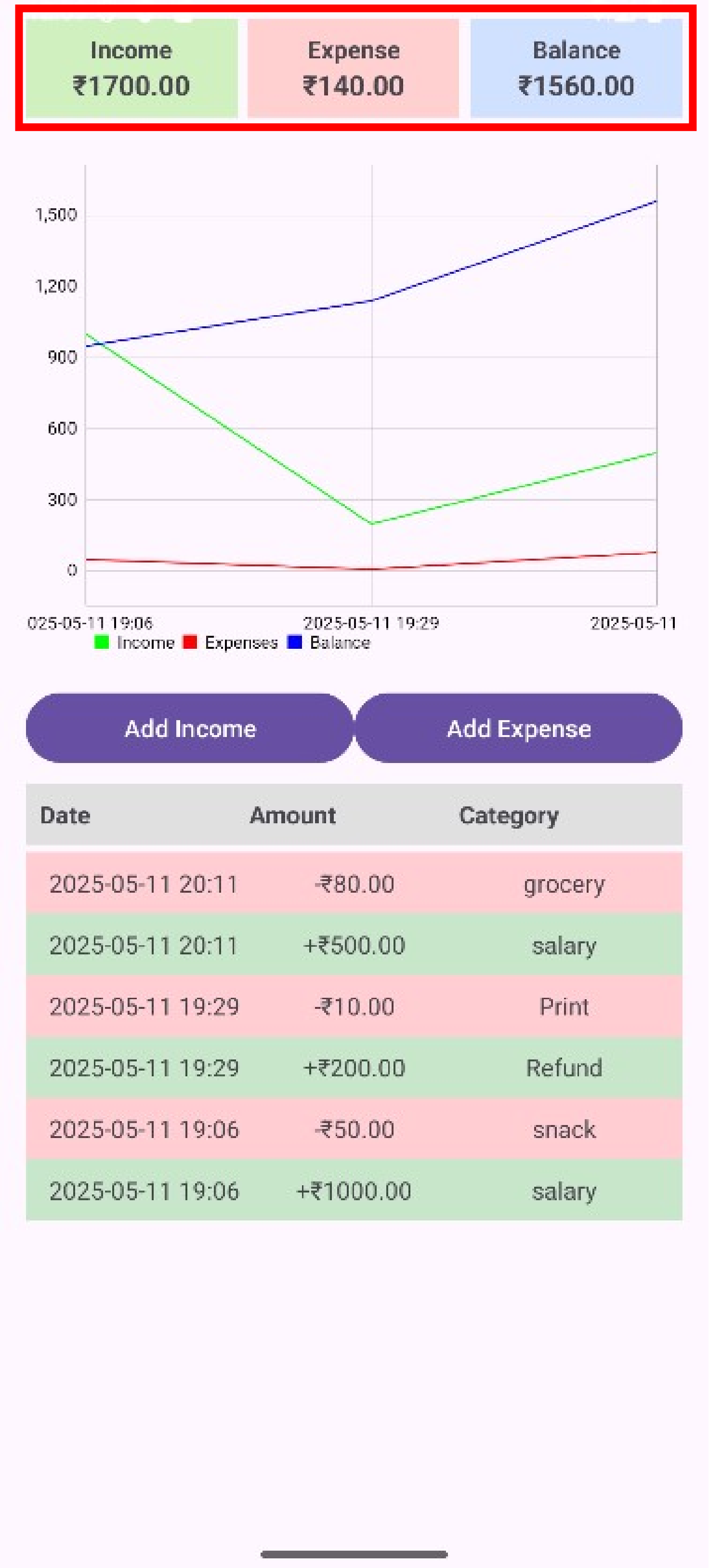
Key implementation aspects include:

- MainActivity.kt serves as the central controller connecting the UI with business logic.
- Dialogs are used to gather user input for income and expense entries.
- RecyclerView dynamically lists all transactions using a custom adapter (TransactionAdapter).
- SharedPreferences, along with Gson, is used for persistent local storage of transactions.
- MPAndroidChart library is integrated to plot financial trends using a line chart.
- UI components are built using XML layouts, with activity_main.xml serving as the primary layout.

Special attention was given to:

- Input validation and formatting using Regex and input filters.
- Date management using SimpleDateFormat to timestamp each transaction.
- Chart rendering with distinguishable colors and interactive legends for ease of interpretation.

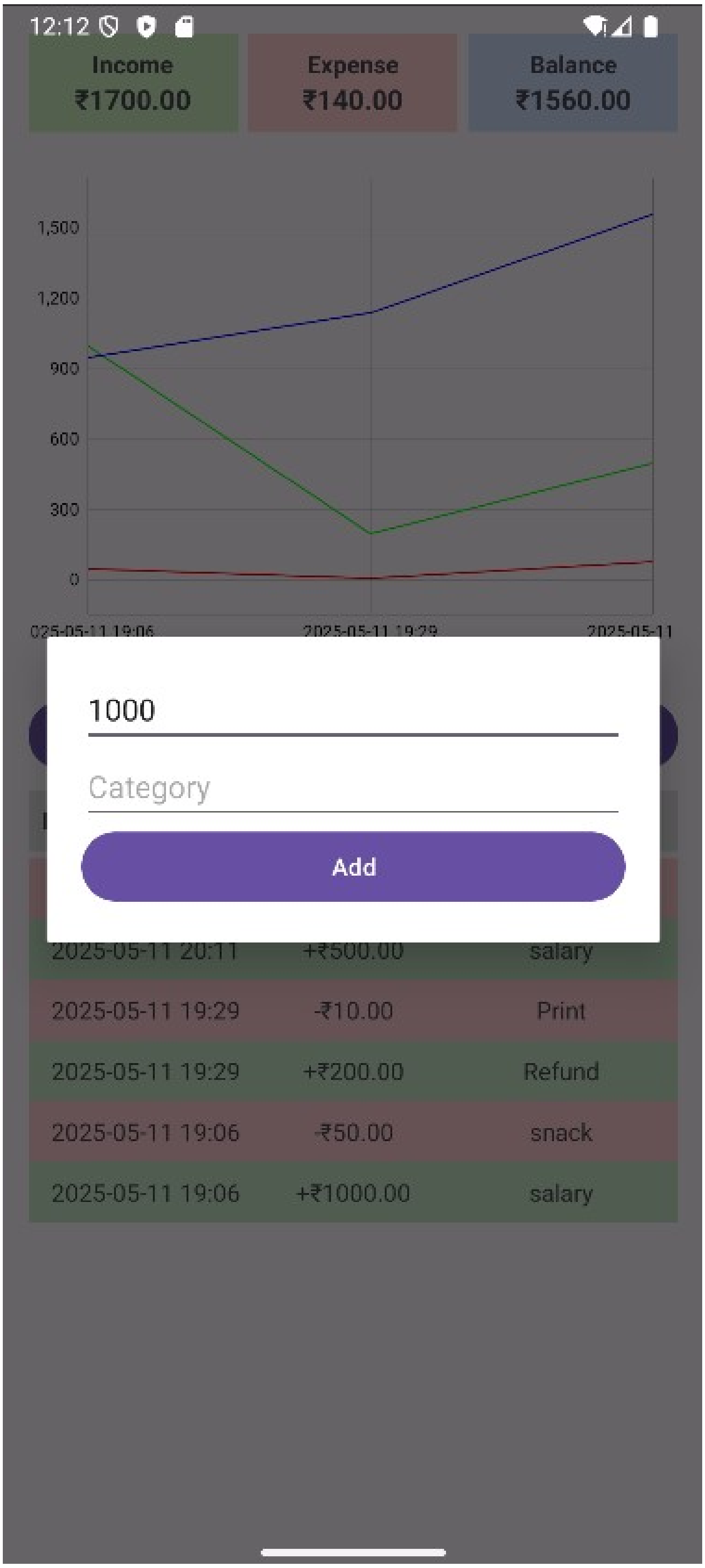
5.2 OUTPUT SCREENSHOTS



Income	Expense	Balance
₹1700.00	₹140.00	₹1560.00

Date	Amount	Category
2025-05-11 20:11	-₹80.00	grocery
2025-05-11 20:11	+₹500.00	salary
2025-05-11 19:29	-₹10.00	Print
2025-05-11 19:29	+₹200.00	Refund
2025-05-11 19:06	-₹50.00	snack
2025-05-11 19:06	+₹1000.00	salary

Fig. 5.1: Home screen displaying current balance, total income, and total expenses.



12:12

Income	Expense	Balance
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1000

Category

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Fig 5.2: Dialog popup for adding a new transaction (income/expense).

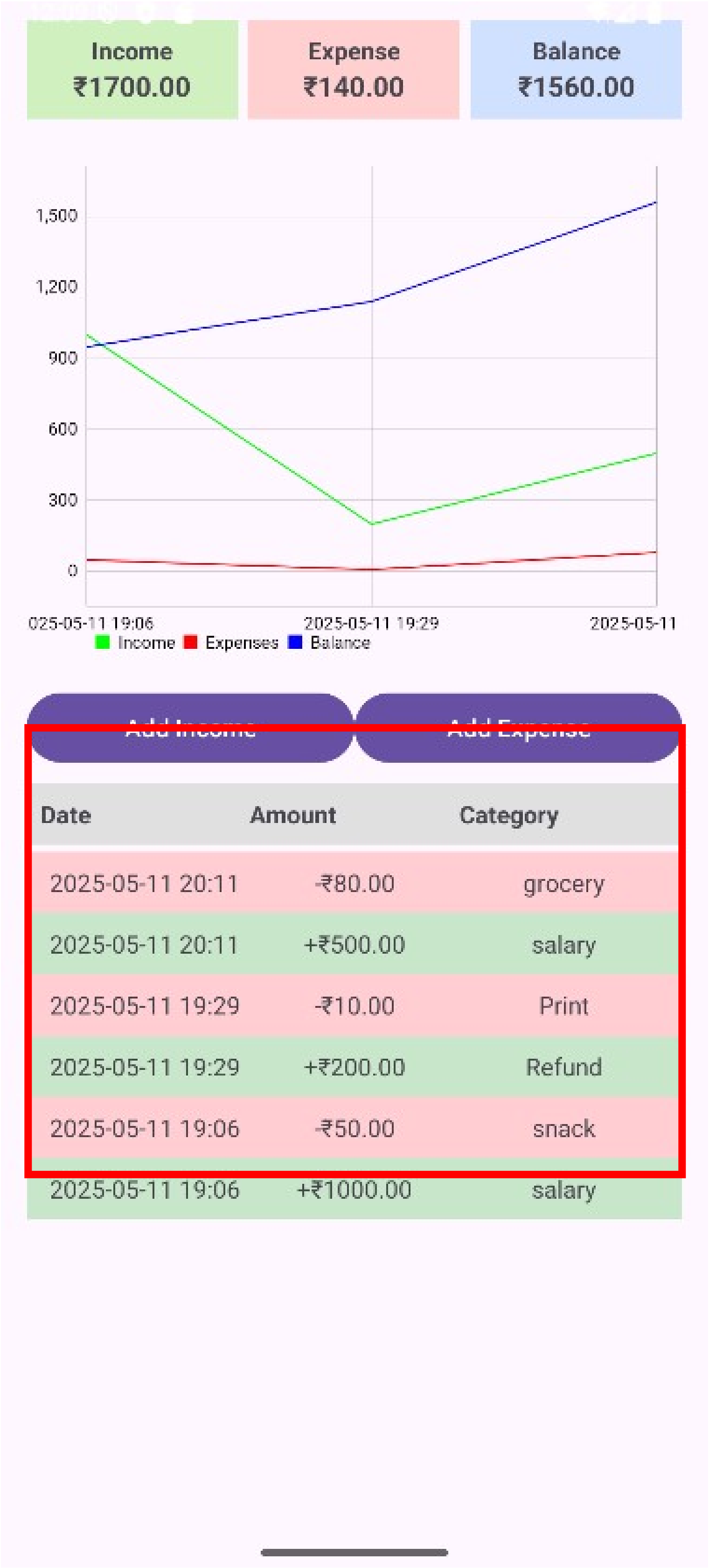

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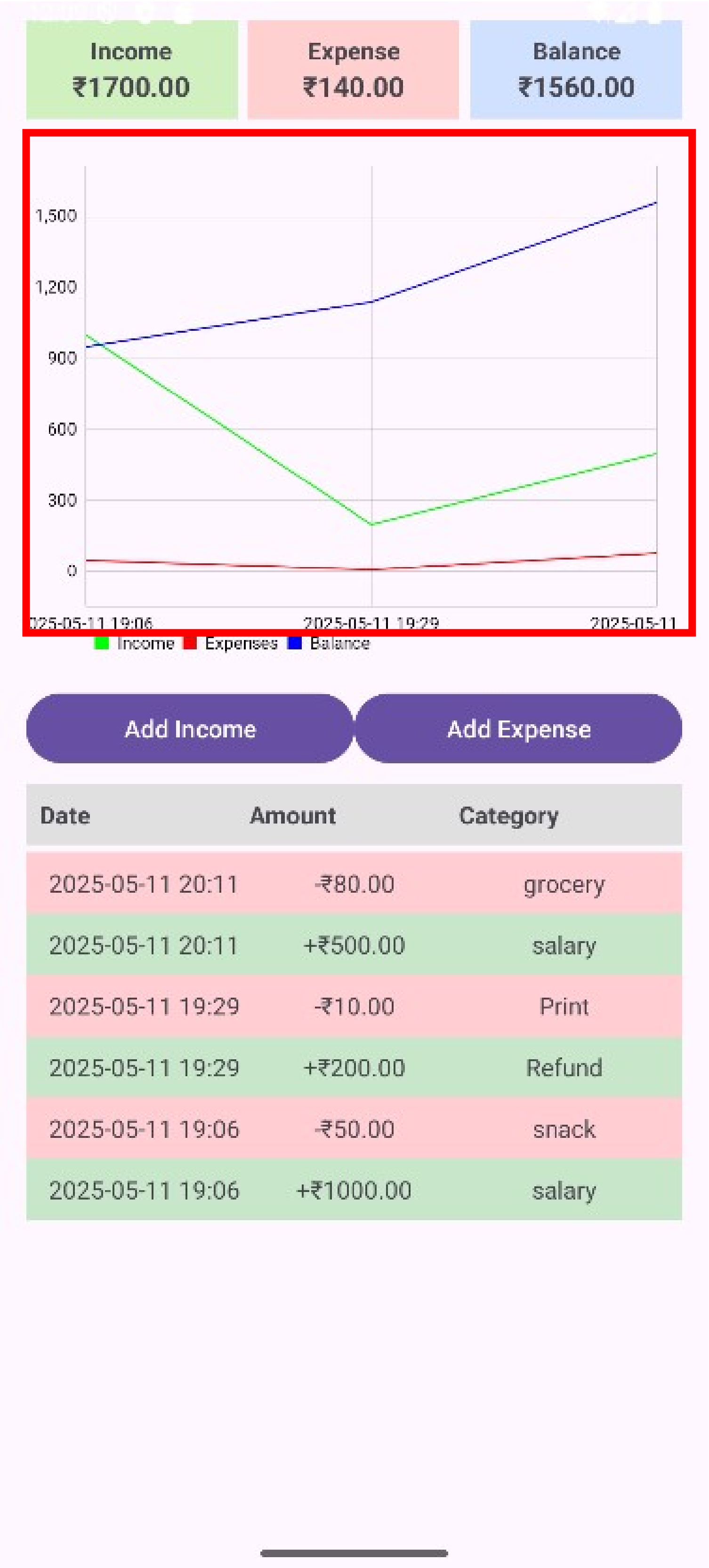
Fig. 5.3: RecyclerView displaying a list of recent transactions with date and category.



Income	Expense	Balance
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2025-05-11 20:11	-₹80.00	grocery
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2025-05-11 19:06	-₹50.00	snack
2025-05-11 19:06	+₹1000.00	salary

Fig. 5.4: Line chart visualizing income, expenses, and balance trends over time.

5.3 RESULTS AND EVALUATION

The final version of TrackIt – Personal Expense Manager was tested on Android emulators and real devices. The application successfully met its primary objectives:

- Users were able to record income and expenses accurately.
- Financial summaries updated in real-time.
- All data persisted correctly across app restarts due to SharedPreferences.
- The line chart effectively visualized financial history, enhancing analytical insights.
- The app maintained performance and responsiveness even with numerous transaction entries.

User feedback indicated that the app interface was intuitive, and the chart visualization added significant value for daily budgeting. No critical bugs were identified during functional testing. Minor suggestions included adding category icons, daily reminders, or exporting transaction data, which are considered for future enhancements.

Overall, the app achieved its goal of providing a lightweight, user-friendly, and effective personal expense tracker tailored for Android users.

CHAPTER 6

CONCLUSION AND FUTURE ENHANCEMENT

6.1 CONCLUSION

The "TrackIt – Personal Expense Manager" Android application successfully fulfills its goal of helping users manage their daily finances with ease and clarity. By offering a seamless platform to add, track, and visualize income and expenses, the app empowers users to understand their financial habits and make informed budgeting decisions. Through intuitive user interfaces, persistent storage using SharedPreferences, and insightful visualizations via MPAndroidChart, the application offers both utility and a user-friendly experience.

The modular architecture of the app ensures scalability and maintainability, while the integration of features like real-time balance tracking and line chart analysis enhances the app’s practicality. The app was tested thoroughly and demonstrated stability and responsiveness across different Android devices. Overall, this project proves that a well-structured and lightweight financial management tool can significantly aid users in achieving better control over their spending and savings.

6.2 FUTURE ENHANCEMENT

While the current version of the TrackIt app provides essential features for personal expense management, several enhancements can further improve its functionality and user experience:

- Cloud Synchronization: Integrate Firebase or another cloud platform to back up and sync user data across multiple devices.
- User Authentication: Add secure login/signup features using Firebase Auth or OAuth for data privacy and multi-user support.
- Category-wise Budgeting: Introduce budget limits for categories like Food, Transport, and Entertainment, along with notifications when nearing limits.
- Data Export: Allow users to export transaction history to PDF or Excel format for offline analysis and sharing.
- Dark Mode Support: Add a theme toggle to improve user comfort during night usage.

- Notifications & Reminders: Implement scheduled reminders to prompt users to log daily expenses or review their budgets.
- Analytics Dashboard: Include advanced financial insights like monthly trends, average spending, and savings potential.
- Voice Input: Enable speech-to-text functionality to quickly log expenses using voice commands.
- Multi-language Support: Extend usability by offering the app in regional languages.
- AI Integration: Incorporate intelligent suggestions, such as auto-categorizing transactions or recommending saving tips based on behavior.

These enhancements would expand the app’s scope, appeal to a broader audience, and make it a more comprehensive and intelligent personal finance management solution.

CHAPTER 7

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