STREAMLINING PERSONAL FINANCE: A USER-CENTRIC FINANCIAL MANAGEMENT APPLICATION

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ABSTRACT

Personal financial management applications are designed to solve the financial problems that people often encounter in their daily lives. Many people lack systematic financial planning, and the ratio of unnecessary income, expenditure and savings leads to insufficient savings, high debt or unclear financial goals. In addition, people's income sources are more diverse, and their consumption methods are gradually enriched. The manual recording method cannot provide users with intelligent financial analysis and suggestions, thus limiting their effective control over the flow of funds. To solve these problems, personal financial management applications help users track income, expenditure, investment and savings. It provides users with budget suggestions, financial planning, and investment suggestions based on the user's financial situation. This project will be developed by using the android studio, Java, Firebase Realtime Database. The main goal of the application is to help users improve their financial situation and provide intuitive financial status. Through regular financial analysis reports and suggestions, users can easily grasp the monthly income and expenditure, avoid unnecessary expenses, and optimize savings and investments. The project enables users to manage their finances more proactively and improve the efficiency of fund use. Users can monitor and adjust financial strategies anytime and anywhere through convenient mobile operations, saving a lot of time and energy. At the same time, the

application displays financial data through intuitive charts and reports to help users clearly understand their financial health.

INTRODUCTION

With the development of modern society and the change of lifestyle, more and more people are beginning to realize the importance of financial management. People's income sources have become more diverse, and their consumption methods have gradually become richer. At the same time, the increase in financial instruments and investment opportunities has made people face more challenges in managing their personal finances. In the past, most people used manual accounting or simple spreadsheets to manage their finances, but this method is neither efficient nor error-prone (Balathas et al. 2021). In addition, the manual recording method cannot provide users with intelligent financial analysis and suggestions, thereby limiting their effective control over the flow of funds.

In order to help individuals better manage their finances, many financial management tools and applications have emerged. These applications can help users easily manage budgets, record income and expenses, track financial goals, and provide valuable analysis and suggestions. (Di Domenico et al. 2022) Personal financial management applications are usually based on mobile devices, allowing users to view and manage financial data anytime, anywhere.

Personal finance refers to the comprehensive planning and management of one's own finances to ensure that funds are allocated reasonably, and financial goals are achieved. Good personal finance can help people reduce financial pressure, achieve savings, investment and wealth appreciation, and maximize the use of your funds through reasonable strategies to achieve financial independence and goals. According to research, financial management applications not only help users control daily expenses but also provide intelligent budget planning and financial advice through data analysis.

Such applications usually analyse spending trends and even generate customized reports based on the financial data entered by the user. These applications usually simplify complex financial activities through a user-friendly user interface, making it easy for ordinary users to get started and improve their financial situation (Higgs 2021).

The applications of personal finance apps can fit into various use cases. First, they can assist users in planning a reasonable budget for various expenses during the day. For instance, users can include a monthly expenditure ceiling within the application which informs the user if he or she has exceeded his or her budget according to actual spending thus enabling the user to manage every expenditure. Besides, these apps also allow users to record income sources such as wages, investment, etc., as well as provide comprehensive reports to allow users to evaluate their finance plans in a detailed manner.

To ensure that young people are disciplined enough to record down their daily transactions, this project aids in keeping records of the transactions that they make. Taking into account that recording of income and expenses can be made as a play, the use of a mobile application and the performance of the application can be on an Android smartphone (Wong et al. 2023).

The project of Android personal financial management app would be useful and offer solutions that are convenient, flexible and tailored to the users needs. It offers users relevant information in the form of financial advice and analysis to enhance the users planning and financial success.

METHODOLOGY

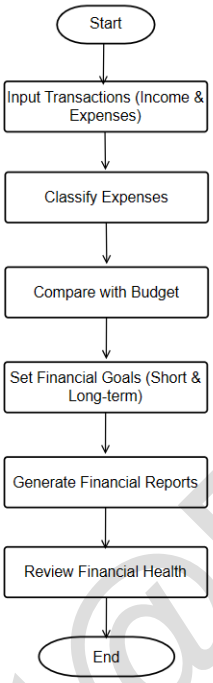

Figure 1. 1 Financial Management Process Flowchart

This Figure 1.1 shows a typical process of personal financial management, which is divided into six main steps to help individuals effectively manage income and expenses, set financial goals, and evaluate financial health. Enter transaction records: The process begins by collecting all personal financial transaction data, including income and expenses. By recording this information, individuals can fully understand their cash flow. Categorize expenses: After recording transactions, all expenses need to be classified. This can help users understand the proportion of expenses in different categories and provide a basis for subsequent budget analysis. Set financial goals: Based on the current financial situation, users can set appropriate financial goals. Generate financial reports: Based on all transactions and analysis, generate financial reports to clearly present personal financial status. These reports usually include a summary of income and expenditure, the proportion of each expenditure, etc., to help users understand financial health more intuitively.

TEST CASE DESIGN

Functional Testing

Functional testing was conducted to verify that all modules of the financial management application performed correctly and met the system requirements. Unit testing ensured each function—such as registration, login, profile updates, transaction input, and budget setting—operated independently without errors. Integration testing confirmed the modules worked cohesively, including data synchronization across devices and budget alert interactions. System testing covered complete user workflows like editing profiles and viewing statistics, all of which executed successfully.

Additionally, acceptance testing was carried out with real users, who validated the application's accuracy, usability, and navigation flow. All 15 test cases passed, demonstrating the app's functional reliability and compliance with user expectations.

Non-Functional Testing

Non-functional testing assessed the system's performance, security, usability, and compatibility. Under simulated user load, the application maintained quick response times across key operations such as login and data visualization. Firebase Authentication secured user data, while password validation and reset mechanisms ensured safe account access.

Usability tests revealed high user satisfaction, with appreciation for intuitive UI features like avatar selection and color-coded budget alerts. Compatibility tests confirmed smooth operation on various Android devices, with consistent layouts and no data distortion. Overall, the system fulfilled its non-functional requirements for reliability, security, and user-centered design.

TESTING AND RESULT

The system was tested using an OPPO Reno 8 Pro smartphone running Android 14, with MediaTek Dimensity 1200 processor, 8GB RAM and 256GB SSD. All testing was executed via Android Studio IDE with Firebase as the backend for real-time database synchronization. This setup was used to simulate real usage conditions, confirming system stability and responsiveness.

Upon login with a valid email and password, the system authenticates the user and navigates to the main interface. Successful login ensures that user data, including income and expenditure records, is synced to the cloud for consistent cross-device access (Ahmadi et al. 2015).

Users can input income and expense data by tapping the 'Add' button and entering amount, category, and notes. Data is saved via Firebase, and the screen updates instantly. Users can also modify or delete records dynamically without manual refreshing (Truica et al. 2015).

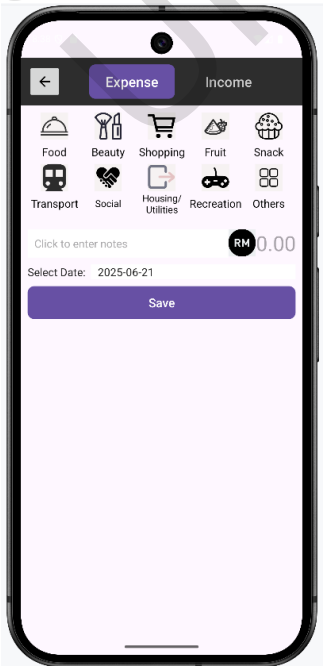

Figure 1. 2 Dynamic display of expenditure record

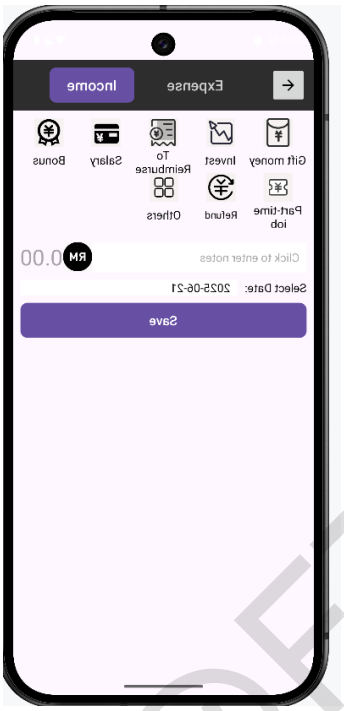

Figure 1. 3 Dynamic display of income record

The budget management functionality allows users to set a monthly spending limit and compare it with actual expenses. When expenditures exceed the predefined budget, the system issues an automatic alert to notify users, thereby reinforcing financial discipline (Talmon & Faliszewski 2019).

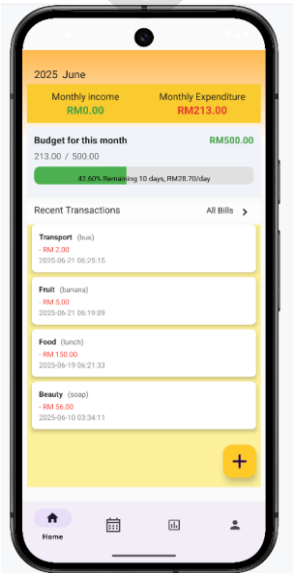

Figure 1. 4 Current spending compared to budgeted amounts

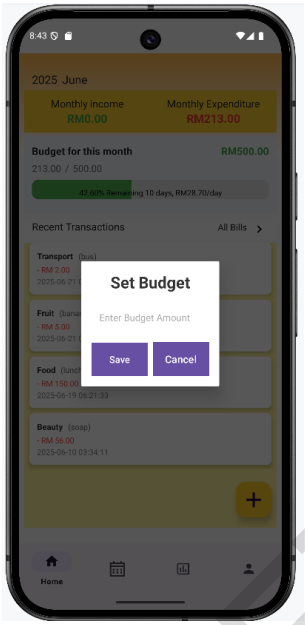

Figure 1. 5 Set budget amount

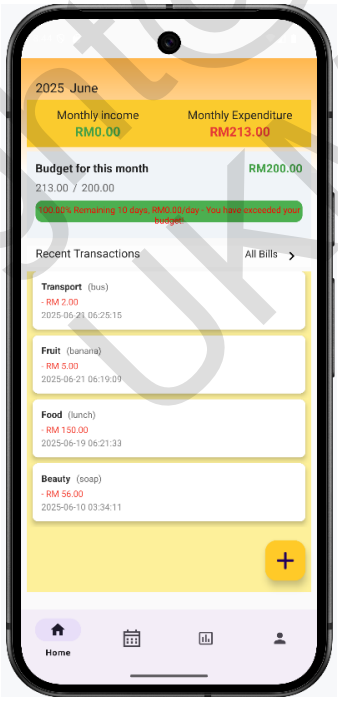

Figure 1. 6 Exceeded budget alert

The application also includes a statistical report feature that presents income and expenditure data in visual formats. Users can filter transactions by time period and

category, and view the results as dynamic bar or pie charts for clearer financial insights (Talmon & Faliszewski 2019).

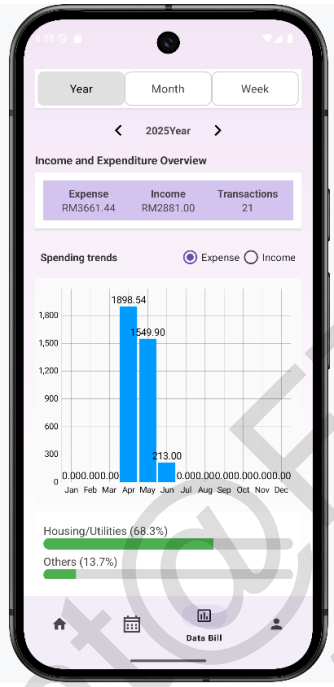

Figure 1. 7 Annual expenditure bar chart and percentage chart

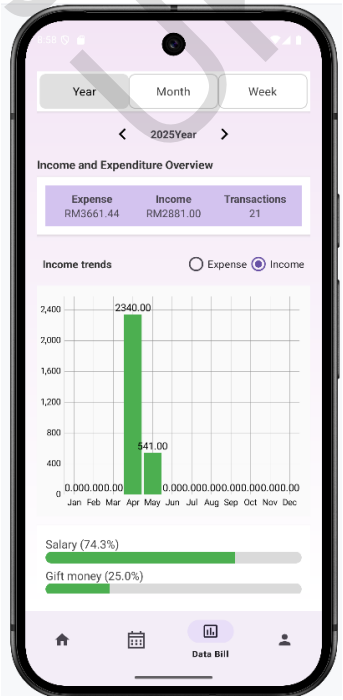

Figure 1. 8 Annual income bar chart and percentage chart

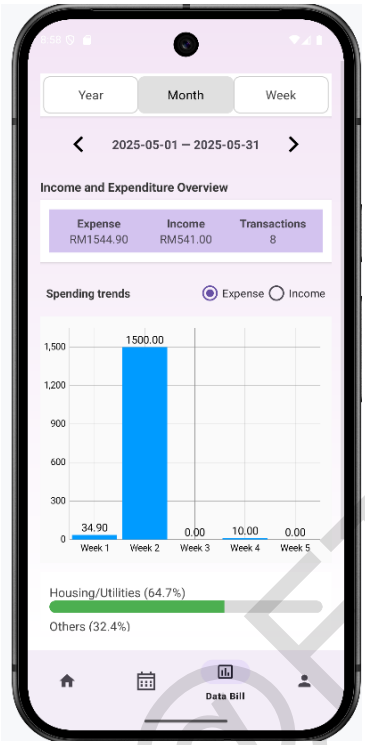

Figure 1. 9 Monthly expenditure bar chart and percentage chart

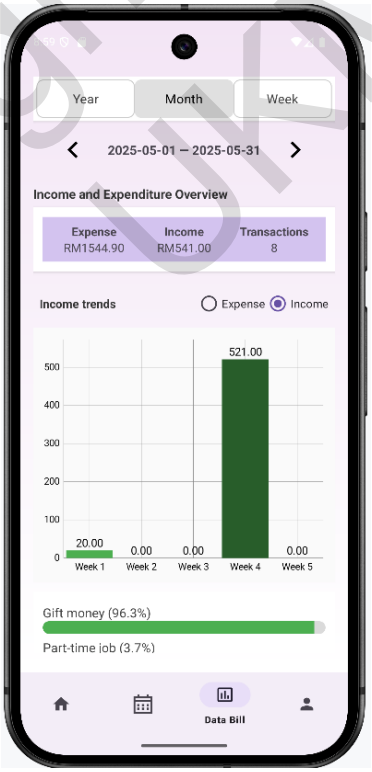

Figure 1. 10 Monthly income bar chart and percentage chart

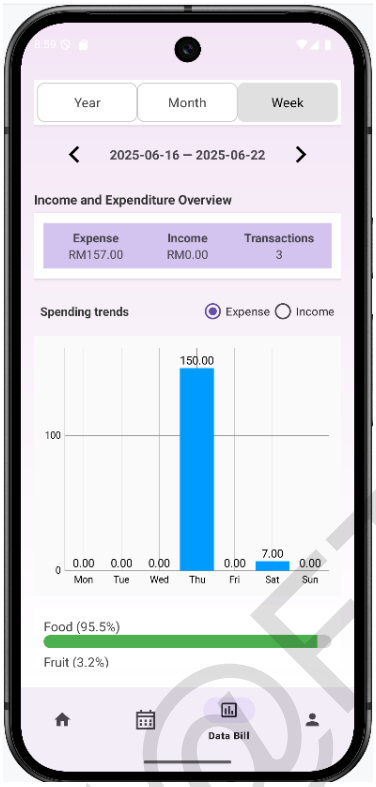

Figure 1. 11 Weekly expenditure bar chart and percentage chart

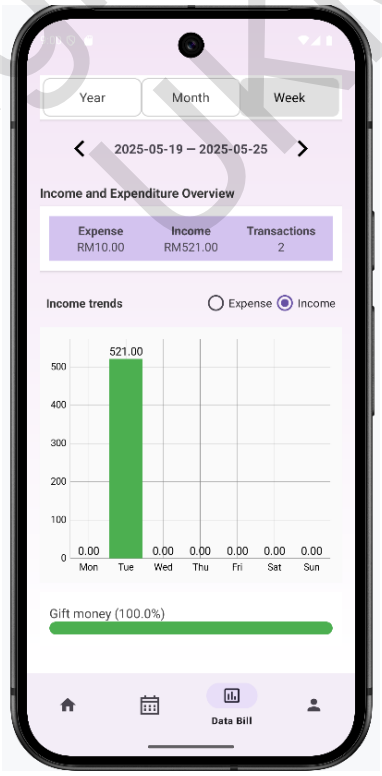

Figure 1. 12 Weekly income bar chart and percentage chart

The synchronization functionality was tested by switching between devices. Users were able to retrieve their income, expenses, and budget configurations on another device using the same account. This ensures consistent user experience and reliable data backup.

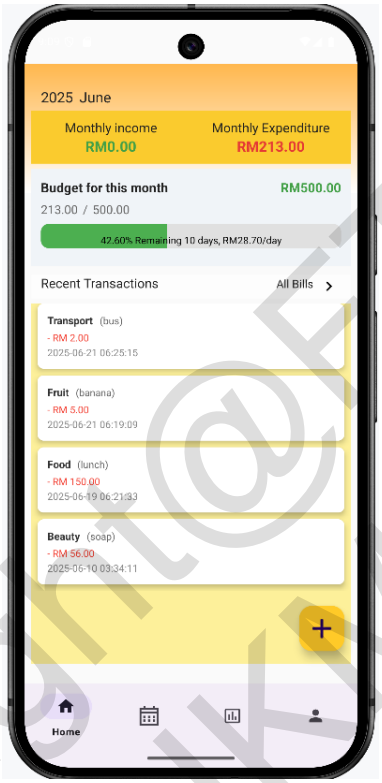

Figure 1. 13 Device A data display

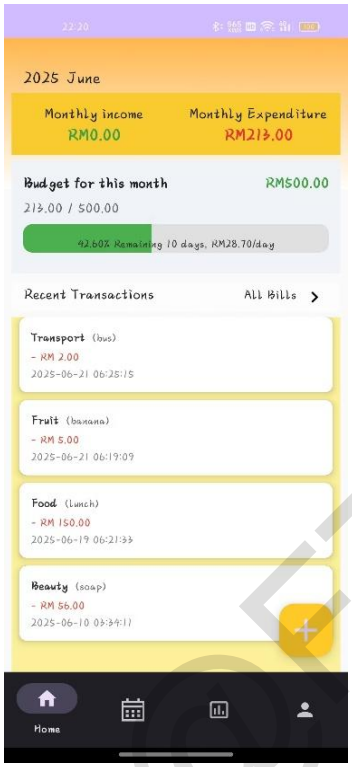

Figure 1. 14 Device B data display

CONCLUSION

This project successfully developed a user-friendly personal finance management application tailored for Android users, allowing efficient tracking of income, expenses, budgeting, and financial visualization. Built using Java, Firebase Realtime Database, and structured under the Model-View-Controller (MVC) architecture, the system emphasizes modularity, maintainability, and future scalability. Its intuitive interface enables a wide range of users—from students to professionals—to manage their finances effectively through real-time updates and graphical summaries.

The application demonstrates several strengths, including usability, real-time data synchronization, and modular design, making it accessible and maintainable. Features such as budget alerts, statistical charts, and category-wise breakdowns support informed financial decision-making. However, limitations include Android-only availability, manual data entry, and lack of integration with external financial services,

reducing automation. It also lacks advanced AI-driven insights and enhanced security features like biometric authentication.

Looking ahead, improvements may include expanding to iOS and web platforms, integrating banking APIs for automatic transaction import, incorporating AI-powered financial recommendations, and enhancing data security protocols. These enhancements aim to increase user convenience, accuracy, and trust, aligning with evolving expectations of smart finance applications.

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