



# **IU International University of Applied Sciences (Berlin)**

Master of Science (M. Sc.) – Computer Science

## **Developing a Comprehensive Personal Finance Management Tool: Enhancing Financial Literacy and Empowering Users**

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## **Introduction**

Efficiently managing one's own money is a crucial component of achieving financial stability, although many people have difficulties in accurately monitoring their income, spending, and savings objectives. The intricacy of financial management may result in suboptimal financial choices, anxiety, and missed prospects for saving and investing. The objective of the Personal Finance Management Tool project is to provide a complete solution that helps users effectively manage their money, addressing the aforementioned difficulties (Di Domenico et al., 2022).

The aim of this project is to develop a user-friendly online tool that enables users to monitor their monthly income, spending, and savings objectives. The application will give analysis on spending habits, suggest tactics for attaining savings objectives, and provide practical guidance for enhancing financial well-being. The application will provide a strong and dynamic platform for managing personal finances by using technologies such as Flask, SQLAlchemy, and Chart.js.

The significance of personal money management is of utmost importance. Efficient financial management enables people to make well-informed choices, steer clear of debt, and attain financial stability. It facilitates improved financial planning, guarantees punctual payment of bills, and contributes to the establishment of a stable financial future. The objective of this project is to streamline the task of overseeing personal money, ensuring it is easily understandable and uncomplicated for users, thereby enhancing their financial welfare.

## **Problem Definition**

A multitude of folks encounter substantial obstacles when it comes to efficiently managing their own money. These obstacles arise from several variables, such as the intricacy of managing different sources of income, overseeing unique spending, and establishing attainable savings objectives. Without a methodical approach, individuals often have difficulties in comprehending their financial circumstances, resulting in inadequate planning, unforeseen deficits, and lost chances for saving (Hui & See, 2015).

The main issue that this project seeks to address is the absence of a comprehensive and user-friendly instrument for effectively managing personal money. Current solutions often lack the ability to provide a comprehensive perspective on income, spending, and savings objectives, hence hindering users from obtaining a holistic understanding of their financial situation. Furthermore, several systems lack the ability to provide practical insights or suggestions derived from the user's financial data, hence restricting their efficacy in assisting people in enhancing their financial well-being (Kaiser & Lusardi, 2024).

Individuals have several challenges when it comes to managing their own money, such as the arduous task of keeping precise records, the time-consuming process of manual monitoring,

and the absence of tailored financial guidance. Moreover, the lack of capacity to mentally represent financial data and analyse trends over a period of time is a challenge for individuals in seeing patterns and making well-informed choices. This project aims to overcome these problems by creating a tool that streamlines the recording process, gives visual analysis, and delivers personalised suggestions. Ultimately, this tool empowers users to improve their financial management.

## **Literature Review**

Xie (2016) examines how personal finance applications may help users succeed financially via financial planning and management. The article discusses PocketGuard, Goodbudget, and Money Manager Expense & Budget. This literature analysis evaluates their pros and cons.

PocketGuard is a personal finance tool that helps users manage their budgets by offering a financial summary. Its user-friendly interface automatically categorises costs and highlights savings opportunities, making budgeting easier. PocketGuard's limited customisation possibilities might be a negative for individuals with complicated financial circumstances.

Goodbudget uses envelope budgeting to help users manage their finances by allocating monies to various categories or “envelopes”. The app's strength is encouraging disciplined spending and saving. Its cost monitoring and goal setting capabilities make it suitable for organised budgeters. Goodbudget's manual expenditure input might be time-consuming and error-prone, which may dissuade some users.

Money Manager Expense & Budget tracks expenses, plans budgets, and reports. Comprehensive financial analysis capabilities and device-wide data synchronisation are its strengths. This makes it useful for in-depth financial analysis. Unfortunately, the app's complicated design and vast capabilities may be difficult for novices to grasp.

The article emphasises how personal finance applications encourage good savings habits and provide financial information. These technologies increase budgeting and spending monitoring, but user-friendliness and customisation may restrict their efficacy. The study emphasises the need for inclusive and accessible personal finance applications that meet varied user demands to assist people make financial choices and succeed.

French et al. (2021) analyse how smartphone applications affect low-income families' financial behaviour and knowledge. The research shows how these applications may boost financial understanding, decision-making confidence, and unexpected spending management.

The article lists various benefits of low-income personal financial applications. Financial knowledge and self-confidence in financial decision-making are strengths. These applications help people defer pleasure and gain financial management. This is crucial for low-income families, for whose financial security is frequently uncertain (Munohsamy, 2015). The

applications also improve financial habits by helping users handle unexpected costs and monitor their money.

In addition, the paper highlights various shortcomings and possibilities for growth. Finance applications may be difficult to use, especially for individuals without a financial decision-making issue. The post advises targeting users with particular financial difficulties and personalising applications with push alerts to increase engagement. Adding gaming aspects to applications might also motivate people to manage their finances.

French's essay shows how personal finance applications may help low-income people improve their finances. The applications have shown great promise, but improving user engagement and personalisation and gamification might boost their usefulness. This technique may enhance low-income consumers' financial behaviour more sustainably.

Shaikh (2024) discusses how personal finance applications help people manage their finances. The report emphasises the importance of mobile applications in financial literacy and disciplined saving and investing. The article examines PocketGuard, Goodbudget, and Money Manager Expense & Budget to show how they help users succeed financially.

PocketGuard's easy UI and automatic spending categorization help consumers find savings immediately. This app's strength is its ability to show users their financial situation, encouraging smarter budgeting. Its limited customisation possibilities may not suit customers with complicated financial conditions (Lusardi, 2019).

Goodbudget uses envelope budgeting to divide cash into expenditure categories. This strategy promotes budgeting and financial discipline. The app's organised budgeting helps users manage their cash carefully. However, manually entering charges may be time-consuming and error-prone, discouraging some users.

Money Manager Expense & Budget provides precise financial reporting and device synchronisation. Its in-depth financial research makes it a great tool for those who need financial information. The app's complexity and comprehensive feature set may overwhelm newcomers and require a high learning curve.

Shaikh's paper emphasises personal finance applications' vital role in financial knowledge and discipline. These technologies improve financial management, but complexity and laborious data input may reduce their usefulness. Personal financial applications must have solid functionality and user-friendly interfaces to meet a broad variety of users' demands and preferences.

## System Design and Architecture

### High-level overview of the system architecture

A Model-View-Controller (MVC) architecture was used to build the Personal Finance Management Tool. This architecture guarantees scalability, maintainability, and separation of responsibilities (Roth, 2017). The three main parts of the system are the database, the backend, and the frontend.

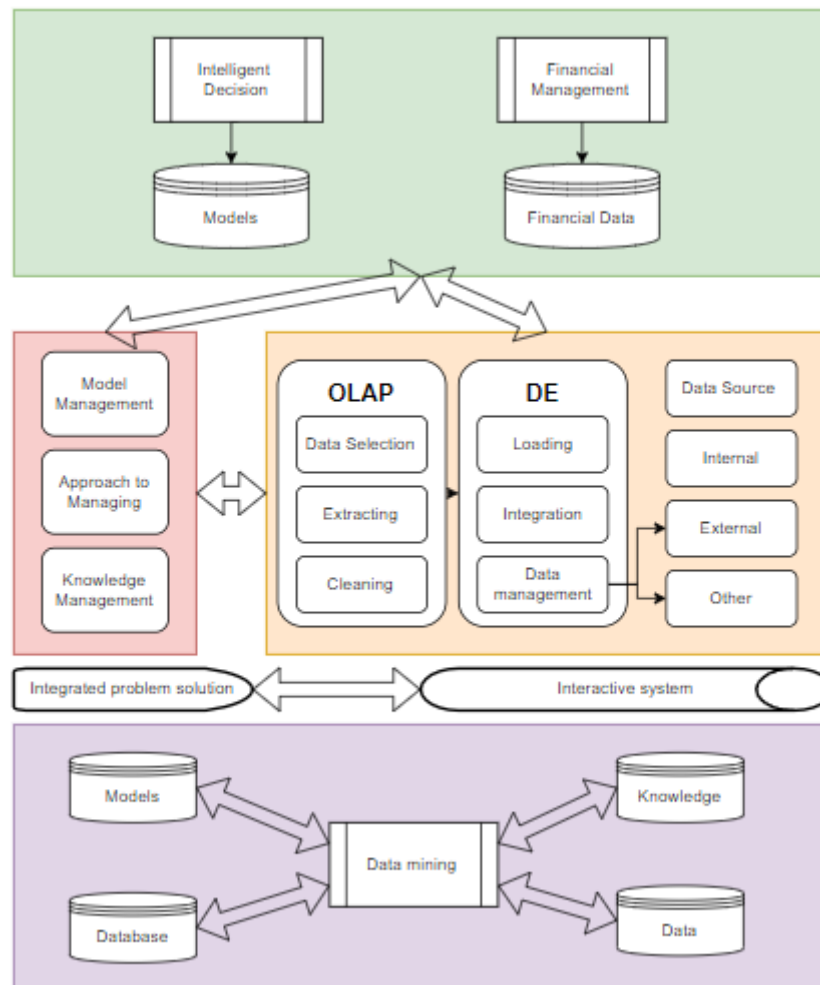


Fig 1: Diagram illustrating the architecture (e.g., MVC architecture)

### Description of each component in the system (Frontend, Backend, Database)

#### Frontend

To provide an intuitive interface, the frontend is built with JavaScript, CSS, and HTML. Users can engage with the system by entering their income, expenses, and savings objectives. The frontend receives data from the backend through HTTP requests and uses that information to

dynamically change the user interface (Salsabilla et al., 2022). Using Chart.js, users can get a bird's-eye view of their financial situation and how far they've come in reaching their goals.

## **Backend**

Flask, a lightweight web framework written in Python, is used to create the backend. As a frontend framework, Flask is responsible for processing user input and handling HTTP requests. In order to accomplish objectives, it executes the business logic, which includes tasks like determining total revenue, expenditures, and suggested monthly savings. Flask secures and personalizes user interactions by managing session data (Salsabilla et al., 2022). In response to the user's financial data, the backend computes the necessary analysis and returns the results to the frontend.

## **Database**

An Object-Relational Mapping (ORM) package for Python called SQLAlchemy is used to control the database layer. By hiding the inner workings of the database engine, SQLAlchemy facilitates communication with relational databases such as MySQL, PostgreSQL, or SQLite. Users' income, spending, savings targets, and achievements are all saved in the database. The complicated queries needed to generate financial insights are supported by this persistence layer, which also guarantees data integrity.

Users will receive practical insights and suggestions to enhance their financial well-being as a result of this architectural setup's assurance of a strong and efficient system for handling personal finances.

## **Implementation**

### **Detailed explanation of the development process**

Core elements such as income, expenses, savings goal management, and monthly analysis will be defined during requirements gathering and planning, which commences the project. The backend will be built on top of Flask, a lightweight and adaptable framework. A PostgreSQL database will be integrated with SQLAlchemy, guaranteeing efficient data storage and retrieval.

### **Technologies used (Flask, SQLAlchemy, etc.)**

Flask for the backend framework that took care of things like API development, routing, and processing requests. With SQLAlchemy's object relationship management (ORM) features,

the application's data models could connect with databases. Financial data visualization with Chart.js's straightforward charts would be a game-changer.

## **Future Work and Enhancements**

### **Potential improvements to the tool**

Improving the capacity to visualize data in order to supply more comprehensive financial insights. To improve savings tactics and foresee future spending habits, we are using machine learning algorithms for predictive analytics.

### **Additional features that can be added**

Including budgeting tools with granular category control and overspending warnings. Motivating people to maintain momentum toward their financial goals through the use of goal monitoring with notifications and milestones.

### **Scalability and deployment considerations**

To make sure the tool can easily manage more users and data, we're moving to a cloud-based architecture for scalability. Optimizing updates and ensuring dependability in various environments through the use of continuous integration and deployment (CI/CD) pipelines (Xie, 2016).

## **Conclusion**

Users now have a powerful platform at their fingertips with the Personal Finance Management Tool, which allows them to efficiently track their income, expenses, and savings goals. Users are empowered to make informed financial decisions by providing detailed analysis and practical recommendations. Users' financial literacy and planning have been greatly enhanced by the program, leading to improved budgeting, debt management, and goal attainment. Overall financial stability and well-being have been aided by its ability to increase consumer awareness and control over their resources. Going ahead, the program will be kept a vital asset in personal finance management with continual additions and updates focused on users.



## Reference

- Di Domenico, S. I., Ryan, R. M., Bradshaw, E. L., & Duineveld, J. J. (2022). Motivations for personal financial management: A Self-Determination Theory perspective. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.977818>
- Salsabilla, S. I., Tubastuvi, N., Purnadi, P., & Innayah, M. N. (2022). Factors Affecting Personal Financial Management. *Jurnal Manajemen Bisnis*, 13(1), 168–184. <https://doi.org/10.18196/mb.v13i1.13489>
- Munohsamy, T. (2015). Personal Financial Management. *ResearchGate*. [https://www.researchgate.net/publication/279198054\\_Personal\\_Financial\\_Management](https://www.researchgate.net/publication/279198054_Personal_Financial_Management)
- Lusardi, A. (2019). Financial literacy and the need for financial education: evidence and implications. *Zeitschrift Für Schweizerische Statistik Und Volkswirtschaft/Schweizerische Zeitschrift Für Volkswirtschaft Und Statistik/Swiss Journal of Economics and Statistics*, 155(1). <https://doi.org/10.1186/s41937-019-0027-5>
- Kaiser, T., & Lusardi, A. (2024). Financial Literacy and Financial Education: An Overview. *ResearchGate*. [https://www.researchgate.net/publication/380029514\\_Financial\\_Literacy\\_and\\_Financial\\_Education\\_An\\_Overview](https://www.researchgate.net/publication/380029514_Financial_Literacy_and_Financial_Education_An_Overview)
- Roth, R. (2017). *User Interface and User Experience (UI/UX) Design*. 2017(Q2). <https://doi.org/10.22224/gistbok/2017.2.5>
- Hui, S. L. T., & See, S. L. (2015). Enhancing User Experience Through Customisation of UI Design. *Procedia Manufacturing*, 3, 1932–1937. <https://doi.org/10.1016/j.promfg.2015.07.237>
- Xie, Y. (2016). The Design and Implementation of Personal Finance Management System Based on Android. *Advances in Computer Science Research*. <https://doi.org/10.2991/iccsae-15.2016.118>
- French, D., McKillop, D., & Stewart, E. (2021). Personal finance apps and low-income households. *Strategic Change*, 30(4), 367–375. <https://doi.org/10.1002/jsc.2430>
- Shaikh, H. B. (2024). Personal Finance Management Apps: Empowering Individuals for Financial Success. *International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)*. <https://ijarsct.co.in/Paper16622.pdf>