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Wealthwise: AI companion for financial management

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Abstract

Despite living in a digital transformation era, managing personal finance is still a tough nut for many people to crack. We describe an AI-based personal finance assistant, which is a web approach that automates and simplifies financial management tasks. With real-time budget tracking, intelligent expense monitoring, and personalized financial recommendations, the system helps customers achieve financial stability and independence. Deployed using Flask for the backend, and SQL Alchemy for interacting with the database, all front end code was written using HTML, CSS and jQuery to provide for a seamless user experience. Important features include budget creation, real-time notifications, savings goal tracking, and data visualizations. Examples include suggestions based on insights that businesses learn from AI, track behaviour patterns and ultimately process the deal with additional recommendations to further improve efficiency, making it a new-age toolbox of sorts for financial management for users on the go.

Keyword: AI-enhanced budget management, savings optimization, personalized finance and expense tracking

1. Introduction

But how well do you know and manage it and also understand the tools available, which are often are not given to you in school. Amidst rising living costs and increasingly complex financial products, the opportunity to provide smart tools that assist in everyday finance decisions is growing. In this paper, we present an artificial intelligent based personal finance assistant to help a user with the budget management, analysis of expenditure and savings out in a web based natural and more automated interface.

2. Literature review

Most personal finance analysis has been static budgeting or manual tracking. There are finance management applications like Mint and YNAB, but they do not have adaptive intelligence. And new advances in both AIs and behavioural analytics have opened the door for customized financial advice. However, our project extends these innovations through the incorporation of AI to understand user behaviour and provide contextual suggestions.

3. Materials and Methods

The development of WealthWise involved the use of several open-source technologies and frameworks that allowed for rapid prototyping and deployment. Below are the specific materials and methods used to ensure the system is functional, scalable, and reproducible by other researchers or developers.

3.1 Tools and Technologies

- **Programming Language:** Python 3.10
- **Framework:** Flask - chosen for its simplicity and flexibility in building lightweight web applications.
- **Database:** SQLite (via SQL Alchemy ORM) - selected for its easy integration with Flask and low setup overhead.
- **Frontend Technologies:** HTML5, CSS3, JavaScript, and jQuery - used for building responsive and interactive user interfaces.

- **Libraries and APIs**
- **JWT (JSON Web Token):** For secure user authentication.
- **Chart.js:** For rendering real-time visual analytics (pie charts, bar graphs).
- **Flask-Mail:** For automated email alerts to users regarding budget thresholds.

3.2 System Architecture

The application follows a Model-View-Controller (MVC) architecture. The Model manages database operations, the View handles presentation, and the Controller facilitates interaction between the two through user input. User data is collected via web forms, stored securely in the SQLite database, and processed by backend algorithms that analyze spending behavior. All routes and business logic are handled through Flask's routing mechanism.

3.3 Experimental Setup

The system was tested on a local development server with the following specifications:

- **Processor:** Intel i5, 8th Gen.
- **RAM:** 8 GB.
- **Operating System:** Windows 11.
- **Browser Compatibility:** Tested on Google Chrome, Mozilla Firefox, and Microsoft Edge.

4. System design and approach

Proposed System: The proposed system is a full stack web application which has the following architecture:

4.1 Frontend

4.1.1 Technologies Used: HTML5, CSS3, JavaScript

The features of Budget App include Interactive Dashboards, Responsive Design, and Visualization components for monitoring expenses and savings goals.

4.2 Backend

- **Framework:** Flask (Python)
- **Database:** SQL Alchemy (with SQLite as the back store)
- **Functionality:** User authentication (JWT), secure data handling, budget calculations, AI processing logic.

4.3 AI Component

The AI module assesses historical spending behaviour through rule-based logic and learning algorithms to provide tailored recommendations, identify areas of overspending, and devise saving strategies.

5. Features and implementation

5.1 Budget Management

Users can input monthly income and then budget for various categories like groceries, utilities, entertainment and savings.

5.2 Recording Expenses and Notifications

A central component of an expense tracking app is to record expenses, either manually or automatically categorized. The assistant sends alerts when spending approaches or exceeds budgeted amounts

5.3 Savings Goal Tracker

Users are able to establish savings goals and monitor them through visual indicators and motivational prompts.

5.4 Real-Time Insights

Users get an insight into their financial behaviour and highlights to improve it through graphical representation.

6. Results and Discussion

Early testing revealed strong user engagement and positive budgeting behaviour. "Users reported higher awareness of how, where and when they spent their money. The AI suggestions were perceived as useful in identifying wasteful spending and promoting savings. The visual components-like pie charts and progress bars-were especially effective in helping users quickly understand where their money was going.

7. Conclusion and future scope

We propose an AI-based intelligent personal finance assistant that improves financial literacy and preparation in this paper. It could also be integrated to provide automatic fetching of statistics from bank APIs in the future, predictive analysis on the data, and investment tracking.

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