T₹ACK – A Finance Tracker Flask Application

A PROJECT REPORT

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BONAFIDE CERTIFICATE

Certified that this project report titled **"T₹ACK – A Finance Tracker Flask Application"** is the bonafide work of **"Alok Raj Dwivedi [RA2311003030217]", "Parth Luthra [RA2311003030222]", "Navneet Singh [RA2311003030216]",** who carried out the project work under my supervision. Certified further, that to the best of my knowledge, the work reported herein does not form part of any other project report.

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ABSTRACT

In today's fast-paced world, managing personal finances efficiently is essential for maintaining financial stability. **T₹ACK** is a user-friendly personal finance management application designed to help users monitor their **income and expenses**, keep track of their **current balance**, and set **financial goals** effectively.

The application features a simple and intuitive interface built using **Flask**, ensuring ease of use for all users, regardless of their technical expertise. **T₹ACK** allows users to log their **income and expenses**, view **detailed financial statements**, and gain insights into their **spending habits** through analytics and visual representations.
All financial data is securely stored using **Sqlite3**, ensuring data integrity and accessibility for reviewing past transactions. Additionally, the application includes **secure user authentication**, enabling users to protect their financial records with a login system.
By offering a streamlined solution for **budgeting and expense tracking**, **T₹ACK** empowers users to make informed financial decisions, develop better financial habits, and achieve long-term financial stability.

INTRODUCTION

Managing personal finances is an essential task for individuals and families. The **Finance** Tracker is a web application developed using **Flask**, designed to help users efficiently track their income and expenses in a secure and organized manner. The application enables users to register and authenticate their accounts, manage financial transactions, and gain insightful analytics to understand their spending habits better.

This project aims to provide a structured, interactive, and easy-to-use platform that simplifies financial tracking. Users can access visual insights into their financial data, making it easier to set budgets, track expenses, and analyze spending patterns. The platform supports multiple transaction types, allowing users to manage personal budgets efficiently. The **Finance Tracker** provides a foundation for better financial awareness and planning.

The purpose of **T₹ACK** is to empower users with a tool that helpsthem maintain control over their finances, promoting better financialhabits, and ultimately enhancing their financial well-being. This introduction to **T₹ACK** outlines the goals, features, and significance of the application in today's financially driven society.

Literature Survey

Evolution of Personal Finance Management Applications

Personal finance management applications have evolved to help individuals and households track and manage their financial activities. The demand for these tools has increased due to the rise in digital transactions, the complexity of modern financial systems, and the emphasis on financial literacy. In this literature survey, we explore existing technologies, methodologies, and applications that have influenced the development of T₹ACK.

Existing Financial Management Tools

Several applications such as Mint, YNAB (You Need A Budget), and PocketGuard have been widely used for personal finance management. These platforms provide features like budgeting, expense tracking, and financial forecasting by syncing with users' bank accounts to categorize transactions automatically.

However, these applications present certain limitations:

Privacy Concerns – Many apps require users to link bank accounts, raising concerns about data security.

Complexity – Advanced features can make these platforms overwhelming for users seeking only basic expense tracking.

Subscription Costs – Many free-tier applications restrict core features behind paywalls.

The inspiration for T₹ACK came from the need for a simplified, accessible, and privacy-focused financial tracking tool. Unlike cloud-based applications, T₹ACK provides a secure and user-friendly interface without requiring external data storage.

User-Centered Design in Personal Finance Applications

A crucial aspect of financial tools is a user-friendly interface. Research by Beresford et al. (2019) highlights the importance of a minimalist design in financial applications to reduce cognitive load and improve engagement.

To meet this need, T₹ACK has been developed with a simple and interactive UI using Flask, ensuring users can log transactions, track balances, and view insights effortlessly. The application allows users to filter transactions, view spending trends, and categorize expenses for a better financial overview.

Financial Literacy and Application Development

Studies by Lusardi and Mitchell (2017) indicate that financial literacy plays a key role in effective money management. Many individuals struggle with budgeting and tracking expenses, requiring intuitive tools that assist without being overly complex.

T₹ACK helps users gain better control of their finances by providing clear spending insights and financial summaries. Instead of complex features, the application emphasizes categorization, visualization, and financial awareness to foster better financial habits.

Local Storage for Data Security

Privacy concerns in financial applications have led users to prefer local storage solutions over cloud-based systems. Many financial apps store sensitive data externally, increasing the risk of security breaches.

To mitigate this risk, T₹ACK uses Sqlite3, a lightweight database that stores all financial data locally on the user's device. This ensures data security and privacy, allowing users to manage their finances without third-party access.

Technology in Financial Management

Technologies such as Python and Sqlite3 are widely used for personal finance applications due to their efficiency, security, and simplicity. Research supports the use of Flask for backend operations and Sqlite3 for lightweight storage, making them ideal for local and secure financial applications.

By leveraging these technologies, T₹ACK provides fast performance, ease of use, and secure financial management, offering an efficient alternative to cloud-based financial apps.

Summary

The analysis of existing financial applications, UI design principles, financial literacy research, and local storage technology has shaped the development of T₹ACK. By focusing on privacy, simplicity, and usability, T₹ACK provides an accessible alternative to complex financial management tools.

With a user-friendly interface, local data storage, and intuitive financial insights, T₹ACK empowers users to track their finances securely and efficiently, fostering better financial habits and long-term stability.

Technology Used

This section outlines the various technologies and tools used in the development of T₹ACK. Each technology was chosen based on its functionality, compatibility, and efficiency in fulfilling the project's objectives, such as local data storage, a secure and user-friendly interface, and smooth performance. Below is a detailed overview of the technologies that form the foundation of T₹ACK.

Python (Backend Development)

Python is an interpreted, high-level, and general-purpose programming language known for its simplicity and versatility. Python was selected for T₹ACK due to the following advantages:

Ease of Use – Python's clean and readable syntax allows for rapid development and easy debugging.

Rich Library Support – Python offers extensive libraries for database management, web frameworks, and data visualization, essential for T₹ACK.

Cross-Platform Compatibility – Python applications can run on Windows, macOS, and Linux, ensuring T₹ACK is accessible to a wide range of users.

Flask (Web Framework)

Flask, a lightweight and flexible Python web framework, was used for developing T₹ACK's backend due to its:

Minimalist Design – Flask provides essential tools without unnecessary overhead, making it ideal for a simple and efficient finance tracker.

Scalability – It allows future enhancements, such as budget planning and multi-user support, without requiring a complete system overhaul.

Integration Support – Flask seamlessly integrates with databases, authentication systems, and visualization libraries.

Sqlite3 (Database Management)

Sqlite3 is a serverless, lightweight, and self-contained database engine used in T₹ACK for local data storage. Key reasons for choosing Sqlite3 include:

Local Storage – Unlike cloud-based solutions, Sqlite3 stores all financial data securely on the user's device, ensuring privacy and security.

Ease of Use – Sqlite3 requires minimal configuration and is easy to integrate with Flask, making database management seamless.

Performance – For a personal finance tracker, Sqlite3 provides fast and efficient data handling, ensuring smooth performance.

Bootstrap & HTML/CSS (Frontend Development)

For the frontend, Bootstrap, HTML, and CSS were used to create a responsive and user-friendly interface.

Bootstrap ensures a modern, mobile-friendly UI, allowing users to access T₹ACK on desktops, tablets, and smartphones.

CSS enables custom themes, such as dark mode, improving user experience.

Interactive UI components like transaction filters and charts were designed for easy financial visualization.

Chart.js (Data Visualization)

Chart.js, a JavaScript library, was used to generate interactive financial charts and reports in T₹ACK.

Visual Insights – Displays monthly spending trends, income-expense comparisons, and category-based breakdowns.

User Engagement – Interactive charts help users understand financial habits and make informed decisions.

Git (Version Control System)

Git, a distributed version control system, was used in T₹ACK development to:

Track Code Changes – Ensures efficient management of different project versions.

Facilitate Collaboration – Supports multiple developers in case of future enhancements.

Backup and Security – Prevents accidental loss of code and maintains a structured development process.

IMPLEMENTATION

The implementation phase focuses on converting the theoretical design of **T₹ACK** into a fully functional software application. This chapter describes the development process, the architecture, andthe individual components of the system. Each aspect of the implementation plays a crucial role in providing a seamless user experience and ensuring that the application fulfills its intended functions.

System Architecture

Financial The architecture of **T₹ACK** is based on a modular structure, where each component handles a specific set of functionalities, ensuring flexibility, scalability, and ease of maintenance. The system is divided into three main layers:

- **Presentation Layer (User Interface)**: This layer is responsible for the interaction between the user and the system. It uses **React** to create a graphical interface that allows users to inputtheir financial data, view budgets, and track expenses.
- **Logic Layer (Application Logic)**: The logic layer contains the core functionality of **T₹ACK**. It processes user inputs, manages financial data, and generates the required outputs like expense breakdowns and reports. This layer also handles the integration of the **Cryptohopper API** for investment tracking and advice.
- **Data Layer (Database Management)**: This layer uses **Sqlite3** for storing all financial information, including user profiles, transactions, budgets, and investment data. The database is designed to be lightweight, yet efficient in handling financial records securely.

User Interface Design

The user interface (UI) was designed to be simple and intuitive, ensuring that users of all technical backgrounds can easily manage their finances. The key elements of the UI include:

- **Dashboard**: Upon logging in, the user is presented with an overview of their financial health. The dashboard provides a summary of monthly expenses, savings, and budget status. Users can also see their investment performance if integrated with the **Cryptohopper API**.

- **Expense Tracker**: Users can input their daily expenses into different categories such as food, transportation, utilities, etc. This feature automatically updates the budget calculations and shows the remaining balance for each category.
- **Budget Planner**: Users can set a monthly or weekly budget for each category. **T₹ACK** will alert the user if they are nearing or exceeding their budget limits.
- **Graphs and Reports**: Using **Matplotlib**, the application generates visual representations such as pie charts and bar graphs to show users where their money is being spent. Users can export these reports as Excel files for detailed analysis.

Data Management and Storage

Data management is a critical part of **T₹ACK**, as it involves storing and retrieving user data such as expenses, budgets, and investments. **Sqlite3** was used to manage this data securely andefficiently. The database schema consists of the following tables:

- **Users Table**: Stores user details such as username, password (hashed for security), and email.
- **Expenses Table**: Contains records of user expenses categorized by date, category, amount, and payment method.
- **Budget Table**: Stores user-defined budget limits for each expense category and tracks current expenditure against those limits.
- **Investment Table**: If the user opts to track investments, this table stores information retrieved from the **Cryptohopper API** regarding cryptocurrency investments, their value, and transaction history.

Expense Tracking and Budgeting

The core functionality of **T₹ACK** is the ability to track expensesand create budgets. Below are the steps involved in the implementation of this feature:

1. **Expense Input**: Users can input their expenses manually via the user interface. The form includes fields for date, category, amount, and payment method.

2. **Data Validation**: The application performs basic validation to ensure correct data entry, such as checking for non-numeric values in the amount field and ensuring that the date is valid.

3. **Data Storage**: Once the expense is validated, it is stored in the **Expenses Table** of the Sqlite3 database.

4. **Budget Calculation**: The application checks the **Budget Table** to see the limit set by the user for each category. It then calculates how much has been spent so far and updates the balance. Alerts are triggered when the user exceeds the budget.

FUTURE SCOPE

The future development of **T₹ACK – A Personal Finance Manager** holds significant potential to further enhance its functionality and user experience. As technology advances and user needs evolve, several key areas can be explored to broaden the app's capabilities:

1. **T₹ACK Advanced AI for Personalized Financial Planning:** Building on the AI module, future updates could incorporate more sophisticated machine learning algorithms to offer deeper financial insights, long-term budgeting, and custom investment strategies based on individual spending habits, life goals, and risk tolerance. The app could act as a virtual financial advisor, recommending savings plans, retirement goals, and optimal investment portfolios.
2. **Multi-Currency and International Support:** With the app's potential for global adoption, adding support for multiple currencies and international financial systems would allow users to manage their finances across borders. Features like automatic currency conversion and tax compliance guidance could be valuable for frequent travelers or expatriates.
3. **Integration with Cryptocurrency:** As cryptocurrency continues to gain traction, future versions of **T₹ACK** could include features for tracking, managing, and even investing in digital currencies. Users would be able to view their cryptocurrency portfolios alongside traditional investments and receive AI-driven insights into market trends.
4. **Enhanced Security and Privacy:** Given the sensitive nature of financial data, future iterations could focus on enhancing security measures such as biometric authentication, end-to-end encryption, and secure cloud backup options to ensure users' data remains safe from breaches and unauthorized access.
5. **Gamification and Rewards:** To motivate users to engage more with their finances, gamification elements could be introduced. For example, users could earn rewards, badges, or even cash-back offers for achieving savings goals, staying within budgets, or successfully following investment recommendations.
6. **Collaboration and Shared Financial Goals: T₹ACK** could introduce features for collaborative financial management, enabling users to set and track shared budgets and goals with

family members, roommates, or partners. This would be especially useful for managing joint expenses and savings goals.

By expanding these features and staying in tune with emerging financial technologies, **T₹ACK** has the potential to become a comprehensive, all-in-one financial management tool, empowering users not just to manage their money, but to grow and optimize their wealth efficiently.

Conclusion

The Finance Tracker Flask application serves as an essential tool for individuals looking to manage their personal finances efficiently. By offering secure authentication, an intuitive interface, transaction tracking, and insightful analytics, users can gain a better understanding of their financial habits.

Future enhancements may include features such as:

Budget Planning: Users can set budget goals and receive alerts when exceeding limits.

Financial Goal Tracking: Setting and monitoring long-term financial goals.

Integration with External Services: Connecting bank accounts for automatic transaction imports.

Multi-user Support: Enabling family or shared financial tracking options.

With these features, the Finance Tracker can evolve into a comprehensive personal finance management tool that empowers users to make smarter financial decisions.

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