International Journal of Scientific Research and Engineering Development-– Volume 9 Issue 2, Mar-Apr 2026
Available at www.ijsred.com

RESEARCH ARTICLE OPEN ACCESS

Smart Personal Expenses Tracker

Shrungi Sarode[1], Vaishnavi Raut[2], Shravani Ajmire[3], Soniya Yeole[4], Prof M.R. Joshi[5]
[1234]Undergraduate Student, Department of Information Technology Shree H.V.P.M. COET, Amravati (MH, 27)
rautvaishnavi2425@gmail.com, ajmireshravani@gmail.com

----------**********----------

Abstract :

In today's fast-moving digital environment, individuals perform numerous financial transactions on a daily basis, often without maintaining a consistent record of their expenses. Over time, this leads to a lack of financial awareness and difficulty in managing budgets effectively. Although several expense management applications exist, many are either overly complex, require paid access, or involve integration with sensitive financial data, which discourages users from adopting them regularly.This paper presents a Smart Personal Expense Tracker, a web-based application developed to provide a simple, secure, and efficient solution for managing personal finances. The system allows users to record income and expenses, organize transactions into categories, and monitor their financial activities over different time periods. It eliminates the need for manual recordkeeping by offering a structured and user friendly interface for tracking daily expenses. To enhance usability and insight, the application generates weekly, monthly, and yearly reports that present categorywise summaries of user spending. and make informed decisions. Additionally, the system includes an emailbased verification mechanism to ensure secure user authentication, along with the ability to send generated reports directly to the user's registered email for convenient access. The application is implemented using Spring Boot for backend development, JavaScript for interactive user interfaces, and MySQL for data management. Overall, the proposed system provides a practical and reliable approach to expense tracking, combining simplicity, security, and meaningful analysis to support better financial management. Expense Tracking, Personal Finance Management, Email Verification, Application, Spring Boot, MySQL. Category-wise Reporting, Web

INTRODUCTION:

In recent years, the rapid growth of digital payment systems and online transactions has significantly changed the way individuals manage their finances. Despite this advancement, personal expense tracking remains a neglected activity for many users. Most individuals either rely on memory or maintain informal records, which often leads to inaccurate tracking and poor financial decision-making. Although several digital solutions are available, they are frequently associated with complexities such as difficult user interfaces, subscription-based access, or the requirement to link sensitive banking information, which raises concerns regarding privacy and security.

To address these issues, this paper presents a Smart Personal Expense Tracker, a web based application designed to provide a simple, secure, and accessible solution for managing daily financial activities. The system enables users to record their income and expenses, categorize

transactions, and visualize their financial data in an organized manner. By focusing on usability, the application ensures that users with minimal technical knowledge can effectively manage their expenses without difficulty.

A key aspect of the proposed system is its emphasis on security and user data protection. Instead of integrating directly with external financial services, the application employs controlled authentication mechanisms, including email-based verification and secure password handling. This approach minimizes the risk associated with exposing sensitive financial information while maintaining system reliability and user trust.

In addition to basic expense tracking, the system incorporates automated reporting features that provide insights into user

spending behaviour. Users can generate weekly, monthly, and yearly reports that categorize expenses based on predefined types such as food, travel, and shopping. These reports not only assist in understanding financial patterns but can also be shared via email for convenient access and record maintenance.

The proposed solution aims to bridge the gap between simplicity and functionality by offering a lightweight yet effective expense management tool. By combining secure authentication, structured data management, and automated reporting, the system supports users in improving financial awareness and making informed decisions in their daily lives

Overall, the Smart Personal Expense Tracker provides a comprehensive yet simple solution for personal financial management. By addressing the limitations of existing systems and focusing on user-centric design, the application successfully delivers a balance between functionality, security, and ease of use. This makes it a practical and valuable tool for individuals aiming to achieve better financial discipline and awareness.

LITERATURE REVIEW

Research on personal finance management systems has gained significant attention in recent years due to the increasing need for effective expense tracking and budgeting tools. With the rapid growth of digital transactions and online payment systems, individuals require efficient solutions to monitor their financial activities and improve spending habits. Various applications and research studies have contributed to this domain by proposing different approaches to expense tracking, financial visualization, and secure data management.

One of the widely recognized applications in this field is Mint, which provides automated expense tracking by linking directly to users' bank accounts. Mint uses transaction data to categorize expenses and generate real-time financial insights. While this approach improves convenience and reduces manual effort, it introduces significant concerns regarding data privacy and security, as users must share sensitive banking information with third-party services. This limitation highlights the need for systems that can function independently without requiring access to confidential financial data.Another important contribution in this domain is YNAB (You Need A Budget), which focuses on proactive budgeting rather than simple expense tracking. YNAB encourages users to allocate their income into predefined categories, promoting disciplined financial planning. Although this approach is effective in improving financial awareness, the application follows a subscriptionbased model, which limits its accessibility. Furthermore, the system requires consistent user input, making it less suitable for individuals who prefer automated or lowmaintenance solutions.Open-source tools such as GnuCash have also been extensively

studied for personal finance management. GnuCash offers advanced features including double-entry accounting, detailed financial reports, and transaction tracking. Despite its powerful capabilities, the system suffers from usability challenges, particularly for users without accounting knowledge. Its complex interface and technical design reduce its adoption among general users. Similarly, Firefly III, a self-hosted expense tracking system, provides flexibility and customization but requires technical expertise for installation and maintenance. This makes it less practical for nontechnical users, even though it ensures better control over personal data.In addition to these applications, several research studies have proposed web-based and mobile-based expense tracking systems that aim to improve usability and accessibility. These systems typically include features such as income and expense management, categorization of transactions, and graphical data visualization. Visualization tools such as pie charts, bar graphs, and dashboards play a crucial role in helping users understand their spending patterns. Studies suggest that visual representation of financial data improves decision-making and allows users to identify unnecessary expenses more effectively.Recent developments in this area have focused on the use of modern web technologies and secure frameworks for building scalable and efficient systems. Technologies such as Spring Boot and MySQL are commonly used to develop backend services and manage financial data. Security mechanisms including password encryption, session management, and authentication systems are implemented to protect user information from unauthorized access. These advancements address some of the major concerns related to data security in expense tracking applications.Despite these improvements, existing systems still face several limitations. Many applications rely heavily on manual data entry, which can be repetitive and error-prone. Additionally, dependence on third-party services for automation reduces user control over personal financial data. Some systems prioritize functionality but compromise on simplicity, while others focus on ease of use but lack advanced features. This imbalance creates a gap between user expectations and system performance.A common trend observed in the literature is the lack of a balanced approach that integrates usability, security, and cost-effectiveness in a single system. While commercial applications provide advanced features, they often require paid subscriptions or access to sensitive data. On the other hand, opensource solutions offer flexibility but lack user-friendly interfaces. Therefore, there is a need for a system that combines the advantages of both approaches while minimizing their limitations.

The proposed Smart Personal Expense Tracker system is designed to address these challenges by providing a secure, userfriendly, and independent solution for managing personal finances. Unlike existing systems, it does not require integration with external financial services, ensuring better privacy and data control. By combining efficient data management, visualization techniques, and secure authentication mechanisms, the system aims to provide a practical and reliable solution for everyday financial tracking.

METHODOLOGY

1. System Overview

The proposed system, Smart Personal Expense Tracker, is a web-based application developed to assist users in managing and analyzing their financial activities. The system is designed using a modular approach, where each component is responsible for a specific functionality such as user authentication, transaction management, and report generation. A layered architecture is adopted to ensure scalability, maintainability, and secure data handling.

2. Development Approach

The system is developed using an Agile development methodology, enabling incremental implementation and continuous refinement of features. Each module, including authentication, transaction processing, and reporting, is designed, implemented, and tested independently before integration. This approach supports early error detection, adaptability to changes, and incorporation of user feedback during development. **3. System Architecture**

The application follows the Model-ViewController (MVC) architecture to separate concerns and improve system organization. **Model Layer:**

Represents the data and business logic of the system, including user information, transaction details, and expense categories. **View Layer:**

Provides the user interface through template-based web pages, allowing users to interact with the system for managing transactions and viewing reports.

Controller Layer:

Handles incoming user requests, processes input data, interacts with the service layer, and returns appropriate responses to the view.

4. Data Collection Method

The system collects financial data primarily through manual user input, where users enter transaction details such as amount, category, date, and description.

Additionally, the system design allows for future enhancement through automated data extraction methods, such as parsing transaction notifications.

5. Data Processing and Storage

User input data is validated and processed through the service layer before being stored in the database. The system applies categorization and business rules to ensure consistency and accuracy. Data is stored in a structured relational database, maintaining separate records for users, transactions, and categories.

6. Authentication and Security

Security is an essential aspect of the system design. The application includes a secure user authentication mechanism with emailbased verification to validate user identity. Passwords are encrypted before storage, and session management techniques are used to maintain secure access. These measures ensure confidentiality and integrity of user financial data.

7. Transaction Management Module

This module manages all expense-related operations, including adding, updating, deleting, and categorizing transactions. Each transaction is associated with a specific user, ensuring personalized data management and accurate tracking. **8. Reporting and Analysis**

The system provides analytical features to help users understand their financial behavior. It generates weekly, monthly, and yearly reports, presenting category-wise summaries of expenses. These reports can be displayed in structured formats and further shared via email for user convenience.

9. System Workflow

The overall workflow of the system is as follows:

Users register and verify their email, log into the system, and record their financial transactions. The system validates and stores the data, categorizes expenses, and generates

reports for analysis based on user-selected time periods.

10. Testing Strategy

The system is tested using multiple testing approaches to ensure reliability and performance. Unit testing is performed to validate individual components, integration testing ensures proper interaction between modules, and user testing evaluates system usability and functionality.

11. Tools and Technologies Used

The system is developed using a Java-based backend framework, template-based frontend technologies, and a relational database system. Security is implemented using authentication and encryption mechanisms to protect user data.

12. Limitations and Future Scope

The current system relies primarily on manual data entry and supports limited automation in transaction capture. Future enhancements may include automated data extraction, advanced analytics, and mobile application integration to improve accessibility and functionality

System Architecture

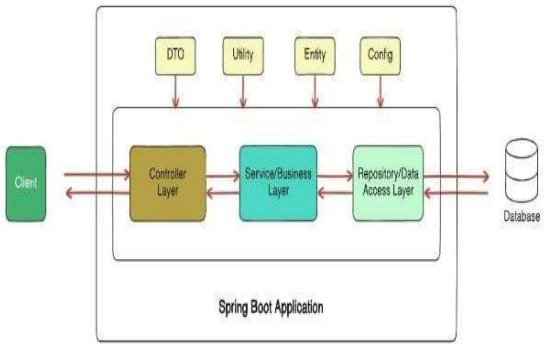


Figure 1: System Architecture of Smart Expense Tracker

The Smart Personal Expense Tracker follows a **three-tier architecture**, consisting of the presentation layer, application layer, and data layer. This design ensures scalability, maintainability, and clear separation of concerns.

The **presentation layer** is developed using JavaScript and provides an interactive user interface through which users can register, log in, and manage their financial records. It communicates with the backend using HTTP requests and displays the processed data in a structured format.

The **application layer** is implemented using Spring Boot, which handles all business logic and system operations. This layer processes user inputs, validates data, manages expense categories, and generates financial reports. It also manages secure authentication through an email verification mechanism, ensuring that only authorized users can access the system.

The **data layer** uses MySQL for storing user information, transaction records, and categorized expense data. The backend communicates with the database using structured queries to perform operations such as insertion, updating, and retrieval of financial data.

The overall workflow begins when a user interacts with the frontend interface. The request is sent to the backend server, where it is processed and validated. The required data is then fetched from or stored in the database, and the response is sent back to the user interface. Additionally, the system integrates an email service to send verification links and financial reports directly to the user's registered email.

ER Diagram

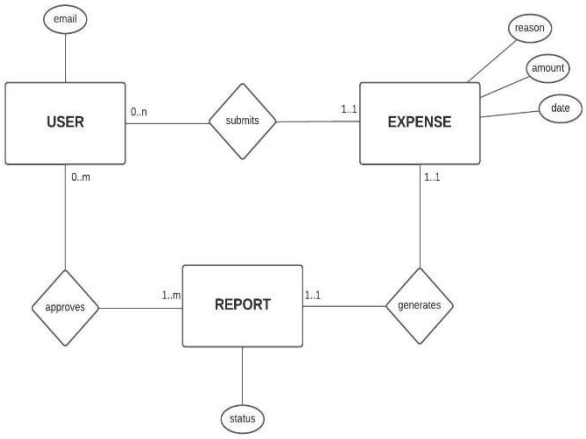


Figure 2: ER Diagram of Smart Expense Tracker

The ER diagram of the Smart Personal Expense Tracker represents the structure of the database and the relationships between different entities in the system.

The primary entity in the system is the **User**, which stores user-related information such as user ID, name, email, and password. Each user can have multiple financial transactions recorded in the system.

The **Expense** entity stores details of individual transactions, including expense ID, amount, date, description, and type (income or expense). Each expense is associated with a specific user, forming a **one-to-many relationship** between User and Expense.

The **Category** entity is used to classify expenses into different groups such as food, travel, bills, and entertainment. Each expense belongs to one category, while a

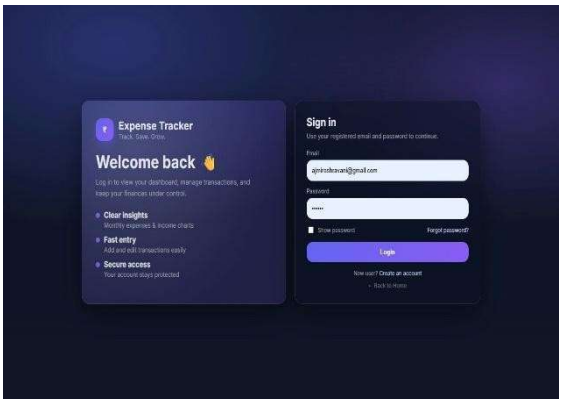
category can contain multiple expenses, forming another **one-to-many relationship** between Category and Expense.

Additionally, an optional **Report** entity can be included to represent generated summaries such as weekly or monthly reports. These reports are derived from expense data and linked to the respective user.

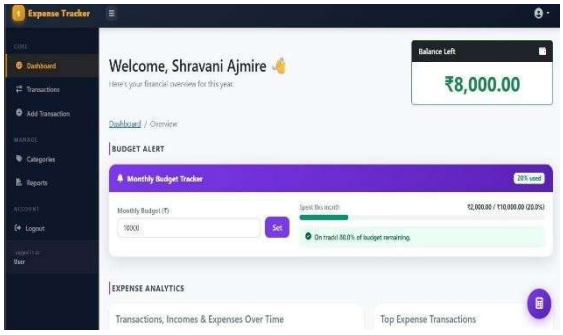
Result and Discussion

The Smart Personal Expense Tracker was successfully developed and tested as a webbased application aimed at simplifying personal financial management. The system performed reliably across all core functionalities, including user registration, secure login with email verification, expense recording, and report generation. Users were able to add, update, and categorize their transactions without difficulty, indicating that the interface design is intuitive and user-friendly.

During testing, the application demonstrated efficient handling of financial data. The integration of MySQL ensured that transaction records were stored and retrieved accurately, even when handling multiple entries over extended periods. The categorization feature proved particularly useful, as it allowed users to clearly distinguish between different types of expenses such as food, travel, bills, and entertainment. This helped in organizing data in a meaningful way.



One of the key outcomes of the system is its reporting capability. The generated weekly, monthly, and yearly summaries provided clear insights into spending habits. Users were able to identify patterns, such as frequent overspending in certain categories, which may otherwise go unnoticed. The visual and structured format of these reports made financial analysis easier, even for users without a technical or financial background.



The email verification feature enhanced system security by ensuring that only authenticated users could access their data. Additionally, the option to send reports directly to the user's email improved accessibility and convenience. This feature was especially helpful for users who wanted to review their financial summaries without logging into the system repeatedly.

Compared to existing expense tracking solutions, the proposed system offers a balanced approach between simplicity and functionality. Many available applications either require complex configurations or raise privacy concerns due to deep integration with bank accounts. In contrast, this system avoids direct financial data linking, thereby increasing user trust and encouraging consistent usage.

However, there are certain limitations that can be addressed in future improvements. For example, the current system relies on manual entry of transactions, which may be time-consuming for some users.
Incorporating features such as automated expense detection or mobile application support could further enhance usability. Additionally, adding data visualization tools like graphs and charts could provide even deeper insights into spending behavior.

Overall, the Smart Personal Expense Tracker achieved its objective of providing a simple, secure, and effective platform for managing personal finances. The results indicate that the system can help users develop better financial awareness and make informed budgeting decisions, making it a practical tool for everyday use.

Conclusion

The Smart Personal Expense Tracker provides a practical and efficient solution for managing personal financial activities in a structured manner. The system simplifies expense tracking by offering an intuitive interface, secure authentication with email verification, and organized storage of financial data. By incorporating categorywise reporting on weekly, monthly, and yearly bases, the application enables users to gain clear insights into their spending patterns and make informed financial decisions.

The integration of email-based report sharing further enhances the usability of the system by allowing users to access their financial summaries conveniently. Unlike many existing solutions, the proposed system maintains a balance between simplicity, security, and functionality without requiring access to sensitive banking information.

Overall, the application demonstrates how modern web technologies can be effectively utilized to build a reliable and user-friendly financial management tool. With potential future enhancements such as automated transaction detection and advanced analytics, the system can be further extended to provide a more intelligent and comprehensive expense tracking solution.

ACKNOWLEDGMENT

We thank our guide and Head of Department for guidance throughout the project.

References :

- http://www.appbrain.com/app/expensemanager/ com.expensemanager
- S. A. Sabab, S. S. Islam, M. J. Rana and M. Hossain, "eExpense: A Smart Approach to Track Everyday Expense," 2018 4th International Conference on Electrical Engineering and Information & Communication Technology (iCEEiCT), Dhaka, Bangladesh, 2018, pp. 136-141, doi: 10.1109/CEEICT.2018.8628070.
- Engineering Association of Palestine. Current Engineering Statistics Book. Ramallah; 2005
- Adepegba, Oluwafunmilola & Fayemiwo, Michael & Oduwole, Oludayo & Onamade, A.A. (2019). An Android Based Mobile Application for Tracking Daily Expenses. 10.22624/AIMS/iSTEAMS2019/V21N1P9.
- ANDROID (Operating System) https://en.wikipedia.org/wiki/Android_(operating_system) Tamia Ruvimbo Masendu1*, Aanajey Mani Tripath, May 2022, Daily Expense T Tracker,InternationalJournal of Research inEngineering, Science and Management,5(5), pp.90-92
- Abishek Hagawane, 2Roshan Gopalghare, 3Prathmesh Isawe, 4Mrunal Aware, 07 June 2022, DailyExpense Tracker, International Journal of Scientific Research in Computer Science, Engineering andInformationTechnology, 8(3), pp. 265-268.
- Velmurugan.R, Mrs. P. Usha2, March 2021, Expense Tracker Application, INTERNATIONALJOURNAL OF INNOVATIVE RESEARCH INTECHNOLOGY,7(10), pp.191-194.
- Shivam Mehra, Prabhat Parashar 2021 Daily Expense Tracker, International Journal of Research inEngineering and Science (IJRES),Volume 09(12), pp. 70-73.
- N.ZahiraJahan, K. I.Vinodhini, 2016 Personalized Expense Managing Assistant Using Android,International Journal of Computer Technique, Volume 3(2) pp. 60-67.
- Darsh Shah,Sanay Shah,Ritik Savani, Dr. Bhavesh Patel,Ashwini Deshmukh, 2021, Application for Predictive Recommendation and Visualization of Personal Expenses, Journal of Emerging Technologiesand Innovative Research (JETIR), 8(3) pp.2196- 2201.
- S. Chandini1, T. Poojitha2, D. Ranjith3, V.J. Mohammed Akram4, M.S Vani5, V.Rajyalakshmi, Mar2019, Online Income and Expense Tracker,International Research Journal of Engineering andTechnology (IRJET), 6(3), pp.4119-4124.
- P. Thanapal , Mohammed Yaseen Patel, T.P. Lokesh Raj and J. Satheesh Kumar, 2015. Income and Expense Tracker, Indian Journal of Science and Technology (IJST), 8(S2), pp 118– 122.
- M. Harish Kumar, G.P. Shree Harini, D. Thenmullai, 2022. Application for Tracking Personal Expense,International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE),11(S4), pp 863-866.
- Ram Kumar Sharma, Shwetank Pandey, Vaibhav Tripathi, Sonam Gupta, Neha kumari, 2021. Expense Tracker, International Journal of All Research Education and Scientific Methods(IJARESM), 9(S6), pp. 3166-3170.

- Prof Miriam Thomas, Lakshmi P, and Dr. Mahalekshmi T,2020 sept, Expense Tracker, InternationalJournal of Advanced Research inScience, Communication and Technology(IJARSCT), 9(4), pp.5-9 • ATIYA KAZI1, PRAPHULLA S. KHERADE2, RAJ S. VILANKAR3, PARAG M.SAWANT, MAY2021, Expense Tracker, ICONIC RESEARCH AND ENGINEERINGJOURNALS, 4(11), pp.19-21.
- Aman Garg, Mukul Goel, Sagar Mittal, Mr. Shekhar Singh4, Apr 2021, Expense Tracker, International Journal for Research in Applied Science & Engineering Technology (IJRASET),9(IV), pp.1067-1070.
- Uday Pratap Singh, Aakash Kumar Gupta, Dr Balamurugan,2021 April, Spending Tracker, TurkishJournal of Computer andMathematics Education, 12(6), pp.5095-5103.
- Nidhi Jitendra Jadhav*1, Rutuja VijayChakor*2, Trupti Mahesh Gunjal*3,Damayanti. D. Pawar*, April-2022, EXPENSE TRACKER, International Research Journal of Modernization in EngineeringTechnology and Science(IRJMETS),4(4), pp.1676-1679

