FINVIZOR: A USER-CENTRIC FINANCIAL STATEMENT ANALYSIS SYSTEM

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Abstract : The increasing adoption of digital banking has resulted in the widespread generation of personal financial data in the form of bank statements. Although these statements provide accurate and comprehensive transaction records, they are commonly delivered in Portable Document Format (PDF), which limits interpretability for non-technical users. Understanding spending behavior, budget utilization, and financial patterns from raw transaction lists remains a challenge for many individuals. This paper presents FinVizor, a user-centric financial statement analysis system designed to transform unstructured bank statement PDFs into structured, visual, and actionable financial insights. FinVizor enables users to upload bank statements, securely unlock password-protected documents, define a monthly budget, and analyze categorized spending using intuitive charts and dashboards. Unlike traditional financial tools that rely on continuous tracking or long-term historical comparisons, FinVizor focuses on single-statement analysis to deliver immediate clarity and usability. The system emphasizes simplicity, privacy, and visualization-driven design, thereby reducing cognitive load and supporting informed financial decision-making.

Index Terms—FinTech, Bank Statement Analysis, Data Visualization, Personal Finance, User-Centric Design

I. INTRODUCTION

Digital banking systems have transformed the way individuals access and manage their financial information. Banks routinely provide customers with detailed bank statements that document transactions over a specific time period. While these statements ensure transparency and accountability, they are often presented in a text-heavy and unstructured format that is difficult for users to interpret.

Bank statements are typically delivered in PDF format and contain extensive transactional details such as dates, descriptions, debit and credit amounts, and account balances. Extracting meaningful insights from such data requires manual effort and financial literacy, which many users lack. As a result, users frequently fail to identify spending patterns, unnecessary expenses, and budget inefficiencies.

Existing personal finance applications attempt to address these challenges through automated expense tracking and budgeting mechanisms. However, many of these solutions depend on continuous bank integrations, long-term data accumulation, or complex setup processes, which may raise privacy concerns and reduce accessibility.

FinVizor is proposed as a lightweight and user-centric solution that prioritizes clarity, privacy, and immediate usability. By focusing on the analysis of a single uploaded bank statement, FinVizor delivers actionable insights through visual dashboards without requiring long-term data storage or advanced financial knowledge.

II. LITERATURE REVIEW

Prior research in financial technology emphasizes the role of data visualization in improving user comprehension of complex numerical data. Visualization techniques such as bar charts, pie charts, and summary dashboards enable users to identify patterns and anomalies more effectively than traditional tabular representations.

Several personal finance systems focus on predictive analytics and long-term transaction tracking. While effective for experienced users, these systems often introduce information overload for individuals seeking quick insights. Studies indicate that excessive features and dense analytics can negatively impact user engagement and comprehension.

Privacy and data security remain critical concerns in financial applications. Solutions that require continuous access to banking data may discourage users who prefer maintaining control over their financial information. The reviewed literature reveals a lack of tools that combine privacy-conscious design with visualization-driven analysis.

FinVizor addresses these gaps by offering a focused financial analysis system that operates on single bank statements and emphasizes visual clarity, privacy, and ease of use.

III. RESEARCH METHODOLOGY
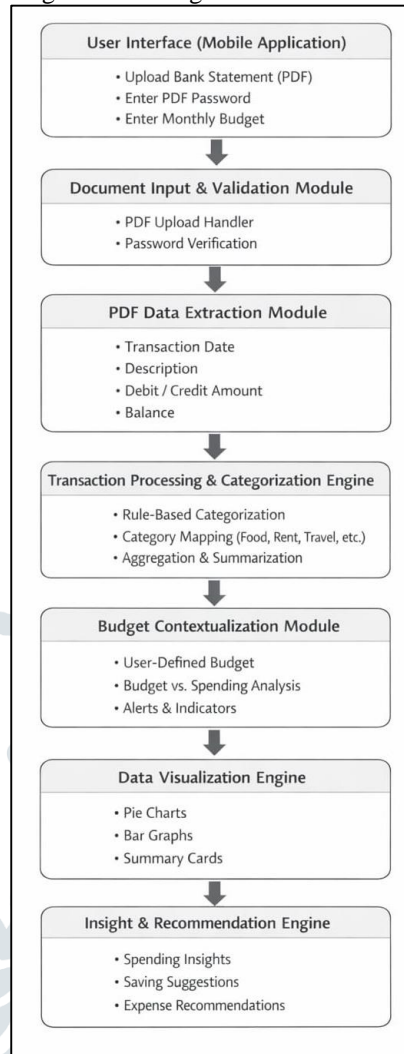
Figure 1: the High-level architecture

Figure 1 illustrates the high-level architecture of the FinVizor system, highlighting the flow of data from user input to insight presentation.

The methodology employed in FinVizor is designed to convert unstructured bank statement data into structured and meaningful insights through a sequence of clearly defined processing stages. The system architecture follows a modular approach to ensure scalability, maintainability, and efficient data flow.

The process begins with the user uploading a bank statement PDF. If the document is password protected, secure verification is performed prior to data extraction. Transaction data is then parsed, categorized, and aggregated. User-defined budget information is incorporated to contextualize spending behavior. Finally, visualization and insight generation modules present the results through intuitive dashboards.

Figure 1 illustrates the high-level architecture of the FinVizor system, highlighting the flow of data from user input to insight presentation.

IV. RESULTS AND DISCUSSION

The implementation of FinVizor demonstrates the effectiveness of visualization-driven financial analysis in improving user understanding of bank statement data. The system successfully transforms raw transaction records into structured visual summaries that highlight spending behavior and budget utilization.
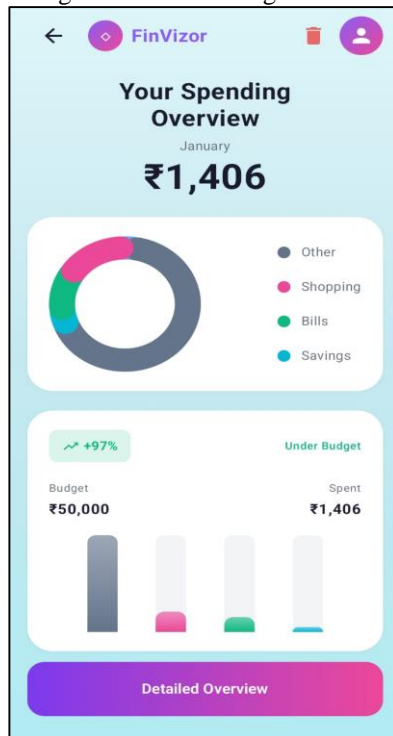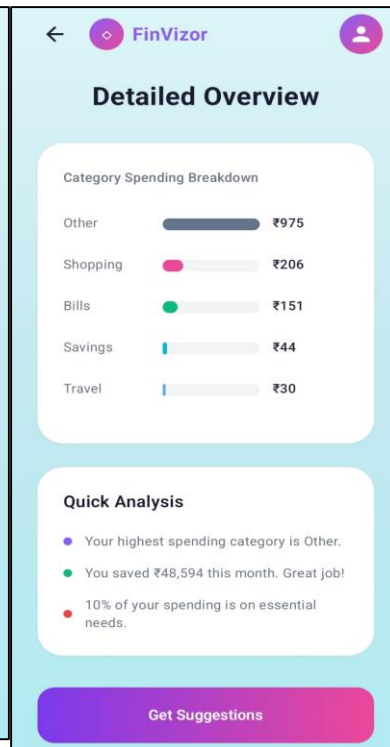

Figure 2: Spending Overview   Figure 3: Detailed Spending overview

Figure 2 illustrates the Spending Overview screen of FinVizor, highlighting how aggregated data is visually represented for quick comprehension.

The Spending Overview dashboard provides a high-level summary of total expenditure and category-wise distribution, enabling users to quickly identify dominant expense categories.

Figure 3: Detailed Spending overview

The Detailed Charts screen facilitates deeper analysis through comparative bar charts, while the Get Suggestions screen presents actionable insights in clear and concise language also there is a convenient profile and user account screen.
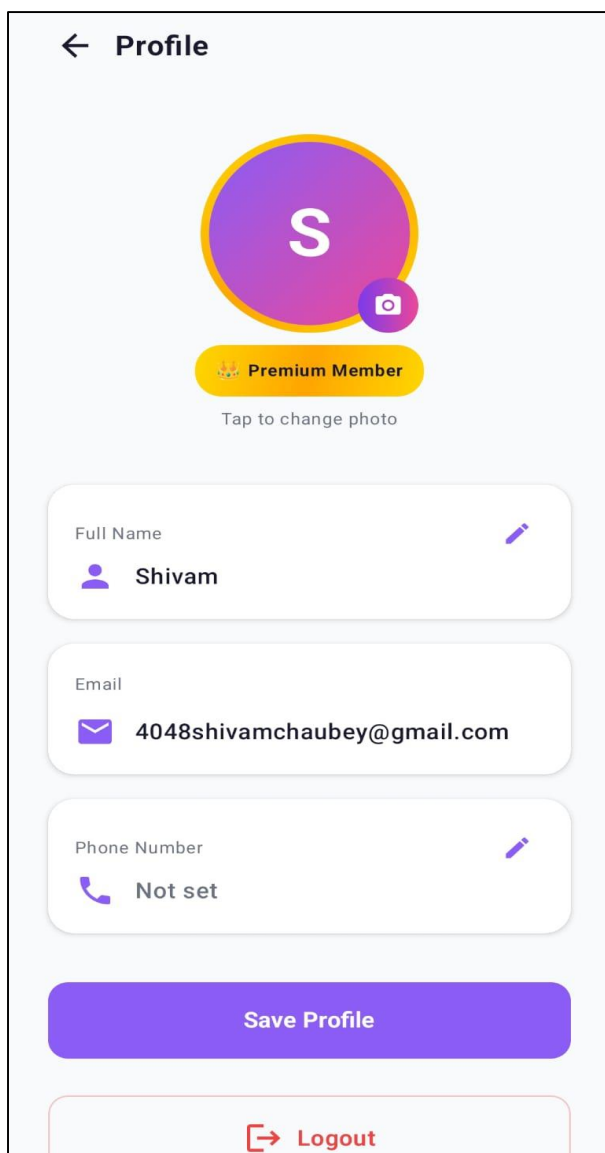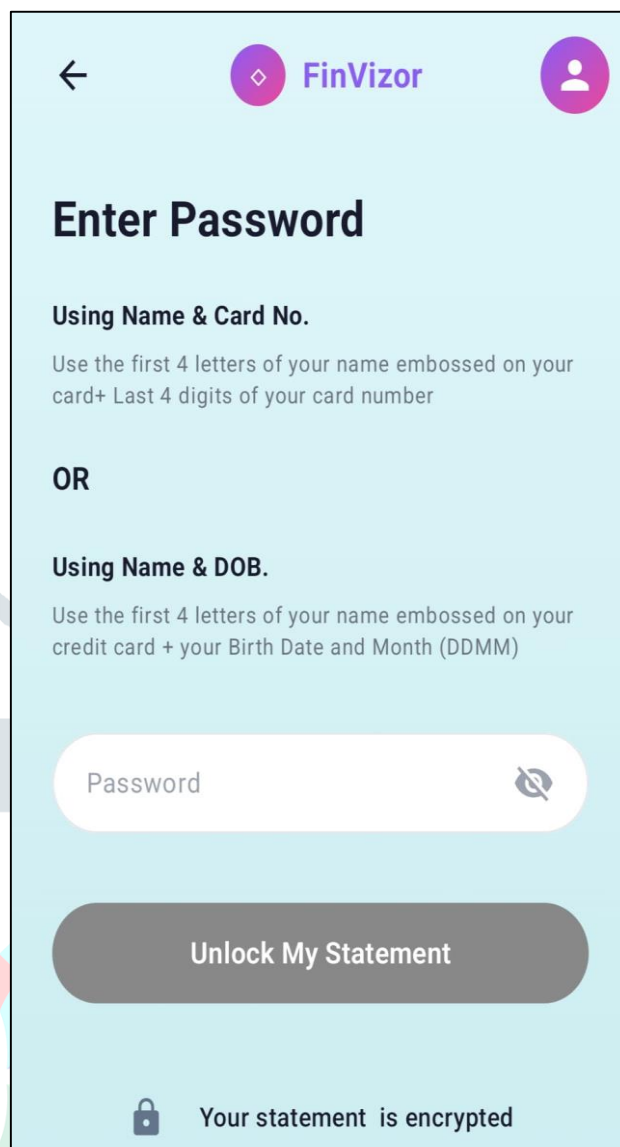
Figure 4: Profile screen   Figure 5: Password Verification

Figure 4 illustrates the Profile screen design of FinVizor

The FinVizor application includes a Profile screen that provides users with access to their account details and basic credentials. This screen displays essential user information such as the full name, registered phone number, and email address, enabling identity verification and enhancing user trust.

A logout option is provided to ensure secure session management, allowing users to safely exit the application when required. The Profile screen supports personalization and security by offering users clear visibility and control over their account information.

Figure 5: Illustrates Bank Statement Password Verification

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A logout option is provided to ensure secure session management, allowing users to safely exit the application when required. The Profile screen supports personalization and security by offering users clear visibility and control over their account information.

FinVizor supports secure processing of password-protected bank statement files. When a user uploads a protected PDF, the system prompts for the corresponding password before initiating data extraction. This ensures that sensitive financial information is accessed only with user authorization.
The password verification process is performed locally and is not stored after document processing, thereby preserving data privacy and security. This mechanism enables FinVizor to handle encrypted bank statements while maintaining user trust and compliance with standard security practices.

V. CONCLUSION

This paper presented FinVizor, a user-centric financial statement analysis system designed to simplify the interpretation of bank statement data. By emphasizing visualization, usability, and privacy, FinVizor enables users to understand their financial behavior without complex analytical models.

The findings demonstrate that meaningful financial insights can be derived from a single bank statement, highlighting the value of visualization-driven approaches in personal finance applications.

VI. FUTURE SCOPE

Future enhancements to FinVizor may include support for multiple bank statements to enable trend analysis, machine learning-based categorization for improved accuracy, and integration with banking APIs for real-time financial monitoring.

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