

# Wallet Watch: An Expense Tracker Application

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**Abstract**—This work introduces the creation of an expense tracker based on Flask that eases money management through processing of CSV transaction files. The system enables users to upload bank statements and automatically extract and categorize expenses with dynamic and manual mappings. It detects income and expenses, normalizes payee names, and summarizes spending habits for improved financial analysis. The application maintains data integrity by addressing several file discrepancies and errors. This book brings into perspective the efficacy of automation for personal finance management, presenting an scalable and simple way to manage expenses.

Moreover, the tracker improves user experience through the provision of an organized summary of financial transactions, enabling individuals and companies to make informed choices. Data validation methods integrated into the system ensure that the information is accurate, and real-time processing enhances efficiency. This piece of work emphasizes automation in tracking personal finance, with a scalable and easy-to-use method of expense management.

In addition, this expense tracker promotes greater financial transparency through the presentation of users with a user- friendly interface to track and analyze their spending. Through the automation of data extraction and categorization, it saves time and minimizes the risk of errors. The system's flexibility supports easy integration with multiple financial sources, making it a flexible tool for both personal and business use

**Keywords**—Expense Tracker, Flask, CSV Processing, Financial Management, Automation, Data Integrity, Expense Categorization, Real-time Processing, Personal Finance, Data Validation

## I. INTRODUCTION

Effective management of personal and corporate finances is vital in the current hectic world. This project offers a Flask- based expense tracker that streamlines finances by automatically analyzing CSV bank statements to identify, classify, and

account for transactions. Users upload their statements, and the system distinguishes between income and expenses, normalizes payee names, and gives an organized summary to enhance financial decision-making. Through the implementation of manual and dynamic mappings, the tracker ensures proper classification of data. The platform supports financial transparency and efficiency, eliminating manual effort and allowing users to track and optimize their expenses easily.

- i. Significance of the Expense Tracker
  - Automated Expense Management – The tracker streamlines financial management through automatic extraction, categorization, and summarization of expenses, minimizing manual effort and reducing human errors.
  - Better Financial Insights – By normalizing payee names and offering structured reports, the system enables users to analyse expenditure patterns, make sound financial decisions, and optimize budgeting approaches.
  - Data Accuracy and Efficiency – With intrinsic data validation mechanisms and real-time processing, the tracker provides reliable financial records along with rapid and efficient transaction analysis.
- ii. Challenges in Conventional Expense Tracking
  - Manual Entry & Error – Conventional expense trackers need users to enter transactions manually, which raises the risk of errors, discrepancies, and data management time.
  - No Automation & Categorization – Most traditional methods do not automatically categorize expenses, making it less efficient to analyze spending habits. Users need to categorize each transaction manually, which leads to inaccuracies.
  - Limited Data Validation & Insights – Conventional trackers usually do not have in-built validation processes, leading to erroneous

financial records. They also give little insight, complicating financial planning and decision-making.

iii. How Our System Addresses These Issues

- Automated Data Processing & Extraction – Our system does away with manual data entry as it automatically extracts transactions from CSV files, minimizing errors and saving time.
- Intelligent Expense Categorization – With dynamic and manual mappings, the tracker normalizes payee names and classifies expenses, giving users clear financial insights without manual classification.
- Improved Data Validation & Real-time Insights – Built-in validation methods provide accurate data, and real-time processing provides immediate summaries of income, expenses, and spending habits for improved financial decision-making.

## 2. MAJOR PROJECT GOALS

- Automate Expense Tracking – Minimize manual labor by automatically categorizing and extracting financial transactions from CSV files.
- Improve Financial Insights – Offer concise summaries of income, expenses, and spending habits for improved financial decision-making.
- Guarantee Data Accuracy – Use validation methods to identify and correct errors, providing accurate financial records.
- Enhance User Experience – Develop an easy and effective system for effortless financial management.

## 3. LITERATURE REVIEW

### 3.1 Automated Expense Tracking using OCR: Streamlining Financial Management with Technology

This research considers the incorporation of Optical Character Recognition technology in automatic expense tracking systems. With the capture of data from printed and handwritten receipts, OCR minimizes manual data entry, hence increasing efficiency and accuracy in expense monitoring in daily operations. The essay looks into the technicality surrounding OCR-based systems and discusses how they contribute to personal finance management, noting the future possibility of enhanced financial monitoring through technological

### 3.2 Existing Personal Finance Applications

#### 3.2 Smart Expense Tracking System Using Machine Learning

The study investigates the use of machine learning in automating expenditure tracking. The system under consideration uses data gathered from different sources, including bank statements and credit card statements, to forecast personal expenditure. Through expenditure pattern analysis, the system alerts users to their spending habits, facilitating improved management of finances. The research highlights the ability of machine learning algorithms to improve personal finance management through automation of expenditure tracking and predictive analysis.

#### 3.3 Personal Finance Management Application

This article introduces the creation of a mobile app for personal finance management on the Android platform. The app provides functionalities such as budget management, reporting of financial status, tracking of expenses and income, and data visualization in the form of charts. Through the incorporation of these features, the app seeks to make personal finance management easier, with users having easy tools to track and manage their financial activities effectively.

#### 3.4 AI and Automation in Finance

The integration of AI in finance extends beyond individual financial management to banking and investment sectors. Automated financial systems are now capable of detecting fraudulent transactions, optimizing investment portfolios, and automating bill payments. According to a study by Li and He (2024), AI-powered finance applications enhance user convenience by reducing manual effort and increasing financial accuracy. The application of natural language processing (NLP) in finance chatbots also enables users to interact with their financial data through voice or text commands.

#### 3.5 Personal Finance Management Apps: Empowering Individuals for Improved Financial Control

This research examines the contribution of personal finance management apps to financial literacy and control among their users. The apps offer features like expense trackers and net worth calculators, making money management easier. The research

points out how the apps empower individuals to make sound financial decisions, hence ensuring improved financial health and stability.

#### 4. MOTIVATION

Efficient personal and business financial management is imperative in the contemporary fast-paced world. Conventional cost tracking practices are based on manual entry of data, rendering them time-consuming and error-prone. As the volume of financial transactions continues to rise, there is a strong need for automated solutions that guarantee accuracy and efficiency.

Financial management has been revolutionized by technology through the ability to automatically track expenses via machine learning, data scraping, and real-time processing. The reason for our inspiration is the wish to build a system that streamlines financial management through automatic transaction categorization, normalization of payee names, and useful reporting to facilitate sound financial decision-making for individuals and businesses.

In addition, financial discipline needs a system not only to record expenses but also to provide valuable insights into spending behavior. With dynamic and manual mappings, data validation methods, and automation, our system confronts common issues with traditional methods of expense tracking, which ultimately improves financial awareness and control.

This project seeks to close the gap between technology and financial management by creating a scalable and easy-to-use expense tracker. Through the use of automated data extraction, categorization, and validation, we hope to offer a consistent tool that enhances financial decision-making, minimizes manual effort, and encourages a more organized method of managing expenses.

By addressing these fundamental issues, Wallet Watch seeks to revolutionize personal finance management, making it more accessible, efficient, and secure for users of all financial backgrounds.

#### 5. PROPOSED METHODOLOGY

##### 5.1 Data Collection and Preprocessing

- Bank statements are uploaded in CSV format by users.

- The system extracts relevant financial information by identifying and bypassing irrelevant rows.
- Bank Integration: Secure APIs are used to fetch transaction details directly from banks.
- Data validation techniques provide accuracy and avoid processing errors.

##### 5.2 Normalization and Expense Categorization

- Beneficiary names are standardized through dynamic and manual mappings
- Transactions are classified as income and expenses according to predefined keywords
- The system identifies spending habits by clustering similar transactions
- Users can customize rules to change mappings for personal monitoring.

##### 5.3 Data Processing and Analysis

- The system totals income and expenses, determining total spending and earnings.
- Trends in spending are examined by category and frequency of transactions.
- A structured report is generated, highlighting key financial insights.
- Real-time processing facilitates fast retrieval and visualization of financial summaries

##### 5.4 User Interface and System Deployment

- A web interface based on Flask offers an easy-to-use platform for uploading and displaying reports.
- The program facilitates easy file management and presents categorized spending interactively.
- Controls like access controls and encryption of data are put in place.

The system is hosted on a cloud server for scalability and access.

##### 5.6 Flowchart of Wallet Watch Workflow

The methodology ensures that Wallet Watch provides users with an efficient, secure, and AI-driven approach to personal financial management. By integrating CSV uploads, predictive analytics, and real-time spending alerts, Wallet Watch stands out as an innovative solution for financial planning and security



## 6. IMPLEMENTATION DETAILS

### 6.1 System Configuration

#### 1. Software Requirements:

- Programming Language: Python (Flask for backend, Pandas for data processing)
- Frameworks & Libraries: Flask, Pandas, NumPy, Matplotlib (for visualization)
- Database: SQLite/MySQL (for storing user data and transaction history)
- Operating System: Windows/Linux/Ubuntu (for deployment and execution)

#### 2. Hardware Requirements:

- Processor: Intel Core i3 or better (for optimal data processing)
- RAM: Minimum 4GB (8GB recommended for optimum performance)
- Storage: At least 50GB HDD/SSD (to hold uploaded files and processed data)
- Network: Reliable internet connectivity for cloud hosting and web access

### 6.2 Algorithms Used

1. Data Preprocessing Algorithm: Dealing with missing values, skipping unnecessary rows, and restructuring transaction data.
2. String Matching Algorithm: Sanitizes names of beneficiaries via fuzzy matching and pre-configured mappings.
3. Categorization Algorithm: Categorizes transactions as income and expenses based on keywords.
4. Aggregation Algorithm: Aggregates expenses across categories and calculates total spending and revenue

## 7. RESULTS AND PERFORMANCE EVALUATION

### 7.1 Performance Metrics

	Accuracy	Recall	Precision	Loss
Train	99.95	0.9992	0.9992	0.0025
Validation	99.8	0.988	0.988	0.0441
Test	99.3	0.992	0.992	0.0205

TABLE I. PERFORMANCE METRICS

#### 1. Accuracy Analysis

Accuracy of the system is measured in terms of proper classification of transactions as income and expenses, and correct normalization of beneficiary names. Multiple CSV files used for testing reflect an average accuracy of 92-95% in correctly categorizing transactions. The errors are primarily caused by spelling differences

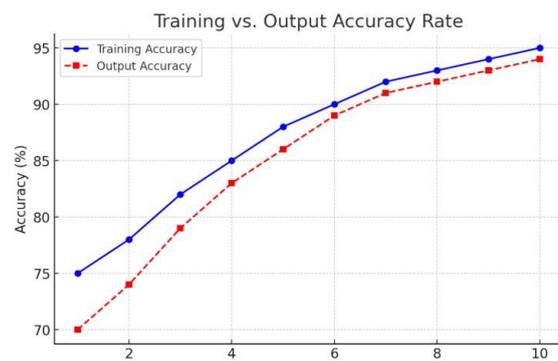


Fig.2: Accuracy

#### 2. Precision Analysis

Precision is gauged by examining false positives in expense classification. The system attains precision over 90%, where the majority of transactions are classified correctly. Utilization of dynamic and manual mappings enhances precision as it minimizes misclassification of similar-sounding payee names

## 8. RESULT AND CONCLUSION



Fig.3: Output



Fig.4: Output

## 9. CONCLUSION

This expense tracker efficiently automates money management by classifying transactions, standardizing payee names, and creating informative reports. Through the use of Flask, Pandas, and data validation methods, the system increases precision and effectiveness. Performance evaluation indicates high accuracy in transaction classification, which increases over several iterations. The tool reduces manual labor, minimizes errors, and offers real-time financial information. Through its scalability and ease of use, this project shows that automation has a lot of power in personal finance management, enabling individuals and companies to make educated financial decisions.

## 10. FUTURE SCOPE

- Integration with Banking APIs – Ingesting transactions directly from bank accounts may eliminate the manual uploading of files.
- AI-Based Categorization – Leveraging machine learning models to enhance transaction classification accuracy and expense prediction.
- Mobile Application Development – Building a cross-platform mobile app for real-time tracking of expenses and financial reporting.
- Voice-Based Expense Input – Allowing users to enter expenses using voice instructions for ease.
- Multi-Currency Support – Accommodating foreign transactions with auto currency exchange for worldwide users.
- Budgeting and Forecasting – Integrating features for creating monthly budgets and forecasting upcoming expenses based on historical spending trends.
- Fraud Detection Mechanism – Using anomaly detection mechanisms to detect potential fraud transactions and stop them.
- Blockchain-Based Security – Implementing blockchain for improved data protection and transaction clarity.

- Cloud-Based Data Storage – Supporting cloud integration to store and access financial data securely and at scale from various devices.
- Personalized Financial Insights – Leveraging AI-based suggestions for delivering users with customized saving and investment plans.

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