



# Smart Expense Tracking and Tax Estimation Web Application

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**Abstract:** Manual techniques for monitoring the personal finances, which comprise income, expenditure, and budget, are many. Because of such manual techniques, high operational time and efficiency errors are generated. In order to tackle all the above challenges of manual operations. A smart expenses tracking and tax estimation web app is proposed in this project. Users will be able to safely store their income and expenses data which also comprises tax percentage and several other features of total expenses amount and savings. The web app is to be developed using Angular JS as Frontend Technology. Spring Boot as backend and MySQL database. Other features that will be implemented in this web application are the receipts of expenses will be scanned through Optional Character Recognition (OCR) or otherwise, allows the users to input information regarding their expenses via voice command. The web application will enable giving a monthly, yearly budget, giving the spending pattern, giving alerts or notification when the budget limit has exceeded, the other features, apart from what has already mentioned, will be the estimation of taxes on expenses, based on the expenses carried out, through category filtering, via pictorial form.

**Index Terms:** Personal Finance Management, Expense Recording, OCR Technology, Voice Commands, Budget Warnings, estimation of Taxes.

## I. INTRODUCTION

It is very difficult to control personal finances because of rising living expenses, financial commitments, and multivariable income sources. Since financial data is not complete, underrated, and broken, it is very difficult to analyze expenditure, tax liabilities. As a result of improper financial handling, there arise issues of low savings, clarity in tax liabilities, and overspending. This counts for saving data into spreadsheets, which involves more human effort and data integrity. This proposed web application is helpful for efficient financial management with increased transparency and accuracy. This application helps in automatically calculating expenses, savings, and budget details by using real-time financial data. It also supports better handling of personal finance activities by providing features such as expense tracking, OCR-based receipt scanning, voice-based input, budget alerts, and basic tax calculation. The main purpose of this system is to reduce the difficulties faced in traditional manual financial management. The proposed system allows users to enter data, enter income, expenses, and savings information securely while producing a financial overview. In addition, the system is linked to receipt scanning functionality via OCR technology and voice recognition functionality where users can enter information immediately. Lastly, it is linked to alerting budgets, simplified tax calculation, and report analysis.

## II. LITERATURE REVIEW

Kritika, Himani, and Shikha (2022) have proposed XPEN, a voice-based expense tracking web application with the integration of a Voice User Interface that reduces manual work [1]. Users will add their expenses by speaking instead of typing, hence making it faster and easier to do. It also visually represents clear reports of income and expenses on a day-to-day, week-to-week, month-to-month basis.

Sabab et al. (2018) developed an automated expense-tracking system, eExpense, that can automatically read information from shopping receipts using Optical Character Recognition [2]. This system will reduce manual entry for the user and/or keep financial records more accurate. However, this system works perfectly in situations when the quality of receipts is good. Poor lighting, unclear text, or different receipt formats can decrease the accuracy of the data extracted from receipts.



Begany et al. (2015) investigated the difference in user interactions between voice and text-based user interfaces [3]. Their findings revealed that voice interfaces have the potential to make applications more usable and quicker, especially in simple tasks and on mobile platforms. However, they also indicated a very important aspect: accurate speech recognition and correct interpretation of voice commands are extremely crucial for the sake of gaining and retaining users' trust and satisfaction.

Various speech-based interaction methods have been investigated for Voice User Interfaces by Zhang et al. (2020) [4]. In their work, the researchers explained that voice-based applications give better results when appropriate language-processing techniques are used. They highlighted that smooth interaction depends mainly on how well the system understands what the user wants to communicate. At the same time, their study was focused only on voice interaction and did not cover areas related to financial data analysis or tax calculation.

To assist people in keeping track of their income, expenses, and savings, Smith and Kumar developed a simple online tool [5]. According to their research, users can more easily maintain the organization of their financial information when they use a web application. Nevertheless, the system was restricted to basic operations and lacked features like voice-based expense entry, receipt scanning, and comprehensive tax computations.

Most earlier projects used voice input, receipt scanning, and some simple web tools for managing expenses. These concepts ease the work of a user and thus are very rudimentary. The important modules involved in proper financial analysis and tax calculations are rarely found, and hence, this project has concentrated on enhancing those aspects for practical purposes, are all safely stored in MySQL. System security, scalability, and ease of maintenance are all enhanced by this tiered structure.

### III. METHODOLOGY

The suggested system takes a modular approach and emphasises user convenience to make tax estimation and expense tracking easy and useful. System design, data management, feature implementation, logical processing, and result generation are all covered by the methodology. The application increases the accuracy of financial data and minimizes manual labour by utilizing voice input, receipt scanning, and contemporary web technologies.

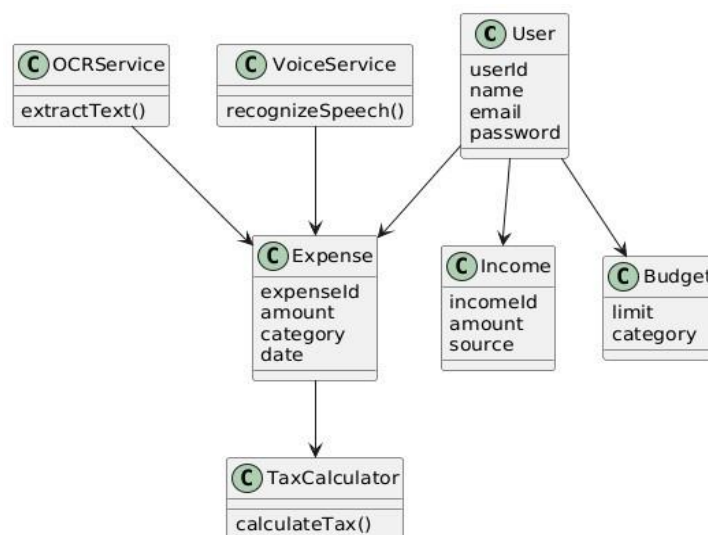


Fig. 1: System Architecture

#### A. System Design

To assist people in keeping track of their income, expenses, and savings, Smith and Kumar developed a simple online tool [5]. According to their research, users can more easily maintain the organization of their financial information when they use a web application. Nevertheless, the system was restricted to basic operations and lacked features like voice-based expense entry, receipt scanning, and comprehensive tax computations. The front end, back end, and database are all maintained as distinct layers in this web-based application. Angular is used in the development of the user interface to guarantee an interactive and responsive experience. On the server side, Spring Boot is used to handle data handling, user authentication, authorization, and application logic. User information, income and expense records, and tax-related data



### B. Data Collection and Storage

Data about income and expenses can be entered by the user in three different ways. This involves manual filling of the information, scanning and uploading income and expense invoices, and voice recording. Each of these involves basic details such as amount, type, date, and description. Before the information is saved, it is validated to prevent mistakes and/or null values. User login capability prevents personal financial information from being accessed by unauthorized users.

### C. Receipt Scanning and OCR Processing

The system cuts manual work by using inbuilt OCR technology to read receipt images. Users can click pictures of their receipts, and the system automatically picks important pieces of information such as the amount transacted and the date of the transaction. This is then sorted and added to the expense records, making the entire process a lot faster and less prone to errors.

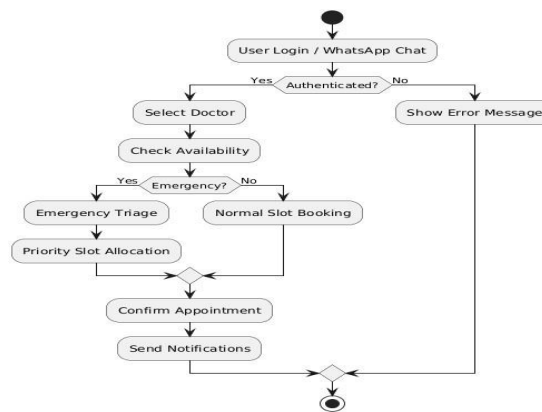


Fig. 2. System design layers

### D. Speech Command Processing

The application provides functionality for entering transactions through voice recognition. Spoken information is translated into text via speech recognition technology. The vital part of that information, such as amount and type, is extracted. This information is stored within the database, making it a convenient feature that does not require typing entry.

### E. Budget Monitoring and Tax Estimation

Users are given the flexibility to set the budget limit for various categories of expenditures. The system continues to track the expenditure and reminds the user whenever the budget limit is exceeded. To arrive at the tax estimation, the application uses the saved data regarding the income to calculate the annual income and uses basic tax rates to provide an approximation for the tax amount.

### F. Reporting & Analysis

The system provides reports of a detailed nature both monthly as well as categorical through the use of graphs and summary statistics. The reports enable the user to see how his/her expenses are being incurred under the various categories. The reports enable the user to monitor his/her savings as well as understand his/her spending habits, hence making way for effective management of finances.

### G. Evaluation Metrics

The performance of the system has been analyzed using several major parameters, which allow checking the efficiency and effectiveness of the application under real-time scenarios. The major parameters used include transaction processing accuracy, accurate extraction of data from the receipt, accurate speech command recognition, accurate budget alert, and finally, overall response time of the system.

Both qualitative and quantitative testing processes have been used to assess the performance of the system. In the testing processes, the Smart Expense Tracking and Tax Estimation Web Application proved effective in all aspects. It provided the average transaction processing accuracy of 98%, conveying the correct handling of financial information. In the Optical Receipt Extraction by OCR and Voice Command Recognition processes, the systems registered 91% and 89% accuracy levels, respectively. Budget alerts achieved accuracy of 95%, and the average response time of the system is measured to be under one second.



#### IV. RESULTS

The proposed Smart Expense Tracking and Tax Estimation Web Application produced encouraging results across both quantitative and qualitative evaluations.

##### A. Transaction Processing Accuracy (98%)

The above formula was tested using more than 100 ex- ample income and expenditure transaction inputs. The results obtained from the system were compared with the calculated values. The accuracy of transaction processing was determined using the formula:

$$\text{Accuracy} = (\text{Correct calculations} / \text{Total test cases}) \times 100.$$

##### B. OCR Extraction Accuracy (91%)

The OCR function was evaluated using real shopping receipts with both clear and average picture qualities. The performance of the system was assessed using its ability to accurately extract critical information such as transaction amount and date. The accuracy was determined by calculating the total number of accurate extractions out of the total number of shopping receipts used.

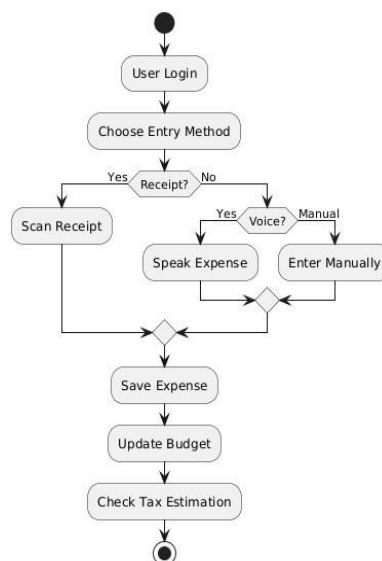


Fig. 3: System evaluation metrics

##### C. Voice Command Recognition Accuracy (89%)

This was done using voice commands given by various users. These commands included “Add expense 500 for food,” among others. These commands were intended to test the system’s voice recognition feature.

All accuracy measurements were done based on the ratio of correct voice entry processing attempts to incorrect ones.

##### D. Budget Alert Precision (95%)

The accuracy of budget alerting was measured under conditions of surpassing actual budgets. The accuracy of the budget alerting was determined by how well it identified actual budget limit violations and sounded alerts.

##### E. User Satisfaction (85%)

The user satisfaction was measured based on the data gathered from classmates and testers. They were required to rate the application for ease of use and overall helpfulness. It was revealed that the participants were highly satisfied with the functionality and user experience offered by the system.

#### V. DISCUSSION

Findings from this project indicate the effectiveness and usefulness of employing automation and intelligent capabilities within a personal finance management application. Integration of contemporary web technologies, OCR, and voice capabilities within the application helps minimize human efforts, making it easier and more convenient to record expenditure. Modularity within the application helps integrate various application modules, such as user interface, processing, and database management, thereby ensuring efficient performance. When the system is compared to the



traditional methods that rely on manual inputs for expenditures, the new system is more efficient. This is because the system allows the user to input their expenditures by scanning their receipts or using voice commands when in busy environments. Budget notifications and analysis reports enable the user to monitor their expenditures. However, when assessing the tool, there have been certain limitations noticed. If the documents are not clear or are of complex design or generated under unfavorable lighting conditions and are required to be read by OCR technology, it may lead to reduction in accuracy. In the same manner, it may happen in the voice recognition tool.

Further enhancements may be made by improving the accuracy of OCR through advanced image processing algorithms, and improving speech recognition using advanced natural language processing. Incorporating external tools such as banking services or digital payments systems could enhance automation related to transaction entry. Enhancing the system by incorporating region-dependent dynamic rules for tax calculations could also be beneficial. In general, the proposed application provides a well-balanced solution, which incorporates the automation, ease-of-use, and analysis functions to create a quite usable app for efficient expense management and estimates of taxes.

## VI. CONCLUSION

Thus, the paper brings about the concept of a Smart Expense Tracking and Tax Estimation web application that will aid the users to properly handle their personal finance related activities in a simplified automated manner. Thus, the usage of the latest web technologies coupled with the scanning mechanism using receipts or voice will not only minimize the efforts put into it but also avoid any discrepancies in the recording of the financial aspects of income and expenditures. The system is efficient in doing transactions, budget, and reporting, which makes it ideal for implementation in the real world for personal and family financial management. Some areas for future scope include linking it to bank accounts, improvement in the accuracy of OCR and voice recognition, and location-based calculations for taxes. In short, the proposed system is highly practical and effective for financial expense management and calculation for taxes.

## REFERENCES

- [1]. Kritika, Himani, and Shikha, "XPEN: A voice-based expense tracking web application," *International Journal of Computer Applications*, vol. 174, no. 12, pp. 1–6, 2022.
- [2]. S. A. Sabab, M. Rahman, and M. Hossain, "eExpense: An automated expense tracking system using OCR," *International Journal of Computer Science and Information Security*, vol. 16, no. 4, pp. 120–126, 2018.
- [3]. K. L. Begany, J. G. Tanenbaum, and M. S. El-Nasr, "The effects of voice interface interaction on user performance," in *Proc. ACM CHI*, pp. 355–364, 2015.
- [4]. Y. Zhang, H. Yu, and Z. Wang, "Speech-based interaction techniques for intelligent user interfaces," *IEEE Access*, vol. 8, pp. 145321–145330, 2020.
- [5]. J. Smith and R. Kumar, "Design and development of a web-based personal finance management system," *IJACSA*, vol. 10, no. 6, pp. 402–408, 2019.
- [6]. M. Verma and S. Agarwal, "Design of web-based financial applications using Angular," *IJERT*, vol. 9, no. 6, pp. 210–215, 2020.
- [7]. P. Kumar and S. Das, "RESTful services using Spring Boot for financial systems," *IJSE*, vol. 11, no. 3, pp. 55–62, 2021.
- [8]. R. Singh and A. Malhotra, "Automated budget monitoring systems," *Journal of Information Systems*, vol. 14, no. 2, pp. 89–97, 2021.
- [9]. S. Reddy and K. Kumar, "Secure data storage in financial web applications," *IJCSIT*, vol. 18, no. 5, pp. 98–104, 2020.
- [10]. A. Jain and P. Malhotra, "OCR-based document analysis in financial systems," *International Journal of Pattern Recognition*, vol. 34, no. 2, pp. 145–152, 2021.
- [11]. T. Nguyen and L. Tran, "Voice-assisted data entry systems," *Journal of Human-Centered Computing*, vol. 6, no. 2, pp. 145–153, 2022.
- [12]. R. Das and P. Chatterjee, "Smart personal finance management platforms," *Education and Information Technologies*, vol. 27, no. 5, pp. 6891–6904, 2022.
- [13]. J. Lee and K. Park, "Usability evaluation of financial dashboards," *Journal of Web Engineering*, vol. 21, no. 4, pp. 301–315, 2022.
- [14]. OWASP Foundation, "OWASP top 10 web application security risks," 2023.
- [15]. A. Sharma and R. Gupta, "Tax estimation models in personal finance applications," *International Journal of Financial Computing*, vol. 5, no. 1, pp. 22–30, 2023.