



TEAM-A

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Abstract:

- A web-based personal finance management system.
- Tracks, visualizes, and predicts monthly expenses.
- Uses Python Flask for backend and CSV for data storage.
- Machine Learning (Linear Regression) predicts future spending.
- Helps users make better budgeting decisions.
-  →  →  →  → 





Problem Statement:

- People often struggle to track and manage their daily expenses.
 - Manual tracking is time-consuming and error-prone.
 - No visual insights to understand spending patterns.
 - Users cannot estimate future expenses based on past trends.
 - Lack of automated tools affects budgeting and financial planning.
- ❖ **So, to solve these financial struggles, we developed a smart expense tracking and forecasting system that helps users manage their money effortlessly.**

Proposed Solution:

- A web-based expense tracking and forecasting system.
- Allows users to add, edit, delete, and manage daily spending.
- Automatically generates visual insights using charts and graphs.
- Uses Machine Learning to predict next month's expenses.
- Provides downloadable reports to support financial decision-making.
- User-friendly dashboard for quick analysis and monitoring.



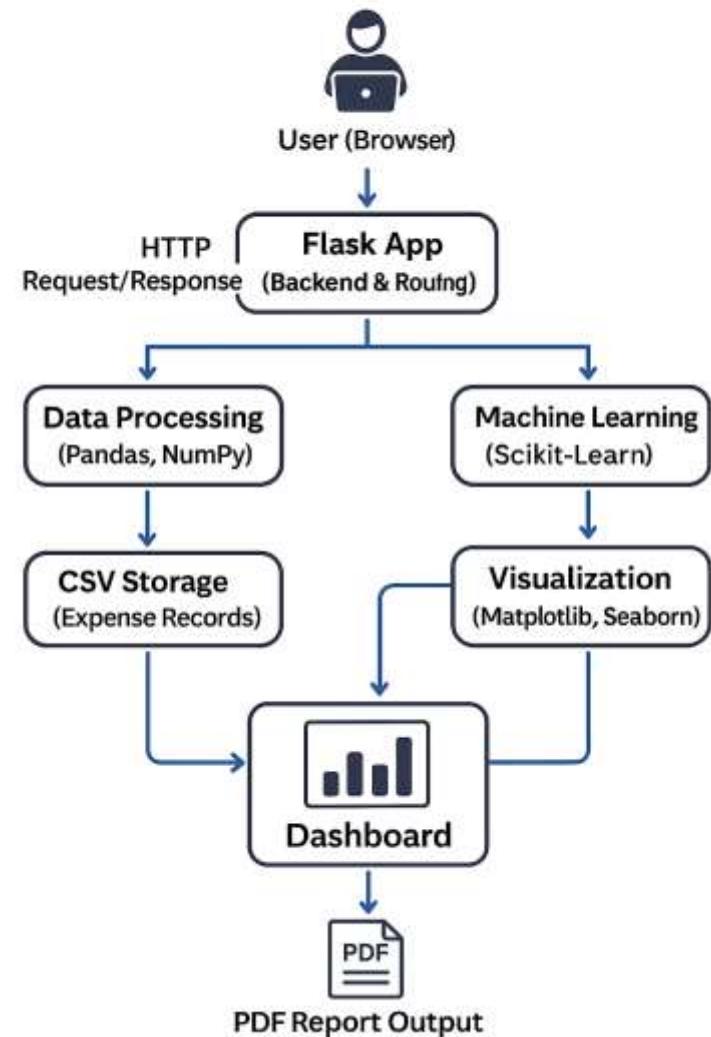
Technologies & Frameworks Used:



- **Python** — Core programming language used for backend logic, data analysis, and machine learning.
- **Flask** — Lightweight web framework used to build the application interface and handle routing.
- **Pandas** — Used for dataset handling, cleaning, grouping, and preprocessing operations.
- **NumPy** — Performs numerical computations and supports feature engineering for the ML model.
- **Matplotlib** — Generates bar charts, line graphs, and other data visualizations.
- **Seaborn** — Creates advanced and visually appealing statistical plots.
- **Scikit-Learn** — Used to build, train, and evaluate the Linear Regression machine learning model.
- **HTML/CSS** — Used for the front-end structure and styling of the dashboard and forms.

- The architecture is based on a simple client–server model using Flask.
- User inputs are handled through a web interface built with HTML and CSS.
- Data is stored and managed in a CSV file using Pandas and NumPy.
- A machine learning model (Scikit-Learn) analyzes past data to predict expenses.
- Visualizations and reports are generated using Matplotlib and displayed on the dashboard.

System Architecture



RESULTS AND OUTPUTS:

Step 1: Run `python app.py` in terminal. And it will generate a link `http://127.0.0.1:5000` or type `localhost:5000` in browser. Click on that link it will direct into the login form.

```
PS C:\Users\DIVYA\Downloads\BudgetWise_Creative> python app.py
 * Serving Flask app 'app'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on http://127.0.0.1:5000
Press CTRL+C to quit
 * Restarting with watchdog (windowsapi)
 * Debugger is active!
 * Debugger PIN: 658-438-070
```

Step 2: The login form consists of default **username : divya** and **password:1234**. And there will be register form for the registration of new user. After the registration we can login and open the home page.

Register Form and Login Form:

BudgetWise – Expense Forecast
AI insights • Visual reports

Login Register

Create account

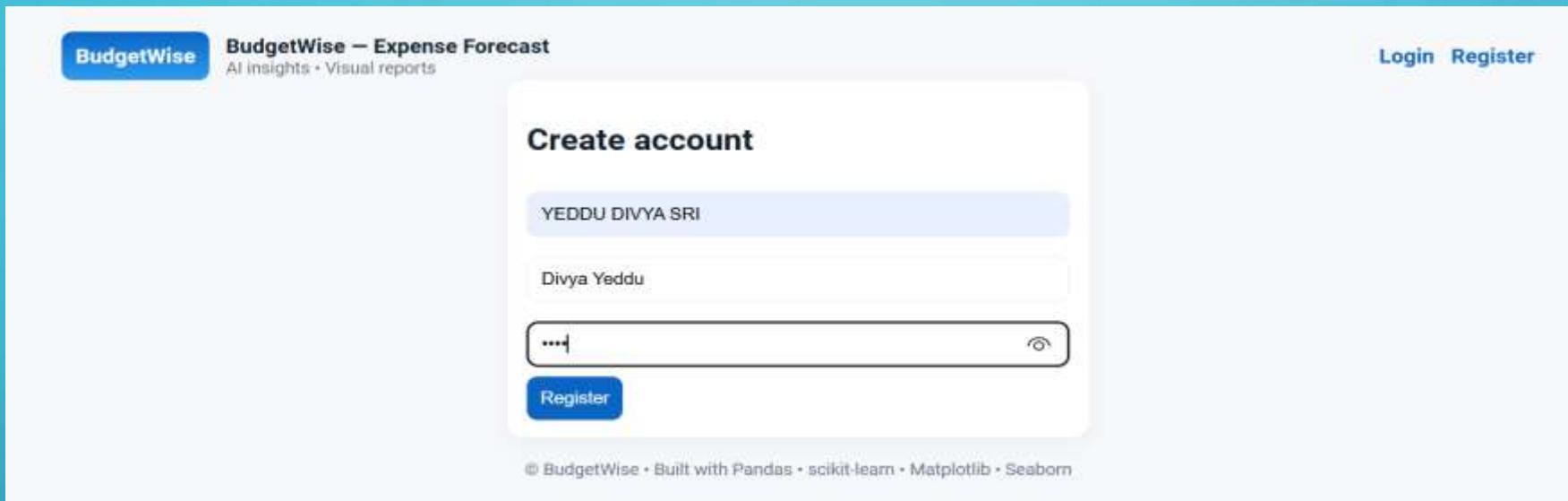
YEDDU DIVYA SRI

Divya Yeddu

.....

Register

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BudgetWise – Expense Forecast
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Login Register

Login

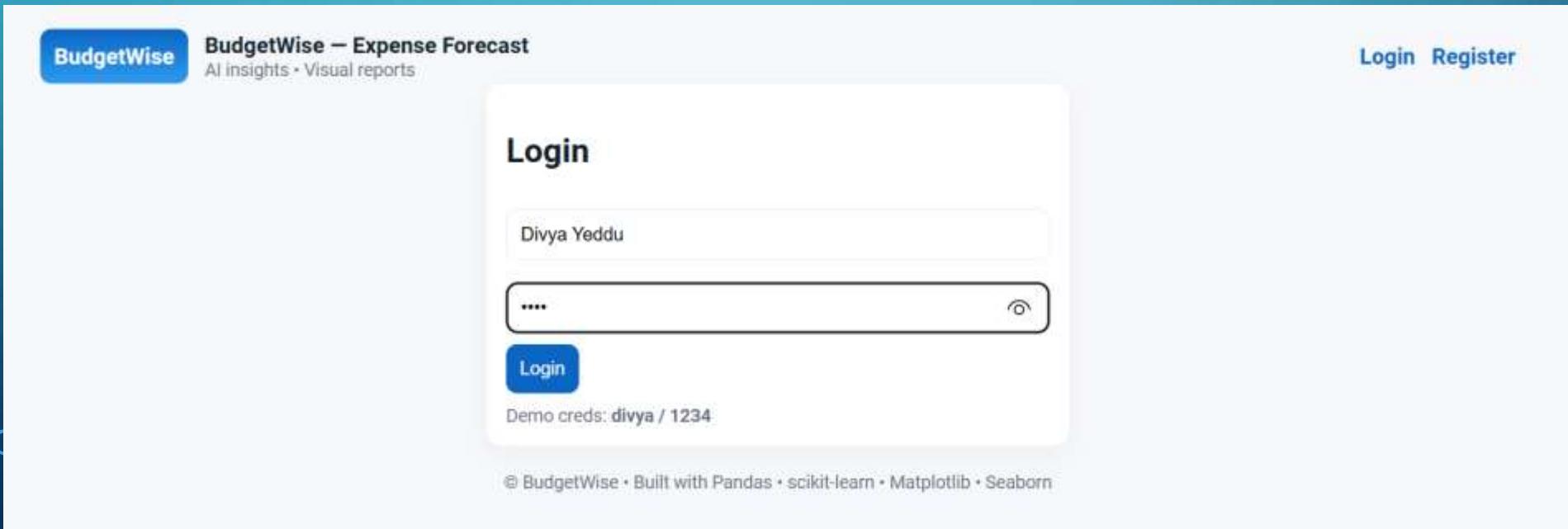
Divya Yeddu

.....

Login

Demo creds: divya / 1234

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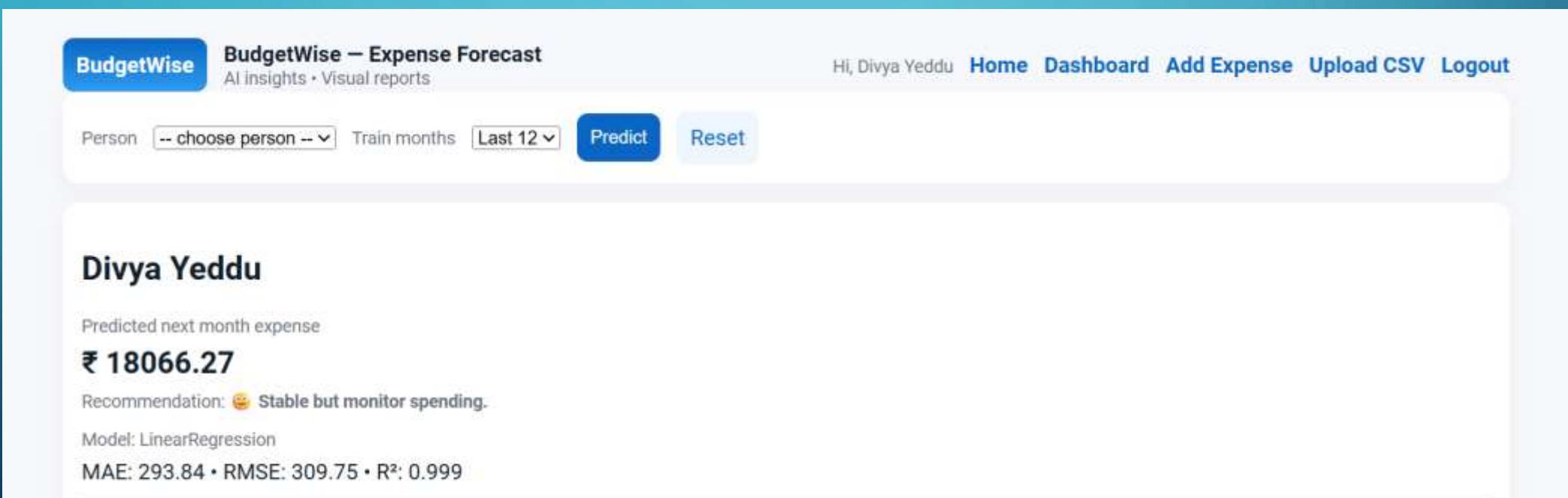
Step 3: It will appear as shown in figure after login.

Click the person and select the train months and click predict to see the information and plots..

BudgetWise – Expense Forecast
AI insights • Visual reports

Hi, Divya Yeddu [Home](#) [Dashboard](#) [Add Expense](#) [Upload CSV](#) [Logout](#)

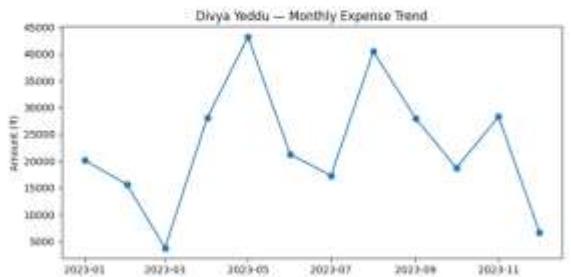
Person: -- choose person -- Train months: Last 12 [Predict](#) [Reset](#)



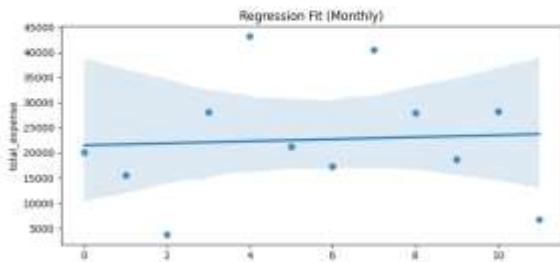
VISUALS OF PLOTS:

Visuals

Trend

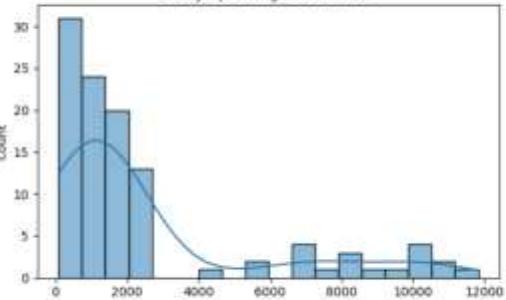


Regression

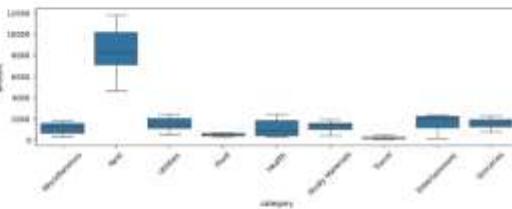


Histogram

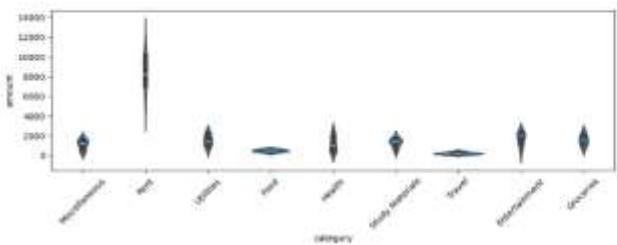
Daily Spending Distribution



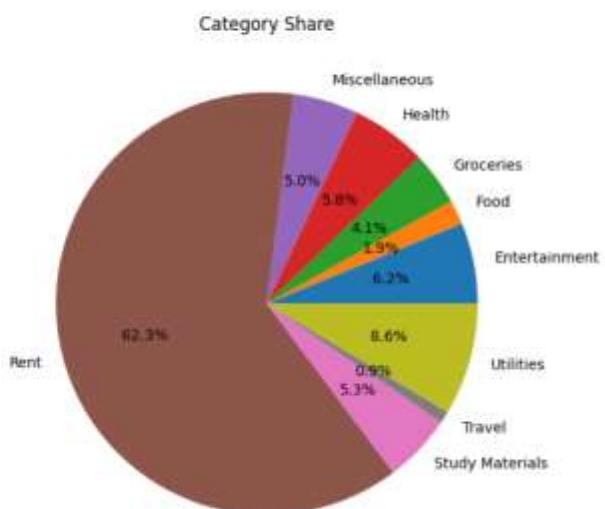
Boxplot



Violin



Pie



Here we can download the report and open the dashboard

[Download PDF Report](#)

[Open Divya Yeddu's dashboard](#)

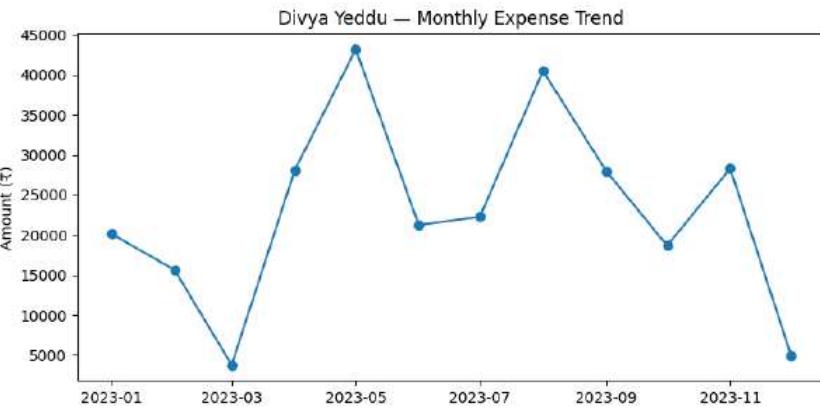


**DOWNLOADED REPORT
APPERS LIKE THIS:**

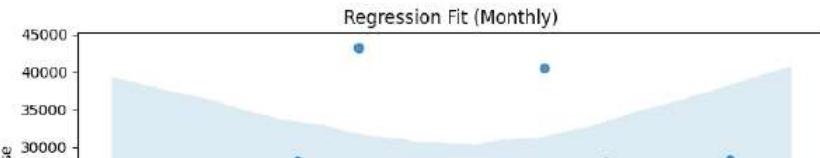
BudgetWise — Expense Report for Divya Yeddu

Metric	Value
Predicted next month expense (■)	17994.66
Model used	LinearRegression
MAE	305.75
RMSE	324.61
R ²	0.999

Trend



Regplot



Step 4: Dashboard Overview

BudgetWise **BudgetWise – Expense Forecast**
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Dashboard – Divya Yeddu

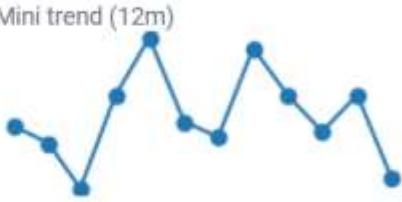
This month spending
₹ 6706.0

Avg daily (this month)
₹ 958.0

Top categories

- Rent – ₹ 169022.0
- Utilities – ₹ 23330.0
- Entertainment – ₹ 16776.0
- Health – ₹ 15828.0
- Study Materials – ₹ 14315.0

Mini trend (12m)



Recent transactions

Date	Category	Amount	Description	Actions
2023-12-25	Miscellaneous	₹ 1774.0	nan	Edit Delete
2023-12-21	Health	₹ 339.0	nan	Edit Delete
2023-12-18	Miscellaneous	₹ 583.0	nan	Edit Delete
2023-12-08	Study Materials	₹ 1967.0	nan	Edit Delete
2023-12-07	Utilities	₹ 862.0	nan	Edit Delete
2023-12-04	Groceries	₹ 783.0	nan	Edit Delete

Step 5: Editing the particular Expense from the Transactions

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Edit Expense

Name

Date
 [x]

Category

Amount (₹)

Monthly Income

Description

[Save changes](#) [Cancel](#)

Step 6: Delete the particular transaction

Recent transactions

Date	Category	Amount	Description	Actions
2023-12-25	Miscellaneous	₹ 1774.0	nan	Edit Delete
2023-12-21	Health	₹ 339.0	nan	Edit Delete
2023-12-18	Miscellaneous	₹ 583.0	nan	Edit Delete
2023-12-08	Study Materials	₹ 1967.0	nan	Edit Delete
2023-12-07	Utilities	₹ 862.0	nan	Edit Delete
2023-12-04	Groceries	₹ 783.0	nan	Edit Delete
2023-12-02	Miscellaneous	₹ 398.0	nan	Edit Delete
2023-11-25	Entertainment	₹ 1331.0	nan	Edit Delete
2023-11-24	Utilities	₹ 1918.0	nan	Edit Delete
2023-11-23	Study Materials	₹ 1540.0	nan	Edit Delete
2023-11-19	Health	₹ 1386.0	nan	Edit Delete
2023-11-18	Entertainment	₹ 2085.0	nan	Edit Delete
2023-11-17	Utilities	₹ 549.0	nan	Edit Delete
2023-11-13	Rent	₹ 5851.0	nan	Edit Delete
2023-11-08	Food	₹ 513.0	nan	Edit Delete
2023-11-07	Rent	₹ 10716.0	nan	Edit Delete
2023-11-02	Travel	₹ 247.0	nan	Edit Delete
2023-11-01	Utilities	₹ 2160.0	nan	Edit Delete
2023-10-31	Health	₹ 956.0	nan	Edit Delete
2023-10-27	Miscellaneous	₹ 1595.0	nan	Edit Delete
2023-10-23	Food	₹ 411.0	nan	Edit Delete
2023-10-21	Rent	₹ 8478.0	nan	Edit Delete

127.0.0.1:5000 says

Delete this?

OK

Cancel

Recent transactions

Date	Category	Amount	Description	Actions
2023-12-25	Miscellaneous	₹ 1774.0	nan	Edit Delete
2023-12-21	Health	₹ 339.0	nan	Edit Delete
2023-12-18	Miscellaneous	₹ 583.0	nan	Edit Delete
2023-12-08	Study Materials	₹ 1967.0	nan	Edit Delete
2023-12-07	Utilities	₹ 862.0	nan	Edit Delete
2023-12-04	Groceries	₹ 783.0	nan	Edit Delete
2023-12-02	Miscellaneous	₹ 398.0	nan	Edit Delete
2023-11-25	Entertainment	₹ 1331.0	nan	Edit Delete
2023-11-24	Utilities	₹ 1918.0	nan	Edit Delete
2023-11-23	Study Materials	₹ 1540.0	nan	Edit Delete
2023-11-19	Health	₹ 1386.0	nan	Edit Delete
2023-11-18	Entertainment	₹ 2085.0	nan	Edit Delete
2023-11-17	Utilities	₹ 549.0	nan	Edit Delete
2023-11-13	Rent	₹ 5851.0	nan	Edit Delete
2023-11-08	Food	₹ 513.0	nan	Edit Delete
2023-11-07	Rent	₹ 10716.0	nan	Edit Delete

Recent transactions

Date	Category	Amount	Description	Actions
2023-12-21	Health	₹ 339.0	nan	Edit Delete
2023-12-18	Miscellaneous	₹ 583.0	nan	Edit Delete
2023-12-08	Study Materials	₹ 1967.0	nan	Edit Delete
2023-12-07	Utilities	₹ 862.0	nan	Edit Delete
2023-12-04	Groceries	₹ 783.0	nan	Edit Delete
2023-12-02	Miscellaneous	₹ 398.0	nan	Edit Delete
2023-11-25	Entertainment	₹ 1331.0	nan	Edit Delete
2023-11-24	Utilities	₹ 1918.0	nan	Edit Delete

Step 7: Add Expense— we can add a new transaction.

The screenshot shows the 'BudgetWise – Expense Forecast' application interface. At the top, there is a navigation bar with the logo 'BudgetWise', the title 'BudgetWise – Expense Forecast', and links for 'AI insights', 'Visual reports', 'Hi, Divya Yeddu', 'Home', 'Dashboard', 'Add Expense', 'Upload CSV', and 'Logout'. The main content area is titled 'Add Expense' and contains the following fields:

- Name: Divya Yeddu
- Date: dd-mm-yyyy
- Category: (empty input field)
- Amount (₹): (empty input field)
- Monthly Income (optional): (empty input field)
- Description: (empty input field)

At the bottom left of the form is a blue button labeled 'Add Expense'.

BudgetWise

BudgetWise – Expense Forecast
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Add Expense

Name

Date
 [Edit](#)

Category

Amount (₹)

Monthly Income (optional)

Description

[Add Expense](#)

BudgetWise

BudgetWise – Expense Forecast
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Expense added.

Step 8: Here we can upload the CSV.

BudgetWise

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Upload CSV dataset

No file chosen

CSV must contain at least columns: person/name/user, date, category, amount. monthly_income optional.

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Model Evaluation:

- The model accuracy was measured using standard **ML** metrics.
- **MAE** (Mean Absolute Error): Shows the average difference between actual and predicted values.
- **RMSE** (Root Mean Square Error): Measures error while giving more weight to larger mistakes.
- **R² Score** (Coefficient of Determination): Indicates how well the model fits the data.
- Results show the model provides reliable expense predictions.





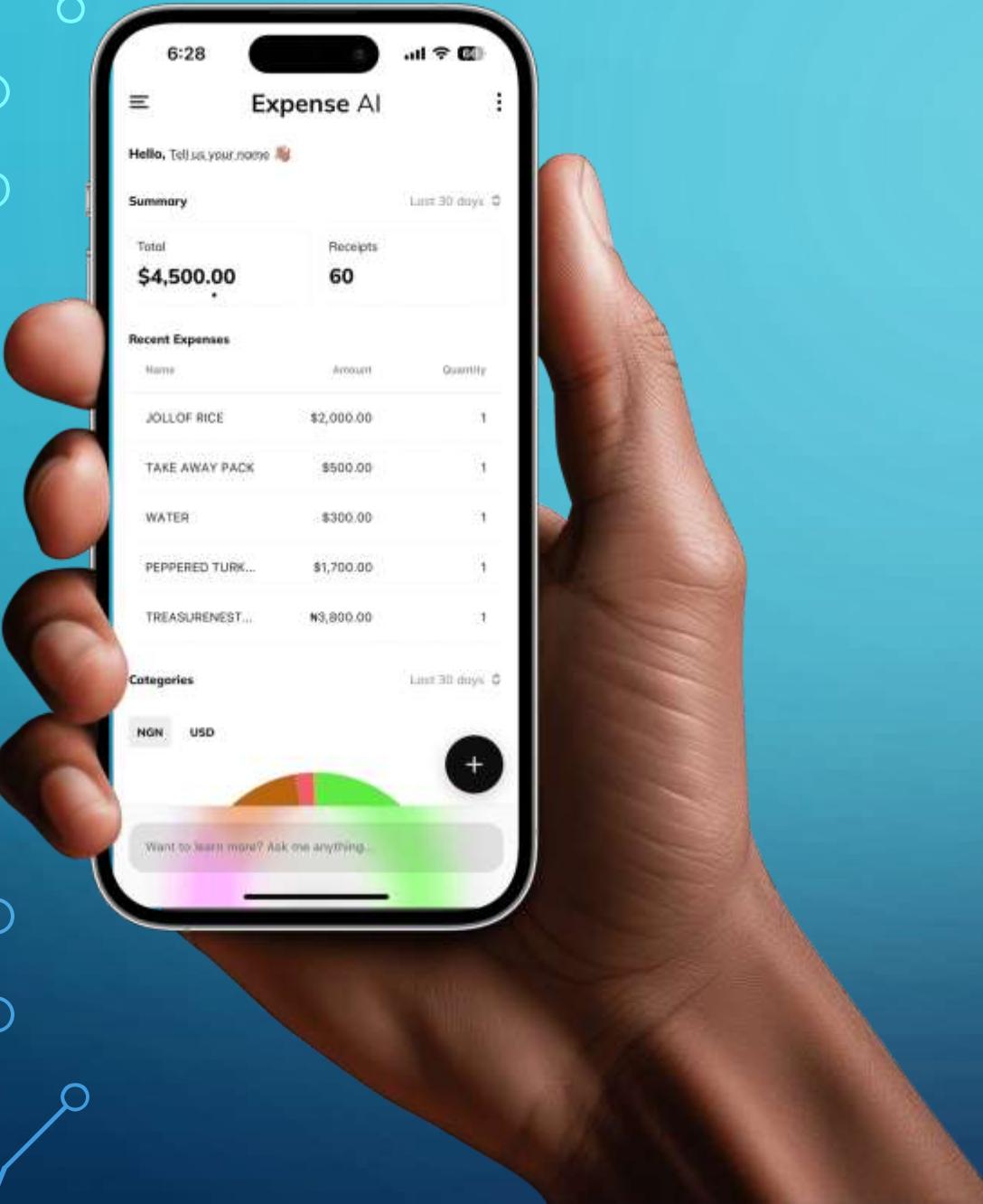
Advantages:

- Simple and user-friendly interface suitable for any user.
- Machine Learning helps predict future expenses accurately.
- Visual charts make it easy to understand spending patterns.
- Lightweight system using CSV, no complex database required.
- Can be easily extended or upgraded with more features in the future.

Challenges Faced During Development:

- Handling CSV data updates without overwriting or losing records.
- Integrating machine learning prediction with Flask routing.
- Rendering multiple plots and ensuring they update correctly.
- Managing errors when users entered invalid or missing input.
- Fixing UI alignment and ensuring smooth navigation between pages.





Future Enhancements:

- Add a **mobile app** version for easier access on smartphones.
- Integrate a real database like MySQL or Firebase instead of CSV storage.
- Use advanced machine learning models like Random Forest or LSTM for better prediction accuracy.
- Add automatic expense categorization using NLP or OCR for reading bills/receipts.
- Enable multi-user cloud support with email login and secure authentication.

Conclusion



The system proves that automation and machine learning can simplify financial planning and improve budgeting accuracy.



Project Completed