



Cloud Computing Project

# WealthWave

<https://wealthwavenyu.net/>

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## Problem Statement

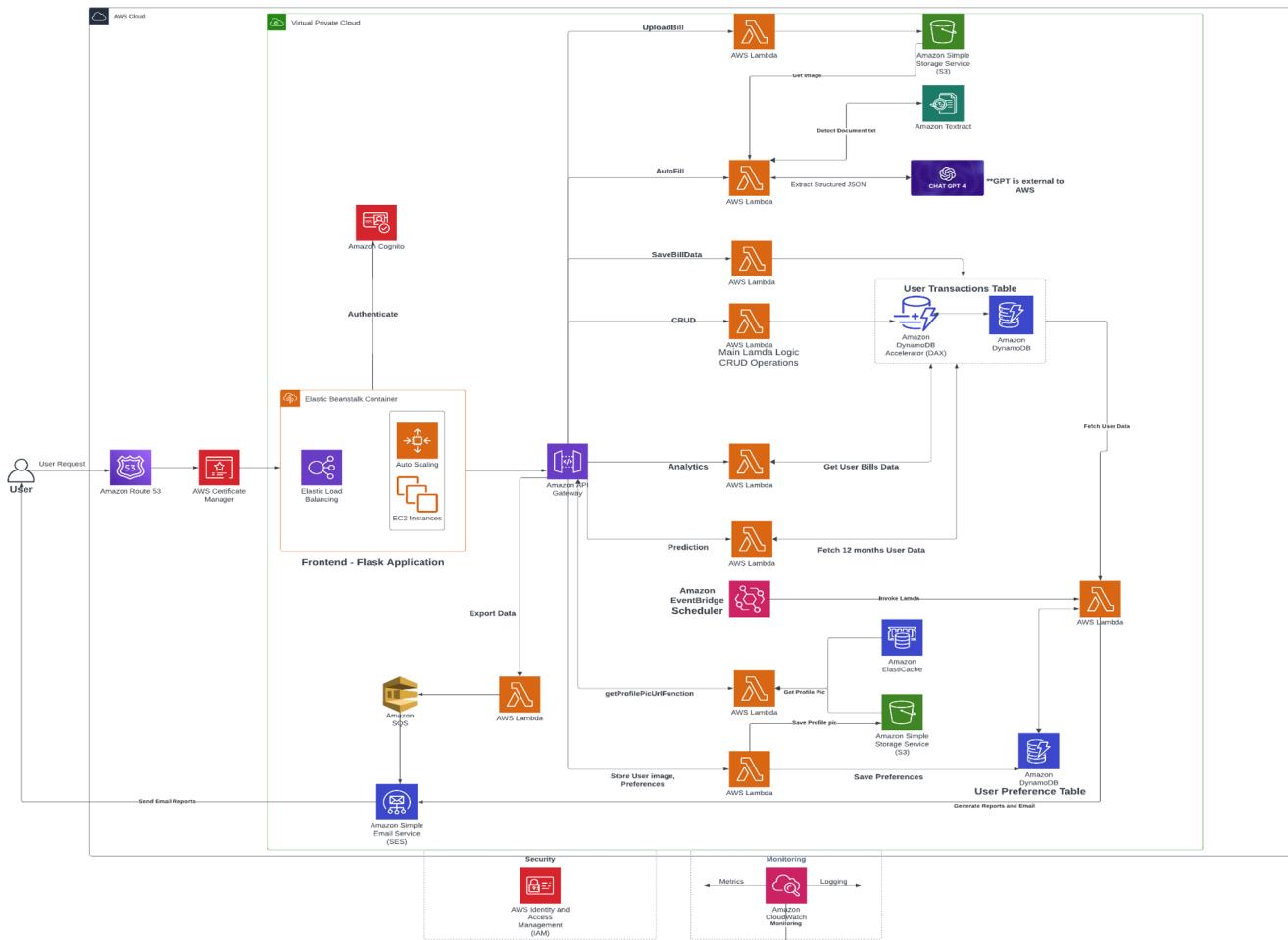
Personal finance management faces a critical challenge not just in tracking expenses but in effectively categorizing them for insightful analysis.

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- **Inadequate Expense Tracking**: Traditional tools are often manual and prone to errors and lack sophisticated categorization which leads to minimal spending insights.
- **Financial Planning Obstacles**: Ineffective categorization hinders sound financial planning and budgeting. Existing solutions fail to offer automated, intelligent categorization.

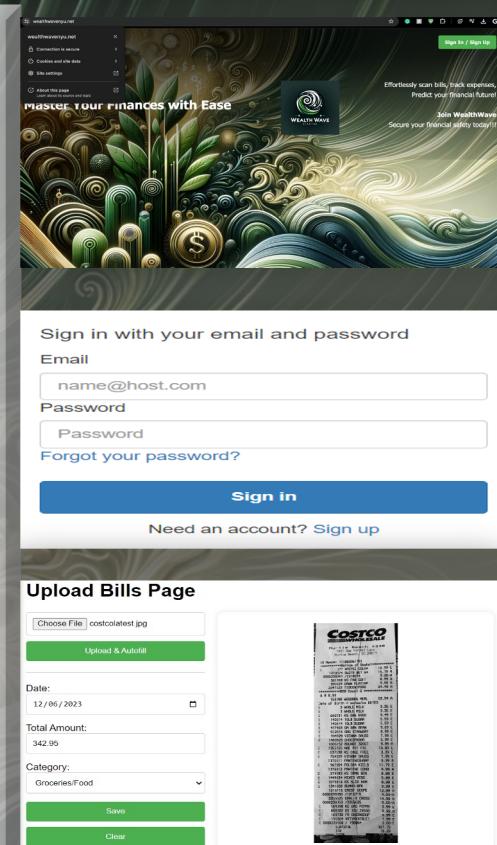
**WealthWave provides an advanced, automated solution for tracking and intelligent categorization of expenses.**

# Application Architecture



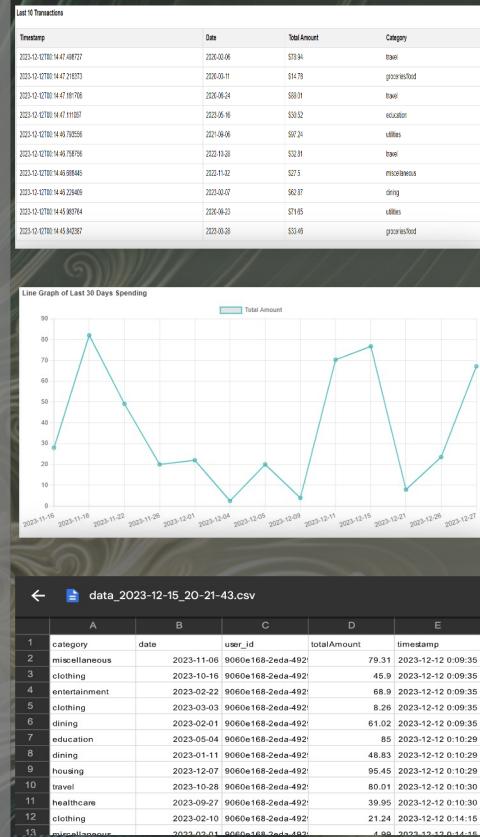
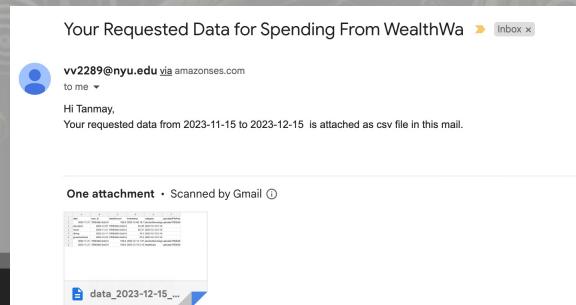
# Components and Workflow

- **Frontend Application:** Utilizes Flask, hosted on AWS Elastic Beanstalk with Elastic Load Balancing and Auto Scaling for scalability.
- **Authentication:** Incorporates Amazon Cognito for secure user signup/login and session management.
- **Routing:** Domain management and request routing through Amazon Route 53 to the application server.
- **User Interaction Workflow:**
  1. Users easily upload bill images via the application interface.
  2. Amazon Textract extracts text from the image stored in S3 Bucket.
  3. Extracted text is given to ChatGPT via API, which returns financial data like date, total amount and category as the response in JSON format.
  4. Users can verify and correct financial data extracted.
  5. Upon confirmation, data is saved in DynamoDB table.



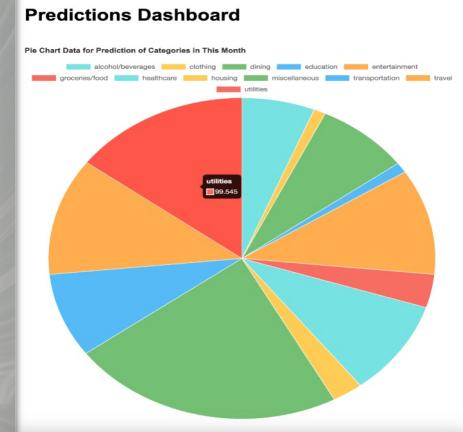
# Components and Workflow

- Data Management:**
  - Home page displays user transactions.
  - Uses DynamoDB to store structured bill data.
  - User transactions are managed through CRUD operations with Lambda functions.
- Analytics:**
  - “Analytics” page shows reports and pie charts based on user uploads.
  - Lambda functions analyze bills and transaction data.
- User Reports:**
  - Options for reports like last week, last month, or custom dates.
  - Automated email reports via Lambda and Amazon SES upon request completion.



# Components and Workflow

- Prediction and Insights:**
  1. Predictive visualizations for the current month's expenses on the "Predictions" page.
  2. Pie chart predictions by category, utilizing Lambda and ML models for data forecasting.
- Settings Page:**
  1. Profile personalization with image upload to Amazon S3.
  2. User-preference management for report frequency, stored in a dedicated database table.



Welcome, Tanmay!

Total Amount of Last 10 Transactions: \$1319.28

Home Wave

wealthwavenyu.net/home?code=c99f3c0a-a587-47f5-8cca-50187966218c

Relaunch to update

Incognito (2)

Google NYU Coursework Visa Excel Sheets Travel Internships Home | Microsoft... Tools News Shopping

Wealth Wave

Tanmay

Home Upload Bill Analytics

### Profile Settings



Choose File No file chosen

Email Frequency

Weekly

Save Changes

# Components and Workflow

- API Gateway:**  
Configured resources within an API gateway to enable dedicated endpoints for specific functionalities. This enabled streamlined and organized access to different services in the system
- Lambda Functions:**  
Chosen for its scalability and ability to manage high volumes of data processing without the need for server management.
- Amazon S3:**  
Stores bill images and user profile pictures. Chosen for its high durability and ease of integration with other AWS services, ensuring secure and accessible data storage.
- Amazon Textract:**  
Extracts text from bill images. Opted over GPT-Vision for cost efficiency and seamless integration within the AWS ecosystem. The extracted text is then processed by GPT language models for detailed insights and structured data.
- GPT Integration:**  
Provides AI-driven insights and categorization of financial data.

The screenshot shows the AWS Lambda console interface. On the left, the 'stage1' function is selected, displaying a list of endpoints under the 'Triggers' tab. On the right, a table titled 'Items returned (100)' displays 100 rows of data, each containing fields like user\_id, timestamp, category, date, and totalAmount. At the bottom, a list of functions is shown, with several items highlighted in blue, indicating they are selected or part of the current context.

user_id (String)	timestamp (String)	category	date	totalAmount
1f93b5b0-0xd2...	2023-12-06T05:36:45...	groceries/food	2023-10-11	5.38
1f93b5b0-0xd2...	2023-12-06T05:40:19...	clothing	2023-11-05	272.08
1f93b5b0-0xd2...	2023-12-06T19:12:54...	alcohol/beverages	2023-11-21	109.8
1f93b5b0-0xd2...	2023-12-12T00:14:14...	housing	2021-10-11	90.59
1f93b5b0-0xd2...	2023-12-12T00:14:14...	travel	2023-06-07	61.46
1f93b5b0-0xd2...	2023-12-12T00:14:14...	entertainment	2020-05-24	44.06
1f93b5b0-0xd2...	2023-12-12T00:14:14...	utilities	2021-01-14	42.96
1f93b5b0-0xd2...	2023-12-12T00:14:15...	travel	2023-01-25	97.74

Function name
getProfilePicUrlFunction
updateUserPreferences
Lasttendays_Lambda
UserFullDetails
csvtotable
AutoFillBillData
exportdata_csv
SaveBillData
uploadImageToS3