CPSC 436C Project Proposal

Team Name: The Team

Team Members:

1. Lauren Lowe (37750536): Team Lead, Data Analyst
2. Chi Pham (29224904): Cloud Engineer, Database Administrator
3. Yuheng Ouyang (76900430): Software Developer, Project Manager
4. Chia-Sheng Lin (34766444): Security Engineer, Business Analyst

Assigned TA: Arman Moztarzadeh

Project Title: Personal Financial Management App

Submission Date: November 1, 2024

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1. Project Overview

1.1 Problem Statement

As a student, I want to better understand my spending habits and financial situation. I currently track my expenses and budget in a spreadsheet with entries like date, price, and description. Our project solves this by taking that data and providing a clear monthly financial summary, along with visualizations. This helps me understand where my money is going and allows me to make more informed decisions about how to budget.

1.2 Solution Overview

Our solution is an application that simplifies personal finance management by having a user upload their expenses spreadsheet with date, price, and description data. The ultimate goals are to help users, especially students, easily track their finances by category and make informed budgeting decisions. The application provides the following features:

- **Summaries**: Overviews of monthly spending and savings for each category.
- **Predictions**: Forecasts of future spending for each category.
- **Recommendations**: Suggestions on how to budget wisely in the future.
- **Visualizations**: Charts and graphs to present historical trends for each category.

2. Technical Requirements and Architecture

2.1 Cloud Services

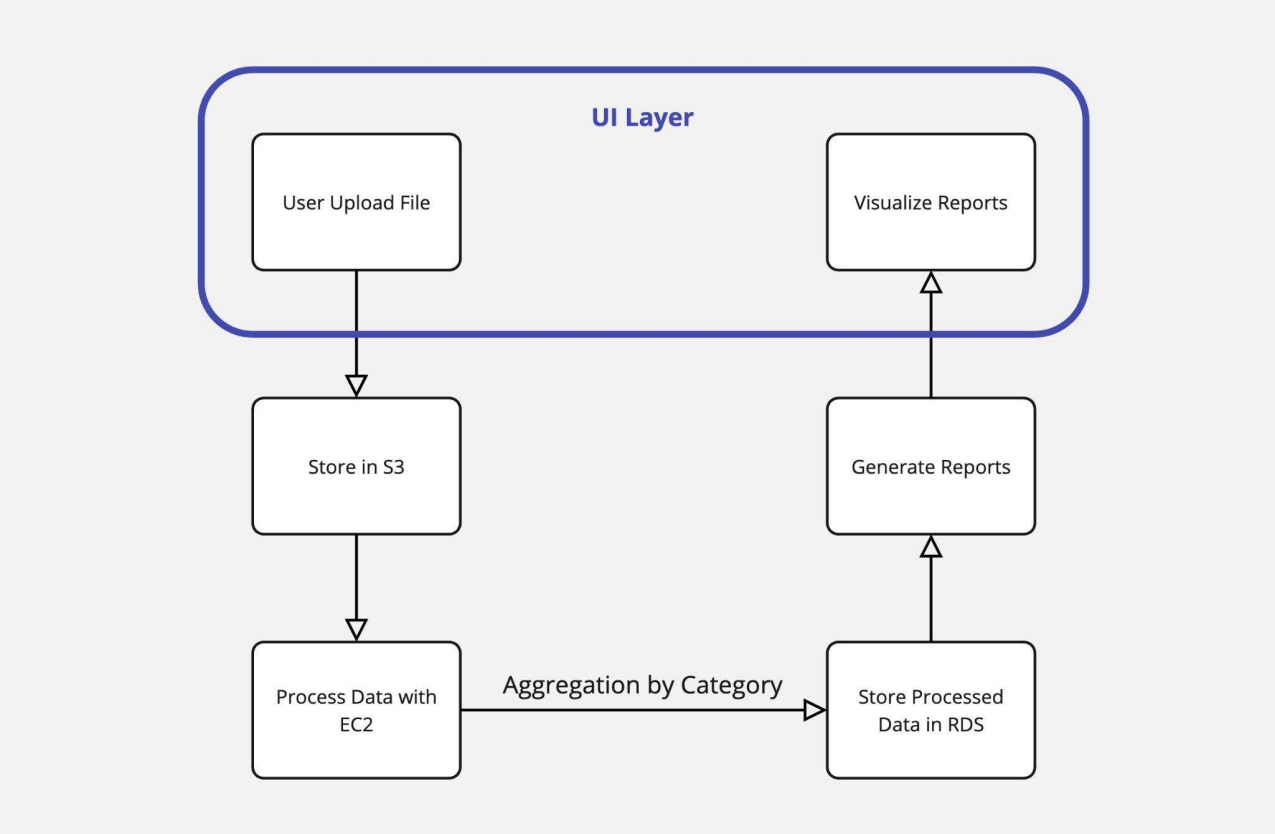
- **Storage:** Amazon S3
    - Scalability: S3 can handle any amount (size) of data
    - Durability: S3 is highly durable, which ensures stable operation of the app
    - Cost: S3 only charges the time and amount of the storage, which makes it efficient to keep temporary user uploads
    - Accessibility: S3 is accessible anytime and anywhere through the internet

- Security: S3 supports encryption to protect sensitive financial data
- Integration: S3 easily delivers data to other services for subsequent processing

- **Computing**: Amazon EC2 and Lambda
  - EC2: takes the training data and user-input data from RDS, predicts future spending; generates a visualization of spending report; and provides useful recommendations to improve spending habits.
  - Lambda: processes input files into RDS storage; processes RDS data into a readable format by the machine learning algorithm.

- **Database**: Amazon Relational Database Service (RDS)
  - Personal finance data comes as rows in tables (e.g., users, spending, etc.), which is easily maintained by RDS. We will join multiple tables to query data for analysis.
    - Users (user_id, name, age, gender)
    - Spending (different spending categories, to be filled later)

2.2 System Architecture



2.3 Security Considerations

- **Data Encryption**: Ensure that sensitive financial data, such as spending habits and personal information, is encrypted both in transit and at rest. AWS S3 and RDS offer encryption options to protect this data.
- **Authentication and Authorization**: Implement role-based access control (RBAC) using AWS IAM to restrict access to sensitive resources and ensure only authenticated users can access or modify data.
- **API Security**: Secure API endpoints with OAuth 2.0 and ensure requests are authenticated to prevent unauthorized access.

3. Project Plan and Timeline

3.1 Milestones

- **Proposal Submission**: November 1, 2024
- **Mid-Project Check-in with TA**: November 7, 2024
- **Initial Setup and Architecture Finalization**: November 10, 2024
- **Core Functionality Completed**: November 22, 2024
- **Final Testing and Optimization**: November 29, 2024
- **Project Presentation**: December 3, 2024

3.2 Weekly Goals

Week	Goals/Deliverables
Nov 3 - Nov 9	● Refine proposal with TA feedback ● Meet with TA to discuss project details ● Set up cloud architecture
Nov 10 - Nov 16	● Implement core functionality
Nov 17 - Nov 23	● Implement core functionality ● Perform initial testing
Nov 24 - Dec 30	● Perform final testing & validation ● Analyze cost & performance ● Complete final report
Dec 1 - Dec 7	● Project presentation

4. Team Responsibilities

- **Lauren Lowe (Team Lead & Data Analyst)**
  - Communicate with TA on behalf of the team
  - Set up cloud architecture (AWS services)
  - Create data visualization by querying the database
  - *Write project report
- **Chi Pham (Cloud Engineer & Database Administrator)**
  - Design relational database (RDS)
  - Route data between RDS and other AWS services
  - *Write project report
- **Yuheng Ouyang (Software Developer & Project Manager)**
  - Develop spending prediction algorithm
  - Develop budget recommendation algorithm
  - Format and finalize deliverables
  - *Write project report
- **Chia-Sheng Lin (Security Engineer & Business Analyst)**
  - Configure cloud security settings
  - Analyze cost and performance
  - *Write project report

**Report writing is a shared responsibility among all members.*

5. Code Repository and Version Control

- **Repository Platform**: GitHub
- **Version Control**: Our team will use Git with a feature-branching workflow, where each feature is developed on a separate branch and merged into the master branch via pull requests after review. This ensures code stability while allowing team members to work independently on different features.

6. Final Deliverables

- **Codebase**: A fully functional cloud-based personal financial management application.
- **Documentation**: In-depth technical documentation that explains how to deploy, configure, and utilize the application. This will include setup and any necessary troubleshooting steps for end-users.
- **Final Presentation**: A 10-15 minute presentation introducing our project's goals and objectives, detailing the technical implementation, and highlighting the challenges we faced, as well as key takeaways and results.
- **Final Report**: A final report including our solution overview, cloud architecture diagram, summary of services/tools, security considerations, cost management, performance evaluation, and challenges/lessons learned.