Problem Statement and Goals
Plutos

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Table 1: Revision History

Date	Developer(s)	Change
09/18/2024	Angela Wang	Initial Draft
09/20/2024	Jason Tan	Environment section and touch ups
09/24/2024	Eric Chen	Update Appendix Reflection Questions
03/08/2025	Angela Wang	Link Requirements Elicitation Report
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1 Problem Statement

1.1 Problem

Young adults often face challenges in managing their finances effectively, especially when it comes to tracking expenses and budgeting. Despite advancements in artificial intelligence (AI) and automation, many budgeting apps still require manual data entry or calculations, resulting in an inefficient and potentially inaccurate process. This inconvenience often leads users to poorly manage their budgeting or abandon it altogether, hindering their ability to optimize spending habits and achieve their financial goals.

1.2 Inputs and Outputs

Inputs: User's receipt photos and desired bugeting goals.
Outputs: Visualizations of the user's spending allocations in comparison to their set budget, and recommendations for how they may adjust their spending to meet their goals.

1.3 Stakeholders

Stakeholders include anyone who is looking to better manage their finances, set budget goals, and track their spending, with a focus on first and second-year university students who are just starting to live on their own.

1.4 Environment

The software product will be compatible for Android and iOS mobile devices with a functional camera.

2 Goals

Our goals include the following:

- Develop a machine learning model that can accurately (>90%) parse commonly purchased items (e.g., groceries, cleaning supplies) from a picture of a receipt.
- Develop a machine learning model that can accurately (>90%) categorize items into approprite, pre-defined spending categories.
- Develop a mobile application that allows users to take a picture of their receipt or manually input their expenses. These expenses would be stored in a database so that the user can review their spending history.
- Within the application, display visualizations of the user's purchases and spending allocations, and provide recommendations for how they may adjust their spending to meet their budget goals. These should be catered to the user's personal spending habits and goals.
- Allow users to set budget goals over different time intervals (e.g., short-term, long-term) and track their progress towards these goals.

3 Stretch Goals

- Build upon the base machine learning model to train on the user's personal spending data to provide more accurate item parsing and categorization (i.e., for items with similar names, the model can learn which category the user typically assigns them to).
- Build upon the base machine learning model to categorize items using user-defined/customizable spending categories.
- Build upon the base machine learning model to predict future spending based on the user's spending history and provide recommendations for how they can adjust their spending to meet their budget goals.

- Gamify the application to make it more engaging and encourate users to meet their budget goals and develop better spending habits.
- Allow users to input expenses through speech recognition, where the application can parse the user's speech and categorize the items accordingly.

4 Challenge Level and Extras

The expected challenge level is **general**. The primary challenge of the project is developing a machine learning model that can accurately parse items from a picture of a receipt, and to categorize them into appropriate spending categories. This requires a strong understanding of training and tuning models on image data to achieve high accuracy. Additionally, different items across various stores may have similar names or be difficult to recognize, which adds to the complexity of the task. The other part of the project is to develop a user-friendly mobile application, which is a more general software engineering component.

Furthermore, our team plans to include the following two extras:

- **Requirements elicitation report**: We will conduct interviews and a survey to gather requirements from potential users to determine user needs and preferences, and document the findings in a report. [Update: Requirements Elicitation Report]
- **Usability testing**: We will ask potential users to test the application and provide feedback on its usability and functionality.

Appendix — Reflection

1. What went well while writing this deliverable?

   During our first tutorial block, our team met up and brainstormed ideas for what we would like to work on for our Capstone project. Once we had our idea in mind, we discussed the feasibility of our problem and walked through our goals for the project. As a result of our discussion, we had a good idea of the direction that we wanted to proceed in, so it was straightforward putting our thoughts down into words when writing this deliverable. There were not many disagreements within our decisions so it was a smooth process.

2. What pain points did you experience during this deliverable, and how did you resolve them?

   It was difficult to determine what we would categorize as our goals vs our stretch goals. We are unsure of what we could reasonably accomplish during the eight months, especially because we had brainstormed many possible features as part of our application and we knew that we also had to keep in mind other time commitments (e.g., writing documentation, planning work, other courses, other hobbies and activities). We spoke to Dr. Smith and concluded that the key part of our project should be the machine learning (ML) model, so we placed our primary focus on this aspect and our secondary focus on the application. This helped narrow down and guide our direction on how to proceed.

3. How did you and your team adjust the scope of your goals to ensure they are suitable for a Capstone project (not overly ambitious but also of appropriate complexity for a senior design project)?

   As mentioned in reflection question 2, our team consulted with Dr. Smith to assess the feasibility of our project. We decided to prioritize the development of the ML model that will parse information from a picture of a receipt, while our secondary focus will be on developing a mobile application that will serve as the user interface. We adjusted our scope in this way so that our team could gain hands-on experience with ML while also demonstrating software engineering skills. Additionally, we plan to elicit requirements and conduct usability testing to ensure that our product is user-focused, with the goal of launching it on the App Store and Google Play by the end of Capstone. These extras contribute toward making the project more complex and ambitious, yet realistic and achievable.