

**Lab 1 - BetterSwipe Product Description**

Cody Cochran

Old Dominion University

CS 411W

Professor James Brunelle

January 26, 2024

Version 1

## Table of Contents

<b>1. Introduction.....</b>	<b>3</b>
<b>2. BetterSwipe Product Description.....</b>	<b>4</b>
2.1. Key Product Features and Capabilities.....	4
2.2. Major Components (Hardware/Software).....	5
<b>3. Identification of Case Study.....</b>	<b>6</b>
<b>4. Product Prototype Description.....</b>	<b>7</b>
4.1. Prototype Architecture (Hardware/Software).....	8
4.2. Prototype Features and Capabilities.....	9
4.3. Prototype Development Challenges.....	11
<b>5. Glossary.....</b>	<b>12</b>
<b>6. References.....</b>	<b>13</b>

## List of Figures

Figure 1: BetterSwipe Major Functional Component Diagram.....	5
Figure 2: BetterSwipe Prototype Major Functional Component Diagram.....	8

## List of Tables

Table 1: Table of Comparison between RWP and Prototype.....	9
---	---

## 1. Introduction

Rewards credit cards have the potential to save consumers a substantial amount of money. For every purchase that gets made, a certain portion of that cost can be earned back and reapplied toward other purchases that the consumer would otherwise have to pay for with their income directly. Unfortunately, the process of finding the best credit card is frustrating and time consuming due to several complicating factors. A nationwide survey conducted by Experian (2017) revealed that 61% of people in the United States are overwhelmed by the number of options available to them. 85 rewards credit cards were tracked by Credit Karma (2023) as of November 2023, and that number changes as new cards are made and older cards become obsolete.

Beyond the sheer quantity of cards, comparing these cards against each other becomes a challenge when three different reward systems are at play: cash back, points, and miles. These provide the card user with rewards for every purchase they make, but their systems are not interchangeable. Cash back rewards provide the consumer with cash directly which is proportional to the amount spent. Other cards do not have a direct cash value and instead offer a separate currency system of points or miles. Different spending categories can reward a different number of miles or points per dollar spent, and the cash value of those rewards depends on where they are spent. In Experian's survey (2017), 57% of the participants expressed difficulty in figuring out which cards would fit them the best. If a consumer's card provides rewards for categories that they rarely make purchases for, those rewards can become underutilized. It has been found that 69% of credit card holders have rewards that they are not utilizing (Black, 2022).

There is a clear need to filter credit card options that do not fit the consumer's lifestyle. Significant time and effort could be saved in their search and their choices would be better informed if they were shown which cards benefit their own expenditures. BetterSwipe is an application that aims to do just that. It utilizes expenditure profiles unique to each person to search for credit cards that would specifically benefit them.

## **2. BetterSwipe Product Description**

BetterSwipe is an expenditure analysis and credit card recommendation tool. It utilizes the consumer's own spending history to provide them with a list of credit cards that would give them returns with the greatest cash value. By removing all but the most viable options it substantially simplifies the reward selection process. BetterSwipe makes it easy to analyze rewards cards use, ensuring that the consumer is always aware of better alternatives as they arise.

### **2.1. Key Product Features and Capabilities**

BetterSwipe provides the user with a secure and encrypted profile where they can easily analyze their purchases for reward opportunities. Purchases will be automatically categorized through bank and credit card statements uploaded by the user, which BetterSwipe will apply to the rewards criteria of credit cards to predict how much the user could save through their use. A side by side comparison of rewards credit cards and their effect on the user's spending profile can be viewed for analysis to make an informed decision on which to choose. Other reports like the user's purchase history and current rewards can be viewed for further analysis.

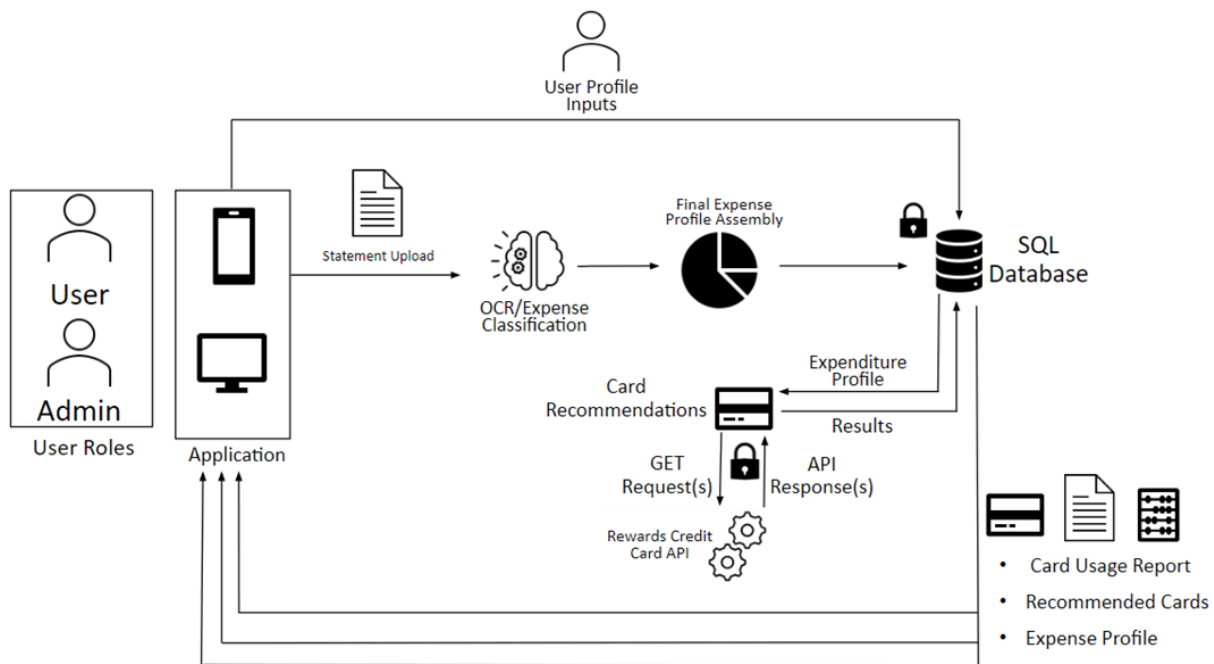
[ *This space intentionally left blank* ]

## 2.2. Major Components (Hardware/Software)

BetterSwipe is a mobile and web application which can be run on computers and mobile devices with an internet connection. From the device the user will be able to scan their own bank and credit card statements, as shown in Figure 1. This data would be transferred securely to the BetterSwipe website hosted on Amazon Web Services (AWS). On the back-end, the purchase data would be sorted into spending categories. This new spending information would be integrated into the user's profile and stored on an SQL database where it can be accessed for card assessments and reports.

**Figure 1**

*BetterSwipe Major Functional Component Diagram*



[ This space intentionally left blank ]

An interface with the Rewards Credit Card (RewardsCC) API fetches data for credit cards and stores their reward specifications in the SQL database so that they can be quickly searched and they can be used in conjunction with the user's spending profile to calculate the estimated reward value for the user. The recommended cards are saved to the same database where they can be used for generating comparative reports. The data saved on the database is sent to the user's application, where they can view their profile, reports, and receive their card recommendations.

### **3. Identification of Case Study**

BetterSwipe is aimed to help consumers who are looking for new rewards credit cards because it will simplify their searching process. It is also aimed at consumers who wish to save their money, since it will offer the best rewards cards for that consumer and ensure that those rewards get utilized. Since it recommends cards based on purchases the consumer is already making, it can also be used by people who are looking to build up their credit responsibly.

College students are typically young-adults, which is a demographic that is only starting to build up credit. Since their experience in researching credit cards is limited, a tool like BetterSwipe would be highly beneficial. Participating students at ODU who are looking for credit cards to build up their credit can act as a case study by using BetterSwipe to recommend them a credit card and track its rewards.

Participants will create accounts and upload their purchases for the last month, and then select one of the recommended cards. Feedback will be collected from the participants pertaining to the quality of the recommendations, and what the discrepancies were. This will help us gauge what details about the user BetterSwipe should focus on.

Once the participant obtains a rewards credit card that was recommended to them by BetterSwipe, they will enter the card into their profile so their purchase history and savings through the use of the card can be monitored. The participants will then provide feedback about the readability of the reports, how informative the data that they show is, and how accurate the rewards recommendations were. Based on their feedback we can adjust the report formatting and method by which reward uses are recommended.

In the future there is the potential for BetterSwipe to provide an analysis of user expenditures. Banks and credit card companies could use the analytics to see what influences consumers to get their cards, however care would have to be taken to maintain unbiased results in credit card searches. Businesses could also use it as a statistical tool to see which markets consumers are most active in.

#### **4.Product Prototype Description**

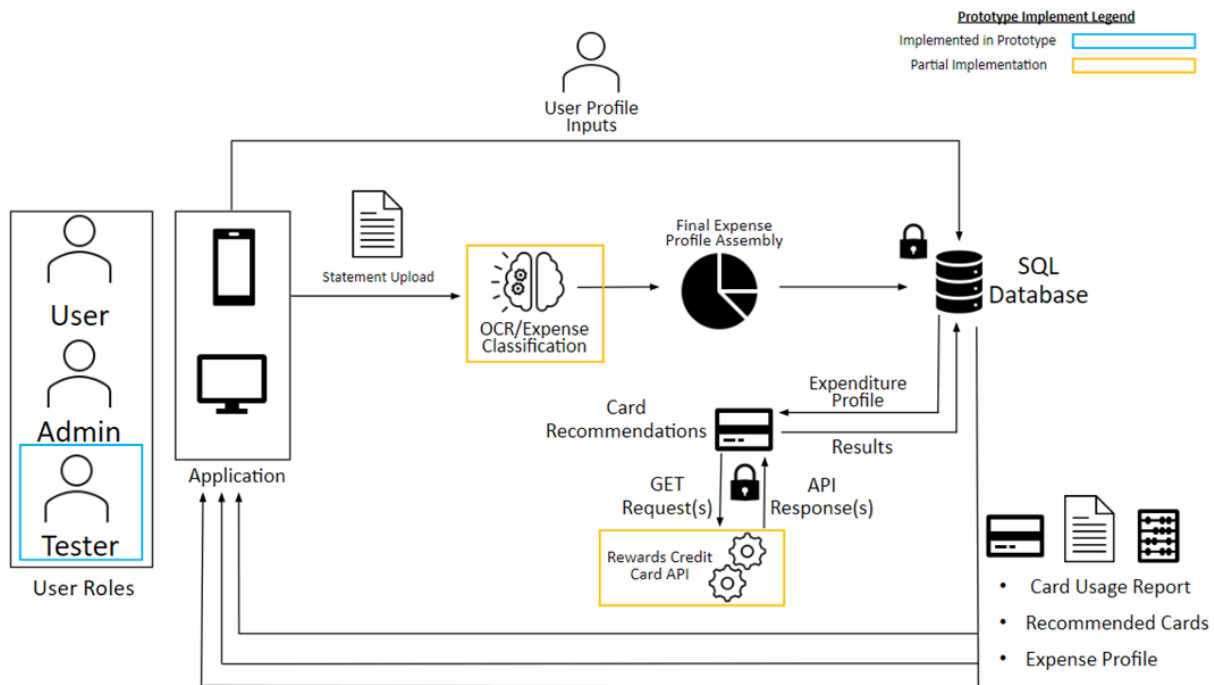
The BetterSwipe prototype will model the user spending profile, expenditure categorization, capability of finding recommendations from a database of credit cards, and the ability to generate reports. Statement files will be limited to Excel-compatible spreadsheet formats. The credit card database will be simulated from a captured baseline from the Rewards CC API. Real-time changes to this resource will be simulated to demonstrate BetterSwipe's capacity to adapt to changes in credit card details and availability.

#### 4.1. Prototype Architecture (Hardware/Software)

The prototype will be written utilizing the React JavaScript library in the front-end of the application, and Django Python library for the back-end. The prototype will not parse text in uploaded documents, so the documents will need to be formatted in a CSV file. The Rewards Credit Card API will also be simulated in a docker instead of fetched from a live database, however the simulated data will have been captured initially from the API.

**Figure 2**

*BetterSwipe Prototype Major Functional Component Diagram*



The profile assembly, reward calculations, and reports will be reflective of the final product, as well as the database to which the profile and card data will be stored. The addition of a tester role on the application will allow for testing and analysis of these primary features of BetterSwipe.



## 4.2. Prototype Features and Capabilities

The primary goal of BetterSwipe is to provide users with recommendations for rewards credit cards that they will have the greatest chance of benefiting from. As shown in Table 1, the ability to create an expenditure profile, receive matching card recommendations, and view reports will be demonstrated in the prototype. This will show that the search space for rewards credit cards can be reduced and adapted to fit the requirements of the user.

**Table 1**

*Table of Comparison between RWP and Prototype*

Functional Element	Real World Product (RWP)	Prototype	Reason
Login/Register	Full Functionality	Full Functionality	
Feature encryption of data at rest and in transit	Full Functionality	Full Functionality	
Statement Upload	Full Functionality	Partial Functionality	Only accepts Excel-compatible format
Categorization of expenditures	Full Functionality	Partial Functionality	Combination of ML and adjustments
Download rewards details for credit cards	Full Functionality	Partial Functionality	Simulating data from a real database baseline
Expenditure Profile Creation/Maintenance	Full Functionality	Full Functionality	
Card Recommendations / Comparisons	Full Functionality	Full Functionality	
Continuous Monitoring of expenditures/cards	Full Functionality	Partial Functionality	Using simulated data
View reports of expenditures and card recommendations	Full Functionality	Full Functionality	

[ This space intentionally left blank ]

While the RWP will have the ability to parse text from a range of formats including scanned images, the prototype will be limited to reading files that are in a spreadsheet format. Our goal is to demonstrate how BetterSwipe utilizes the data that it is given, while allowing a greater range of formats is simply a matter of convenience for the consumer. Categorizations will be made using a machine learning model, but the model's training will be limited during the prototyping stage. To mitigate the risk of a miscategorization, the user will have the ability to modify the categorizations of their purchases, which will be fed back into the model to give it better recognition of future purchases. This should be particularly effective for repetitive everyday purchases such as gas or groceries.

The connection to the Rewards CC database will be simulated using prefetched data, which will demonstrate a saved cache of cards from the database. This data will then be modified to simulate changes to the database. Rewards credit cards will come and go and the cards in the database will be ever changing, so it is essential that BetterSwipe is able to adapt to whatever credit cards it is provided externally. Once this is demonstrated in the prototype, the RWP can be connected to the Rewards CC API to make its decisions on the most up to date collection of available cards.

[ *This space intentionally left blank* ]

### **4.3. Prototype Development Challenges**

The team has limited knowledge on the major libraries being used on the project: React, Django, and SQL. All members will require a period of training. Collaborating in teams for each module may help to speed up the process by allowing knowledge to be shared between members. Knowledge on dockers is also limited, which will be required to set up the simulated Credit Card API.

Scheduling will likely be another hurdle for the development. The team members have varied schedules, making it difficult to meet at a single time. This can be mitigated by breaking the project into smaller teams with less members who have a greater chance schedule overlap. Clear communication between the teams would need to be established to keep the project cohesive. Team leaders could be elected to report between teams so that the expectations for the interfaces remain clear.

## 5. Glossary

**Application Programming Interface (API):** software intermediary that allows two applications to talk to each other. APIs are an accessible way to extract and share data within and across organizations.

**Artificial intelligence (AI):** development of computer systems capable of performing tasks that historically required human intelligence, such as recognizing speech, making decisions, and identifying patterns.

**Annual Percentage Rate (APR):** is the cost you pay each year to borrow money, including fees, expressed as a percentage. The APR is a broader measure of the cost to you of borrowing money since it reflects not only the interest rate but also the fees that you have to pay to get the loan.

**Amazon Web Services (AWS):** is a subsidiary of Amazon that provides on-demand cloud computing platforms and APIs to individuals, companies, and governments, on a metered, pay-as-you-go basis. Clients will often use this in combination with autoscaling.

**Graphical User Interface (GUI):** a form of user interface that allows users to interact with electronic devices through graphical icons and audio indicators.

**Machine Learning (ML):** a branch of AI and Computer Science which focuses on the use of data and algorithms to imitate the way humans learn, gradually improving its accuracy.

**Optical Character Recognition (OCR):** the process of extracting text from an image so that it can be read and interpreted by a machine.

**Rewards Credit Card:** credit cards which offer you some type of “reward”—typically cash back, points, or travel miles—for every dollar you spend, sometimes up to certain limits.

## 6. References

Black, M. L. (2022, August 15). *Survey: Credit cardholders sitting on unused rewards*.

LendingTree. <https://www.lendingtree.com/credit-cards/study/unused-rewards/>

Credit Karma. (2023). *Compare credit cards & apply online instantly*. Intuit Credit Karma.

<https://www.creditkarma.com/credit-cards/search-cc>

Experian. (2017). *Survey Findings: How Do Consumers Feel About Credit Cards?*

<https://www.experian.com/blogs/ask-experian/survey-findings-how-do-consumers-feel-about-credit-cards/>

NerdWallet. (2023). *Compare Rewards Credit Cards for Good Credit. Rewards Credit Cards -*

*Compare 98 Card Offers*. <https://www.nerdwallet.com/rewards-credit-cards?amex=1>