Lab 1 – BetterSwipe Product Description

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1. Introduction

In today's financial landscape, the ever increasing availability of rewards credit cards offers a plethora of choices that make it difficult for the consumer to choose which best suits their spending habits.With options ranging from cash back to points and ,iles, consumers are inundated with choices - 53 cash back cards, 12 miles cards, and 20 points cards, as reported by Credit Karma (Credit Karma 2023). This combination of rewards options, while beneficial, comes with its own sets of challenges. The complexity of these reward systems, each offering different returns, has led to a situation where a significant portion of consumers are overwhelmed and under informed regarding how to select rewards cards that give them the best financial advantage. Recent studies by Experian in 2017 highlighted that 69% of individuals find the process of selecting a new credit card excessively time-consuming, 61% are overwhelmed by the sheer number of available options, and 57% struggle to find a card that aligns with their specific needs. This issue is further compounded by the fact that many consumers are not fully utilizing their rewards, with a report by Black in 2022 revealing that 69% of rewards credit card holders are not maximizing their potential benefits. This underutilization signifies a substantial loss in potential

savings, and when combined with the challenges associated with selecting rewards cards, indicate a need for a solution that simplifies and personalizes the process of choosing the most beneficial credit card.

BetterSwipe is an application designed to address this need. BetterSwipe leverages users' transaction histories to develop a personalized expenditure profile. BetterSwipe offers tailored recommendations for rewards credit cards that best match the users' spending habits. Additionally, the platform allows users to fine-tune their profiles by incorporating factors like their approximate credit score and the cards they currently own, ensuring that the recommendations are as relevant and beneficial as possible.

2. BetterSwipe Product Description

BetterSwipe is a web application that is designed for consumers that want to optimize their financial rewards. Leveraging deep analytical insights into individual spending habits, BetterSwipe recommends credit cards that align with user lifestyles and expenditure patterns.

2.1. Key Product Features and Capabilities

BettertSwipe revolutionizes the approach to choosing rewards credit cards by developing a unique spending profile for every user. This profile is meticulously crafted based on each user's transaction history, paving the way for the recommendation of a few rewards cards that offer the highest financial advantages tailored to their spending habits.

BetterSwipe delves into the intricacies of a user's financial habits to suggest rewards credit cards that are not just beneficial but also pertinent to the user's financial health. It leverages detailed analysis of transaction history to craft a bespoke spending profile for each

user. This profile is dynamically updated to reflect current spending trends, ensuring its recommendations remain relevant and beneficial.

With the integration of additional personal financial details such as credit scores and the number of currently held rewards cards, BetterSwipe enriches the customization of each profile. This comprehensive view allows for recommendations that go beyond general spending habits to consider the broader financial landscape of the user. As a result, BetterSwipe empowers users to optimize the utility of rewards credit cards, making well-informed choices that align with their financial lifestyle and aspirations.

2.2. Major Components (Hardware/Software)

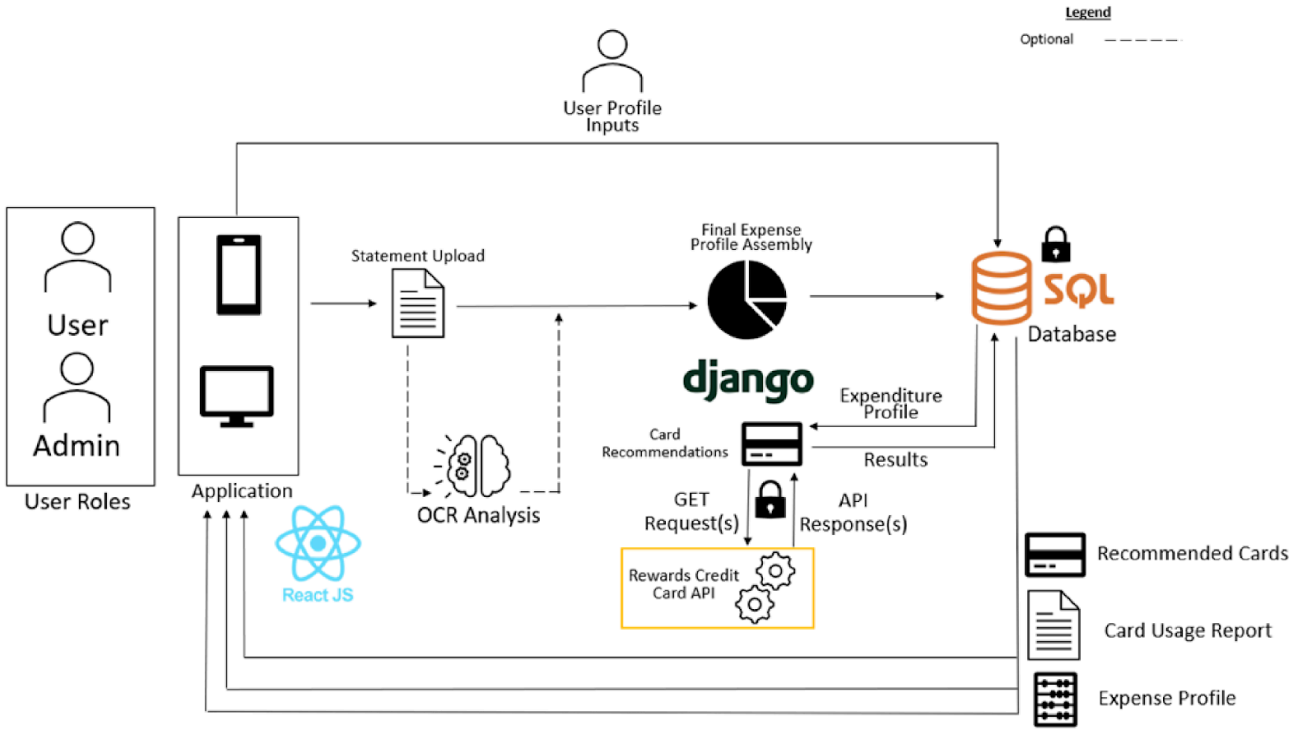
The Framework of BetterSwipe is an advanced integration of both hardware and software elements tailored to simplify the credit card selection process. THe infrastructure's hardware aspect is reliant on internet-connected devices, which include personal computers with Linux, macOs, or Windows operating systems, as well as smartphones equipped with Android or iOS. These devices link users to the BetterSwipe platform, which is sustained by high-performance servers to deliver consistent and prompt service. In terms of software, BetterSwipe leverages a suite of programming languages and development tools to construct a robust and maintainable platform. The web interface is developed with HTML, CSS, and JavaScript to ensure a user-friendly and engaging online presence. For the creation of web and mobile applications, Python is employed for its powerful simplicity and operational effectiveness. The platform's database needs are addressed with a MySQL database system, renowned for its reliable and structured storage solutions for user particulars and financial behaviors. The software architecture is fortified by an assortment of libraries and external applications. Development is conducted in the integrated development environment Visual Studio Code, facilitating a versatile development process. Code versioning is controlled using the combined strengths of Github and Git, ensuring

efficient code lifecycle management. Automate building and testing are achieved through the use of Gradle, confirming the integration and performance of application components..Here will be where the MFCD for BetterSwipe be (expressed as Figure 1).

Project management and team collaboration are enhanced by the adoption of agile methodologies, operationalized through Trello for task management and progress tracking. Team communication and collaborative efforts are further bolstered by tools like Discord and Zoom, which provide a platform for effective teamwork and collaboration.

Figure 1

Major Functional Components Diagram



3. Identification of Case Study

BetterSwipe is mainly geared towards consumers who are looking for new rewards credit cards to utilize, but are overwhelmed by choosing through the vast amount of options available, which rewards credit card best suits their monetary spending habits BetterSwipe aims to serve as a tailored platform that simplifies the selection process based on individual spending profiles.

Navigating the reward credit card landscape can be daunting due to the complexity and variety of card benefits. Users often miss out on maximizing their potential savings or rewards due to a lack of personalized guidance. Moreover, the absence of a centralized and intelligent system aligns credit card options with personal spending patterns and financial objectives leaves many individuals with rather poor credit card choices. BetterSwipe addresses this issue by directly offering a solution that not only recommends cards suited to the user's unique financial lifestyle but also educates them on making informed decisions that enhance their financial well-being.

The objective of BetterSwipe is to revolutionize the way individuals select reward credit cards by making the process more intuitive, personalized, and efficient. By leveraging detailed spending profiles and incorporating factors such as credit scores and existing card ownership, BetterSwipe provides targeted recommendations that are closely aligned with the user's financial habits and preferences. This personalized approach ensures that users are equipped with the tools and knowledge to select credit cards that truly match their financial lifestyle, leading to improved satisfaction and financial outcomes.To validate the effectiveness of BetterSwipe and its impact on user's decision-making processes, a case study will be conducted with a group of users who represent a wide range of spending habits and financial goals. Participants will use BetterSwipe to select reward credit cards based on the app's recommendations and track their satisfaction and

financial benefits over a designated period. This study will also gather user feedback on the ap's usability, the relevance of recommendations, and overall impact on their credit card selection strategy. The case study aims to demonstrate BetterSwipe's value in empowering users with the knowledge and confidence to make optimal credit card choices, thereby enhancing their financial health and maximizing rewards.

As BetterSwipe evolves, user feedback will be crucial for refining its algorithms, expanding its features, and ensuring the platform remains at the forefront of personalized financial guidance. This continuous improvement cycle is essential for meeting the diverse needs of its users and maintaining BetterSwipe's position as a leading tool in personal financial management.

4. BetterSwipe Product Prototype Description

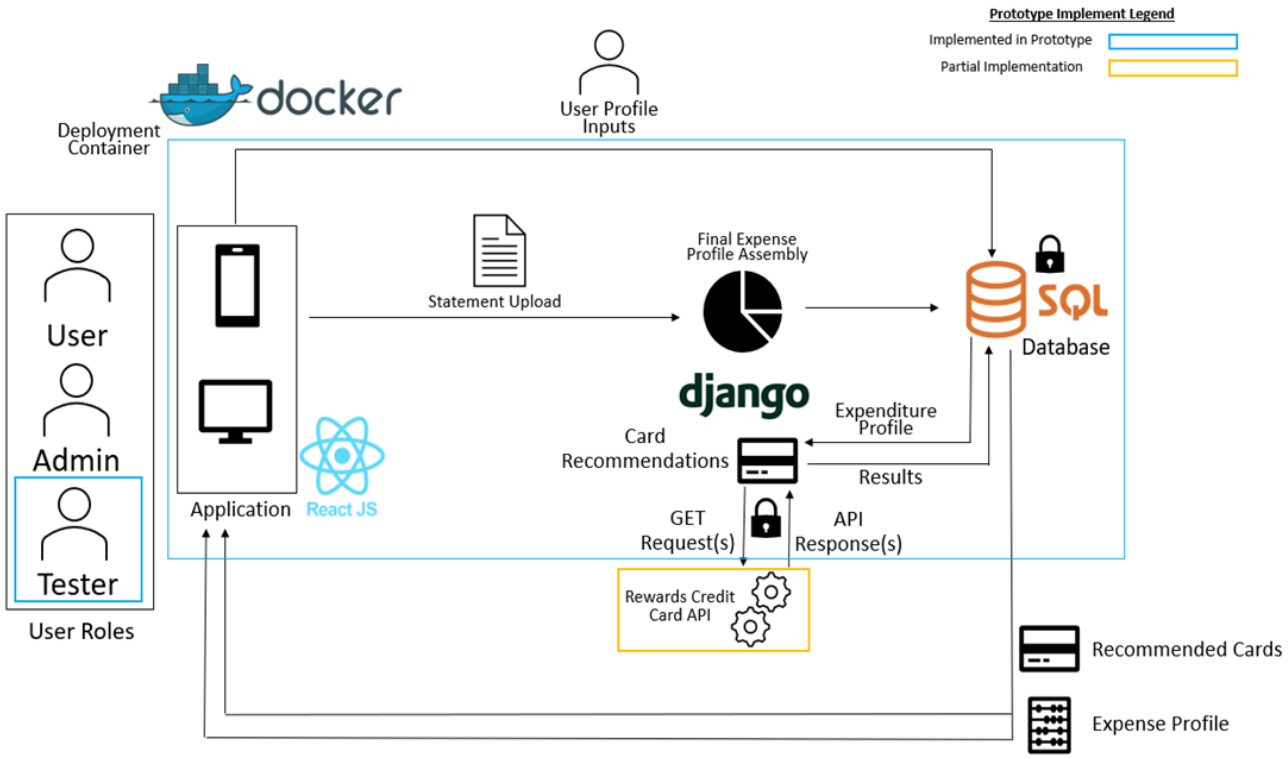
The foundational goal of the BetterSwipe product prototype is to provide a platform that enables users to efficiently manage and optimize their reward credit cards.The BetterSwipe prototype serves to showcase the essential features and functionalities of BetterSwipe, facilitating an intuitive user experience for managing reward card benefits.

4.1. Prototype Architecture (Hardware/Software)

The prototype for BetterSwipe is designed to be accessible as a web page, closely emulating the architecture of the real world product, but it distinguishes itself by being deployed within a virtual environment. Specifically, the prototype operates on a virtual machine, which is facilitated through a Docker Container. This arrangement is intended to replicate a controlled development environment similar to what might be provided by an academic institution's computing resources, offering a scalable and isolated testing framework as shown in Figure 2.

Figure 2

Prototype Major Functional Components Diagram



The BetterSwipe prototype's software architecture is designed to ensure a seamless and engaging user experience across various web-enabled devices. The frontend of the website will be developed using HTML, CSS, and JavaScript, which are fundamental technologies for creating responsive and interactive web pages. This combination allows for a versatile user interface that is accessible on both desktop and mobile platforms. In contrast, the backend logic of the web application relies on Python, a programming language renowned for its straightforward syntax and effectiveness in web development scenarios, making it a perfect fit for developing server-side operations.

For data management , mySQL will be used for the relation database, providing a solid foundation for storing and retrieving complex data structures efficiently. This choice reflects a preference for a robust and scalable database solution capable of supporting the application's data - intensive operations.

In terms of libraries and frameworks, the prototype leverages React for the frontend to facilitate the development of a dynamic and component - based user interface, significantly enhancing user interaction with the application. On the backend, Django, is employed to expedite the process through its pragmatic approach to design and its emphasis on rapid development, which is crucial for meeting project timelines and ensuring the application's maintainability.

The development environment used with the production of the BetterSwipe prototype will be Visual Studio code, which supports a variety of programming languages and development tools. The version control used for this project consists of the combination of Github and Git, in which offers a robust platform for code management and team collaboration. The testing process is streamlined with Gradle, an automation tool that simplifies the building and testing of software ensuring that each component of the application performs as expected.

4.2. Prototype Features and Capabilities

The BetterSwipe prototype is developed to showcase the key features and functionalities planned for the real world prototype(RWP), highlighting its capacity to streamline the management of rewards credit cards . This will be shown in Table 1.The prototype incorporates a robust login and registration framework, laying the foundation for user data protection from the outset. At the forefront of BetterSwipe's innovative offerings is a sophisticated card recommendation engine that harnesses spending data to present users with the most advantageous credit card options. This is supplemented by a comparative tool allowing for the juxtaposition of card features, which facilitates astute financial decision-making.

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Table 1

Functional Element	RWP	Prototype	Current Plan
General			
Web and Mobile Interfaces	Fully Implemented	Partially Implemented	Partially Implemented
Account Registration	Fully Implemented	Fully Implemented	Fully Implemented
Authentication	Fully Implemented	Fully Implemented	Fully Implemented
Profile CRUD	Fully Implemented	Fully Implemented	Fully Implemented
History of Reports	Fully Implemented	Fully Implemented	Fully Implemented
Security			
MFA	Fully Implemented	Eliminated	Eliminated
Data-at-Rest Encryption	Fully Implemented	Fully Implemented	Fully Implemented
Data-in-Transit Encryption	Fully Implemented	Partially Implemented	Partially Implemented
Statement Analysis			
Statement Upload	Fully Implemented	Fully Implemented	Fully Implemented
Expenditure Categorization	Fully Implemented	Fully Implemented	Fully Implemented
OCR/ML Analysis	Fully Implemented	Eliminated	Eliminated
Expenses Summary	Fully Implemented	Fully Implemented	Fully Implemented
Rewards Card Features			
Card Recommendations	Fully Implemented	Fully Implemented	Fully Implemented
Card Comparisons	Fully Implemented	Fully Implemented	Fully Implemented
Rewards Card Details	Fully Implemented	Fully Implemented	Fully Implemented
Continuous Monitoring			
Savings Prediction	Fully Implemented	Partially Implemented	Partially Implemented
Future Purchase Recommendations	Fully Implemented	Partially Implemented	Partially Implemented

Moreover, BetterSwipe imparts intricate details on rewards programs, granting users the ability to discern the intricacies of each card's offerings. The platform accommodates a holistic view of one's financial health by supporting the import of transaction lists in .csv format, thus amplifying the accuracy of tailored card recommendations.

As detailed in the appended RWP/Prototype features table, the prototype retains most of the real-world product's functionality. However, some aspects are only partially implemented to prioritize the development of core elements and to gauge the practicality of the intended design. For instance, the ability for users to schedule appointments, fully operational in the RWP, will be manual in the prototype, requiring an attorney's intervention to finalize bookings. Similarly, the document management feature will be limited to specific file typ

4.3. Prototype Development Challenges

Developing the BetterSwipe prototype presents several key challenges critical to its success. Keeping credit card information current is a challenge, requiring an automated system for updating reward programs and terms in respons to the ever-changing financial landscape. Integration with external APIs for financial data poses its own set of challenges, including handling access limitations and data inconsistencies that could affect the prototype's functionality. Additionally, the effectiveness of personalized card recommendations depends on the availability of comprehensive user data, a challenges at the outset that demands the formulation of expenditure profiles based on spending categories and effective algorithms to match rewards card offerings to the consumer based on their spending habits. The learning curve associated with the programming languages being used to develop this application is one of the biggest developmental challenges to overcome due to the inexperience with these programming languages. Another challenge is the database setup and integration with Docker and understanding the functionalities of how the database and the Docker container interact, whilst also keeping in mind that the team is geographically distributed and tailoring the schedules of those in the team will be a massive challenge. Overcoming these challenges is essential to ensure BetterSwipe's reliability, security, and user-centric value.

5. Glossary

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.

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.

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.

CSS: Cascading Style Sheets, Programming language used to determine how HTML elements are displayed.

GitHub: Service that provides hosting and version control for software development projects.

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

HTML: Hyper Text Markup Language, a programming language used for creating Web pages.

Javascript(JS): a scripting programming language that enables dynamic updates of content.

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.

MySQL: Open source database management system that could be used from creating a simple shopping list to holding a large amount of company data.

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