

Lab 1 – CreditTrax Product Description

Darrick Allen

Old Dominion University

CS411W

Professor S. Hosni

January 31, 2025

Version 2

Table of Contents

1	Introduction.....	3
2	Product Description	4
2.1	Key Product Features and Capabilities	4
2.2	Major Components (Hardware/Software).....	6
3	Identification of Case Study.....	9
4	Glossary	10
5	References.....	12

List of Figures

Figure 1: Major Functional Components Diagram.....	7
Figure 2: Database Schema.....	9

List of Tables

Table 1: Development Tools.....	8
---------------------------------	---

1 Introduction

Financial stress is a pressing issue for many young adults in the United States, driven by the rising cost of living, escalating student loans, mounting credit card debt, and limited financial education. Today, student loan debt exceeds 1.74 trillion dollars, with over half of students leaving college in debt (Safier & Young, 2024). Similarly, credit debt in the United States now totals over 1 trillion dollars and is increasing annually among young adults across the nation (Horymski, 2024). These financial pressures often delay important life milestones for young adults, such as marriage, buying a home, and starting a family, while also impacting their physical and mental health by increasing levels of anxiety, depression, and stress (Rademacher & Melford, n.d.).

While most individuals experience unexpected expenses like medical bills, car repairs, or household emergencies, young adults encounter these issues without the benefit of financial experience. Limited exposure to budgeting and the long-term impact of financial decisions can significantly hinder young people early in their careers, often leading to a future with no retirement in sight (Cariaga, 2024). Although many budgeting and debt management apps exist, they rarely prioritize user education or offer clear insights into the long-term consequences or benefits of current financial actions.

CreditTrax bridges these gaps by offering a comprehensive platform with predictive financial algorithms, debt tracking, and financial literacy tools in a single location. Through personalized data analytics, visualization, and What-if analysis, CreditTrax provides young adults with clear insights into their financial present and future, empowering them to navigate an uncertain phase of life and setting a strong foundation for future financial success.

2 Product Description

CreditTrax is a web-based mobile application created to guide young adults through the challenges of managing their finances. Without proper experience or guidance, early financial decisions can lead to long-term hardship and lasting setbacks. This is why CreditTrax emphasizes early financial education by providing tools for financial literacy, planning, and tracking, setting young adults on the right track from the start. By leveraging both hard-coded and AI-based algorithms, CreditTrax offers personalized, data-driven recommendations and insights to its users. Additionally, our What-If analysis tool offers a glimpse into future scenarios, giving young adults a clear window into their finances at any time, present or future, so they can rest assured that they are always on the right track.

2.1 Key Product Features and Capabilities

To facilitate early financial literacy and awareness, CreditTrax offers a range of features including a personalized financial dashboard, What-if analysis simulations, debt tracking, smart payment reminders, budgeting recommendations, a community rewards system, and the ability to set both short and long-term goals. These features are designed to provide clarity, guidance, and motivation for young adults managing their finances.

The personalized financial dashboard provides users with an organized snapshot of their financial health. This feature allows users to track and visualize their financial spending habits, debt obligations, financial goals, and earned rewards at a convenient glance.

The What-If analysis tool utilizes hard-coded, and AI-based algorithms to help users simulate personal financial scenarios. Users can project a range of outcomes, such as, “What if I make the minimum payment on my student loan over the next year?” or “What if I place 10% of my income after expenses into savings?” This ensures users always have the foresight to know which financial path is best for them.

Debt-tracking tools provide users with a clear view of their financial obligations in one place. Users can input all their debts, such as credit card balances and student loans, along with their respective interest rates and due dates, offering a 24-7 snapshot of their financial responsibilities. The opt-in smart notification system ensures timely payments before a due date by prompting users to manually confirm that a debt has been paid. If the user neglects to confirm, the reminders will gradually increase as the due date approaches.

Personalized budgeting recommendations leveraging AI technologies, such as Claude's API, allow users to interact with a personalized chatbot tailored to their specific debt and spending habits, receiving personalized suggestions to reduce unnecessary spending and allocate funds more efficiently.

Community and gamification features ensure users are rewarded for their good financial habits by offering badges and monthly leaderboard points whenever a user pays off a debt on time or achieves a financial goal. This feature provides a gamification element to the app promoting healthy, long-lasting financial decisions.

Finally, the ability to set short- and long-term financial goals ensures progress is always being made towards a better financial future. Users can choose from a list of preset goals or create custom goals tailored specifically to their needs. These goals can then be integrated into the What-If analysis or budgeting recommendations feature to help influence their results.

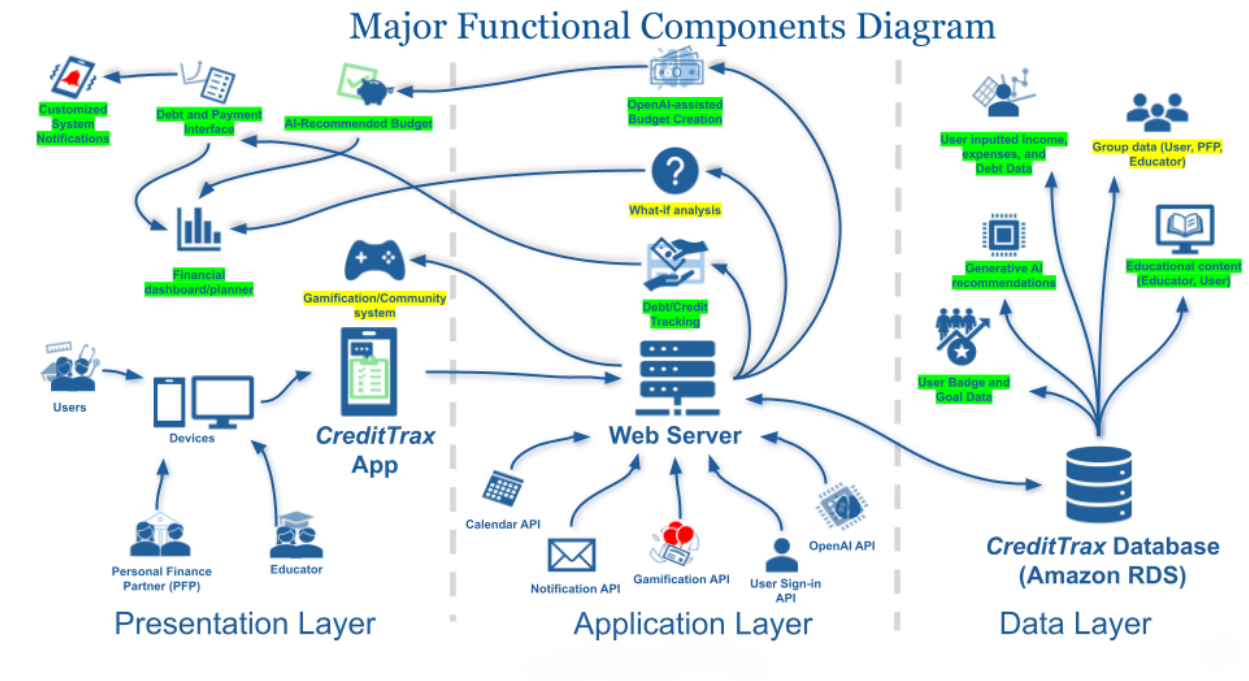
2.2 Major Components (Hardware/Software)

CreditTrax is a web-based mobile application, designed primarily for Android or IOS devices. However, desktop web browsers are also supported. Additionally, the device in question requires a stable internet connection for proper functionality.

Users interact with CreditTrax through its Presentation layer, allowing for information to be both visualized and inputted by the user for processing. Through this layer, users can access CreditTrax via web browser or mobile web application interface, allowing for the visualization of data and access to core features through communications with the web server.

The Application layer acts as the processing hub, powering core features such as our What-If analysis tool, budgeting recommendations, and smart reminders. It also integrates key APIs such as our Badge API for rewards, Claude's API for chatbot functionality, and Google Calendar API for smart notification reminders.

The Data Layer is responsible for storing system configurations and user data. It will leverage a containerized version of MySQL through Docker to securely manage sensitive information, such as credit, transaction, and debt records, and user profile data. Additionally, Amazon RDS services are utilized to provide seamless communication with our application layer.

Figure 1*Major Functional Components Diagram*


For frontend development, web technologies such as HTML5, CSS, and JavaScript are utilized to craft the user interface while Bootstrap acts as our primary frontend framework to help diminish the workload involved with writing extensive CSS stylesheets. For testing, Jest is utilized to ensure code quality and reliability while JSDoc acts as our documentation tool of choice.

Backend development utilizes Python as the primary language, supported by libraries such as sci-kit Learn, NumPy, and Pandas to handle calculations and analysis. Django acts as our backend framework to help with data communications and project structure in tandem with

Pytest to ensure robust and consistent code quality. For organized documentation, Pydoc and Sphinx are leveraged.

Table 1

Development Tools

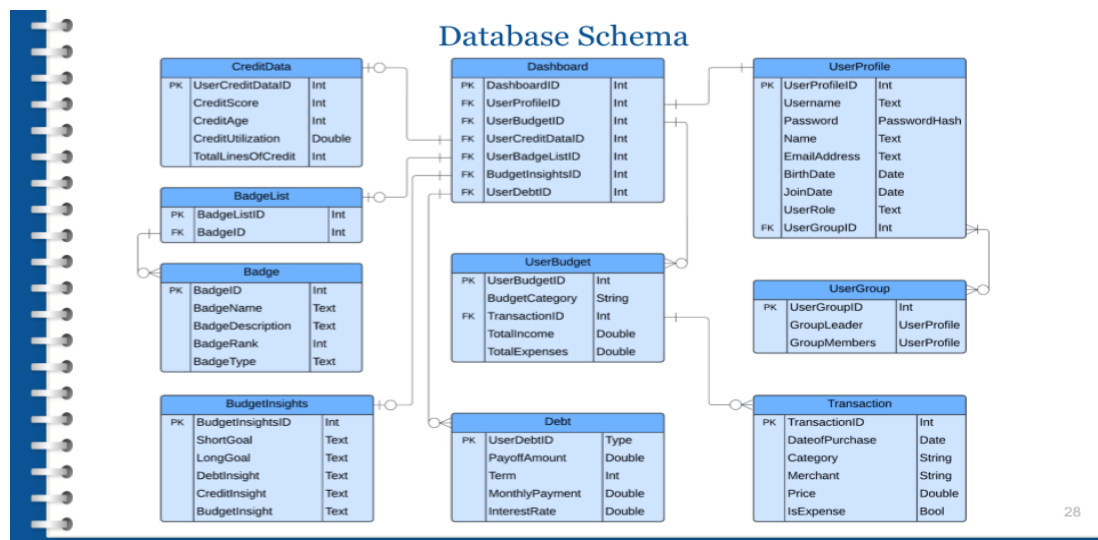


Development Type	Front-End	Back-end
IDE	VSCode	VSCode
Version Control	Github	Github
CI and CD	Github	Github
Language	HTML5, CSS, JS	Python
Testing Framework	Jest	Pytest
Documentation Tool	JSDoc	Pydoc, Sphinx

CS 411W Team Copper

19

Amazon RDS, in conjunction with a containerized version of MySQL, is leveraged to provide a secure and scalable solution for system and user data, such as user profiles, budgets, debts, transactions, and badges. As for data protection, Amazon RDS not only offers robust security but also advanced features, such as automated back-ups and 35-day data retention, ensuring a fail-safe for data recovery in case of an emergency.

Figure 2*Database Schema*

3 Identification of Case Study

CreditTrax is designed for young adults ages 18-34 who are new to managing their finances and want greater control over both their current and future financial health. This includes individuals currently struggling with student loans, credit cards, car payments, or any other form of financial obligation. Additionally, CreditTrax helps those looking for tailored financial recommendations on future savings, retirement planning, or What-If scenario insights.

Key users include young adults mentally overwhelmed by a lack of experience with personal finances, young professionals burdened by student loans and credit card debt, service members transitioning from service to civilian life, and recent graduates who lack financial literacy and are in need of budgeting support.

While CreditTrax is primarily aimed at a younger audience, we see how it can be expanded through universities that wish to help their students develop strong financial literacy skills, employers looking to offer financial wellness programs to their employees, and financial institutions seeking to better serve a younger audience.

4 Glossary

Annual Inflation Rate: The percentage increase in the cost of goods over the course of a year.

APR (Annual Percentage Rate): The annual rate charged for borrowing money as a percentage of the total borrowed amount.

Credit Score: A three-digit number that reflects an individual's creditworthiness based on their credit history, influencing lenders' decisions on loan approvals and interest rates.

Debt: Money that is borrowed and must be repaid, typically with interest.

Financial Literacy: A strong understanding of essential financial skills and concepts, such as budgeting, saving, and debt management.

Financial Management: The process of budgeting, saving, and monitoring personal finances to achieve one's financial goals.

Financial Uncertainty: The fear or concern about one's financial situation, often relating to income, debt, or future stability.

Student Loans: Money borrowed by an individual for educational purposes (for tuition, transportation, textbooks, etc.) which must be repaid with interest.

"What-if" Analysis: A technique that allows users to simulate various (financial) scenarios and visualize their potential outcomes.

Young Adults: Individuals between the ages of 18 to 34 who are in the workforce and have limited experience with personal finances.

Young Professionals: Young adults aged 18-34 who are in the workforce, in college, or have recently graduated.

5 References

U.S. Federal Reserve. (2024, September 9). Consumer credit - G.19.

https://www.federalreserve.gov/releases/g19/HIST/cc_hist_memo_levels.html

Chernikoff, S. (2024, April 18). How are college costs adding up these days and how much has tuition risen?. USA Today.

<https://www.usatoday.com/story/news/education/2024/04/18/college-tuition-costs-graphics/73347491007/>

Cariaga, V. (2024, May 17). Saving for the future: Why most young adults put nothing toward retirement. Yahoo Finance.

<https://finance.yahoo.com/news/saving-future-why-most-young-160623467.html>

Gravier, Elizabeth. (2024, January 11). Remind yourself of ‘what makes you happy’: Blogger shares her advice about battling debt and depression. CNBC.

www.cnbc.com/select/debt-and-mental-health/.

Federal Trade Commission (FTC). (2018, March 1). How to get out of debt. Consumer Advice.

<https://consumer.ftc.gov/articles/how-get-out-debt>

Horymski, C. (2024, March 11). Consumer credit card report. Experian.

<https://www.experian.com/blogs/ask-experian/state-of-credit-cards/>

Martinez, D., & Seikel, M. (2024, February 22). Credit card interest rate margins at all-time high. Consumer Finance.

www.consumerfinance.gov/about-us/blog/credit-card-interest-rate-margins-at-all-time-high/.

Martincheck, K., & Santillo, M. (2024, September 18). Many young adults have taken on debt. It could jeopardize their financial futures. Urban Institute.

<https://www.urban.org/urban-wire/many-young-adults-have-taken-debt-it-could-jeopardize-their-financial-futures>

National Institute of Standards and Technology. (2020). NIST cybersecurity framework: A framework for improving critical infrastructure cybersecurity.

<https://www.nist.gov/cyberframework>

Rugaber, C. (2022, July 13). U.S. inflation at 9.1 percent, a record high. PBS News.

www.pbs.org/newshour/economy/u-s-inflation-at-9-1-percent-a-record-high.

Rademacher, I., & Melford, G. (n.d.). Young adults and consumer debt: The quiet crisis next time. New America.

<https://www.newamerica.org/millennials/reports/emerging-millennial-wealth-gap/young-adults-and-consumer-debt-the-quiet-crisis-next-time/>

Suknanan, E., & Gravier, J. (2024, July 9). Mint is gone — Here are some alternative budget apps to consider. CNBC.

<https://www.cnbc.com/select/mint-budgeting-app-is-going-away-here-are-some-alternatives/>

Safier, R., & Young, J. (2024, September 29). Student loan debt: Averages and other statistics in 2023. USA TODAY Blueprint.

www.usatoday.com/money/blueprint/student-loans/average-student-loan-debt-statistics/

US External Debt, 2003 – 2023 | CEIC Data. CEIC Data,

www.ceicdata.com/en/indicator/united-states/external-debt/.

Winters, M. (2024, June 29). The 10 U.S. places with the highest cost of living—No. 1 costs more than double the national average. CNBC.

<https://www.cnbc.com/2024/06/29/us-highest-cost-of-living.html>