

CodeFit_AI.js

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[IMAGE OF PROTOTYPE]

Technical Field

This project involves the technical fields of Advancing Computer Science and Artificial Intelligence.

Background Information

Of all majors in the US, Computer Science has the highest dropout rate of 10.7% of a roughly estimated 40% yearly dropout rate, ([What Is the Highest Dropout Rate by Major? | Lantern by SoFi \(lanterncredit.com\)](#)). Coding Bootcamps face a similar problem, with graduation rates anywhere from about 69% to 89%, depending on the bootcamp, ([Coding Bootcamp Graduation Rates and Outcomes \(careerkarma.com\)](#)). Aspiring software engineers often lack a clear understanding of the skills required to succeed as a software engineer, and they are also unaware if they possess the aptitude for software engineering. This leads to wasted time and resources in education and training, as well as wasted investments, time and money, in their career paths. This problem is significant because it affects individuals who are at a crucial decision-making stage regarding their career paths. It impacts:

- Aspiring software engineers who may spend years and significant financial resources on an unsuitable career.
- Educators and mentors invest time in students who may not be suited for the field.
- The tech industry, which faces oversaturation of new entrants who are unqualified and do not possess the skills needed for the positions that they are applying for.

Prior Art

Codewars - An educational community for computer programming mainly focusing on coding challenges or what's known in the industry as "problem solving".

- Link: <https://www.codewars.com/>
- NOTE: There are many other platforms like Codewars which I will mention just briefly – LeetCode, HackerRank, etc.

Codecademy – An online platform that offers free coding classes.

- Link: <https://www.codecademy.com/>

- NOTE: There are many other platforms like Codecademy which I will mention just briefly – FreeCodeCamp, Coursera, Udemy, Pluralsight, etc.

Google’s Grasshopper – An app developed to teach users to code with JavaScript.

- Link: [Learn to code with Grasshopper, now on desktop \(blog.google\)](#)
- NOTE: A Professor brought this app to my attention. It does not appear to exist anymore, neither as a mobile app nor a desktop app.

Project Description

The project is a web app that will assess any aspiring software engineer’s aptitude and personality via third-party services, it will give a recommendation whether they possess the aptitude and personality profile for software engineering. If they do not, it will give them recommendations for other fields within the IT Industry which would be more suitable given their results. If they do, then they will begin learning the fundamentals of web development and the JavaScript programming language via an interactive coding platform with an AI Mentor. If they do not finish the fundamentals, they will be reminded to finish. If they finish the fundamentals, they will be rewarded with a certificate of completion and a roadmap to guide them on their journey towards becoming a full stack, frontend, or backend software engineer, and they will also receive exclusive offers to join partnered coding bootcamps or universities, if any. The user will interact with AI throughout the app, just more so during the interactive coding lessons. This should give aspiring software engineers an unbiased opinion on whether they are a good fit for coding as a career.

Innovation Claim

My AI-powered web application assesses aspiring software engineers' aptitudes and personality profiles to determine whether they have the mind and personality for software engineering. Through AI powered interactive coding lessons, users will learn the fundamentals of web development, programming in JavaScript, and will be provided personalized feedback. Upon completion, they will be given a customized learning pathway. The goal of the app is to ensure users are fit to code and equipped with the right mindset, as well as encouraged that they have the capabilities necessary before making any educational commitments.

Usage Scenario

The innovation behind this application can extend beyond assessing and guiding aspiring software engineers. Its underlying principles and functionalities can be adapted for various other domains and purposes such as career transition assistance.

In today's job market, many professionals seek to transition into new careers. This application can be repurposed to assist individuals from various fields who are contemplating a career change. By assessing their aptitude and personality traits, the system can recommend suitable new career paths based on their existing skills and interests.

For instance, a marketing professional considering a switch to a tech-related field can use the application to evaluate their potential fit for roles such as data analysis, online marketing, or project management in IT. The interactive learning platform can then offer courses and resources to help them acquire the necessary skills for their new career path, complete with AI-driven mentorship and progress tracking. This not only broadens the user base but also addresses a critical need for personalized career guidance.

This project is designed to cater to a diverse demographic that includes:

- **Aspiring Software Engineers:** Individuals, typically high school or college students, who are exploring the possibility of a career in software engineering and need guidance on their suitability and potential success in the field.
- **Career Changers:** Professionals from various industries looking to transition into software engineering or other IT roles. This group benefits from the assessment and tailored recommendations, helping them identify their strengths and potential new career paths within the tech industry.
- **Lifelong Learners:** People who are passionate about continuous learning and self-improvement. This group may already have a career but is interested in acquiring new skills in software development or other IT-related fields for personal growth or to stay competitive in the job market.
- **Educational Institutions and Coding Bootcamps:** Schools, universities, and bootcamps that want to offer a robust career assessment and skill-building tool to their students, helping them make informed decisions about their career paths and providing them with structured learning opportunities.

Evaluation Criteria

The following questions will identify the successful completion of the project:

1. Does the web app successfully assess users' aptitude for software engineering?
2. Does the app provide clear and personalized recommendations for alternative IT fields if users are not suited for software engineering?
3. Does the app effectively guide users through learning the fundamentals of web development?
4. Does the interactive coding platform function smoothly and without significant technical issues?
5. Is the AI Mentor able to provide helpful and contextually accurate assistance during coding lessons?
6. Does the app issue reminders to users who have not completed the fundamentals?
7. Is a certificate of completion automatically awarded to users who finish the fundamentals?

8. Does the app provide a clear and detailed roadmap for users who complete the fundamentals?
9. Are users offered exclusive opportunities to join partnered coding bootcamps or universities upon completion?
10. Does the app ensure an unbiased assessment of users' suitability for a coding career?
11. Is the user interface intuitive and user-friendly?
12. Are the results and recommendations provided by the app perceived as valuable and accurate by users?
13. Can the app handle multiple users simultaneously without performance degradation?
14. Is there a mechanism in place for users to provide feedback on their experience with the app?
15. Are there regular updates and improvements made to the app based on user feedback?
16. Does the app comply with relevant data privacy and security standards?
17. Is there a clear and effective onboarding process for new users?
18. Do users feel motivated to complete the learning modules and assessments?
19. Are the coding lessons engaging and educational?
20. Does the app track users' progress accurately and provide appropriate feedback?

Objectives and Tasks Associated with the Project

High-Level Objectives:

1. Assess User Aptitude and Personality
2. Provide Personalized Career Recommendations
3. Facilitate Learning of Web Development Fundamentals
4. Implement and Maintain an Interactive Coding Platform with AI Mentor
5. Issue Certificates and Provide Career Roadmaps
6. Partner with Coding Bootcamps and Universities
7. Ensure User-Friendly and Intuitive Interface
8. Maintain High Performance and Scalability
9. Implement Feedback and Improvement Mechanisms
10. Ensure Data Privacy and Security Compliance

Tasks for Each Objective:

1. Assess User Aptitude and Personality

Develop Assessment Framework

- Task Description: Create a comprehensive framework for assessing users' aptitude and personality. May have to turn to third-party sources for guidance and/or testing.
- Completion Date: TBD

- Decision-Making Transparency: Utilize industry standards and psychological research to develop questions and evaluation criteria.

Build Assessment Tool

- Task Description: Design and implement an online assessment tool integrated into the web app.
- Completion Date: TBD
- Decision-Making Transparency: Collaborate with UX designers to ensure a seamless user experience.

Validate Assessment Accuracy

- Task Description: Conduct pilot testing with a sample group to validate the accuracy and reliability of the assessment. May not be necessary if going with third-party sources.
- Completion Date: TBD
- Decision-Making Transparency: Analyze pilot test results and refine the tool based on feedback and data analysis.

2. Provide Personalized Career Recommendations

Develop Recommendation Algorithm

- Task Description: Create an algorithm that provides personalized career recommendations based on assessment results. May be unnecessary if using third parties for the assessments.
- Completion Date: TBD
- Decision-Making Transparency: Use machine learning models and consult career development experts for input.

Integrate Recommendations into App

- Task Description: Implement the recommendation algorithm into the web app.
- Completion Date: TBD
- Decision-Making Transparency: Ensure recommendations are clear, actionable, and relevant.

3. Facilitate Learning of Web Development Fundamentals

Design Curriculum

- Task Description: Develop a curriculum for web development fundamentals.
- Completion Date: TBD

- Decision-Making Transparency: Consult with experienced educators and industry professionals. Do not need to, I can do this myself, if need be, but this can be helpful.

Create Learning Modules

- Task Description: Build interactive learning modules covering HTML, CSS, and JavaScript.
- Completion Date: TBD
- Decision-Making Transparency: Use instructional design principles to ensure effective learning.

Implement Progress Tracking

- Task Description: Add features to track user progress and completion status.
- Completion Date: TBD
- Decision-Making Transparency: Ensure tracking mechanisms are accurate and provide meaningful feedback.

4. Implement and Maintain an Interactive Coding Platform with AI Mentor

Develop AI Mentor

- Task Description: Create an AI-powered mentor to assist users during coding lessons.
- Completion Date: TBD
- Decision-Making Transparency: Leverage natural language processing and machine learning techniques.

Integrate AI Mentor with Platform

- Task Description: Seamlessly integrate the AI mentor into the interactive coding platform.
- Completion Date: TBD
- Decision-Making Transparency: Ensure the AI mentor is intuitive and user-friendly.

Test and Optimize AI Performance

- Task Description: Conduct rigorous testing and continuous optimization of the AI mentor.
- Completion Date: Ongoing
- Decision-Making Transparency: Collect user feedback and performance metrics for ongoing improvements.

5. Issue Certificates and Provide Career Roadmaps

Design Certificate Templates

- Task Description: Create professional certificate templates for users who complete the fundamentals.
- Completion Date: TBD
- Decision-Making Transparency: Ensure certificates are visually appealing and credible.

Develop Career Roadmaps

- Task Description: Create detailed roadmaps for users to follow based on their career goals.
- Completion Date: TBD
- Decision-Making Transparency: Consult industry experts to ensure roadmaps are realistic and actionable. Do not rely solely on my own expertise here.

6. Partner with Coding Bootcamps and Universities

Identify Potential Partners

- Task Description: Research and reach out to potential coding bootcamps and universities for partnerships.
- Completion Date: TBD
- Decision-Making Transparency: Evaluate partners based on their reputation, course offerings, and alignment with project goals.

Establish Partnership Agreements

- Task Description: Negotiate and formalize partnership agreements.
- Completion Date: TBD
- Decision-Making Transparency: Ensure agreements are mutually beneficial and clearly define partnership terms.

7. Ensure User-Friendly and Intuitive Interface

Conduct User Research

- Task Description: Perform user research to understand needs and preferences. May not need to for reasons stated in next section below.
- Completion Date: TBD
- Decision-Making Transparency: Use surveys, interviews, and usability testing.

Design UI/UX

- Task Description: Design the user interface and user experience based on research findings. May not need to, I already have an experienced UI/UX designer.
- Completion Date: TBD
- Decision-Making Transparency: Iterate designs based on user feedback and testing.

8. Maintain High Performance and Scalability

Implement Performance Monitoring

- Task Description: Set up monitoring tools to track app performance. May be built into web hosting services.
- Completion Date: TBD
- Decision-Making Transparency: Use real-time data to identify and address performance issues.

Optimize Code and Infrastructure

- Task Description: Continuously optimize code and infrastructure to handle increasing user loads.
- Completion Date: Ongoing
- Decision-Making Transparency: Follow best practices and industry standards for performance optimization.

9. Implement Feedback and Improvement Mechanisms

Create Feedback Channels

- Task Description: Establish channels for users to provide feedback.
- Completion Date: TBD
- Decision-Making Transparency: Ensure feedback channels are easily accessible and user-friendly.

Analyze Feedback and Implement Changes

- Task Description: Regularly review user feedback and make necessary improvements.
- Completion Date: Ongoing
- Decision-Making Transparency: Prioritize changes based on user impact and feasibility.

10. Ensure Data Privacy and Security Compliance

Conduct Security Audit

- Task Description: Perform a comprehensive security audit to identify vulnerabilities. May not need to, security may be built into web hosting services, but an audit is never a bad idea.
- Completion Date: TBD
- Decision-Making Transparency: Use third-party experts to ensure unbiased assessment.

Implement Security Measures

- Task Description: Implement recommended security measures from the audit.
- Completion Date: TBD
- Decision-Making Transparency: Follow best practices and legal requirements for data privacy and security.

Description of Design Prototype

Describe the **design prototype** implementation. You should describe the platform on which the system will be built and provide directions on how to run the prototype (if necessary). Elaborate on the functionality of the parts that define your project. Effective descriptions will give the reader an understanding of what the design prototype will be, and how it relates to the final project.

Note: This section will be revised prior to SIP408 to describe the design prototype in its final form.

Evaluation Plan

Provide a complete, paragraph style description of the plan that is to be used to evaluate your project. This section should be a **description of the full plan** for how the team will go about answering the “Evaluation Criteria” questions. Do not simply repeat the questions!

Note: This section must be revised prior to SIP408 to describe the full evaluation plan as it was actually implemented.

Project Completion Assessment

Note: This section must be completed prior to SIP408

Provide an in-depth description of the completion assessment of your project. Describe how well the completed components function and highlight the innovative facets of your design. This is sometimes known as a “Post-Mortem” or “Lessons-Learned Report”. A good approach for this section is to answer the following 4 questions: “What went right? What went wrong? What was learned throughout the process? What would be done differently if you had to do it again?”

Appendices

Note: This section must be completed prior to SIP408.

Include as appendices any supporting material for this project, including charts, graphs, and other data; images associated with the project; or other documentation (e.g., a game design document or read-me file). Include any prior art that was used such as U.S. Patent Documents, Foreign Patent Documents, or other sources. Remember that this section should only be a list of additional files, not the actual data of the files!

Use the following format:

Appendix letter: description of item – file name

Example...

Appendix A: Game design document – myGameDoc.docx

Appendix B: 3D render of primary character – mainCharacter.jpg