SRS Document

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1   Introduction

1.1   Purpose

The app is designed to help students find courses that match their individual learning pace. The app uses data analytics and machine learning algorithms to analyze the student's learning style and behavior, based on their past academic performance and other relevant factors such as their personal interests, career goals, and preferred learning methods.

1.2   Intended Audience and Reading Suggestions

The project is intended for the learning community, specifically students who are interested in expanding their domain of knowledge and learn new topics

1.3   Project Scope

Number of courses recommended can be increased as well as the number of languages or topics provided by the app.Improving the feedback system to provide more courses after finding the mistakes more accurately.Choosing the right machine learning algorithm to find best learning rate and recommend best courses for the user. This could involve training and testing multiple models to determine the most accurate and reliable one.

1.4   References

1. https://classpert.com/

2. Teaching Programming and Algorithm Design with Pythia, a Web-Based Learning Platform-Sébastien COMBÉFIS, Vianney le CLÉMENT de SAINT-MARCQ

3. A two-tier test-based approach to improving students' computerprogramming skills in a web-based learning environment" - Tzu Chi Yang , Gwo Jen Hwang , Stephen J. H. Yang and Gwo Haur Hwang

2   Overall Description

2.1   Product Perspective

Our web app designed for learning programming languages is an exceptional tool that combines innovative features with machine learning techniques to provide a seamless and personalized learning experience. The app uses adaptive learning algorithms to adjust the difficulty and pace of learning materials to match the user's skill level and learning speed, ensuring that every user gets a tailored experience. The intelligent feedback system provides specific feedback

on errors, suggests improvements, and provides customized explanations based on the user's level of understanding, enabling them to improve their coding skills more efficiently.The app leverages natural language processing techniques to provide users with a natural language interface, making communication between the user and the app easier and more intuitive.Predictive analytics is another powerful feature of the app that allows it to forecast a user's future performance based on their past performance. This can help users to focus on areas where they need improvement and track their progress towards achieving their learning goals. Finally, the app offers personalized content recommendations based on the user's learning progress skill level, and interests. This feature allows users to discover new topics and areas of programming that they may be interested in and provides them with a more engaging and personalized learning experience. Overall, the web app for learning programming languages is an excellent tool that combines advanced machine learning techniques with a user-friendly interface to provide a seamless and personalized learning experience. It offers an unparalleled opportunity for users to enhance their coding skills, gain new knowledge and stay ahead of the curve in the rapidly evolving world of programming.

2.2   Product Features

1. **Personalized Recommendation:**The product is designed to help students find courses that match their individual learning pace using machine learning algorithms.

2. **Feedback System:** The product provides a feedback system where mistakes in the tests made by the user are corrected and resources for the same are recommended for better understanding of the concepts.

3. **User-Friendly Interface:** The product should have a user-friendly interface that allows users to interact with the software.

4. **Security and Privacy:**The product should have robust security measures to ensure that candidate information is protected, and user privacy is maintained.

2.3   User Classes and Characteristics

The different types of users who will access the website are as follows:

1. **Students:** Students of all ages and academic levels can benefit from the app's personalized learning approach. The app can help them stay engaged and motivated in their studies, track their progress, and receive real-time feedback on their performance. The app's natural language processing techniques can also help students clarify doubts and get answers to their questions in real-time.

2. **Professionals:** Working professionals can use the app to improve their skills and knowledge in their respective fields. The app's personalized content recommendations can help them stay up-to-date with the latest trends and developments, while the predictive analytics feature can help them identify knowledge gaps and areas for improvement.

3. **Language learners:** The app's natural language processing techniques can be particularly useful for language learners, as they can practice their skills

2.4   Operating Environment

The operating environment would typically include the following components:

1. **Hardware:** The system would require a server to run the machine learning algorithms and process data. The hardware needs to be powerful enough to meet the needs of the project such as training and testing machine learning models.

2. **Software:** The system would require various software components, including machine learning frameworks and libraries, programming languages such as Python, and database management systems such as MySQL.

3. **Data sources:** The system would require access to a variety of data sources, including various websites that provide learning materials.

4. **Security:** The system needs to be designed with strong security features to protect sensitive applicant data and prevent unauthorized access.

2.5   Design and Implementation Constraints

Design and implementation constraints may include:

1. **Data Quality:** The accuracy and completeness of the data used to train the machine learning algorithms and predict personality traits are important for the product's effectiveness.

2. **Model Complexity:** The accuracy of the personality prediction model may be affected by the complexity of the machine learning algorithms. Increasing model complexity may lead to longer training times and higher resource requirements.

3. **Bias:** The machine learning algorithms used to predict recommend courses may be biased based on factors such as the data used to train the model and it can be inaccurate.

3 System Features

3.1 Functional Requirements

1. **Data collection:** Gathering data and details of various courses pertaining to different fields and topics related to a user's study interest.

2. **Feature extraction:** The system will sort the collected data and recommend it to the user according to his/her preference.

3. **Recommendation:** Using ML the system will predict the learning rate of different users and offer them specific road maps and courses for their interested topics.

4. **Feedback System:** The system should be able to provide additional resources depending on the weaker areas of a user after collecting data from quiz or test attended by the user.

5. **Model training:** The system should be able to update rhe learning rate according to a user's progress and level of study

6. **Security and privacy:** System must be able to protect a uses login status and data from data breach.

4 External Interface Requirements

4.1 User Interfaces

1. **Web-based interface:** Access through web/app based system for logging in to a users profile.

2. **Feedback System:** Feedback system to give valuable insights to the user which will help them with the learning process.

3. **Quiz:** Test/Quiz feature to get a better understanding about the users progress of a certain topic.

4.2 Software Interfaces

1. **Database management system:** The system uses a database management system (DBMS) to store and manage the course resources and questions.

2. **Machine learning libraries and frameworks:** The system uses machine learning libraries and frameworks to develop and train the machine learning models for accurate recommendation.

5 Non Functional Requirements

5.1 Performance Requirements

1. **Response time:** The system should provide fast response times for both training and prediction processes which will help to make quick decisions.

2. **Scalability:** The system should be designed to handle large dataset and a high volume of users.

3. **Accuracy:** The system should have a high accuracy rate in predicting personality traits.

4. **Reliability:** The system should be reliable and available for use at all times.

5.2 Safety Requirements

Data privacy: The system should ensure that the data and other sensitive system data are kept private and confidential.It should be able to protect user login status and data breach.

5.3 Software Quality Attributes

1. **Reliability:** The system should be reliable and accurate in recommending courses based on user's learning rate.

2. **Maintainability:** The system should be easy to maintain and modify, with well-structured code, clear documentation, and efficient testing processes.

3. **Usability:** The system should be user-friendly and easy to use, with clear instructions and intuitive interfaces.

4. **Performance:**The system should have good performance and respond quickly to user requests, with minimal latency and downtime.

6   Use Case Diagram