

Analysis of Student Study Pattern for Personalized Learning using an Innovative Approach

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Abstract

In an era of rapid technological advancements, the area of Artificial Intelligence and Machine Learning (AIML) is revolutionizing the way we learn and interact with technology. However, this influx of information can be overwhelming for students, making it challenging to absorb and retain knowledge within a short timeframe. Learning preferences vary greatly from individual to individual, with some students preferring video tutorials, others favouring hands-on practical experiences, and still others relying on traditional textbooks. To address this diverse range of learning styles, i.e., a need for an interactive application that provides regular assessments following each lesson, regardless of the chosen learning method. This application would analyse each student's performance to identify their most effective learning approach. This personalized approach is particularly valuable in large coaching institutes, where a limited number of instructors cannot effectively monitor the progress of thousands of students simultaneously. By incorporating additional learning materials and implementing specific adjustments, this application can significantly enhance the learning experiences to students and adult learners alike, empowering them to navigate the complexities of technology with greater confidence and ease.

Keywords: Personalized learning, Machine learning, Education, Artificial Intelligence, study improvement application, student study analyser

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1. Introduction

In today's rapidly evolving technological landscape, the area of Artificial Intelligence and Machine Learning (AIML) is poised to revolutionize the way we learn and interact with technology. However, the sheer volume and complexity of information can be overwhelming for students, making it difficult to absorb and retain knowledge within a short timeframe. Traditional learning methods, such as textbooks and lectures, often fail to cater to individual learning preferences, which can hinder student progress and engagement.

To address these challenges, i.e., the pressing need for an interactive application that provides personalized learning experiences tailored to each student's needs and preference.

1.1. The Need for Personalized Learning

Learning preferences vary greatly among individuals. Some students thrive in visual environments, preferring video tutorials and interactive simulations. Others learn best through hands-on practical experiences, while still others S. F. Isamiddinovna explores the use of mobile applications as a modern means of learning English [4].

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The study discusses the benefits and potential of mobile or cell- phone apps in facilitating English language learning. S. Ying investigates vocabulary learning in mobile apps through web surveys [5]. The study explores different approaches and strategies used in mobile apps for vocabulary learning and their effectiveness. X. L. Pham, T. H. Nguyen, and G.-D. Chen analyzes factors that impact quiz scores in a mobile learning app [6]. The study identifies and observes various factors that impact learning outcomes in the context of cell phone or mobile learning apps. Basu, Debarati, Lohani, Vinod, and Xia, Kang analyze students' personalized learning and engagement within a cyberlearning system [7]. The research focuses on understanding individualized learning and engagement behaviors within a specific cyber- learning system. The above literature survey provides an idea of various studies related to mobile or cellphone applications for learning the language, particularly for the preview of English learning. These studies explore different aspects, such as platform development, AI assistance, game-based learning, user engagement, and learning outcomes. Each study contributes to understanding how mobile or cell phone apps can enhance language learning experiences and how they provide valuable insights into designing and implementing effective language learning apps prefer the structure and guidance provided by traditional textbooks. Recognizing these diverse learning styles is crucial for optimizing the learning process and maximizing student outcomes.

1.2.Limitations of Traditional Learning Methods

Traditional learning methods often fall short of addressing the individual needs of students. Textbooks, while valuable resources, can be dense and difficult to comprehend for some students. Lectures, on the other hand, may lack interactivity and fail to engage students who prefer a more hands-on approach. Additionally, traditional methods cannot often adapt to individual learning paces and provide real-time feedback.

This article approached a new innovative approach for student study pattern analysis using an AIML in second part mentioned some of the features and implications of study findings, the third part mentioned about algorithm in the methodology and finally.

2. Implications of the Study Findings

This model available here is to the available options of study materials allocated to students. This app would be useful if it is linked to any coaching institute so that they can monitor the progress of each student based on his/her

method of studying. Many coaching institutes use their self-made websites where they have a lot of study materials in the form of videos, text, phrases, and audiobooks for theory subjects. Here we have created the website for a student in his SSLC/HSC/UG/PG where they have a lot of subjects to go through. After a user opens the application, it predominantly asks the user about how many subjects he/she went through in a day. As shown in fig 1.

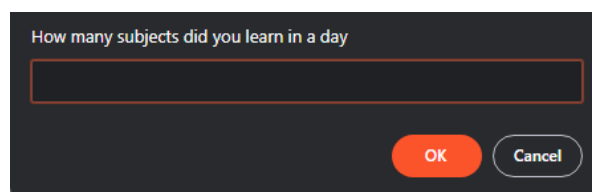


Figure 1. Input number of subjects

Q. Yang and W. Zhou present an English online learning platform based on a mobile Android app [1]. The platform offers a mobile learning practice for English language students or learners and focuses on leveraging the C.-F. Hsu, C.-M. Chen, and D. Cao is researching how the design elements of a game-based language learning app impact learning outcomes, sustained focus, emotional state, and memory retention [3]. Their study explores the impact of app design on various aspects of learning outcomes and user experiences.

3. Methodology

The methodology proposes to analyze student study patterns and provide personalized learning experiences using an innovative approach. It addresses the diverse range of learning styles by developing an interactive application that incorporates regular assessments and adapts to each student's preferred learning method. Here we can find a detailed explanation of the methodology:

1. Understanding Learning Preferences: The methodology recognizes that learning preferences vary greatly among individuals. Some students prefer video tutorials, others prefer hands-on practical experiences, and some rely on traditional textbooks. The main aim is to cater to these diverse learning styles.

2. Interactive Application Design: The methodology proposes developing an inter- active program that ensures students to engage with the learning material. The application will provide regular assessments after each lesson, regardless of the chosen learning method.

3. Performance Analysis: The

application will analyze each student's performance to identify their most effective learning approach. By gathering data on how students utilize the material and assessing their comprehension and retention, the application can determine the methods that work particularly for each student.

4. Personalized Learning Approach: It is because of earlier analysis by students, the application will provide personalized recommendations and adjustments to enhance their learning experience. This could include additional learning materials tailored to their preferred method [8].

5. Scalability in Large Coaching Institutes: The methodology acknowledges the challenge of effectively monitoring the progress of a vast number of students in coaching institutes with a limited number of instructors. The interactive application can help address this by challenging and providing personalized support and guidance to each student, empowering them to navigate the complexities of technology with confidence and ease.

6. Continuous Improvement: The methodology emphasizes the very importance of incorporating additional learning materials and implementing specific adjustments based on ongoing analysis of student performance. This ensures that the application evolves and improves over time to face the changing needs of students and adult learners [9].

Overall, this methodology proposes the development of an interactive application that assesses and analyzes student performance, identifies their most effective learning approach, and provides personalized recommendations and adjustments. By doing so, it aims to increase the learning experience for students, irrespective of their preferred learning method, and empower them to navigate technology with confidence.

The algorithm for the program regarding student analysis is as follows.

Step 1. Initialize an array 'd' with 5 elements, all initially set to 0. These elements represent the count of different study methods.

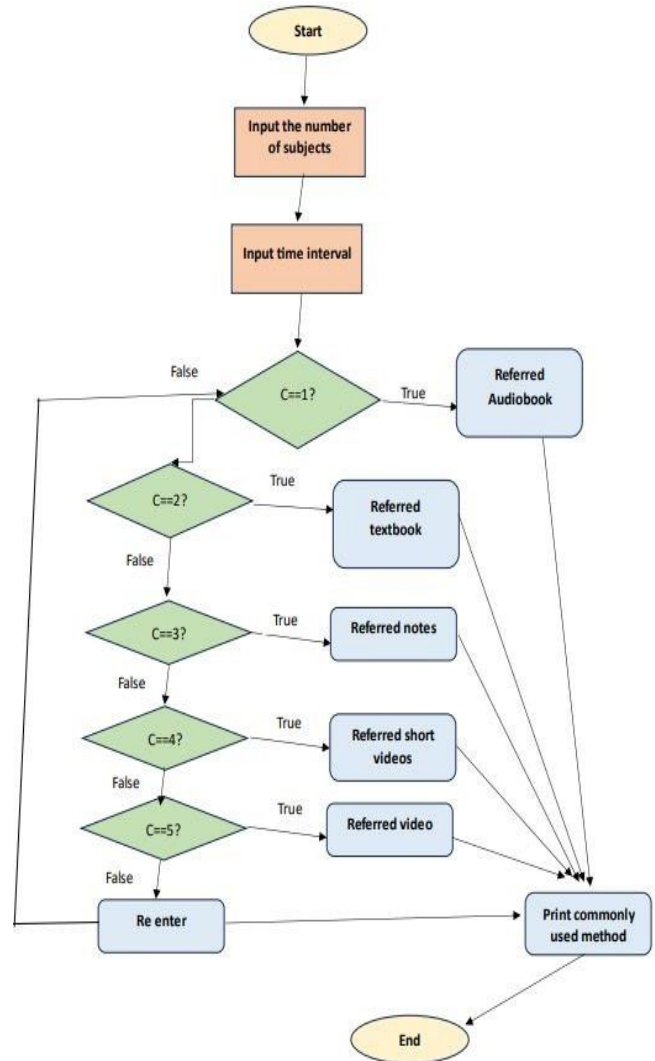


Figure 2. Flowchart on Student Study Analyzer algorithm

Step 2. Use the 'prompt' function to get the subject name and the time interval ('b') as input from the user.

Step 3. Create a 'for' loop that iterates from 0 to 'b-1' to collect information, on each time slot.

- a. Inside the loop, use the 'prompt' function to ask the user to enter their method of study (1 for Audiobook, 2 for Textbook, 3 for notes, 4 for short videos, 5 for video tutorials).
- b. Use a 'switch' statement to update the corresponding count in the 'd' array based on the user's input.

If the user enters an invalid option, decrement the loop counter ('i') and ask them to re-enter the option Step 4.

Define five separate functions, 'c0', 'c1', 'c2', 'c3', and 'c4', each responsible for displaying the count for a specific study method if the count is bigger than zero.

Step 5. Call the five functions ('c0', 'c1', 'c2', 'c3', and 'c4') to display the counts for each study method.

Step 6. Initialize a variable 'largest' with the importance of the first element in the 'd' array ('d [0]').

Step 7. Create a function 'c5' to find the study method that had been visited most frequently and display it alongside with the subject name.

- a. Initialize a variable 'p' to store the position for the most frequently visited study method.
- b. Use a 'for' loop to compare each element in the 'd' array with the current 'largest' value and update 'largest' and 'p' if a larger count is found.
- c. Display the largest count and the position of most frequently visited study method.
- d. Based on final value 'p', it display the most frequently visited study method for the given subject.

Step 8. Call the 'c5' function to find and display the most frequently visited study method for the subject.

The provided algorithm outlines the steps to collect and display data about the user's study methods and find the most frequently visited method for the subject. The code you provided in your question implements this algorithm in JavaScript

4. Results and Discussion

After entering the no of subjects, the next that comes up is the name of the subject.

After we enter the data about the subject, a new page opens as revealed in Fig 3

Here the user must enter the time interval of his studies. That includes all the different kinds of references available on their website. After entering the records, a new page opens as revealed in Fig

Here we get an option regarding the different study materials available. Here we get 5 options, which can be changed, and the basic 5 are audiobooks, textbooks, notes, short videos and video tutorials. After this, we get the amount of time intervals we took per subject. The output would be as revealed in Fig 5.

The output would be as exposed in the Fig 6. Here it calculates the maximum amount of time a person has used any of the available resources, i.e; It is easier when a department or an education institute has to keep a check on every student's progress and time of study.

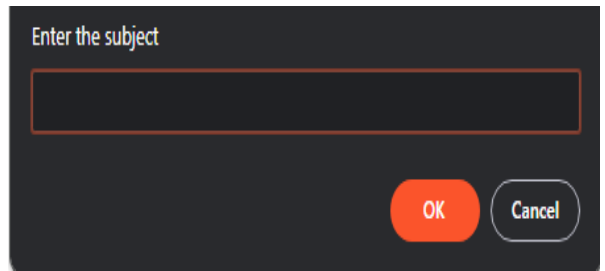


Figure 3. Input the subjects

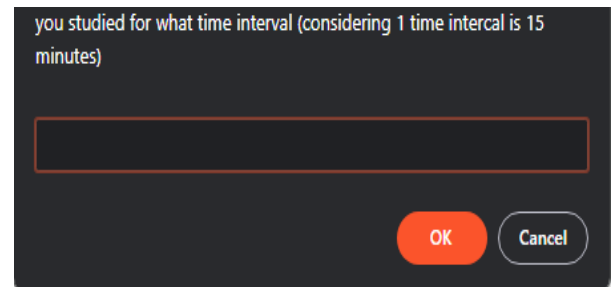


Figure 4. Input time interval

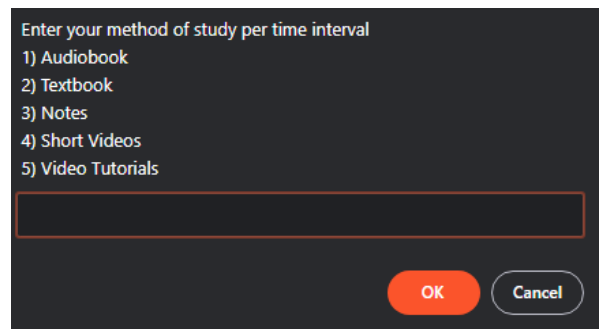


Figure 5. Shows the input method of an application

subject c programming

You went through Audiobook for 1 time interval

You went through textook for 2 time interval

You went through Notes for 1 time interval

You went through Short Videos for 1 time interval

the largest number is 2 at position 2

You have visited Textbook most frequently for the subject c programming

Figure 6. Output of the application

5. Conclusion

Currently, around the globe, there are various learning apps available, and some of them employ AI for user customization in some way, we think that it is a better method to make it beneficial for users. Shortly, learning applications may use VR and real-time AI interaction approaches for improvisation. The development of an interactive AIML- powered application is possible to revolutionize the learning landscape, particularly in the monitoring of large coaching institutes. By catering to diverse learning styles, providing personalized feedback, and incorporating additional learning resources, this application can empower students to achieve their goals more efficiently. As AI and ML technologies continue to evolve, the possibilities for enhancing the experience through personalized instruction are limitless.

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