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Adaptive Learning Model for User's Performance and Knowledge and Big Data

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Abstract— Researcher will learn more about the learners ' learning process and summarise the learning rules by analysing the big data model, and then create customised learning schemes according to their information needs and current skills. Every person's style of learning is unique. To extract the necessary learning content from the enormous content available, some adaptive and personalization techniques are required here. Here, an adaptive learning method is built such that personalization is conceivable. By considering the learner's experience, an adaptive learning system is developed. To establish this by consideration of a particular domain. It takes the output of the person into account and continuously adjusts by reacting to unique learning material from the student. Based on the original evaluation carried out, it categorises learners. Based on the results obtained and on the show of his / her content option. The performance of the Learner is analysed and modelled, adaptation is carried out accordingly by continuous assessments carried out after each module and tweaked during interactions. The basic purpose of this paper is to integrate the disclosure of ideal settings in which students can enhance their learning abilities.

Keywords— Adaptive learning, Big data, Learning process, Techniques, Learners.

I. INTRODUCTION

A highly creative Big Data offers a unique platform for world-class research investigating the difficulties and opportunities of gathering, processing, and disseminating massive quantities of data, including data science, big data infrastructure and analytics, and ubiquitous computing.[1] Big Data is a loosely defined concept used to describe data sets that are so broad and complex that they become difficult to work with. The growth of digital and mobile communication has made the world more linked, linked and traceable, usually contributing to many large-scale data sets becoming available. Some of the Big Data Set keepers build interfaces for anyone to access and interpret some of the information, e.g. Google offers Google Insights that are freely available, although others are hesitant to provide any access [2]. Big Data coverage includes: standards for the big data industry, emerging technology being developed specifically for big data, data collection, storage, delivery, best practises, data security, privacy and regulation, research-to-product market

priorities, the increasing position of business intelligence, Big Data infrastructure analysis and design concepts, physical interfaces and robotics.

Using Internet technologies and developments to provide a broader variety of techniques that improve skills and efficiency "is e-learning." There have been many advances in e-learning for over a decade. Unlike conventional learning, which provides any person with the same or restricted learning material. In addition, during his relaxed period, the learner can learn and place-learning offers plenty of opportunities. In e-learning systems, learners can choose their learning material. A continuous method is e-learning. The learning content and accessibility of tools is becoming enormous day by day. When searching for the necessary material, it takes plenty of time. Efficient plans must be in place to include the requisite material for learning. Regarding a specific topic, not everyone has the same expertise. The learning material to be presented to the learner must also be distinct. Providing the relevant material makes the device tailored and adaptive. The personalization of e-learning programmes is a significant factor to take into account when designing them. It is important to have a personalised structure that can then adapt with personalization to the learner's learning styles and intensely prescribed content. The problem is not the development of electronic learning tools, but how to provide usable data in a personalised manner.

This paper develops a customised e-learning framework that first follows student profiling, followed by a knowledge test that assesses the level of knowledge of the learner and shows the information accordingly, and monitors and measures the progress of the learner over the course of time by carrying out an evaluation after learning a chapter that the framework adapts accordingly.

II. BACKGROUND WORK

Daminda Herath et al [1] proposed system for intelligent e-learning environment recommendations consists of three modules, a learner module that describes the learning behaviours and interests of learners, a domain module that contains all the information for a specific discipline and a recommendation module that pre-processes data to generate a comprehensive list of recommendations and performance predictions. Using the level of expertise of learners at different stages and the variety of recommendation techniques based on content-based filtering and collaborative approaches, the recommended resources are obtained. To improve personalization with filtering techniques to provide a recommendation and enable learners to improve their results, several techniques such as grouping, clustering, predictions and association rules are used.

Duoduo Liu et al. [2] This paper analyses the behavioural data mirroring the intrigue highlights by using Data Mining Techniques. It models a Customized Recommendation Framework after examining behavioural evidence. This scheme helps the learner in an efficient way. It takes into account the criteria of the learner and then, based on behavioural data mining, recommends the learner. Educational Data Mining can help to suggest which practises, tools, tasks and experience in learning are recommended. In any event, the choice of a Learning resource correlates to the interest of the Learner in specific material. Data Mining Methods are used for behavioural knowledge in this article, and a customised e-learning framework helps to recommend material based on the interest of the learner. It does not, however, take into account the learner 's experience.

Bens Pardamean et al. [3] The current practise of upgrading E-Learning in High School is often checked. It is said that the technique used is the Learning Management System (LMS). For the most part, e-learning is divided into three segments: The Educating Process, The Learning Process, and Information Level. It also depicts the relationship between the learner and the system. A study was conducted here to establish the link between the programming skills of students and their academic achievements within courses in information technology. To discover the degree of relationship, Pearson's Correlation Analysis is used. It demonstrated the degree of linear correlation between the programming skills of the learner and the achievements of the curriculum. This paper notes that the contributions of students are not dependent on the results. The psychomotor and affective scores are based on them. It is possible to explain these two factors further.

Mohammed M. Alhawiti, et al. [4] The E-Learning domain is discussed in this article. The Parser tool is used to structure a customised plan based on the objectives of the learner. Online Mining is another technique discussed in this article. It is used according to his or her choice to provide the learning material to the learner. It was also stated that not only the preferences of the learner, but also the preferences of learning courses and teachers affect the personalization method. Learning material is provided in the learning object, metadata from the learning object contains details such as Learning object type, Format and Teaching style or Interaction style. Combining the efficacy of content management, Ontology, Semantic Web and Learning objects, an adaptive E-Learning domain is created. There are four steps in this framework: I Authoring ii) Characterization iii) Distribution and iv) Feedback.

Alzain Meftah Alzain, et al [5] This paper reflects primarily on the previous papers and tells us that the existing forms of learning are focused only on the textual type, i.e. Instrument VARK. This standardised textual data is more suited for students with strong verbal skills. The newly created ALSI instrument aims to incorporate various learning styles such as Visual and Active in this article. Figures, maps and equations for the ALSI instrument are also taken into account. A paired t-test is performed here using both the methods (ALSI and VARK) Hypothesis (H0, H1) is taken into account to verify these learning types. H0 hypothesis indicates that the effect of newly developed methods will not influence the styles of learning. The H1 hypothesis indicates that learning patterns can be influenced by the effects of newly invented instruments. The findings indicated that the Learning Style would be greatly affected by ALSI.

III. METHODOLOGY

1. Authentication:

The new user must be registered with the system until the authentication has been completed, and then they can login directly to the system.

2. Knowledge Test:

A test is performed in this module that analyses an individual's knowledge level. And the result obtained is taken into account when the learner is clustered. The learner chooses his or her favorite language for programming. The machine gets an idea of what material is to be presented to the learner at the beginning by doing this.

3. .Content Display:

The learners will be grouped based on the results obtained in the module above. Under any of the 3 classes called Beginner, Intermediate, and Advanced, a learner will be judged on his skill. The content needed and necessary will be given to him. The learners of the advanced group can also access material and assessments at the beginner stage. Beginner level learners can also access advanced level material and assessments as long as they complete all the exams at their level by meeting the threshold value for each test.

4. Performance Monitoring and Analysis:

The learner will be tested by administering a test that includes questions based on the previous chapter learned after completion of a chapter and will be assessed accordingly. If the performance of the learner is degrading, he may be asked to relearn the material or may be relegated to another group and vice versa. In group the learner again, the above grades will be used when showing the material of the next chapter and this adaptation continues until all the chapters are mastered. The performance of learners will be controlled, recorded, and evaluated over the course of time. Also, the learner can monitor the success available in progress where all the test scores can be seen.

A. PROPOSED WORK

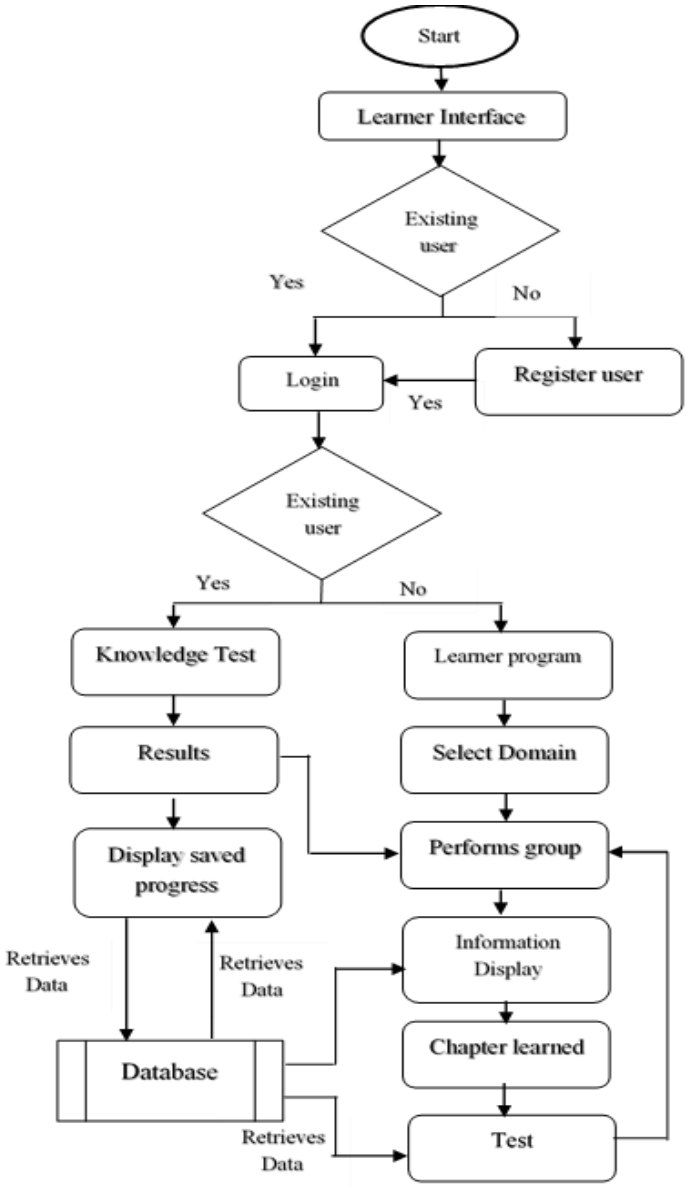

Fig 1 Proposed Flow chart

Step 1: If the learner is a new user, he/she must get registered. If the learner is an existing user, he/she gets login into the system.

Step 2: If the learner logs in for the first time, he/she has to take the knowledge test. If it is not the first time, he/she will be directed to the home page.

Step 2a: Learner chooses the programming language

Step 2b: Based on the results obtained in the knowledge test and the programming language selected the learner will be clustered

Step 2c: Learner will be displayed with the suitable content Step 3: Progress will be saved into database

Step 4: Saved progress stored in the database can be viewed by the learner

Step 5: Learner continues learning.

Step 6: After completion of one chapter, a test is conducted.

Step 7: Based on the results obtained the learner will be clustered again and is displayed with the suitable content. Step 3 to Step 7 takes place recursively

B. WORKING PROGRESS

Step 1: Registration is done, and Knowledge test is taken. According to the test results they were assigned any one of the 3 categories Basic, Intermediate or Advanced.

Step 2: Among the available languages C language is selected.

Step 3: Selected few of the registered users covering all the three categories.

Step 4: Tests were taken, and responses were stored, and results were noted. All these results along with number of attempts were tabulated. Best score among all the attempts was taken as the final score.

Step 5: Progress of the user was checked, where the user's whole progress along with all the results was displayed. Bar graph can also be used to know the progress of each test in each level.

Step 6: Admin view is checked after signing out. All the users list was displayed and can delete or view progress of any user. Also, the number of users taking tests in each level can be known with the help of a Bar graph.

IV. RESULTS AND DISCUSSION

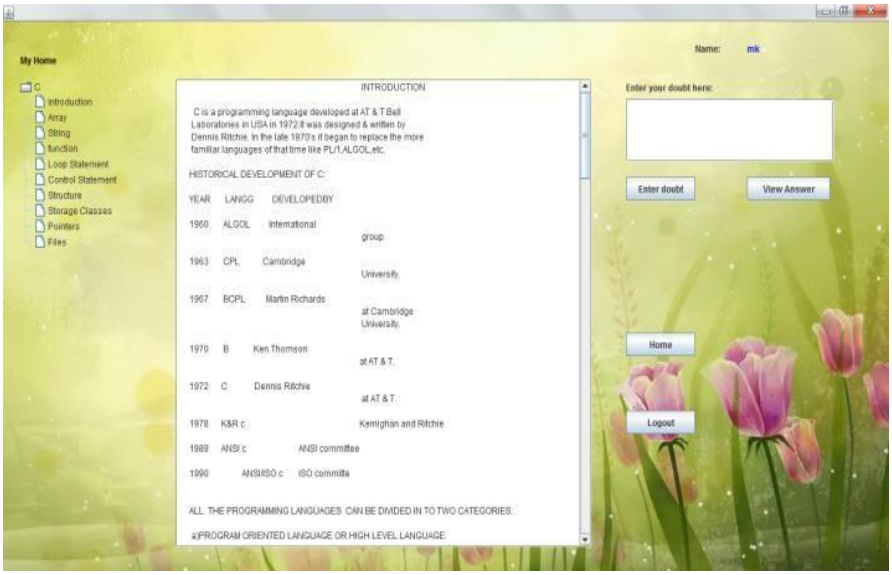

Fig 2. Learner Interface

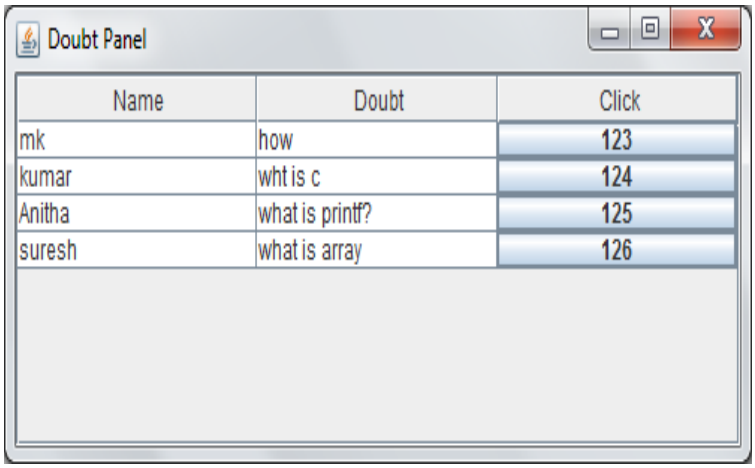

Fig 3. C programming Doubt panel

Adaptive Learning System) is a research forum and 60 major education technology students are chosen to study C language programming subjects. In this work, the experimental group (adaptive learning) and the control group (non-adaptive learning) are randomly divided into two classes, 30 individuals each, with no substantial difference in cognitive capacity between the two groups. At the same time, bad students (0-4 points) and outstanding students (5-9 points) were the elements, based on the pre-test results. After the information point is calculated, the effects of some data analysis are shown in the following table during the two- month review of all students in the experimental group and the control group conducted.

	Control Group		Test Group	
	Poor Students	Excellent Students	Poor Students	Excellent Students
Front Side	3.8	5.8	3.7	5.9
Back side	5.9	7.0	7.2	7.1
Study time(min)	2205	1816	1623	1449
Discord Number of Questions	48	30	19	10
Try to Solve the Number of times	70	90	33	25

Table I. Data Analysis Learning Result Table

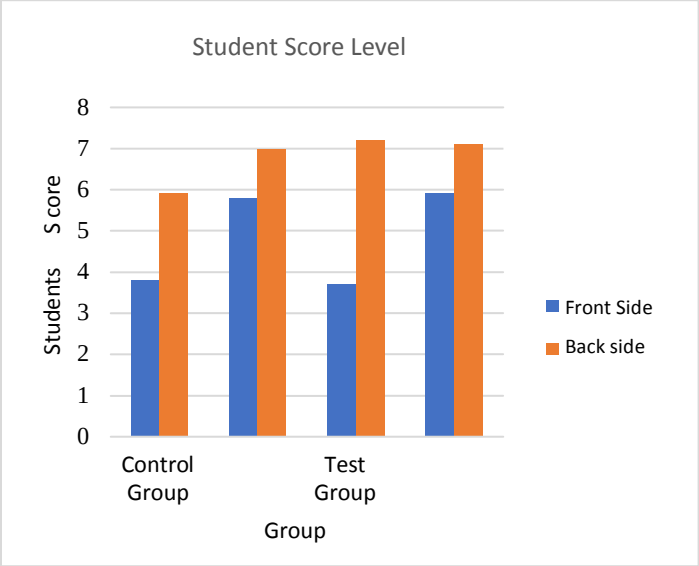

Fig 4. Student score level

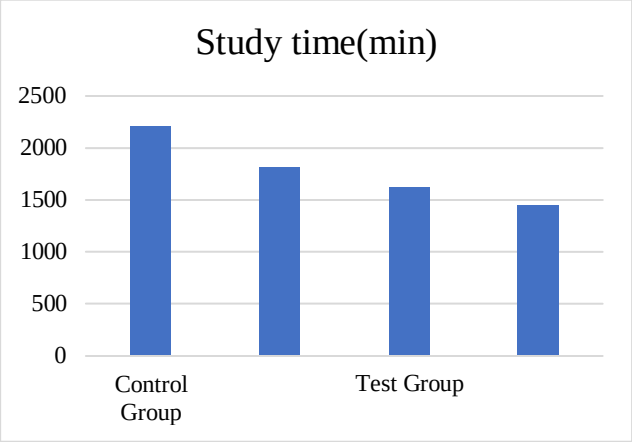

Fig 5.Leaner study time

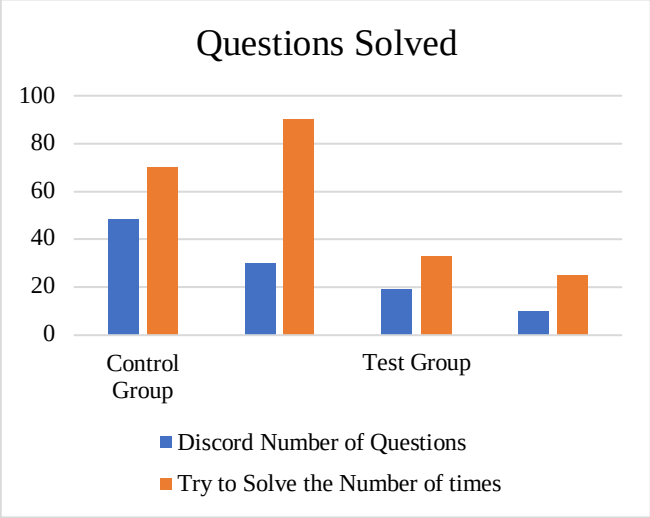

Fig 6. Learner solved question

The improvement effect of the learning output in the experimental community can be seen from the data in table 1 as the most evident, and the score is increased from the pre- test 3.7 to the post-test 7.2. In contrast, the increase in the academic performance of the outstanding students is not evident, and the experimental group and the control group are not noticeable. The academic output of exemplary students does not make any noticeable difference. The explanation for the study is that bad students all learn according to the adaptive system's learning route and the learning materials of sufficient difficulty. The outstanding students have clear control and do not completely believe in the suggestions for the framework. For poor life intervention guidance, it can be seen that the customised adaptive learning research model based on big data is more successful.

V. CONCLUSION

In this paper to discussed the importance of personalization for enabling proficient e-Learning forms. It gives the learner the right content based on one's performance so that it fits well. As the data is increasing day by day and searching requires a lot of time, Initial knowledge test as well as student profiling enables the system to provide the right content from the very beginning. As the content in the learner's level is viewed one after the other it enables the learner to learn in an organized way, with perfection and the following topics can be understood clearly. Even if learner in higher levels are given access to lower levels. We are not limiting the user to the higher levels with a view that they may want to refer or learn previous topics in any circumstances.

The tests conducted after each chapter not only allows the learner to know his abilities and can keep track of his performance and the areas yet to be improved but also the system to keep track of user's performance and provide the necessary suitable content. Moreover, learner can easily access the right content without searching for longer time. The learner can view the complete progress along with the number of attempts and score obtained for each attempt, final score, Percentage of tests completed.

VI. FUTURE SCOPE

More number of languages and topics can be added in the future. There also may be a possibility to develop thecontent based on user's qualification. Test assessment patterns may be more advanced.

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