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Adaptive and Advanced E-learning Using Artificial Intelligence

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ABSTRACT
E-Learning is the emerging technique in education and learning. Learning is a complex process as learning pat-terns, approach, skills and performance varies from person to person. Adaptive e-learning focuses on understanding the individuals learning performance, skills and adapts to it. It also provides a means to analyse the behavioural learning pattern. As it provides the detailed skill mapping and performance which enables the users to understand the areas needs to be improved. Further the information can also be used by teachers to improve the teaching mechanism. Advance E learning is an emerging concept. Here the classes are not taken face-to-face in a classroom but through an electronic medium as a substitute. These virtual classrooms are gaining importance every day and very soon they are going to be an integral part of our world. Taking up these virtual classes through an electronic medium is termed as E-Learning.

Keywords: — Adaptive learning, E-learning, Cognitive Science, JARVIS

I. INTRODUCTION

The purpose of this adaptive and advanced E-learning system is to enable students to get proper knowledge of course and adjusting system according to the users IQ level. It is an educational method which uses computers as interactive teaching devices and reduces the teacher's workload to give attention to each and every student/user. As the e-learning is a new approach it has many flaws. Learning is a sophisticated task. And if the computers have to replace a human teacher they need to be more intelligent as Just Put It On Web Approach (JPIOBA) approach does not provide the quantitative teaching learning mechanism.

To strengthen the online learning mechanism the paper processes the conclusion of five sub models in the system which are: The Artificial Neural Network (ANN) question classification to achieve the goal of computer adaptive test, Determining the level/trend of the student by using approach called moving averages conversion and diversion or some threshold, graphical representation of user's performance, Qualitative analysis of learning based on Bayesian network. If possible we can have skill mapping to scores achieved in different tests.

II. EXISTING SYSTEMS

Time period for completion of course is fixed. Syllabus distribution for each exam is fixed independent of user's excellence in previous exams. No personal attention is given on the user performance. No feedback to focus on skills in which user is not so good. Just Put It On Web Approach (JPIOBA). There are chances on skipping video lectures and just appearing for exams with complete preparation. Course completion certificate comprises only overall percentage. Following are some of the existing systems: Carnegie learning: Carnegie learning, Inc. is a leading provider of maths curricula for grades 6th to 12th written and design to align to common core or integrated pathway. Carnegie learning solutions include math text book with student centred, collaborative class room activities along with innovative, adaptive software and teacher professional development. Robomate: 'ROBOMATE' is a brand name of MT Educare's digital educational products. Through the robomate app, a student can access study material in form of recorded lectures (audio and video) of India's best teacher, notes and test series for learning and revision.

III. PROPOSED SYSTEM

JARVIS (Just A Really Very Intelligent System) concept. Smart tutor along with human doubt sessions. Progress of the user with be tracked after every exam. Syllabus for exam will be displayed to the user on his previous performance. Minimize the chances of skipping syllabus by calculating score using key points. Automatic

generation of question papers, progress graphs and related skill sets to be improved.

IV. STEPS FOR IMPLEMENTATION

This project is online learning environment that supports the individual learning. It is an educational method which uses computers as interactive teaching devices to enhance individual skills. It is based on the project based methodology in which users cognitive and psychological skills will be judged based on his/her overall performance. It is based on artificial intelligence domain. Here we aim to do project in following ways:

- Provide registration for new candidates with login id and passwords.
- After login to the course (e.g.: C Programming) student will get access to his/her syllabus for first test.
- After appearing for test, depending on his/her scores new syllabus for next test will be shown to him/her.
- Question papers will be set using state space search algorithm based on previous exam scores.
- Generation of progress reports and skill sets will be done hill climbing algorithm

V. ALGORITHMS

A. ANN Back Propagation Method

Web-based education is very important component of educational technology. One of the main advantages is the classroom and platform independence. Implementing Artificial Intelligence (AI) techniques to support efforts to improve the webs intelligences and provide better services to end users. Instructors try to reveal new strategies and enhanced learning in learner's side, since education consists of instructions and learning. The popular AI method: Artificial Neural Network (ANN). The education should be learner centred and learning occurs in a cognitive manner in learner's mind. It should be included that, individuals have own learning style and learning performance of each person cannot be evaluated in a simple way such as measuring the test's results depending on number of rights and wrongs answers. The question classification abilities depending upon the item response of students, item difficulties of questions and question levels were determined by using Gaussian Normal Curve.

The equation is:

ID=MSCA/SCAE

Where,

ID: Item difficulty

MSCA: minimum sum of correct answers

SCAE: Sum of correct answer of each question.

This ANN technique helps to map user's skill sets to his/her scores in exams. Consider an example of course as C programming language teaching then if student writes his/her own code for a given program statement and then using compiler depending on the type of error or success i.e. status of result systems that map his/her skills like logical skills , motor skills, mug up skills.

B. State space search

State space search may be a method employed in the sector of technology, as well as computer science (AI), within which serial configurations or states of associate instance are thought-about, with the goal of finding a goal state with desired property. Problems are usually modelled as a state space, a group of states that a problem can be in. thus set of states forms a graph where two states are connected if theirs associate operation which will be performed to remodel the primary state in to the second. State space search usually differs from ancient technology search strategies as a result of state space is implicit: the everyday state space graph is far long to come up with and store in memory. Instead, nodes are generated as they are explored, and usually discarded thenceforth. An answer to a combinational search instance might incorporated the goal state itself, or of a path from some initial state to the goal state. For the above some example if user gives his/her test then on the basis of his/her score next question paper for the test will be set. This will be done using the module level difficulty and user level difficulty updating on regular intervals.

C. Hill Climbing Approach

In technology, hill climbing may be a mathematical improvement technique that belongs to the family of native search. Its associate degree iterative algorithmic program that starts with associate degree arbitrary solution to a problem, then attempts to seek out a more robust solution by incrementally dynamic a single part of the solution. If the modification produces a more robust solution, associate degree progressive modification is formed to the new solution, continuance till no additional enhancement are often found. To calculate the score of student here exam level consideration will be taken care of. If the student with difficult exam level attempts less questions right and if the

student with easy level attempts more questions correctly then their performance graph will be similar in nature. In short for attempted questions only system will respond according to the answer submitted by student. This algorithm helps in score generation of user.

VI. PROGRAMMING TOOLS

Following programming tools are required for the implementation of the proposed system:

- JSP (Java Server Pages)
  JSP is a technology that helps software developers create dynamically generated web pages based on HTML, XML, or other document types.
- JAVA
  It is use as back end tool to write artificial intelligence algorithms to generate the progress report of user.
- Back end – WAMPP Server (MySQL)
  MySQL is a relational database management system(RDBMS) based on SQL (Structured Query Language). For storing questions of different levels, valid login ID's details, exam score details in the database.

VII. INTERFACE DESIGN

The user interface is an important part of this software and will make the software very user friendly.

1. Profile screen
   It will display the user's basic info.
2. Progress tracker
   It will show the progress of tests in form of graphs and mapping their skills accordingly.
3. Syllabus screen'
   It will display the next level syllabus for exam to student. Overall syllabus is divided into 10 chapters for C language,
4. Test screen
   Exams will be conducted here.

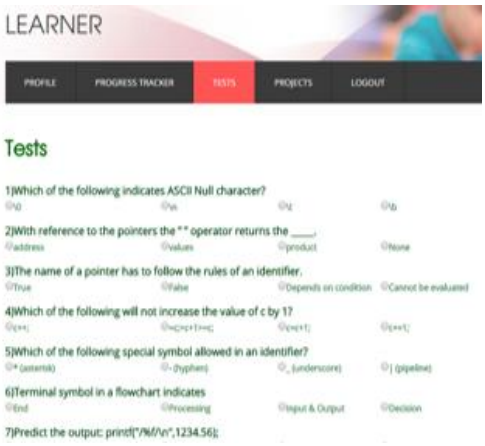

Fig.1 Sample of the test screen

Fig.2 Sample of progress tracker screen

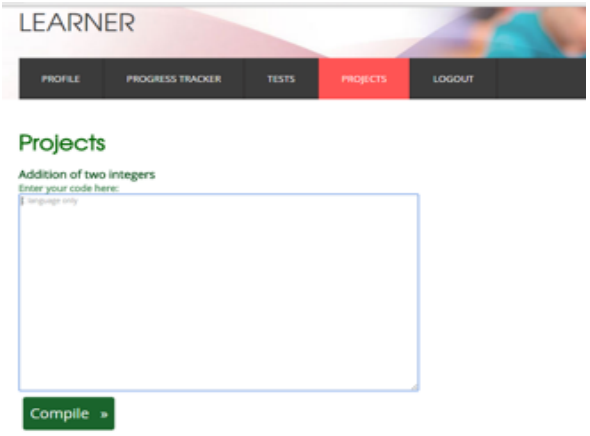

Fig.3 Sample of progress tracker screen

VIII. CONCLUSION

Adaptive e-learning is an enhancement that makes e-learning systems more effective by adapting the presentation of information and overall link structure to the individual user, based on his/her knowledge and behavior. The learning improves as the system adapts to the user

level of understanding. The teachers can use the user behavior information for various analyses and make the changes in the teaching process to improve the teaching and learning process. By further expert analysis and experimentation it can become a firm educational method which uses computers as interactive teaching devices to enhance individual skills. It is based on project methodology in which users cognitive and psychological will be judged based on his/her overall performance. It is based on artificial intelligence domain and further scope of improvement is huge.

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