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e-Learning System Based on Learning Style

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ABSTRACT: In recent years e-learning is an asynchronous or synchronous accomplishment. Everyone can learn by utilizing their time, what they need to know when they need to know it. It has a global reach, and can be accessed by people around the world. For learning mobile devices, computers can be used so online courses are literally in the hands of the world who need them, at any time. It is distributed electronically to thousands instead of offering in-person preparation. Online Learning results in cost reduction of organizations which replace their traditional instructor commanded teaching. Online resources maintain consistency and quality in delivering content. However, most of the e-learning systems are not altered as per learner's interest. Even today e-learning platforms are delivering the same educational content which could not be relevant to the learner's search interest. So there is a need to create specific strategies that will build personalization of e-learning systems. Recommended e-learning systems will gather student's learning preferences from different discussion, domain experts and organize those attributes into learning models.

KEYWORDS: Learning object, learning style, case-based learning, e-learning

I. INTRODUCTION

First generation of learning systems used a tutor based system, it was basically classroom teaching. In traditional teaching approaches, the teacher's role is to explain concepts to learners. It required equal participation of students and teacher's during learning. Whereas this process comprises dependability of each other. Due to the concept of distance learning, second generation web-based E-Learning systems came into existence where these systems used artificial intelligence techniques to support new functions beyond content presentation. For example, these functions might include content adaptation to user preferences, needs, and abilities. The Internet and the World Wide Web specifically offer an exclusive platform to fix learners with academic resources.[1] Learning material in the multimedia form in a Web-based educational system makes education a driven assignment process. It stimulates students to search different course-plotting routes through the domain information. Though, the structure of the offered domain and the content are usually accessible in the same way, without compelling into account the students' aims for surfing, their involvement, their present awareness. It is an issue that needs additional consideration, exclusively when it comes to Web-based teaching, where the beginners' inhabitants are usually categorized by significant heterogeneity with admiration to background knowledge, age, capabilities, social circumstances, occupations, inspiration, and objectives, and where beginners take the primary accountability for their learning.

II. CASE BASED REASONING PROCESS

The case-based reasoning has been used for resolving the problem from particular disciplines to ordinary tasks. It highlights previous knowledge used for future problem-solving. If a current problem occurs, it is auspicious to answer the solution by mentioning past experiences.

Case-based reasoning procedure is as follows:

1. Retrieve the most analogous case (or cases) by matching the case to the reference library of earlier cases;
2. Reuse the retrieved case to attempt to resolve the present problem;
3. Revise and adjust the future solution if needed:[2]
4. Retain the final explanation as part of a new trial. [16]

There are different methods for forming, recovering, applying and indexing the information retained in earlier cases.



Retrieve:

Retrieving a situation starts with a problem explanation and finishes as soon as a similar example has been found. The subtasks comprise:

Recognizing a set of applicable problem descriptors; Matching the case and recurring a set of satisfactorily analogous cases (given a correspondence threshold of absolute values); [3] and Picking the best evidence from the set of circumstances returned. Previously the retrieval process was carried out by comparing syntactically corresponding threshold values, whereas the advanced system compares semantic values too.

Reuse:

Reusing the recovered case solution in the situation of the new case emphasizes on recognizing the variances between the retrieved and the present case, and categorizing the part of a retrieved case which can be reassigned to the original case. Usually, the explanation of the extracted case is reassigned to the new situation in a straight line as its solution case. Reuse is the phase of the procedure when one example carefully was chosen for its solution to reclaim. It is accomplished when the new solution is projected for the next assignment of the process reconsideration. Reuse is roughly recommending a solution for answering the original problem by re-claiming statistics and information in the retrieved case. [4] Reuse is rather simple when the new situation is indistinguishable from the retrieved case problem.

Revise:

Revising the case answer created by the reuse procedure is required when the response proves inappropriate. It offers a chance to study from failure. Revise starts when a solution is planned to solve the new problem, and it is accomplished when it is complete. Revise aims to assess the applicability of the proposed settlement. Assessments can be completed in the real world or a simulation. Simulation is more comfortable and cheaper but may inattention practically essential characteristics. In the real world, assessment features may be present that one might not have measured in the prototypical. The frame problem of an artificial Intelligence says that one can never entirely express all thinkable pieces of evidence that may happen in the real world.

Retain:

Retaining the case is the procedure of integrating whatever is valuable from the new fact into the case reference library. It contains conclusions on what evidence to recollect and in what form to recall it; how to assign a key value to case for future retrieval; and integrating the different case into the case reference library.[5] Revising the problem produces a new trial, informing the case base with the learned case for solving a future issue. However, an established explanation may or may not be remembered. Some systems learn new solutions improved through practice; others agree to take only actual cases.

III. ALGORITHM AND METHODOLOGY

This work is implemented by considering case-based reasoning approach and K-Nearest neighbour method. Algorithm for implementing Case based reasoning using K-nearest neighbour.

```
1. Load the dataset from Database
2. Split the dataset in training and test dataset based on split
a. Then predict the result:
for (each record = test in testset) do:
for (each record = x in training set) do:
for each feature = f1 in x and f2 in test do:
xval= normalize(f1)
tval=normalize(f2)
xfeatureDistance=square(xval-tval)
end feature for
distanceX= squareRoot(sum of all xfeatureDistance)
end training for
sort by xdistance
get k neighbours with least xdistance
get votes from each neighbor
```

Predict= highest voted feature for test
end testset for

For each prediction verify with actual and calculated value. For training dataset different parameters are considered, Input list = {Problem, learning style, Knowledge levels, Learning objects, Test performance, Path}. Depending on the input, priority has been assigned to different feature vectors. [6] As all the features above do not have the same unit like iris flower dataset which has the same measure unit 'cm', normalize these by assigning an integer value. Case data are having different fields such as Problem, Learning Style, Knowledge Level, Learning Objects, and Test Performance. As per table 1 if Case 1 and Case 2 get matched then new users would use Case 1 learning objects for learning. Solution given to the new user for learning content is to use video and simulation.

Table1: Representation of retrieve phase of CBR

Case 1	Case 2
Features	Features
Problem: for loop Learning Style: Visual Knowledge Level: Intermediate Learning Objective: Video, Simulation Test Performance: 10 Path: Log data	Problem: for loop Learning Style: Visual Knowledge Level: Intermediate Learning Objective: ...? Test Performance: ...? Path: ...?
Solution: Secured 10 marks	Solution: Use Video, Simulation for learning

Consider case 3 of table 2, where learners are interested to learn if-else but that case not in case library. Initially it matched with case 1, the generated solution uses video simulation for learning.

Table 2: Representation of Revise phase of CBR

Case 3	Case 3
Features	Features
Problem: if-else Learning Style: Visual Knowledge Level: Intermediate Learning Objective: ...? Test Performance: 5 Path: ...?	Problem: if-else Learning Style: Visual Knowledge Level: Intermediate Learning Objective: Video, Simulation Test Performance: 8 Path: Record Path
Solution: Use Video, Simulation	Solution: If test performance is greater than 5 then add case to database

Learner approached to test and if learners test performance is greater than 5 then as per domain expert's it will get stored in the case library as a new case by assigning new index value.

IV. EXPERIMENTAL RESULTS

For this work a sample survey has been taken into consideration. Below graph represents the responses received from different learners. These questionnaires are set as per the learning style.[7] This paper demonstrates three learning styles such as visual, auditory and kinesthetics.

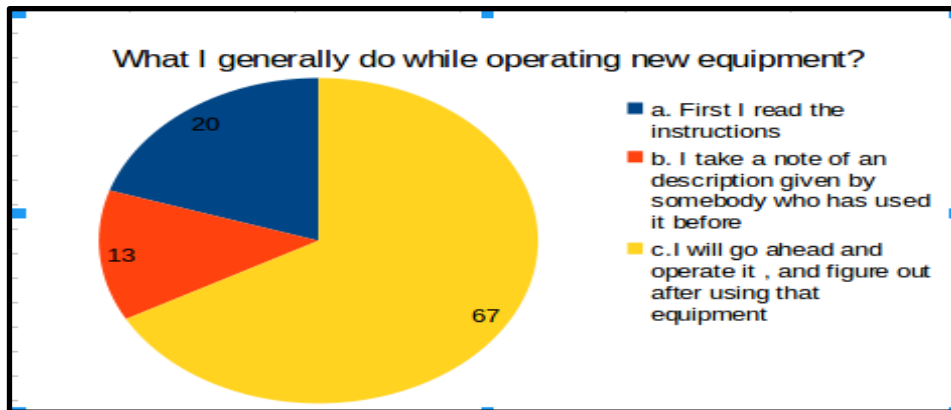


Fig. 1. Responses Received from Learner's

After completing the questionnaire, received responses are required to be analyzed. Following graph 2 represents the percentage of different learners. As per the graph visual learners are 55 percent, auditory learners are 15 percent and kinaesthetic learners are 30 percent.[8] There is a higher percentage of visual learners in the division. So, it is suggested to adopt animation, diagrams, charts, graphs, and videos for study material demonstration. These are the learning object recommendations are provided by case-based e-Learning system.[9]

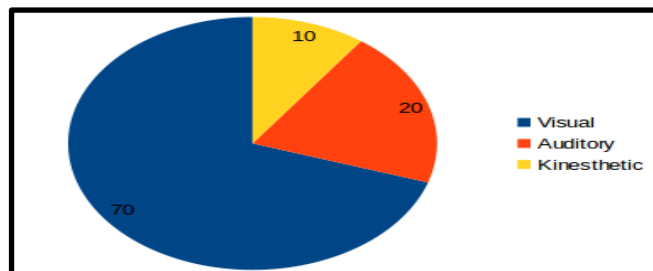


Fig. 2. Individual Student Response

However, learners can use different learning objects for the understanding of the same topic. It is a revised phase of case-based reasoning.

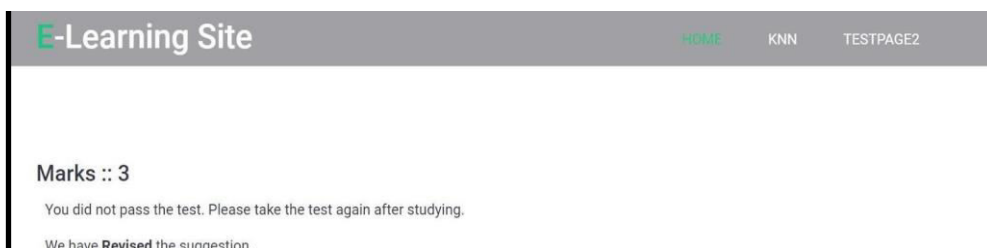


Fig.3: Revised phase of CBR

Suggestions are revised if learner performance is not up to the mark. As per the revised suggestions, learners' job is to follow the suggestions and recommendations.[10] Learners again appear for the test for the retained phase of the case-based reasoning process. If the test performance is satisfied then add that particular student path to the case library.



V. CONCLUSION

This paper focuses on the current technology of internet e-learning. In this article, we proposed an algorithm for the preference of learning objects for understanding particular concepts. This methodology is appropriate for applications in e-learning such as to enhance the website to the personalized facility. Generation of the weblog is dynamic activity so each time we are getting unambiguous results that is key behind this research work to focus on the learner's interest as well as their performance. This system is mainly suitable for teenagers where they are always in confusion about which technique to follow to learn the concepts. So adaptive personalized e-learning systems based on log perception solve their misunderstanding by showing them content as per their desires. This approach is used for e-business for web personalization.

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