Intelligent Learning System using Data Mining-Ilsdm

M. Kavitha, M. Suganthy, R. Srinivasan

Abstract: In this paper, adapted learning methodology is proposed using Data mining techniques to satisfy the individual needs of the student. First part of the proposed methodology is to create student profile, so that need of the student is analyzed. K-means clustering is used to group the contents of a particular student. C4.5 Algorithm is implemented in the dashboard section to display the content to the user. Second part is to develop intelligent learning application by using Page ranking algorithm. For every user, the content displayed on the dashboard is different. Content are selected and displayed from the database to the user after analyzing their answers submitted in the questionnaire section. As every user has different area of interest and according to their choice the contents are displayed. The page ranking algorithm helps keeping the most preferred and referred material at the top.
Keyword: C4.5 Algorithm Dashboard, Data mining, K-means Clustering, Page ranking

I. INTRODUCTION

Latest Technology of learning is E-learning. E-learning is a new technology and it satisfies the user need and requirements. E-learning is a kind of tool which helps in creating new ideas and to communicate new policies, concepts etc. E-learning helps in delivering huge amount of knowledge, which enhances the performance for the students studying in distance based education mode. E-learning is the web empowered learning. Web has progressing to rebuilding training. The obsolete classrooms must be exchanged. Just 1% of the populace taken online course e-learning is still new. There is have to improve the e-learning through various procedures like information mining, insights, machine learning and some more. E learning will be tremendous[1].

Clearly e-learning is the consequence of joining the conventional learning styles with assortment of current web innovation. E-learning activities are growing in scholarly and corporate setting driving enthusiasm for deep rooted learning. Be that as it may, it could similarly be viewed as an exponentially developing bad dream, in which unstructured data stifles the instructive framework [2] without giving any eloquent information to its performing artists; Data Mining was destined to handle issues this way. As a field of research, it is relatively contemporary to e-learning.

It is, however, fairly hard to characterize. Not as a result of its natural intricacy, but rather in light of the fact that it has a large portion of its underlying foundations in the consistently moving universe of business. At its most definite, it can be comprehended not similarly as an accumulation of information examination techniques, however as an information investigation process that envelops anything from information understanding, pre-handling and displaying to process assessment and Implementation[3]. All learning procedures and programming ought to be customized as per needs of a student. Students have distinctive necessities and qualities i.e., earlier information, scholarly level, premiums, objectives, psychological characteristics (memory, limit, thinking capacity and acquainted learning aptitudes) and learning style. Future training implies personalization in addition to insight [4]. Along these lines, here we propose customized e-discovering that utilizes instructive information mining and gives the client enhanced learning quality and proficiency.

II. LITERATURE SURVEY

Muhammad Arif and Mehdi Hussain, et al[4] made survey on Intelligent Agent based architectures for e-learning system. This paper depicted the detail of surely understood operator based engineering for e-learning. E-learning gives financially savvy and virtual condition. Mohammad Ubaidullah Bokhari and Sadaf, et al[5] , developed an Intelligent Multi-Agent based e-learning for Interactive Distance Learning. Its design depends on seven individual operators working in a community mold to give an E-learning condition that is intuitive, versatile, synergistic, secure and proficient. The fundamental focal point of the framework is to improve the intelligence at the client level and in addition to lessen the intricacy of the framework. This framework has a reflection layer as an online interface that shrouds the multifaceted nature of inside points of interest of the framework working from the end client and gives simple treatment of the framework.Shimaa Abd Elkader Abd Elaal, et al explained how e-learning can be done using Data mining. Instructive Data Mining (IDM) is the way toward changing over crude information from Educational frameworks to valuable data that can be utilized by instructive programming Developers, understudies, educators, guardians, and other instructive specialists. At present there is an expanding enthusiasm for information mining and instructive frameworks, making instructive information mining as another developing examination group. This work gives the utilization of information mining to customary instructive frameworks, specific electronic courses, surely understood learning content administration frameworks, and versatile and insightful online instructive frameworks.

Every one of these frameworks has diverse information source and goals for learning finding. After pre-handling the accessible information for each situation, information mining systems can be connected: insights and perception; grouping, arrangement and exception recognition; affiliation manage mining and example mining; and content mining. The accomplishment of the abundant work needs significantly more particular work all together for instructive information mining to end up a develop zone.Jun Wang, Yong-Hong Sun, Zhi-Ping Fan, and Yan, et al [6] explained how collaborative e-learning system can be done based on Multiagent In view of the investigation of the procedure of the collective e-learning framework and the attributes of Multi-operator innovation, this paper presents a community oriented e-learning framework structure established on Multi-specialist. In the interim, it furnishes with the key innovation to acknowledge e-learning and the math to scan for the teammate, does assist examination of the framework's working system, multi-specialist's rationale structure, Agent limit and time many-sided quality. At show, the instruction isn't highly best in class despite the fact that there are different online assets and learning stage. The conventional learning strategy i.e. paper-pen, books, cooperation with educators and gathering discourse still proceeds however these days in the long run these all techniques are very little in slant[7]. Numerous individuals are moving towards the online assets and ebooks as their strategy for learning.

III. INTELLIGENT LEARNING SYSTEM USING DATA MINING (ILSDM)

The proposed framework gives a more extensive degree by adding the progression to the current framework. The "Intelligent Learning System" is a more intuitive and gives a simple access to the required instructive substance. Aside from simply giving the substance it additionally thinks about the individual instructive need of each client[8]. This framework enables the client to get to the information as per his/her necessities. This framework is progressed than the current frameworks. Fig. 1 shows the System Architecture.

There are different points of interest of utilizing this framework, for example, Different instructive contents can be gotten to on a solitary stage and thus the client does not need to look for them independently. The framework is fit for investigating the client profile and giving the substance in light of that. The framework gives personalization to learning by meeting the individual client necessities and empowering him/her to get to the substance identified with his/her advantages[9]. The framework design shows the procedure stream of the proposed framework. The accompanying design comprises of different segments of the framework. Here above all else the client makes his/her profile and the data is put away in the profile database. Assist the survey gathered from the client is put away in the poll database which can be refreshed later in the client's dashboard at whatever point the client needs. The following comes the investigation of the poll database as per the individual profile. Once the survey is broke down the substance identified with the understudy necessities are removed from the learning source database[15]. This removed substance is given to the individual client on his/her dashboard.
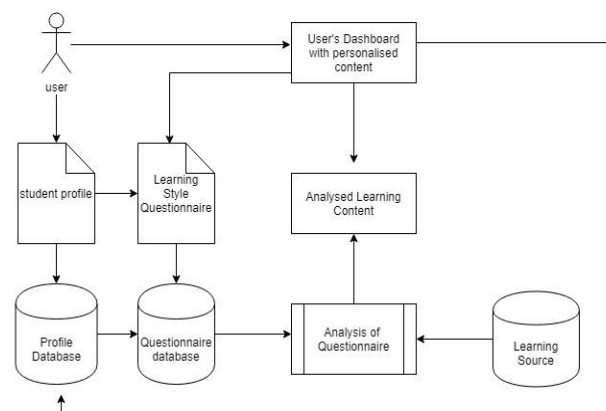

Fig. 1 System Architecture

A. Encryption Algorithm

Encryption is the way toward encoding a message or data such that exclusive approved gatherings can get to it and the individuals who are not approved can't[10]. The encryption calculation utilized as a part of this task is SHA1 (Secure Hash Algorithm).

SHA-1

Secure Hash Algorithm 1 is used in registration page and login page. While the user registers in this webpage, his/her password is encrypted and stored in the database along with a randomly generated salt key. And when the user tries to login using the password, the password is encrypted using the same salt key (stored in the database) and it validates the encrypted password in the database with newly encrypted password. If both the encrypted value is same then user is granted access or else access is denied.

Salt key generation

```php
<?php
function getSalt() {
$charset =
'abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQR
STUVWXYZ0123456789';
$randStringLen = 64;
$randString = "";
for ($i = 0; $i < $randStringLen; $i++) {
$randString .= $charset[mt_rand(0, strlen($charset) - 1)];
}
return $randString;
}
```

B. K-means Algorithm

K-means clustering is one of the clustering technique used to partition the 'm' observations into k clusters[12][15]. Every cluster will belong to some cluster by calculating the nearest mean.

Algorithm

Let $X = \{x_1, x_2, x_3, \ldots\ldots, x_n\}$ be the set of data points and
$V = \{v_1, v_2, \ldots\ldots, v_c\}$ be the set of centers.

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1) Cluster Centres 'c' is randomly selected.
2) Distance between the data point and cluster centers are calculated.
3) Data point is allocated to cluster center, where in its distance is less of all the cluster centers.
4) New cluster center is calculated using

$$v_i = (1/c_i) \sum_{j=1}^{c_i} x_i$$

4) where, 'ci' represents the number of data points in ith cluster.
5) Go to Step 4 to calculate the distance for each new cluster center.
6) Repeat from step 3, till data point is reassigned. Otherwise stop the process.

C. C 4.5 ALGORITHM

C4.5 is used to construct the classifier to form a decision tree. This algorithm is implemented in the dashboard section to display the content to the user. For every user, the content displayed on the dashboard is different[11][13]. Content are selected and displayed from the database to the user after analyzing their answers submitted in the questionnaire section. As every user has different area of interest and according to their choice the contents are displayed.

Algorithm
1. Normalized Information Gain Ration is found for each attribute 'a'.
2. Let highest normalized Information Gain be the attribute 'a_b'.
3. Decision node is created which splits on a_b.
4. Iterate at the sublists acquired via splitting on a_b, and add those nodes as children of node.

D. PAGERANKING ALGORITHM

Page Rank algorithm is used to find the importance the object, it is kind of unsupervised learning approach which results in most relevant data.

Algorithm
This algorithm is implemented in dashboard to display the history or recently accessed content.
1. All the user's data is saved in SQL database
2. When a user logs in, his/her all the data i.e. area of interest, scripting language,
search history, programming language is extracted from the db with the help of php language.
3. The result retrieved from the db is saved in the form of a string array.
4. From these string arrays we do a sorting in alphabetical order.
5. Then we apply similar sorting algorithm which sorts the content of the array according to the occurrences of the elements.
6. The resultant array is transformed into a json file.
6.1.1 In this json file, the data is saved according to its number of occurrences.
7. While displaying the result the content of the json file is read and results are displayed on the dashboard accordingly.

IV. EXPERIMENTAL RESULTS
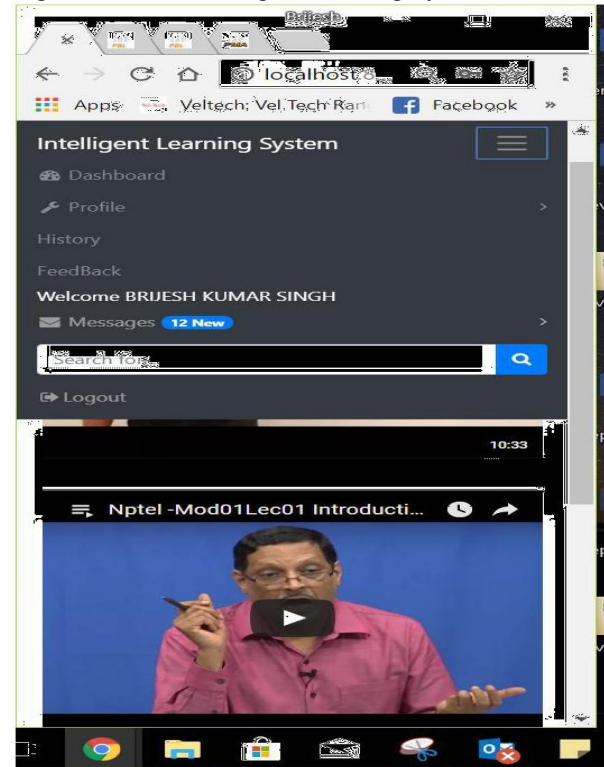
Fig. 2 shows the Intelligent Learning System.

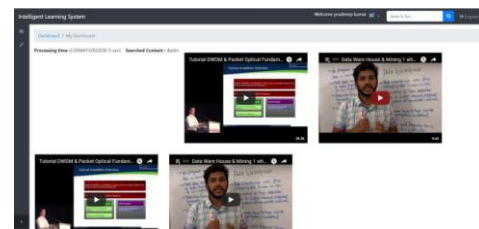**Fig. 2 Intelligent Learning System**


Fig. 3 Processing Time for searched content

Complexity of any application is measured with respect to time and space. Time complexity determines the total time taken for the execution or processing of the application. And the space complexity refers to the memory used by the application. Table. 1 shows the execution time of ILS and Google

Content	Google (in secs)	ILS (in secs)
TOC	0.52	0.19
DWDM	0.49	0.21
SOFT SKILLS	0.66	0.54
JAVA	0.44	0.219
OS	0.58	0.288

Table. 1 Execution Time

The Execution time of proposed system is less because the content in the database is less when compared to Google. Fig. 4 shows the comparison.
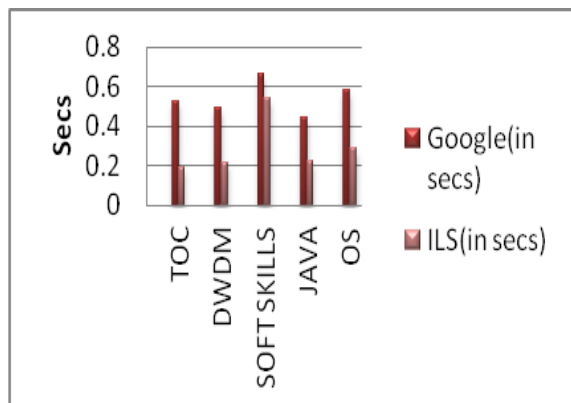
Fig. 4 Execution time comparison of search engine

V. CONCLUSION

With a specific end goal to make a customized, canny learning framework, as a matter of first importance, understudy's learning style ought to be recognized by getting the appropriate responses of different poll from the student, at that point putting away the reasonable learning style of every student in the database. After that the understudy learning style is investigated by the understudy profile and afterward the in light of that is accommodated the specific understudies on their separate dashboards.

There is a degree for future upgrade in this proposed framework. Different ascribes can be added to this framework and consequently it can be made more intelligent and compelling. In future, different modules can be included here like a self-investigation report age, where the clients will have the capacity to check their advance in taking in their intrigued courses and enhance themselves. Likewise an evaluation based module can be made to investigate the comprehension of the specific learnt course. This will push the clients to frequently check their enhancements and shape their getting the hang of as per their necessities. Later on, the proposed framework can likewise be upgraded by additionally giving a focused stage, where the clients with same interests can contend among themselves. Consequently, developing their learning and seeing considerably more.

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