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Solving The Problem of Adaptive E-Learning By Using Social Networks

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Abstract
This paper propose an enhanced E-Learning Social Network Exploiting Approach focused around chart model and clustering algorithm, which can consequently gathering dispersed e-learners with comparative premiums and make fitting suggestions, which can at last upgrade the collective learning among comparable e-learners. Through closeness revelation, trust weights overhaul and potential companions change, the algorithm actualized a programmed adjusted trust association with progressively upgraded fulfillments.
Keywords: Relations, Adaptive E-Learning, Clustering , Social Network , E-learning , and Collaborative Learning

1. INTRODACTION

Throughout the last few decades, the nature of training in numerous instructive organizations has declined prompting inadmissible low scholastic execution, large amount of useful lack of education, developing populace of unemployable graduates. Adapting never was limited to classrooms. The changing sociotechnical connection offers a guarantee of new open doors, and the feeling that by one means or another things may be distinctive. Utilization of the Internet and other developing innovations is spreading in recurrence, time and space. Individuals and associations wish to utilize innovation to help learning look for speculations to casing their comprehension and their advancement.

Learning is a dynamic transaction between individuals as one individual teaches and an alternate learns . It is an imputed experience on the grounds that people investigate new zones of learning together in such a path as to make a typical center and ideas. Additionally, it is a typical encounter as understudy acquire the same educated viewpoints of certain learning ranges.

E-Learning which breaks the traditional classroom based learning mode enables distributed e-learners to access various learning resources much more convenient and flexible. However, it also brings disadvantages due to distributed learning environment. Thus, how to provide personalized learning content is of high priority for e-learning applications. An effective way is to group learners with similar interests into the same community [1].

In the early beginnings of the Adaptive systems development this new approach of software individualization promised to improve human-computer interaction considerably. Many frequently occurring problems of usability and learn ability seemed to be easily solved. However, even today, after elaborating significantly the modeling techniques, it is not obvious whether this promise has been kept, because only few empirical evidence exists that supports this claim[2]. Adaptive e-Learning is a new approach that can make an E-Learning system more effective by adapting the presentation of information and overall linkage structure to individual users in accordance with their knowledge and behavior[3].

A social network is a structure formed by people and by connections between people, with the connections enabling interactions and exchange of information and influence [4][5],Socio technical systems recognized many years ago that organizations functioned most effectively when their social and technological networks were compatible. This is the case exactly with e-Learning systems [6]. Social network analysis is a research area that has received significant attention, especially in the last several years. The correspondence between real-world social relations and social media ties has been confirmed on several occasions [7- 10].

In other hand, costs of digital devices, storage and bandwidth have fallen, audio, video and text processing has come to be used daily by people at home, at work and in formal education. Internet usage has became commonplace in the developed world and is growing fast in developing countries see (Figure 1 , Figure 2) ("Internet Usage Statistics," 2011 and 2012). There are still significant discrepancies in Internet penetration rates but Africa is enjoying the greatest growth rate in users 2000-2012 (from a low base), and Asia already has the largest number of Internet users. This widespread and growing number of Internet users offers the possibility of local and global dialogue and sharing of resources, subject to linguistic and socio-cultural constraints.

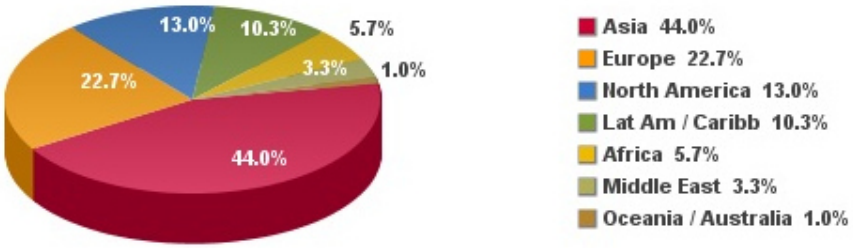

Figure 1. Internet Usage Statistics for year 2011

WORLD INTERNET USAGE AND POPULATION STATISTICS
June 30, 2012

World Regions	Population (2012 Est.)	Internet Users Dec. 31, 2000	Internet Users Latest Data	Penetration (% Population)	Growth 2000-2012	Users % of Table
Africa	1,073,380,925	4,514,400	**167,335,676**	15.6 %	3,606.7 %	7.0 %
Asia	3,922,066,987	114,304,000	**1,076,681,059**	27.5 %	841.9 %	44.8 %
Europe	820,918,446	105,096,093	**518,512,109**	63.2 %	393.4 %	21.5 %
Middle East	223,608,203	3,284,800	**90,000,455**	40.2 %	2,639.9 %	3.7 %
North America	348,280,154	108,096,800	**273,785,413**	78.6 %	153.3 %	11.4 %
Latin America / Caribbean	593,688,638	18,068,919	**254,915,745**	42.9 %	1,310.8 %	10.6 %
Oceania / Australia	35,903,569	7,620,480	**24,287,919**	67.6 %	218.7 %	1.0 %
WORLD TOTAL	**7,017,846,922**	**360,985,492**	**2,405,518,376**	**34.3 %**	**566.4 %**	**100.0 %**

Figure 2. Internet Usage Statistics for year 2012

2. RELATED WORK

Adaptive e-learning is often meant to be new or in an early development stage[11].Computer-based learning system are critized by many researchers for their adaptability of teaching actions compared to rich tactic and strategies employed by human expert teachers and limited ranges [12] [13].

There are different types of online learning that is individualized, but an adaptive e-learning system is regarded as one of the most recent models. This system tries to adapt to each individual by presenting learning materials in accordance with one or several characteristics of the student. The adaptive e-learning system needs to be developed by considering that the conventional e-learning systems are not capable of providing an individualized learning; they present the same material for all students [14].

General Architecture of adaptive e-learning , in this part, we present various diagrams of application design for an adaptive e-learning shown in (Figure 3). The objective is to conceive a system which can model the description of pedagogic resources and guide the learner in his formation according to his assets and to the pedagogic objective that is defined by the trainer. This pedagogic objective presents the capacities that the learner must have acquired at the end of the formation activity.

The Expert Space which relates to the modelization of pedagogic resources to prepare them to be used by the adapter. In Expert Space, nominally the teacher or the expert, who seeks to integrate new resources in the base, describes them by filling a form ,The Learner Space performs the following jobs: it accommodates the identifiers of a learner, selects his profile from the Learners database and returns it to the adapter as well as the goal of this formation. The adapter (adaptation process) uses optimization algorithms to seek the optimal strategy while selecting the courses in the resources base and provides them to the user interface. The Learner database contains the identifiers of the learner and his knowledge or asset. As a result, the system provides an optimal courses list to achieve the current goal by applying the genetic algorithms to seek the intermediate states [15].

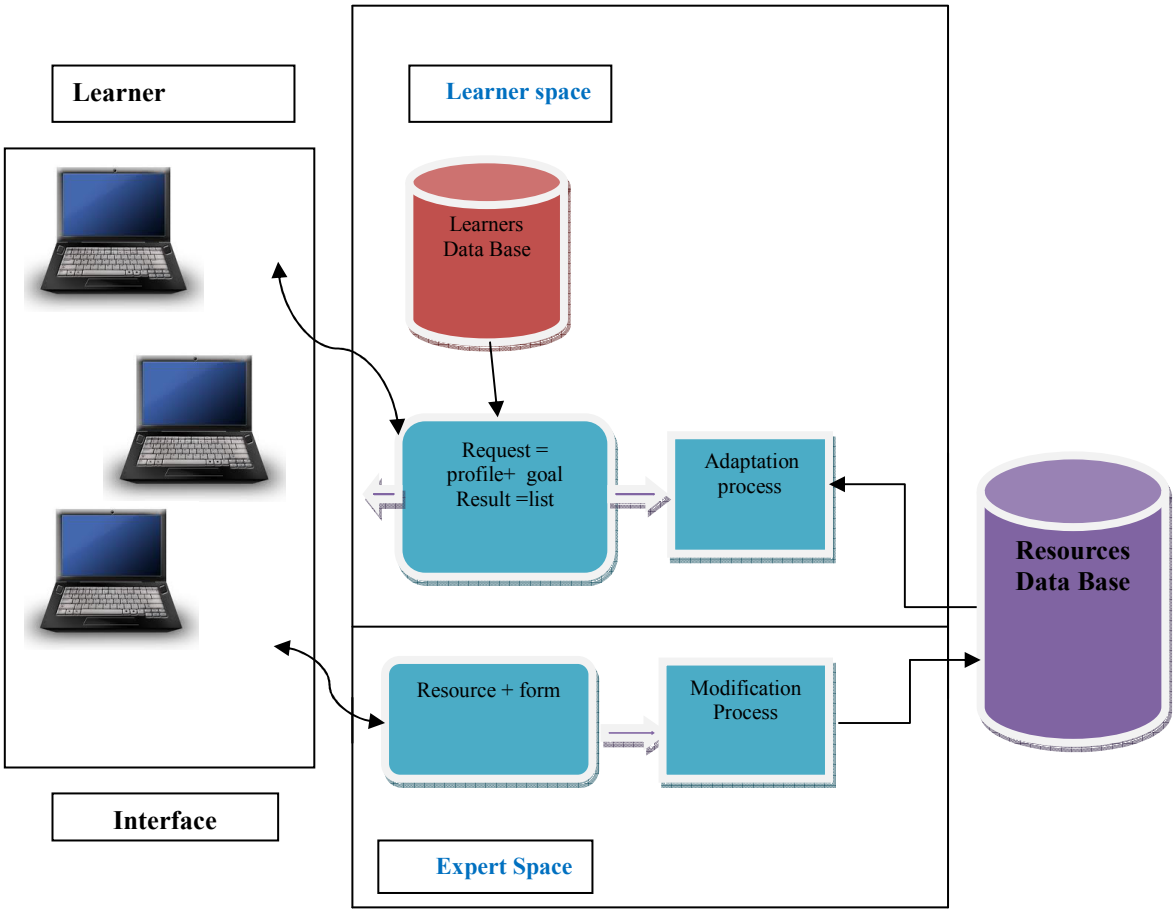

Figure 3. Structure of the adaptive e-learning system

Virtual Learning Environments sometimes called learning management systems or managed learning environment, create a controlled virtual learning space where teachers and students interact, post and submit homework, give and receive feedback from their peers, and link to course resources and information. Combining technology and education, VLEs provide comprehensive course management tools and are often used in distance education. Traditionally, VLEs were simplistic and contained a lot of text, simple graphics, and included the lecturer's notes in an eBook format. "Today, we have the ability to create very sophisticated and complex interactive virtual environments," that include sound, video, and animation. These VLEs help students and teachers interact and communicate in ways previously not possible (Figure 4) shows Blackboard e-learning framework which has many limitation in social interaction and personalization [16].

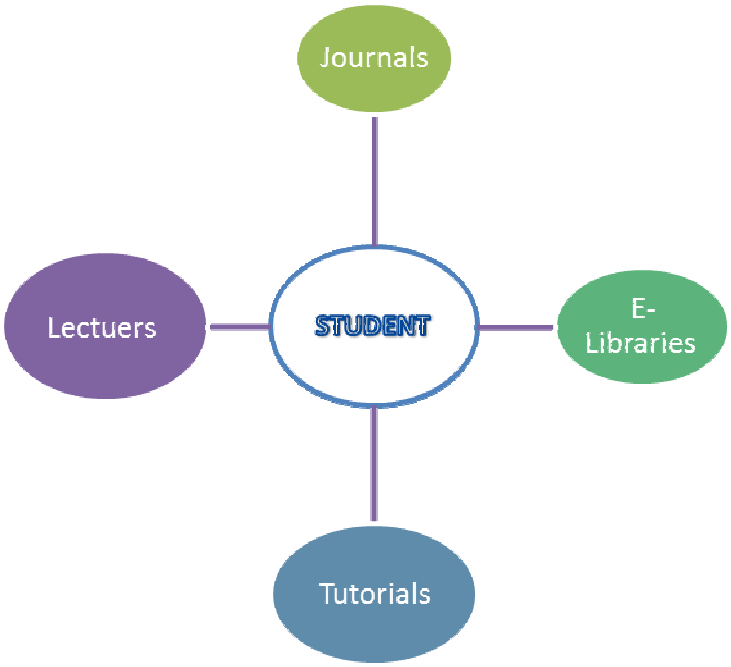

Figure 4. Blackboard E-learning Framework

Adaptive-based learning The objective of adaptive based learning is to conceive a system which can model the description of pedagogic resources and guide the learner in his formation according to his assets and to the pedagogic objective that is defined by the trainer, This pedagogy objective presents the capacities that the learner must have acquired at the end of the formation activity [17][18]. Adaptive e-Learning systems would be a good solution for better e-Learning[19].System such **Moodle** use *adaptive e-learning* which creates the best possible learning experience for students by emulating the talents of great educators. This is achieved by using technologies that adapt and shape teaching to the needs of the individual student.
The process of applying rule mining over the Moodle data consists of the same four steps as the general data mining process [20]:

- **Collect data**. The LMS system is used by students and the usage and interaction information is stored in the database. We are going to use the students' usage data of the Moodle system.

- **Preprocess the data**. The data are cleaned and transformed into a mineable format. In order to preprocess the Moodle data we used the MySQL System Tray Monitor and Administrator tools [21] and the Open DB Preprocess task in the Weka Explorer [22].

- **Apply association rule mining**. The data mining algorithms are applied to discover and summarize knowledge of interest to the teacher.

- **Interpret**, **evaluate and deploy the results**. The obtained results or model are interpreted and used by the teacher for further actions. The teacher can use the discovered information for making decision about the students and the Moodle activities of thecourse in order to improve the students' learning[23].

Project-Based Learning a strategy that encourages students to explore a problem through driving questions and authentic experiences, can be an excellent means to a social constructivist end. PBL helps teachers blend technology with hands-on materials to create imaginative and challenging student activities [24].

Management Information System E-Learning tends to revolutionize and manage the learning process [25]and is divides in two types **University Management Information System** and **Learning Management System (LMS)** is the software that automates the administration of education. LMS registers students, tracks courses in a catalogue, records data from learners, and provides reports to management.

An LMS is typically designed to handle courses by multiple publishers and providers. It usually doesn't

include its own authoring capabilities; instead, it focuses on managing courses created by a variety of other sources [26].

Global Collaboration takes such student engagement and learning outside the walls–or virtual walls–of the classroom and into the greater world. Learning communities, such as those established by communities or universities, provide a place for learners to pursue their interests, solve a problem, provide support, get feedback, or otherwise connect with people who share similar passions. Such constructivist interaction can be scaffolded in a classroom environment to allow students to work more independently and even help someone else solve a problem [27].

3. PROPOSED FRAMEWORK

3.1 Proposed Framework

In order to overcome the problem of traditional In order to overcome the problem of traditional e-learning or adaptive e-learning, we proposed half breed framework that satisfies the social e-learning framework however with some new features or adaptive e-learning, we proposed mixture framework that satisfies the social e-learning framework yet with some new features. *Collaborative feature*, each user (student, teacher) has own sharing and chatting tool which introduce availability. *Semantic Support feature*, each student or teacher has supported with intelligent process which suggest the closest friends. *Agent feature*, each agent in the community holds a set of resources such (Profiles, Friendship, Courses and Exams) which are rated by proposed algorithm. (Figure 5) shows proposed social e-learning framework.

To measure the nature of framework must first ensure that framework satisfied 3th principles of connectivism. Principles of connectivism are the accompanying:

- personality of connections with abnormal amount of security.
- huge Capacity is needed for successful social learning network.
- decision making is itself a learning process. picking what you learn and who you learn.

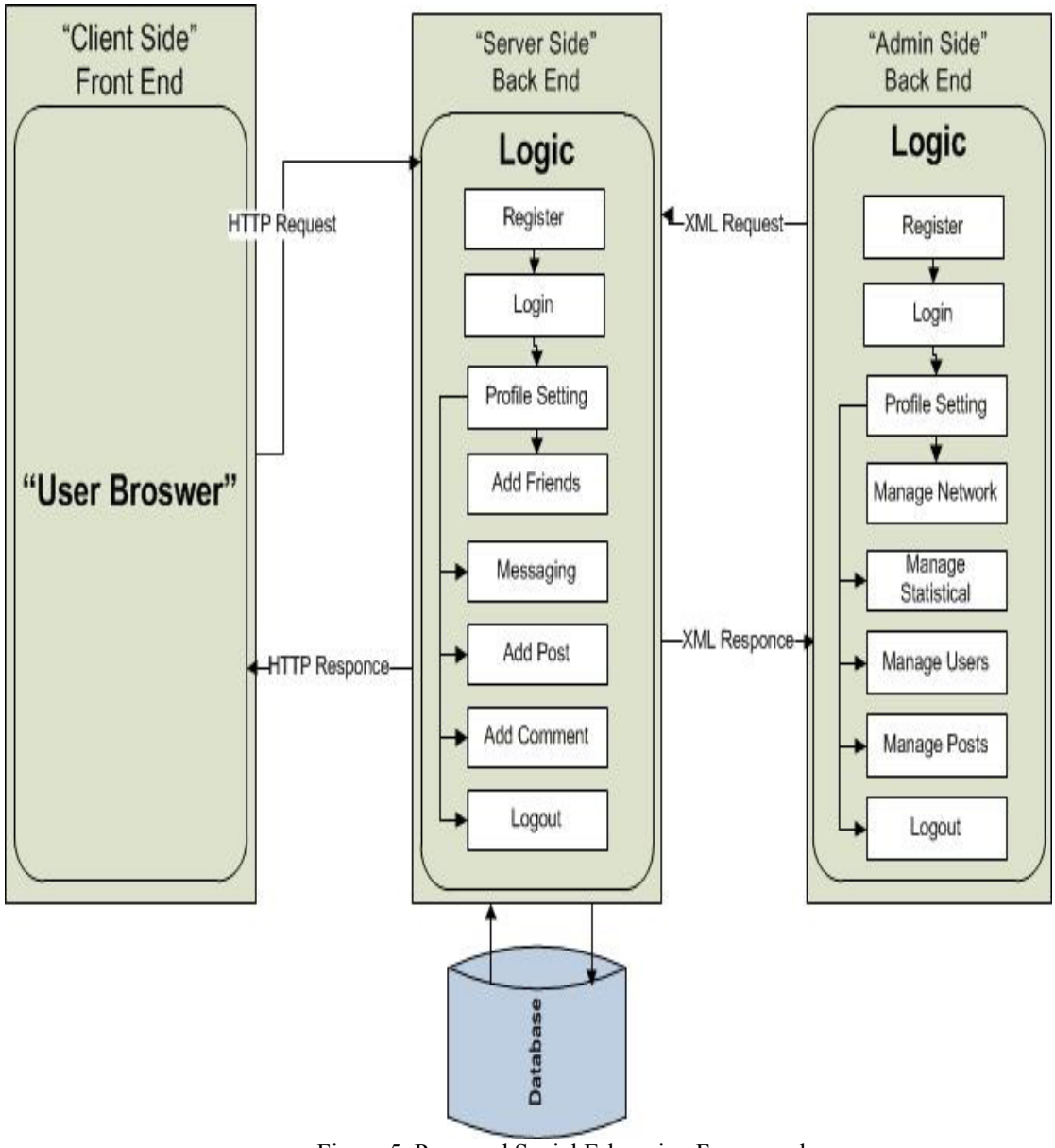

Figure 5. Proposed Social E-learning Framework

2. Proposed Algorithms

Nodes which control our framework are actors such (Student, Teacher and Posts or Courses). Every node has one or more relations with other node. The strength of relation is calculated by graph classification techniques. (Figure 6) shows social e-learning concept graph. We suppose case study of 4 students, 4 courses and 4 teachers which I means number as (1,2,..n) and cursors means relations and nodes S means Student, C means Courses and T means Teachers.

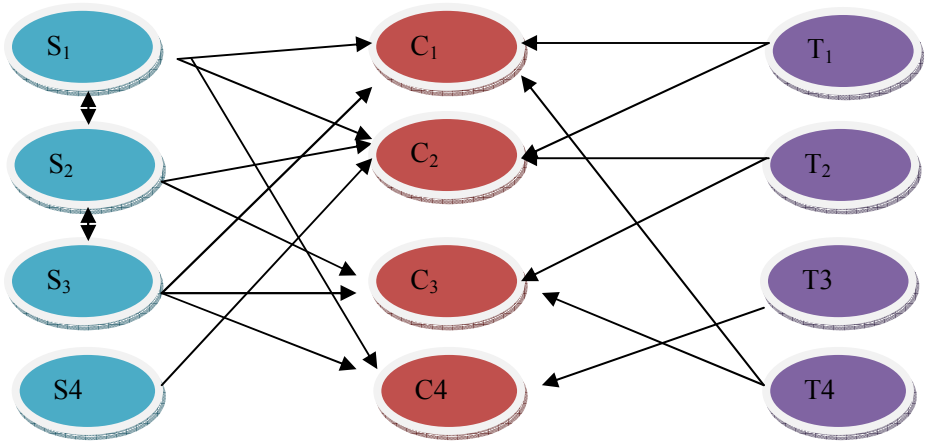

Figure 6. The Graph of Social E-learning Concept

very Relationship between different nodes has strength number come from matrix of this relationship. Relations are student's friends and favorite courses. With these relations, system can be determined which friend or course must be suggested first. From (Figure 6), we can demonstrate the following matrices of relationships in order to classified friends or courses and therefore enhance e-learning.

First, the friend relationship matrix =

	S1	S2	S3	S4
si1	0	1	0	0
s2	1	0	1	0
s3	0	1	0	0
s4	0	0	0	0

Then from this matrix, we can conclude that S1 is friend of student S2 in our case study and S2 is friend of student S3, and S3 will be the first suggested friend to S4because they subscribers in friendship of S3.

First, the favorite courses relationship matrix =

	S1	S2	S3	S4
c1	1	0	1	0
c2	1	1	0	1
c3	0	1	1	0
c4	1	0	1	0

Then from this matrix, we can conclude that S4has not any courses in our case study and will be the first suggested courses is C2 because C2subscribers in friendship of S2 and S3.

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