

A Framework for Adaptive Learning Environment

Shri Vindhya¹, V. Kalpana², Karunakaran A³

¹Associate Professor, Institute of Computer Science and Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai, Tamil Nadu, INDIA Email shrivindhya.sse@saveetha.com

²Assistant Professor, Department of Computer Science and Engineering, Vel Tech Rangarajan Dr Sagunthala R&D Institute of Science and Technology, Chennai, India,
Email-kalpanavadivelu@gmail.com

³Assistant Professor, Department of Electronics and Communication Engineering, Rajalakshmi Institute of Technology, Chennai, India.

Abstract. *The principle destinations of this paper are to recognize the understudy's learning style. In light of that, the gathering of understudies can be shaped utilizing k-implies grouping calculation. The grouping of students is a technique for leaning go give the effective learning for the users. Instructors value the ability to work with the help of a person. To be sure, studies show that they value it more than the ability to act autonomously. The value of effective learning, understanding, has been very much felt for some time. Acceptable learning is described by some credibility, where the best presentation of people understands what is best implemented by the whole crowd. It may be formal or mediocre, but often involves explicit teacher mediation, with less collaboration and increased learning.*

Keywords: *Collaborative learning, Personality traits, K-NN Algorithm, learning style, grouping.*

1. Introduction

Defender of cooperative studying disputes that the effective swap of suggestions among tiny associations not only develops care within the members but also develops analytical philosophers. CSCL orders use the latest electronics to manage and supervise, to interplay, to manage duty, order and character, and to interfere with the acquisition of new knowledge. Admitting learners to create their self associations will probably conclude in unbalanced organizing. Addition feasibility is to do an introductory evaluation; and then located on the conclusions; busily generate associations that mix capabilities. In order to have a healthy learning environment we have to group students-based learning styles.

2. Background

The analysis of Computer supported collaborative environments where students are actively participating in learning, how different techniques have been utilized for identification of personality, interaction patterns and learning styles has been done. And how groups are organized in the learning environment in order to maximize the students' performance has also been analyzed.

2.1. Computer Supported Collaborative Learning

They embraced an innovation called data mining to investigate learners' parts in shared learning. In allude to the ordinary procedure of data mining; they proposed a system of part examination in view of Data Mining which information planning and learner talk design mining are portrayed. A contextual analysis is likewise directed to demonstrate the data mining procedure and finding and additionally talk on the data mining comes about.

The configuration examples would give awesome advantages to the improvement of reusable, adaptable, and adjustable segment based CSCL applications. They clarified that the improvement of such structure infers that product engineers have a legitimate comprehension of the key ideas and standards of the space of interest. They proposed and represented the utilization of the alleged Collaborative Learning Patterns: itemized portrayals of all around acknowledged sorts of community oriented learning exercises characterized by Collaborative Learning specialists. They proposed SimCoL, which is a multi-specialist condition that reproduces collective learning among understudies and operators offering help to the instructor and the understudies. Their outcomes demonstrated that SimCoL1) nearly caught the individual and aggregate learning practices of the understudies in a CSCL environment; 2) recognized the effect of different key components of the CSCL condition (e.g., understudy qualities and gathering arrangement calculation) on the community oriented learning of understudies; 3) thought about and differentiate the effect of specialist based versus non agent-based gathering development calculations; and 4) gave experiences into the adequacy of operator based teacher bolster for the understudies in a CSCL domain.

2.2. Group Formation

Asma Ounnas et al (2008) proposed that the collaboration has long been considered an effective approach to learning. Asma Ounnas et al (2008) recommended that the coordinated effort has for quite some time been viewed as a compelling way to deal with learning. In any case, framing ideal gatherings can be a tedious and complex undertaking. Distinctive methodologies have been created to help educators distribute understudies to bunches in light of an arrangement of limitations. Be that as it may, existing devices frequently neglect to dole out a few understudies to bunches making an issue surely understood as "vagrant understudies". The utilization of both Semantic Web advancements and Logic programming demonstrated to build the fulfillment of the imperatives and defeat the vagrants' issue.

Shuangyan Liu et al. (2013) examined that the current work has highlighted how thought of learning styles during the time spent gathering arrangement for community-oriented learning can have a positive effect. They researched the execution of comparative learning style bunches and assorted learning style aggregates in gathering work, and investigated how a gathering calculation in view of understudies' learning styles influences understudies' learning accomplishments and procedures. An exact review with past college understudies in the UK has been directed. The taking part understudies were welcome to achieve two gathering discourse errands. No volunteer imparted both gatherings to any individual understudy. They concentrated on examining the learning accomplishments and coordinated effort forms for the two sorts of gatherings, especially concerning the nature of gathering cooperations. A huge contrast was found between the rates of time spent on important collaborations by the two sorts of gatherings, uncovering that differing learning style bunches have a tendency to invest essentially more energy in significant communications than comparative learning style bunches. What's more, the different realizing style bunches had exhibited altogether less negative social-enthusiastic responses in demonstrating contradictions.

2.3. Learning Styles

David Adrian Sanders et al. (2010) portrayed that the noteworthy advances in consequently foreseeing client learning styles. The framework has worked with new customer-based frameworks that channel Web pages and gives simple, organized, cantered, and controlled access to the Internet. A first framework called iLessons was installed inside Microsoft Internet Explorer 6 and gave educators apparatuses to make the lesson Web pages, characterize zones of the Internet that could be gotten to amid the lesson, and authorize these settings in an arrangement of PCs. A moment framework can empower understudies to examine and work together utilizing the Internet. The framework separated Web pages in light of the significance of their substance and helped understudies by gathering their learning style (dynamic or intelligent) and by suggesting pages found by kindred understudies in view of page pertinence, understudy learning style, and perspective measured by movement. The framework induced learning style continuously by checking

client movement, and late huge advances in the examination are depicted. Juan Yang et al.(2014) proposed a learning style prediction method based on a pattern recognition technique.

The fundamental commitments of that strategy are: (1) it is a type of middleware that can be connected to other smart coaching frameworks, and (2) it can handle point subordinate data to make forecasts and refresh learning style profiles in a recursive way. Exploratory assessments showed the adequacy of this forecast technique.

Norazlina Ahmad et al. (2014) explored the various reviews which have been done for as far back as quite a while reference to the promising technique on programmed recognition of style of learning for a superior learning adaption. In like manner in this review, they underlined on showing the outcome for the meta-examination done on past reviews which consolidated the utilization of writing-based strategy - narrowing to dynamic and intelligent measurements of Felder and Silverman demonstrate by means of internet learning condition. They figured out how to basically recognize a few fundamental perspectives that can profit and filled in as a rule for executing a programmed recognition of learning style approach later on. Among the viewpoints that value being seen from the displayed six reviews are internet learning stage, applicable elements, conduct example, and exactness.

Nor Bahiah Hj Ahmad et al. (2010) thought about the execution of a few classifiers which in done in WEKA, for example, Bayes, choice tree and order governs in grouping understudy's learning style.

2.4. Interaction Patterns

Yonghe Zhang et al. (2011) suggested that in Computer Supported Collaborative Learning inquire about, the cooperative procedure of focal significance. Accordingly, the expectation is to divulge users' collaboration designs through breaking down setting of inquiries in discourse transcript. In light of suppositions on data source and clients' working procedure of examining inquiries' specific situation, a few outline standards have been recognized. Guided by these standards, a specialized arrangement is displayed to execute an apparatus for investigating setting of inquiries. By joining content arrangement and data representation innovations, the apparatus underpins substance and structure examination of exchange transcripts to create visual examples in a type of 5W1H setting of addressing. The device empowers clients to comprehend collaboration designs in an instinctive and well-disposed way. A contextual analysis is additionally led to approve the adequacy of the instrument.

3. Method

Identity is the complicated of all the features observable, capricious, sentimental and intellectual that characterizes a particular person. It is notable that revelation transfers a heap of data about the talker in inclusion to their linguistic content. One such kind of data contains clues to the talker's identity characteristic, the most basic measure of difference between individuals.

The database can be combined with LIWC and MRC psycholinguistic databases. The automatically trained models can be used to recognize the personality of students in that group.

3.2. Identification of Interaction Patterns

The Interaction Patterns of students in the Face book group can be identified by using java library JUNG. JUNG- the Java Universal Network/Graph Framework--is a program information centre that gives a familiar and expansive dialect for the pattern investigation and perception of information that can be presented as a diagram or structure. Here the Face book dataset can be connected to JUNG API. The student can be considered as Nodes and the conversation between them designed as vertices. The Network diagram of overall chat can be obtained as result. By applying the Graph Algorithms, the different type of factors like Betweenness centrality, Degree Centrality, Closeness Centrality can be obtained. By using this we can identified whether the user is more important or less important.

The intermediate central node is mentioned as the expression: where the total represents shortest distance between two nodes. The Degree centrality of a node refers to the number of boundaries joined to the node.

For realize the regulated total, you must break each total by $n-1$ (n = the number of nodes). By using this we can identify whether the person is more or less active.

The closeness centrality found by calculates the upturned total after you calculate the total number of measures to a node. For knowing the regulated total, you must break a total by $(n-1)$, and then take reverse. By using this score, we identified whether the person is more or less reachable.

3.3. Interaction Pattern Identification Using Jung

Interaction patterns of discussion databases can be identified by using a java framework JUNG which is specially designed to create and analyze the network graph. Using JUNG we also identified different network Graph Algorithms and found different scores.

Algorithm: Interaction Pattern Identification

Input: Student's comment table

Output: A network graph of overall comments and centrality scores of all.

begin

Step 1: Connect discussion database to JUNG API.

Step 2: The Students can be designed as nodes and communication between them can be created as vertices.

Step 3: The graph diagram can be obtained as result in Applet.

Step 4: And also graph algorithm to identify betweenness centrality, degree centrality and closeness centrality can be used.

Step 5: By using that scores we categorized students into different types More/Less active, More/Less Important, More/Less Reachable.

Step 6: This can be stored in database.

end

3.4. Learning Style Identification

The Learning Styles can be identified by query processing.

Algorithm: Learning Style Identification

Input: Student's comment and post table

Output: Learning style of each student

begin

Step 1: According to Learning style there are four types of learning styles are there which is classified based upon

By feeling	:	Concrete
By Thinking	:	Abstract
By Observing	:	Reflective
By Doing	:	Active

Step 2: To find the concrete learning style, the persons who initiate and who create questions can be identified.

Step 3: To find Abstract learning style, the persons who answering questions and who provide content can be identified.

Step 4: To find Reflective learning Style, the persons who just likes the post and not participated can be identified.

Step 5: To find Active those who working with programming or with examples can be identified.

Step 6: Thus these types can be categorized and stored in database.

end

3.5. Identification of Learning Styles

In this commendations Kolb's miniature is chiefly ethereal, since it bids diploid an access to assimilate peculiar entity varied research genre, and moreover an elucidation of a chain of factual invents that cover to all of us.

Kolb embody this 'chain of research' as a main decree his factual research axiom, commonly advertise as quartet-aspect chain of research, in which 'abrupt or stable confrontation' give a thesis to 'concept and rumination'. Kolb assert that in a impeccable earth (and by derivation not commonly) this agenda speaks to a research chain or curving where the trainee 'contact each one of the footing', i.e., a chain of confrontation, rumination, scrutinizing, and performing. abrupt or stable encounters prompt concept and rumination. These ruminations are then adjust(saved and elucidated) into theoretical theories with proposals for analysis, which the entity can adequately analysis and shot varied goods with, which hence permit the evolution of unique confrontation.

Kolb's miniature thence functioning on binary aspect - a quartet-aspect chain:

Concrete Experience - (CE)

Reflective Observation - (RO)

Abstract Conceptualization - (AC)

Active Experimentation - (AE)

This can be identified from the discussion dataset using query processing.

Step 5: The Page details can be parsed into text files using JSON parser.

Step 6: The text files stored dynamically in runtime.

Step 7: The text files connected to the MySql database.

Step 8: Create two tables: Post, Comment

Post [PostID, Postname, Post, PostLikes]

Comment [PostID, CID, CName and Comment]

4. Discussion

The subtends behaviour and character is identifies based on the records obtained in their social media and compared with the psycholinguistic databases like MRC and LIWC. The interaction patterns can be identified by network graph of chats formed by java framework JUNG. Using this, different types of centrality scores can be obtained separately. The learning styles can be obtained by using query processing based on Kolb's learning style.

Personality	Number of Users
Agreeableness	8
Conscientiousness	34
Emotional stability	8
Extraversion	113
Openness to experience	56

Table 1 Chart for Identifying Personality of Users

Table 2 It illustrates the personality of the users' based on the records obtained from their social media and compared the dataset with Psycholinguistic Databases (LIWC and MRC).

Learners	Number of Users
Abstract	26

Active	4
Concrete	16
Neutral	142
Reflective	31

Table 2 Chart for Identifying the learning style along with the number of users.

Table 3: It illustrates the number of users for each group which are identified by Query processing.

Group	Number of Users
A	117
B	34
C	25
D	11
E	31

Table 3 Chart denotes the Grouping of Students

Table 4: It illustrates the 5 different classified groups for users which is done with the help of K-Means Clustering algorithm.

Table 4 Evaluation of Identification of personality

Groups	Personality
1	Openness to experience
2	Extraversion
3	Conscientiousness
4	Agreeableness
5	Emotional stability

5. Conclusion

The interaction patterns can be identified by network graph of chats formed by java framework JUNG. Using this, different types of centrality scores can be obtained separately. The learning styles can be obtained by using query processing based on Kolb's learning styles. Then we can categorize the groups for the students with the help of K-Means Clustering by the scores obtained above. By using this approach, it can implement in online learning and in distance educations. This proposed system is helpful in forming groups of students with some constrains to make the learning more effective.

References

- [1] Asma Ounnas, Hugh Davis, David Millard, "A Framework for Semantic Group Formation", Proceedings of the Advance Learning Technologies, Vol. 8, pp. 34-38, 2008.
- [2] David Adrian Sanders, Jorge Bergasa-Suso, "Inferring Learning Style From the Way Students Interact With a Computer User Interface and the WWW", Proceedings of the Engineers Transactions, Vol.53, pp. 613-620, 2010.
- [3] Juan Yang, Zhi Xing Huang, Yue Xiang Gao, Hong Tao Liu, "Dynamic Learning Style Prediction Method Based on a Pattern Recognition Technique", Proceedings of the Learning Technologies, Vol. 7, pp. 165-177, 2014.
- [4] Nobel Khandaker, Leen-Kiat Soh, "SimCoL: A Simulation Tools for Computer-Supported

Collaborative Learning”, Proceedings of the Institute of Electrical and Electronics Engineers on systems, man, and Cybernetics, Vol. 41, pp. 533-543, 2011.

- [5] Norazline Ahmad, Zaidatun Tasir, Nurbiha A.Sukhor, “Using automatic detection to identify students’ learning style in online learning – Meta Analysis”, Proceedings IEEE 14th International Conference on Advance Learning Technologies, ICALT 2014, Vol. 14, pp. 126-130, 2014.
- [6] Nor Bahiah Hj, Ahamd, Siti Mariyam Shamsuddin, “A Comparative analysis of mining techniques for automatic detection of student’s learning style”, Proceedings of Conference on Intelligent Systems Design and Applications, Vol. 10, pp. 877-882, 2010.
- [7] Shuangyan Liu, Mike Joy, Nathan Griffiths, “An Exploratory Study on Group Formation Based on Learning Styles”, IEEE 13th International Conference on Advanced Learning Technologies, Vol.13, pp.95-99, 2013.
- [8] Yonghe Zhang, Yanyan Li, Peijie Cao, Ronghuai Huang, “Understanding Learners’ Interaction Pattern through Analyzing Context of Question in Discussion Transcripts”, IEEE 11th International Conference on Advanced Learning Technologies, Vol. 11, pp. 548-552, 2011.