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Knowledge Acquisition Using E-Brainstorming Technique on Educational Data

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Abstract—**Educational Data Mining is an promising obedience that focuses on applying Data Mining tools and techniques to extract related data from web. The discipline focuses on examining educational data to extend models for improving learning experiences. The proposed work introduces a new way of fusing classifiers at the level of parameters of classification rules. This system is based on the use of probabilistic generative classifiers using multinomial distributions. E-Brainstorming integrates the unique association thinking of humans with an intelligent agent method to invent an computerized decision agent called the Semantic Ideation Learning Agent (SILA). It can represent a session applicant who is actively participating in brainstorming. The main advantage of this fusion approach is that the hyper distributions are retained throughout the fusion process.**

Keywords—Web content mining; Bayesian classification; E-Brainstorming; Semantic Ideation Learning Agent (SILA); Collective Brainstorming Decision System (CBDS)

I. INTRODUCTION

An E-brainstorming technique is an optimization of collaborative learning. This technique presents a tactic and tools allowing the use of online multiple-choice questionnaires to enhance collaborative work [1]. The first goal is to allow the questionnaires generation and setting with a simple and ergonomic manner, but also to let questioned people making comments and proposing new questions to other contributors [2]. The developed system provides a revelation of a synthesis of the questionnaire results that is also accessible by the mean of external applications through standard Web services. These ideologies were developed and tested on a sample of users. Semantic is study of significance in communication. The word derives from Greek semantikos "Significant", from semaino "to signify, to indicates" and from sema"sign, mark, token". In linguistics it is study of elucidation of signs as used by agents or communities within particular occurrence and perspective [3]. It has related meaning in several other fields. The E-Brainstorming tools represent believable solutions to improve the e-research community activities with respect to processes regarding idea generation and idea collection. However, the obtainable e-Brainstorming systems show procedural and technological limitations. The present work proposes a brainstorming model that aims at overcoming the aforementioned limitations by exploiting Social Web and Semantic Web technologies and practices supporting on-line social aspect, application interoperability, knowledge representation, knowledge sharing and correlation discovery [4]. The unique ideas thinking of humans with an intelligent agent to devise an preset decision called the Semantic Ideation Learning Agent (SILA) that can represent a session participant who is actively participating in brainstorming [5]. SILAs are stranded on the three association capabilities of human thinking similarity, contiguity, and contrast. A Collective Brainstorming Decision System (CBDS) is built to construct an environment where SILAs can share their knowledge with everyone in the concern areas. CBDS is integrated into an intelligent care project for the purpose of innovation e-service recommendation. Evaluation results indicate that the proposed system advances e-brainstorming by crossing the three key boundaries of human ideation capability understanding, cognition boundary, and survival [6].

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II. RELATED WORK

Hospedales et.al [7] discovered rare sorting and classifying new cases of them is an important data mining issue in many fields, but fully supervised learning of a rare class classifier is prohibitively costly in labeling effort. There has therefore been increasing interest both in active discovery: to identify new classes quickly, and active learning: to train classifiers with minimal supervision Many real life problems are characterized by data distributed between vast yet uninteresting background classes, and small rare classes of interesting instances which should be detected. In astronomy, the vast majority of sky survey image content is due to well understood phenomena, and only 0.001% of data is of interest for astronomers to study. In financial transaction monitoring, most are perfectly ordinary but a few unusual ones indicate fraud and regulators would like to find future instances. Computer network intrusion detection exhibits vast amounts of normal user traffic, and a very few examples of malicious attacks. In computer vision based security surveillance of public spaces, observed activities are almost always everyday behaviors, but very rarely there may be a dangerous or malicious activity of interest.

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Sakthipriya et.al [8] revealed the World Wide Web is an interactive and popular way to transfer the information. A massive quantity of information is available over the internet. Now-a-days web mining is one of the significant topics in data mining, which is used to extract information from web documents. It is basically categorized into three types, namely, web content mining, web structure mining and web usage mining. It is used to create many web applications, which are playing an important role in our daily life. This paper is mainly aimed to analyze the web mining categories and its web applications. And discuss the recent trends of web mining categories and challenges. The web applications are playing an important role over the internet in a different environment for all types of users. Most of the applications are used in the field of commerce. Now-a-days, the government is also using the web applications frequently like job portal, e-payments, certificate issuing, and identity cards. Today, people are doing most of their work in one place where they are sitting, and also the web applications reduce the time of folks in all ways.

Jaydeep B et.al [9] sorted of hyper spectral data using a classifier ensemble that is based on support vector machines (SVMs) is addressed. First, the hyper spectral data set is decomposed into a few data sources according to the similarity of the spectral bands. Then, each source is processed separately by performing classification based on SVM. Finally, all outputs are used as input for final decision fusion performed by an additional SVM classifier. Results of the experiments underline how the proposed SVM fusion ensemble outperforms a standard SVM classifier in terms of overall and class accuracies, the improvement being irrespective of the size of the training sample set. Nevertheless, a large number of features can become a curse in terms of classification accuracy if enough training samples are not available, i.e. the Hughes phenomenon. In this context, the use of conventional statistical methods may not be adequate for classifying high-dimensional data and therefore more sophisticated classifiers need to be considered.

Xiao-Lei et.al [10] discussed an important classifier ensemble for multiclass classification problems is Error-Correcting Output Codes (ECOCs). It bridges multiclass problems and binary-class classifiers by decomposing multiclass problems to serial binary class problems. And present a heuristic ternary code, named Weight Optimization and Layered Clustering based ECOC (WOLC-ECOC). It starts with an arbitrary valid ECOC and iterates the following two steps until the training risk converges. The first step, named Layered Clustering based ECOC (LC-ECOC), constructs multiple strong classifiers on the most confusing binary-class problem. The second step adds the new classifiers to ECOC by a novel Optimized Weighted (OW) decoding algorithm, where the optimization problem of the decoding is solved by the cutting plane algorithm. Technically, LC-ECOC makes the heuristic training process not blocked by some difficult binary-class problem. OW decoding guarantees the non-increase of the training risk for ensuring a small code length. Results on 14 UCI datasets and a music genre classification problem demonstrate the effectiveness of WOLC-ECOC.

Sander et.al [11] exposed Bayesian theory delivers a powerful theoretical platform for the mathematical description and execution of fusion tasks, especially if the information delivering sources are of heterogeneous nature. However, the complexity of Bayesian fusion tasks increases exponentially with the number of sources. By the transformation of the available knowledge, the corresponding uncertainties, and the given dependencies into Degree of Belief (DoB) distributions in the Bayesian sense, a consistent mathematical description for non-compatible kinds of information is possible. From a Bayesian point of view, a lossless information fusion is then feasible. DoBs embody the numerical degree of certainty taking account of the given knowledge. By defining DoB distributions, subjectivity may be incorporated and two subjects equipped with the same amount of information need not conclude the same DoB distribution. An established transformation method for obtaining objective DoB distributions is the maximum entropy method.

Makarenko et.al [12] presented an algorithm for Bayesian decentralized data fusion (BDDF) and its extension to information theoretic control. The algorithm is stated for a feature represented by a general probability density function. Several specific representations are then considered – Gaussian, discrete, Certainty Grid, and hybrid. Well known algorithms for these representations are shown to fit the general BDDF pattern. Stating the algorithms in Bayesian terms has a practical advantage of allowing a generic software implementation. It is also hoped that a clear general formulation will stimulate extensions to efficient non-parametric representations of arbitrary distributions. The algorithms are described in the context of the Active Sensor Network architecture – a modular framework for decentralized cooperative data fusion and control. The Active Sensor Network (ASN) paper at the University of Sydney aims to combine decentralized data fusion and control algorithms into unified yet flexible system architecture suitable for a wide range of sensing tasks. The ASN can be described from three viewpoints: the architecture, the algorithms, and the concrete implementation. The focus of this paper is on the algorithmic side of the framework but the general approach is briefly described to provide the necessary background.

Eric Hsueh et al. [13] evaluated a framework for personal mobile commerce pattern mining and predicting of mobile users‟ movements and purchase transactions under the context of mobile commerce. The mobile commerce explorer used to mine the pattern and predict the user by similarity inference model, personal mobile commerce pattern mine, and mobile commerce behavior predictor. Mobile users move between the stores, the mobile information which includes user identification, stores and item purchased are stored in the mobile transaction database. This framework is to support the prediction of next movement and transaction.

Yuewen et al. [14] explained the moderating effect of value uncertainty for online auction. In this method used a technique Meta-Analysis that effect of design in online auctions. It had mainly focused on three main findings in the moderating method that are the public reserve price has a

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positive effect on the auction price, secret effect reserve option has a positive and the buy-out option has a positive effect when auction price items are of low value. It identified value uncertainty as the key moderator of the relationship between auction design option and auction outcomes.

Prabhu et.al [15] investigated the actual fusion of two components works one level higher on the hyper distribution which is the result of Bayesian training in Co-ordinate Measuring Machine (CMM) experiments with some benchmark data set outline the properties of new knowledge fusion approach. This proposed technique could be used in the field of distributed data mining. Probabilistic generative classifiers which are based on the Bayesian theorem are assumed to solve these classification problems. The hyper distribution of the CMM classifiers is trained using semantic ideation learning agent instance association algorithm. The converged training algorithm is used to derive the classifier parameter from the hyper distribution by the means of point estimates. The main advantage of the fusion technique is possible of detect the novel structure in dynamic environment and a rejection criterion could be defined easily. Experiments with some benchmark dataset are outlined the properties of new k novel fusion approach which can be implemented in the field of distributed data mining.

Jaydeep et.al [16] sorted of hyper spectral data using a classifier ensemble that is based on support vector machines (SVMs) is addressed. First, the hyper spectral data set is decomposed into a few data sources according to the similarity of the spectral bands. Then, each source is processed separately by performing classification based on SVM. Finally, all outputs are used as input for final decision fusion performed by an additional SVM classifier. Results of the experiments underline how the proposed SVM fusion ensemble outperforms a standard SVM classifier in terms of overall and class accuracies, the improvement being irrespective of the size of the training sample set. The definition of the data sources resulting from the original data set is also studied. Hyper spectral data cover a wide spectral range from the visible to the short-wave infrared, resulting in hundreds of data channels. Thanks to this volume of information, it is feasible to deal with applications that require a precise discrimination in the spectral domain. Nevertheless, a large number of features can become a curse in terms of classification accuracy if enough training samples are not available, i.e. the Hughes phenomenon. In this context, the use of conventional statistical methods may not be adequate for classifying high-dimensional data and therefore more sophisticated classifiers need to be considered.

Seth Lloyd et.al [17] intended Machine-learning tasks frequently involve problems of manipulating and classifying large numbers of vectors in high-dimensional spaces. Classical algorithms for solving such problems typically take time polynomial in the number of vectors and the dimension of the space. The generic nature of the quantum speed-ups for dealing with large numbers of high dimensional vectors suggests that a wide variety of machine learning algorithms may be susceptible to exponential speed-up on a quantum computer. Quantum machine learning also provides advantages in terms of privacy: the data base itself is of size O(MN), but the owner of the data base supplies only O(logMN) quantum bits to the user who is performing the quantum machine learning algorithm. In addition to supplying an exponential speedup over classical machine learning algorithms, quantum machine learning methods for analyzing large data sets (‘big quantum data’) supply significant advantages in terms of privacy for the owners of that data.

III. PROPOSED WORK

E-Brainstorming is a computerized format of sharing ideas and it replaces verbal communication. This technique allows all the participants to contribute their ideas at same time and it effectively eliminates Production Blocking and Reduces Social Loafing. The productivity of ideas generated has been viewed as the leading measure of E Brainstorming. Briggs and Reining provided a hypothetical explanation in Bounded Ideation Theory to clarify the relationship between idea quantity and idea value. They also recommended supervision for the improvement of ideation techniques for improving the quality of ideas. Fig.1 embody of the proposed system in E-Brainstorming. A good idea was defined as one that is feasible to implement and would attain the goal. Although brainstorming has become a popular group technique, researchers have not found evidence of its effectiveness for enhancing either quantity or quality of ideas generated. Because of such problems as social loafing, occurs

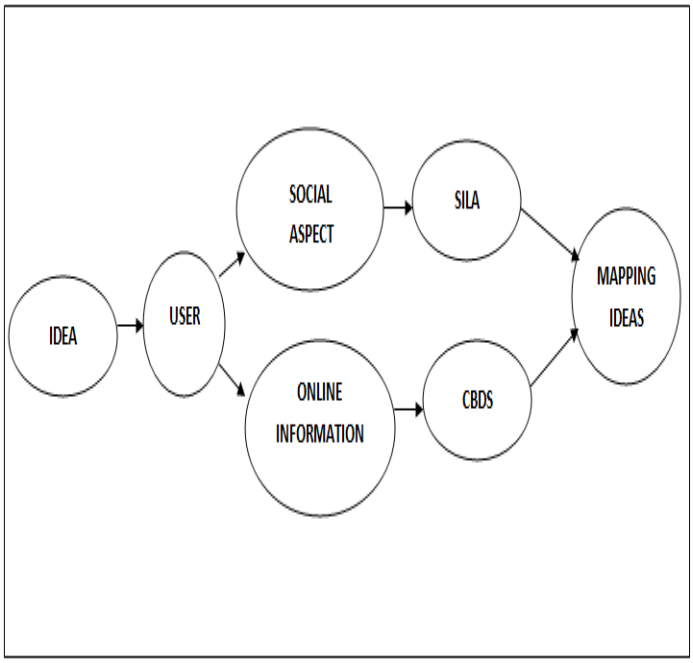

Fig. 1. Process of proposed system in E-Brainstroming

when participants in a group feel unmotivated and they think their contributions will not be valued. Evaluation apprehension, occurs when individuals withhold their ideas out of concern that others may not approve them. Production blocking, occurs when something prevents a participant from verbalizing their ideas as they occur e.g. forgetting an idea

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while waiting for a turn to speak. Traditional brainstorming does not increase the productivity of groups, it may still provide benefits, such as boosting morale, enhancing work enjoyment, and improving team work. Brainstorming session helps a team break free of old, ineffective ideas. This technique for generating ideas may produce some that seem half-baked, but it can lead to new and original solutions to problems. Some of the specific benefits of Brainstorming are Increases creativity expands the thinking to include all aspects of a problem or a solution. which can identify a wide range of options, Rapidly produces a unique ideas By encouraging people to offer whatever ideas come to mind, it helps groups develop many ideas quickly, Involvement of all team members. It provides a nonjudgmental environment that encourages everyone to offer ideas. All ideas are recorded, Fosters a sense of ownership. Having all members actively participate in the Brainstorming process fosters a sense of ownership in the topic discussed and in the resulting activities. When the people on a team contribute personally to the direction of a decision, they are more likely to support it Provides input to other tools and they may want to affinities the brainstormed ideas. If it appropriate, that can work with the team to reduce the number of ideas by Multivoting. Brainstorming is useful when you want to generate a large number of ideas about issues to tackle, possible causes of problems, approaches to use, or actions to take. This system aims at incorporating a modified E-Brainstorming ideation model, which integrates Flexible ideation map construction for ideation rounds. In this system, tree like ideation map was constructed in which the SILA(Semantic Ideation Learning Agent) performed the associations with respect to a given idea and then generated their creative ideas and it was termed as Ideation Round. And an efficient Collective Brainstorming Decision System (CBDS) method is used to construct the ideation map for diverse ideas and their relationship. Access controller enables access restrictions e.g. read and write. This System works with intelligent agents based environment with privacy preferences and mapping is done with different domains areas. The agents are filtered and grouped according to their knowledge domain.

The proposed system integrates the unique technique to devise automated agent facilities called the Semantic Ideation Learning Agent (SILA) which represent a session participant who is actively present in brainstorming. SILAs are grounded on the three association capabilities similarity, contiguity, and contrast. A Collective Brainstorming Decision System (CBDS) is to construct an environment where SILAs can share their knowledge with everyone. Evaluation results indicate that the proposed solution advances e-brainstorming by crossing the three key boundaries of human. The data fusion layer of the ASN fulfils the function of sensing, fusion, and dissemination of information. Data fusion design involves making many architectural choices, including: data fusion method, distribution in processing and storage, communication topology, type of exchanged information, degree of preprocessing, and many others. Listing our choices in the same order, the ASN approach to data fusion is: Bayesian decentralized in processing and storage, over a tree or general network, utilizing both scan-to-track and track-to-track fusion, feature-based. Because ASN is component-based, understanding interactions between components is required to understand the fusion algorithm. Fig. 2 shows component types

Semantic Ideation Learning Agent instance Association Algorithm

The instance association algorithm based on Q-Learning is presented below. The algorithm is based on the concept that the optimal action from any state is that with the highest Q-value. SILA receives the input instance of ideation around k, I. input, k, and views input, k as the state variable sk SILA determines ak and generates a creative idea, namely, I. creative, j, k . The Collective Brainstorming Blackboard computes the creative value of the I.creative, j, k, represented as rk. SILA then updates the original Q* (sk, ak) as the learned experience.

Function Instance Association (I.input, k) **return** I.creative, j, k /* **Instance Association Algorithm***/
Input:
I.input, k: the input instance of the ideation round k
Variable:
sk: the state of the ideation round k
ak: the action determined by policy π^* (sk) at Ideation round k
rk: the numerical reward of the ak
sk: the resulting state after executed ak
begin
sk = I.input,k
ak = arg max Q*(sk,ak)
Executed ak **and generated** an I.creative, j, k
Observe one-step reward rk and s'k =I.creative,j, k
Update
Q*(sk,ak):=(1 - α)Q*(sk,ak) + α[rk + max Q*(s'k ,a'k)]
return I.creative, j, k
End

implementing the data fusion layer of the system. Information Sources observe the environment, Nodes fuse and distribute information, Sinks request and use information, and Frames are responsible for localization and other platform related functions. The relationship between component types is described by the services each type provides and requires. The Localized interface plays an important role of providing global localization to Information Sources. The localization method is chosen by individual Frames. The next two sections describe the internal structure of Sensor and Node components.

The local filter generates state estimates on the basis of observed, predicted and communicated information. Other infrastructure such as channel filters and the topology manager exist only to support the proper functioning of the local filter. The local filter contains an array of Bayesian filters representing individual features of the environment. Different feature types may be stored side by side and the filters may

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use different representations. Observations arriving asynchronously are stored in a buffer and the local filter is

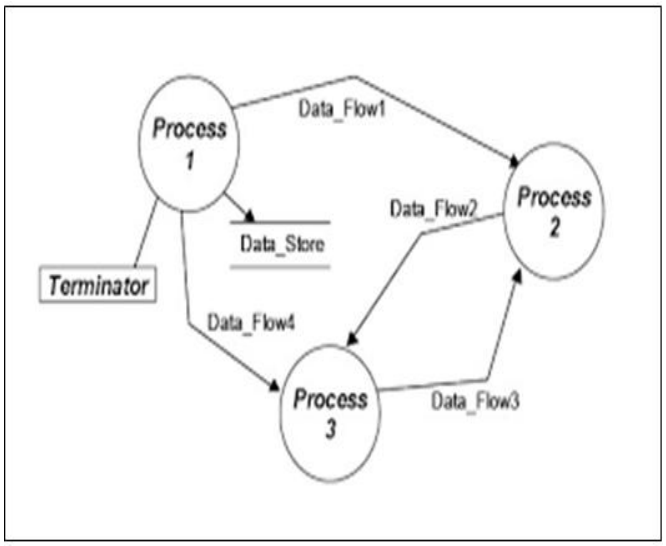

Fig. 2. Structural diagram of data fusion layer

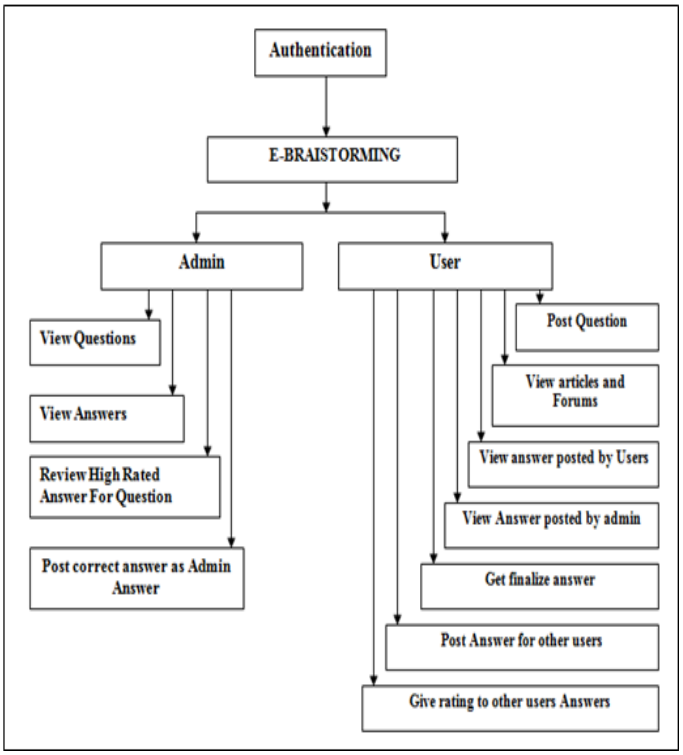

Fig. 3. Architecture of Proposed System

notified. Inside the local filter, all features of the matching type are first predicted forward to the observation time. Data association is performed by matching the observation with the local estimate. The results of data association performed by the Sensor may also be used. If there is no match to an existing feature, a new one is created. Multiply associated observations are ignored. With correct association, the local filter fuses the observation and the prediction assuming conditional independence. The updated feature is marked as modified. The panels are shows the same procedure in less detail, Processing of a channel update is shown in panel. The fusion procedure depends on whether the common information contained in the two estimates is known. If it is, then optimal fusion is possible. The Fig. 3 illustrates the overall process of proposed system that SILA and CBDS. The common information is first subtracted from the remote estimate and, if the information gain is positive, the new information is fused with the latest local estimate which has been predicted to the time horizon. If common information is not known, then the two estimates are fused conservatively.

IV. EXPERIMENT RESULT AND DISCUSSION

In the experimental result the proposed techniques could be used in the field of web based data mining, where data sets have to be split to cope with huge amounts of data and where the communication costs have to be low. It is also possible to use them in educational brainstorm environments where data are locally processed as they arise locally (e.g., in knowledge mining).A very famous brainstorm application has been proposed in this paper: collaborative learning, where intelligent technical systems learn from each other by exchanging. The fusion approaches and proposes a completely novel way to fuse the parameters of components. “Averaging” of parameters seems to be simple at first glance but consider cases, for example, where multivariate distributions are needed with covariance matrices. In this case, it would be necessary to decompose the covariance matrices into two matrices describing scaling and rotation of a multivariate standard normal distribution, for instance. It provides a much more elegant way which is based on second-order distributions: For each parameter, for example, mixture coefficient, center, covariance matrix, and so on, we define hyper distributions which basically model the “uncertainty” concerning the exact value of the parameter. In the instance, a normal-gamma distribution would be needed as second-order distribution over the two parameters “center” and “variance” of a normal distribution. Such a distribution would be required for each Gaussian component of the classifier. The parameters of the hyper distributions can be “trained” from sample data in a Bayesian way. For the actual definition of a classifier, that point estimates of the parameters of the classifier’s components that can be found by taking the expectations of the second-order distributions, for instance. The key contribution of this method is that show the actual fusion of classifiers (or, components of classifiers). It can be accomplished essentially by multiplying the second-order

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distributions if the classifier is based on certain members of the exponential family of distributions. In the overall anticipated system could give best fusion results of the active system. E-Brainstorming method enhances with the existing methods of Bayesian and CMM. It gives the 90% of Accuracy, 29% of Time, 43% Quality. The proposed work using a tool to finding fusing accuracy. The tool is Weka 2013 version and Weka (Waikato Environment for Knowledge Analysis) is open source software issued under the GNU(General Public License). It is a collection of machine learning algorithms for data mining tasks. Weka supports several standard data mining tasks, more specifically, data pre-processing, clustering, classification, regression, visualization, and feature selection. All of Weka's techniques are predicated on the assumption that the data is available as a single flat file or relation, where each data point is described by a fixed number of attributes. Weka provides access to SQL databases using Java Database Connectivity and can process the result returned by a database query. It is not capable of multi-relational data mining, but there is separate software for converting a collection of linked database tables into a single table that is suitable for processing using Weka. Another important area that is currently not covered by the algorithms included in the Weka distribution is sequence modeling. The algorithms can either be applied directly to a dataset or called from your own Java code. Weka contains tools for data pre-processing, classification, regression, clustering, association rules, and visualization. It is also well-suited for developing new machine learning schemes. In this section, we apply the new fusion method to an artificial data set, TREC(Text Retrieval Conference), real-world datasets to fusing the results. Fig. 4 describes the development of proposed system and their eminence in knowledge fusion.

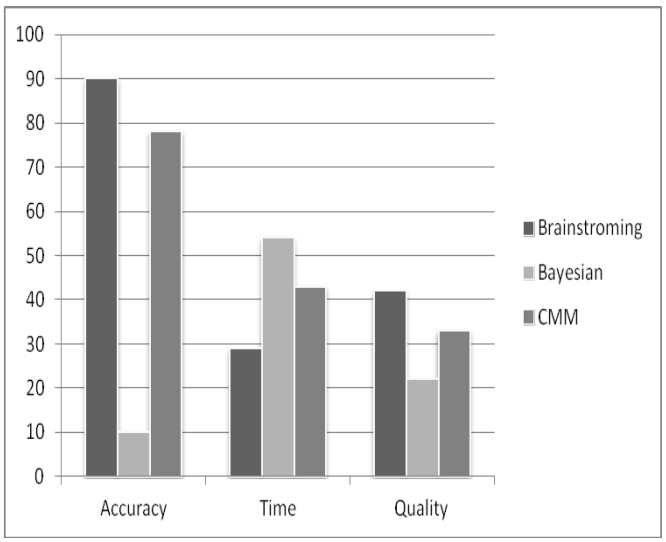

Fig. 4. Analysing Methods with E-brainstroming Technique

V. CONCLUSION

E-Brainstorming method is planned to implement for Humanistic brainstorm and Artificial E-Brainstorm as single system. With the productivity of CBDS (Artificial E-Brainstorm) and Decision of Humanistic brainstorm this solution gives us effective result. It presents the use of semantic ideation agents (SILAs) in the e-brainstorming process in order to reach automatic collective decisions by e-brainstorming. And it collaborates with CBDS of e-brainstorming system. SILA can learn to understand the task and utilize external stimuli without restrictions in the working memory or attention span. CBDS is the ideation architecture and environment, with which SILAs can learn and share knowledge. The proposed method advances the current state of the art of e-brainstorming by developing SILAs that proactively engage in idea association instead of just passively supporting brainstorming sessions. Although a big gap still exists between artificial brainstorming and creative human brainstorming, this study advances existing e-brainstorming research by crossing the three key boundaries of the human ideation capability (understanding, cognition, and endurance). We believe that the proposed agent-based e-brainstorming system improves e-service recommendation and delivery by creating a novel reasoning process for recommender systems, focusing on producing creative recommendations.

VI. FUTURE ENHANCEMENT

In future, the proposed work could be implemented in auto retrieval of answer which could be related to question, that are posted question from the previous results. Suppose the users are satisfied with that result they can get solution else they would continue in posting session. This proposed work has covered almost all the requirements, that were focused on rating educational dataset. Further requirements and improvements can easily be done, since the coding is mainly structured or modular in nature. Changing the existing modules or adding new modules can append improvements. Future enhancements can be made to the application, which could improve the web site functions for auto retrieval.

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