International Journal of Scientific Engineering and Applied Science (IJSEAS) - Volume-1, Issue-3, June 2015
ISSN: 2395-3470
www.ijseas.com

Comprehensive fuzzy tree based recommended System for Search Engine

V Ganesh kumar[1], P Murugan M.E [2]
[1] PG Student, [2]Assistant Professor,
Department of Computer Science and Engineering,
PTR College of Engineering and Technology, Tamilnadu, (India)

ABSTRACT

The shopping trends emerge into a new era by means of web services. Currently online shopping grabs everyone attention due to its vast technology implementation with easy methodology. On this way web creates wonderful online privileges for the customers. In this process the important factor to be discussed is providing automatic suggestion about the product or services to the customer by the system. But in real time business-to-business scenario two challenges are still in development stage such as complication of tree structure on items or user profile based on the item similarity measures. And another one is the existing online preference is indistinct which cannot be prominently used by the recommended methods systems. In this paper, we improved the user preference by proposing fuzzy tree-structured model in those preferences. The methodology behind this proposed system is comparing two tree-structured data and identifies their equivalent parts by means of considering the available information such tree structure, node attributes and weights. The experimental result on the dataset proves that the proposed methodology using fuzzy tree-structured user preference enables a valid demonstration on tree-structured items mainly in e-business applications. This system is also implies in developing a web based business partner recommender system in an effective manner.

Index: Fuzzy preference, E-business, web-based support system, recommender system, tree matching

INTRODUCTION:

The modern life style and economical change puts roots to the electronic business by means of using internet. This makes the interaction by selling and buying products by the consumers. To enable this process in a well defined manner an automatic system is required to handle the product or services for the customers. Today's trend has dealing with many e-business applications but those still with some basic drawback to be overcome. That to be developed in order to save the time as well as maintaining the accuracy of the business. In e – business application have a vast amount of data's which can be stored, and retrieving the accurate one is more complicated among the applications by means of an automatic system is too tedious. To support this process various methodology is arise with common factor known as user preference. However by means of discussing with the user preference will not be a practical solution. This thought raises the evolution of tree structure. To be structure a fuzzy is implemented on the user preference tree structure strategy. In which web based environment is the technology based component that enables online discussion, data collection, resource sharing etc. By means of a customer details can be saves and new services can be predicted by the application. To do this various

algorithms were discussed in the research in which fuzzy is the most popular among those. Generally fuzzy deals with approximate instead of fixed or exact reasoning. It mainly works with the principle of 0 and 1with range between completely true and completely false.

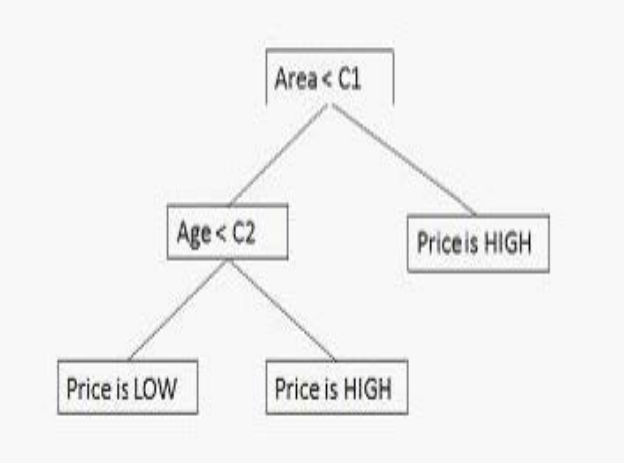

Fig1: A sample Fuzzy based tree structure

Before discussing this in detail fig 1 shows how the fuzzy how is applicable with the tree structure. In this the fig1 illustrate that area is low and age is old means the price is low. Next the area is low and the age is new than the price is high. If the area is high and age is old then the price is high. Finally area is high and age is new then the price is high. Another thing which noticed in forming the tree structure is relationship, here were are considering user preference in e-business. Those details how is it matched by with and the decision tree model should be accurate and efficient. Some of the common drawbacks to be concentrated in this research work are the vast amount of information from the web creates overloaded problem and some of the methodology which are not applicable for the real time scenario.

RELATED WORKS:

For an enhanced online experience various techniques were evolved in which most discussed one is recommendation technique. These recommend based system supports web system by means of ranking system without the need of user's [1][2]. This system is very effective in the case of information explosion in the most of the e-commerce we application [3]. In the early stage this system is deeply discussed for e-learning, e-tourism in those areas where recommendation of news, movies, books, videos, resources and real estate were analyzed [4][5][6]. The most popular three recommendation techniques are collaborative filtering (CF), content-based (CB) and knowledge-based (KB) techniques [7]. In which the commonly used recommendation technique is CF [8] [9], it enables to choose a choice of according to the opinion of similar person who share the same interest. This technique can be categorized into user-based and item-based CF approaches but the major drawback which makes this technique unpopular is data sparsity and cold-start (CS) problems. It occurs due to the insufficiency of number items to the number of ratings in the rating matrix. The reason for CS [10] [11] inefficiency is incapable of locating similar neighbor's results in poor recommendation. This problem is known as new user problem which reflects in affecting the user who has small number of ratings or none. According to the CB recommendation techniques is it recommend the item which are previously prefer by the user [12] [13]. But here the items suffer from content dependence problem, overspecialization problem, and new user problems. The next technique is KB [14] [15] it does not have CS problem as the new user can obtained the recommendation using the knowledge of her or his interest. But it has the scalability problem as it needs more time and effort in estimating the similarities when dealing with the large cases. To overcome these limitations a combined approach is required this

raise the evolution of Fuzzy set theory and techniques for handling the uncertain issues in recommendation problems. According to the previous research on fuzzy set [16] [17][18] the user preference is used but incomplete and uncertain information are still in development stage. Most of the recent researches are focused on fuzzy user preference with vector representations accordingly. On handling of excessive information's in business – to-business e-services [19] [20] that collects enormous amount of information on web which leads to the information overloaded problems. This form due to its complicated structure and best known method for rectifying this problem is tree structures [21]. For the most of the applications to enable a prominent tree structures a huge research is undergoes on tree similarity measure [22], tree isomorphism [23], and sub tree matching problems [24]. Among these the tree edit distance model is the effective method on comparing with structures of ordered or unordered labeled trees. This results in a graphical specification [25] in labeling two trees which analyze considered tree structures, node attributes, and weights. But these approaches are failed to solve the fuzziness problems in tree-structured data.

EXISTING SYSTEM:

The existing uses Fuzzy set with user preference and item features as Fuzzy with recommendation system is well applicable in handling the imprecise information. In this technique the item feature and user's intentional preferences is used as the basic preference module. This method defines the item sets and values for further processing. The Fuzzy set evaluate the similarity by means of four factors such as fuzzy set theoretic, cosine, proximity, and correlation-like. In which the user preference describes the positive and negative feelings from the user set. Then the user similarity is computed using fuzzy relational calculus with item preferences to the item similarity relations.

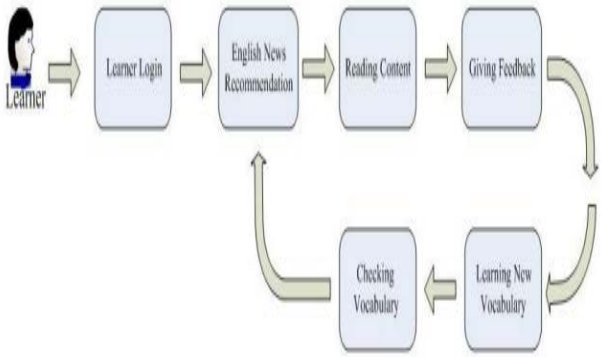

Fig 2: An architecture using Fuzzy based user preference

In the above fig 2 the user preference is gathering by means of detail observed in the feedback section. The user preference store the details by means of following properties that determines the relevant personal information such as age, marital status, gender and educational level, etc. As those details are processes for similarity measure by applying fuzzy relationship calculus.

The Fuzzy relation can be explained by term of max-min composition then,

E (x,y)={1 when x=y
0 when x≠y}

It satisfies the following condition such as;

- It exist in the one first member and at most one last member
- It may exists several maximal members and several minimum members
- In certain case a first member exists then only one minimal member exists otherwise it's identical to the first member

International Journal of Scientific Engineering and Applied Science (IJSEAS) - Volume-1, Issue-3, June 2015
ISSN: 2395-3470
www.ijseas.com

- Rather than a last member exists, then only one maximal member exists and it is identical member

Here the user preference information can be obtained by two ways such as extensionally and intentionally. In which extensionally means the information based on previous experience and intentionally means the information what they desire during items which are in under consideration. But the fuzzy methods on this approach are not effective in fuzziness problem when dealing with large amount of data's according to the real-time applications. Moreover the vector representations of Fuzzy user preference details are not suitable for structured data. And it's not effective in making the recommendations for personal users. It is more complicated for a user to express their interest in an item with exact numbers in business-to-business environment.

PROPOSED SYSTEM:

We proposed a fuzzy tree-structured user preference technique with personalized recommendation approach to overcome the above mentioned problems. In fuzzy user preference tree structure, the tree structure has the value based on the user preference with corresponding attributes. The each sub tree in the tree structure states about certain aspects with finer features.

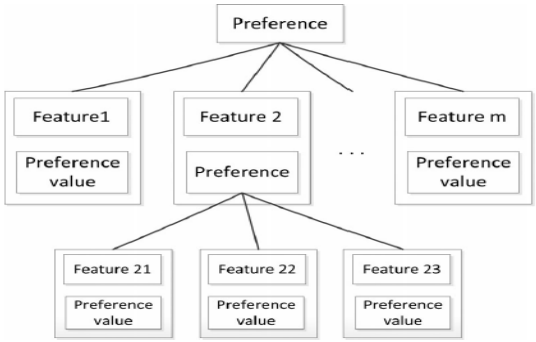

Fig 3: Fuzzy tree structure with user preference.

The above fig 3 shows clearly how the algorithm works and each sub tree defining similar aspects according to the corresponding values which was calculated by the fuzzy relational calculus.

Fuzzy Preference Tree-Based Recommendation Approach:

In this algorithm it intends to cover both the user's intentionally expressed preference and their extensionally expressed preference from the user items. It form the structure based on two factors such as matching the corresponding the parts and rating by prediction on user targeted item using user preference aggregations. Next the two trees are mapped using conceptual similarities between the corresponding parts of two trees with fuzzy preference.

- Here the user's fuzzy preference tree is mentioned as T_u and the item tree T_i
  - The maximum conceptual similarity tree mapping between T_u and T_i
  - Then both trees are weighed equally and constructed by merging $T_i$into T_u
  - The tree operation is done and the merging is defined by $M_{u,i}$
  - Next the function pr (), that takes the fuzzy preference tree and similarity tree mapping as input

Then it works as follows;

1 $mc \leftarrow MatchedChildren(t_u[j], M_{u,i})$

2 if $v(t_u[j]) = null$ and $mc = null$

3 return 0;

4 else if $v(t_u[j]) \neq null$ and $mc = null$

5 let the preference value be $\tilde{p}_{uj} = \{f_{1,uj}, f_{2,uj}, \ldots, f_{r,uj}\}$

return $\sum_{k=1}^{r} k \cdot f_{k,uj}$

6 else if $v(t_u[j]) = null$ and $mc(t_u[j]) \neq null$

7 return $\sum_{t_u[j_x] \in mc} w_x \cdot pr(t_u[j_x], M_{u,i})$

8 else if $v(t_u[j]) \neq null$ and $mc(t_u[j]) \neq null$

9 return $\beta_j \cdot \sum_{k=1}^{r} k \cdot f_{k,uj} + (1-\beta_j) \cdot \sum_{t_u[j_x] \in mc} w_x \cdot pr(t_u[j_x], M_{u,i})$

IMPLEMENTATION METHODOLOGY:

In this the initial stage is preparing the database, here we use movie data base which is processed in proposed algorithm to achieve the accuracy as compared to the existing system. The system developed in a java platform using Netbeans IDE with MySql as the database. It also includes JSF, EJB, and JPA frameworks to achieve the expected result.

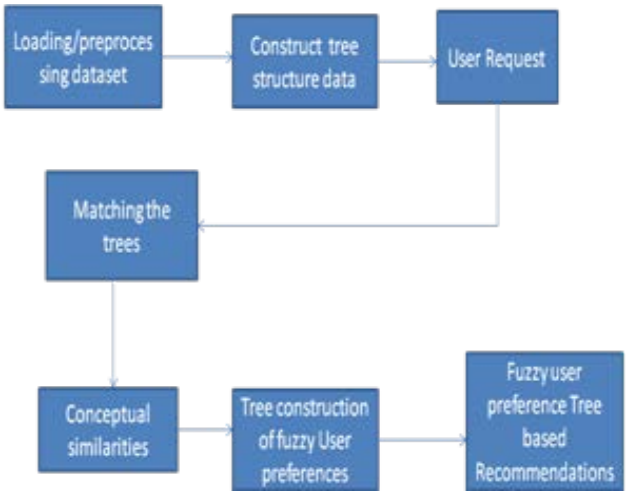

Fig 4: Architectural Diagram of proposed System

Preprocessing:

The prepared database is loaded to the system setup in which it contains two set of database such as user information as well as the movie information's. After t his process it removes unwanted words in the database until getting a raw data without affecting the whole process. By means of doing it there is possibility of accuracy, de-duplication and achieving enhanced time consumption.

Interpersonal Effect:

Here the relationship submerges with user personality by the information provided during the pre-process. The main intention of this process is reducing the size of the entire database. It contains the information like user request, his online shopping details, and his movie or product preference. The topic he/she is choosing along with recommendation sharing on the social ratings is considered for analysis. Thus by means of this gathered information a well structured keyword is obtained and used for the recommendation systems.

Recommendation System:

International Journal of Scientific Engineering and Applied Science (IJSEAS) - Volume-1, Issue-3, June 2015
ISSN: 2395-3470
www.ijseas.com

In this section, the obtained keyword is used for filtering to categorize the main class and sub classes. Then the rating preference which was given by the user for a product or topic is taken into count for process. Then the similarity measure is calculated by comparing the similar and dissimilar records collected from the user‘s which was obtained during the earlier process.

Collaborative Filtering:

According to this method a complete filtration is done by combining the information’s from multiple agents, viewpoints and data sources. Based on this a certain entropy rate confirms the user details and categorized as separate entities. In later stage each entity is tree structured by means of the relationship using the Fuzzy preference algorithm. The accuracy is obtained by the finding the user sharing the same preference for those items under rating pattern. By combining this information’s each main tree and sub trees are structured which are combined in resulting a finite tree structured with maximum accuracy when compared to the traditional methods as discussed earlier.

6. RESULT AND DISCUSSION:

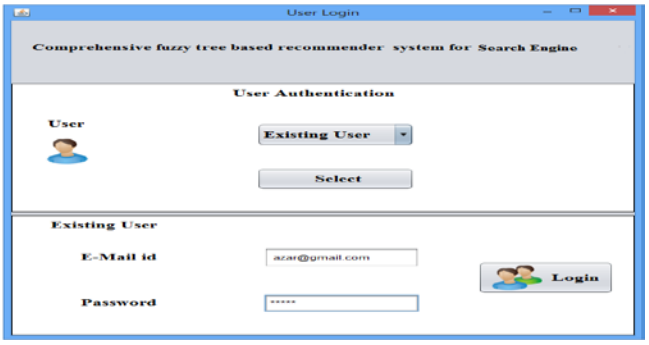

Fig 5: User database

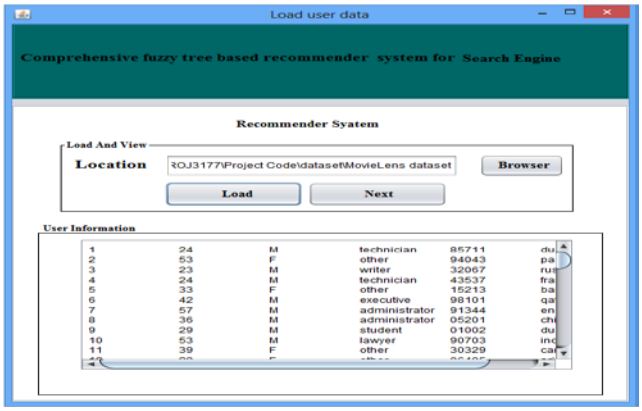

Fig 6: Loading the database

In fig 5 to extract the user detail for analyzing user preference their details are collected by means of fame work. In which it is categorized into existing user and new user by means of doing this only authorized users can access and their social network profiles is calculated for analyzing the online rating to preference in a secure manner. To do this a database is prepared with collection of movie list with their attributes and categorized according to the journals. The fig 6 shows such a database is prepared and loaded for processing. It has the attributes like what the movie about under which category, when it is screened its size then rating, etc. In the same manner as per fig 5 during preprocessing user details like location, age, occupation and gender etc can be collected which is used for future progress.

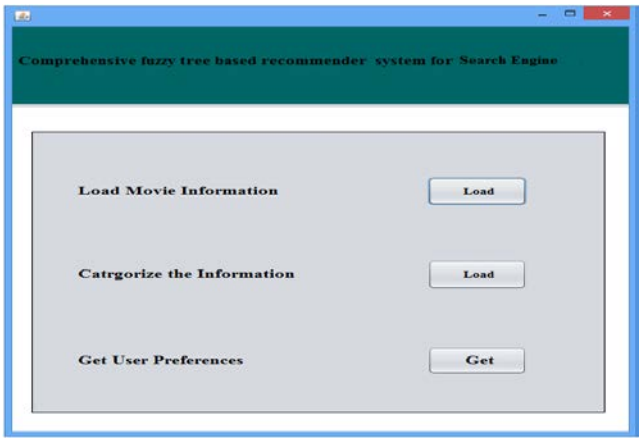

Fig 7: Collaborative approach based on preprocessing on recommended system

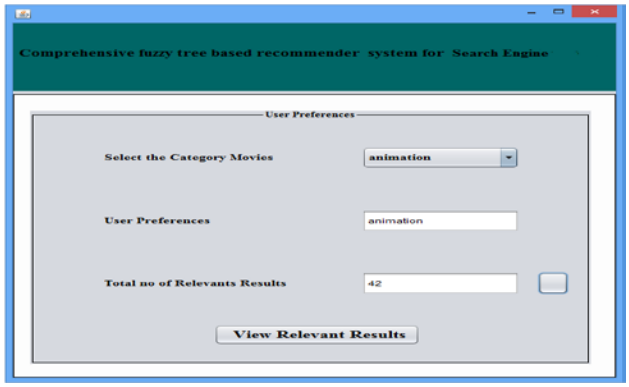

Fig 8: Result of user preference based on proposed algorithm

As discussed the result from preprocessed on recommended system are taken and processed under collaborative technique. The fig 7 show the result of that methodology it then process into fuzzy based tree structure based on user preference which match the similarity of user detail with movie details along with social network information. Then fuzzy relational calculus algorithm is applied to obtain a best result on user preference. In fig 8, it shows the result of user searching in an online search engine with preference which also gives the detail about total no of relevant results based on the similarity.

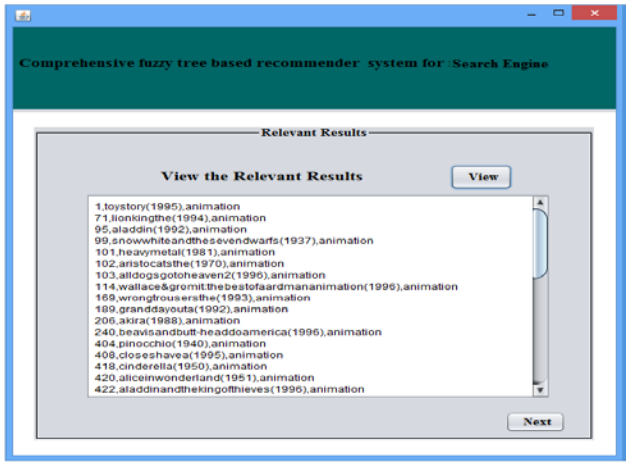

Fig 9: Final result obtained

The fig 9 shows clearly the effectiveness of fuzzy based tree structure using user preference, here the user preference from the feedback gained by social networks gather as shown in fig 8 a best result is gained by achieving the accuracy and minimum time consumption according to the user search. This proves the proficiency of our proposed system is much better than the existing system in maintaining the accuracy at a maximum level.

CONCLUSION:

This paper proposes a fuzzy tree-structured user preference modeling method by separating the uncertainty and develops a new recommendation approach using users extensionally and intentionally expressed preferences. The data collection is collected from the real time scenario in order to achieve a better matching method for identifying the corresponding parts in the database. It takes the user similarities from the feedbacks and sharing of recommendation on the social rating as a main source. By using this valid detail an efficient user preference is modeled and computed in a Fuzzy to achieve an overall structured tree. The experimental result according to the real-time data proves the improvisation of the proposed system is far better than the existing system. The future worked is carried in the motto of achieving an efficient method in identifying business groups and make group recommendations with similar features and characteristics.

REFERENCE:

1) G. Adomavicius and A. Tuzhilin, “Toward the next generation of recommender systems: A survey of the state-of-the-art and possible extensions,” IEEE Trans. Knowledge Data Eng., vol. 17, no. 6, pp. 734–749, Jun. 2005.

2) X. Guo and J. Lu, “Intelligent e-government services with personalized recommendation techniques,” in Proc. Int. J. Intell. Syst., 2007, vol. 22, pp. 401–417.
3) P. Markellou, I. Mousourouli, S. Sirmakessis, and A. Tsakalidis, “Personalized e-commerce recommendations,” in Proc. IEEE Int. Conf. e-Bus. Eng., Beijing, China, 2005, pp. 245–252.
4) J. Lu, “Personalized e-learning material recommender system,” in Proc. 2nd Int. Conf. Inf. Technol. Appl., 2004, pp. 374–379.
5) J. Gemmell, T. Schimoler, B. Mobasher, and R. Burke, “Resource recommendation in social annotation systems: A linear-weighted hybrid approach,” J. Comput. Syst. Sci., vol. 78, pp. 1160–1174, 2012.
6) X. Yuan, J. H. Lee, S. J. Kim, and Y. H. Kim, “Toward a user-oriented recommendation system for real estate websites,” Inf. Syst., vol. 38, pp. 231– 243, 2013.
7) R. Burke, “Hybrid recommender systems: Survey and experiments,” User Modeling User-Adapted Interact., vol. 12, pp. 331–370, 2002.
8) J. Schafer, D. Frankowski, J. Herlocker, and S. Sen, “Collaborative filtering recommender systems,” in The Adaptive Web, vol. 4321, P. Brusilovsky, A. Kobsa, and W. Nejdl, Eds. Berlin, Germany: Springer-Verlag, 2007, pp. 291–324.
9) M. Deshpande and G. Karypis, “Item-based top-N recommendation algorithms,” ACM Trans. Inf. Syst., vol. 22, pp. 143–177, 2004.
10) B. Sarwar, G. Karypis, J. Konstan, and J. Reidl, “Item-based collaborative filtering recommendation algorithms,” in Proc. 10th Int. Conf.WorldWide Web, 2001, pp. 285–295.
11) R. M. Rodr´ýguez, M. Espinilla, P. J. S´anchez, and L. Mart´ýnez-L´opez, “Using linguistic incomplete preference relations to cold start recommendations,” Internet Res., vol. 20, pp. 296–315, 2010.
12) M. Pazzani and D. Billsus, “Content-based recommendation systems,” in The Adaptive Web, P. Brusilovsky, A. Kobsa, and W. Nejdl, Eds.. vol. 4321, Berlin, Germany: Springer-Verlag, 2007, pp. 325–341.
13) A. Felfernig, B. Gula, G. Leitner, M. Maier, R. Melcher, and E. Teppan, “Persuasion in knowledge-based recommendation,” in Persuasive Technology, vol. 5033, H. Oinas-Kukkonen, P. Hasle, M. Harjumaa, K. Segerst°ahl, and P. Øhrstrøm, Eds. Berlin, Germany: Springer-Verlag, 2008, pp. 71–82.
14) R. Burke, “HybridWeb recommender systems,” in The AdaptiveWeb, vol. 4321, P. Brusilovsky, A. Kobsa, and W. Nejdl, Eds. Berlin, Germany: Springer-Verlag, 2007, pp. 377–408.
15) B. Kim, Q. Li,C. Park, S. Kim, and J.Kim, “Anewapproach for combining content-based and collaborative filters,” J. Intell. Inf. Syst., vol. 27, pp. 79– 91, 2006.
16) A. Zenebe, L. Zhou, and A. F. Norcio, “User preferences discovery using fuzzy models,” Fuzzy Sets Syst., vol. 161, pp. 3044–3063, 2010.
17) R. R. Yager, “Fuzzy logic methods in recommender systems,” Fuzzy Sets Syst., vol. 136, pp. 133–149, 2003
18) C. M. Chen and L. J.Duh, “Personalized web-based tutoring system based on fuzzy item response theory,” Expert Syst. Appl., vol. 34, pp. 2298–2315, 2008.
19) C. Cornelis, J. Lu, X. Guo, and G. Zhang, “One-and-only item recommendation with fuzzy logic techniques,” Inf. Sci., vol. 177, pp. 4906–4921, 2007.
20) C. Porcel, A. G. L´opez-Herrera, and E. Herrera-Viedma, “Arecommender system for research resources based on fuzzy linguistic modeling,” Expert Syst. Appl., vol. 36, pp. 5173–5183, 2009.
21) J. Lu,Q. Shambour,Y.Xu, Q. Lin, andG. Zhang, “BizSeeker:Ahybrid semantic recommendation system for personalized government-to-business e-services,” Internet Res., vol. 20, pp. 342–365, 2010.
22) R. Connor, F. Simeoni, M. Iakovos, and R. Moss, “A bounded distance metric for

comparing tree structure," Inf. Syst., vol. 36, pp. 748–764, 2011.
23) F. Ricci and L. Senter, "Structured cases, trees and efficient retrieval," Adv. Case-Based Reason, vol. 1488, pp. 88–99, 1998.
24) P. Bille, "A survey on tree edit distance and related problems," Theor. Comput. Sci., vol. 337, pp. 217–239, 2005.
25) K. Zhang, "A new editing based distance between unordered labeled trees," in Combinatorial Pattern Matching, A. Apostolico, M. Crochemore, Z. Galil, and U. Manber, Eds. Berlin, Germany: Springer-Verlag, 1993, pp. 254–265.