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A TECHNICAL REVIEW ON RECOMMENDATION SYSTEMS IN A FRAMEWORK OF JOB RECOMMENDER SYSTEM USING NAIVE BAYES ALGORITHM

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ABSTRACT

Recommender systems are software tools or techniques which helps us to provide suggestions for items for use for a user. The recommender systems have become fundamental entity in electronic commerce and information access, which provides appropriate suggestions by pruning from the large information item sets to only those that are best suited with the users preference. There are many techniques for the implementation of recommender systems,out of which the most widely used techniques are collaborative filtering,content based filtering and knowledge based filtering,and hybrid recommendation systems. In this paper,a framework for job recommender systems are considered and the advantages of the same over existing criteria are discussed.

Keywords: *Recommender systems, Collaborative filtering, content based filtering, knowledge based filtering ,hybrid filtering, Job Recommender Systems.*

I. INTRODUCTION

With the explosive growth in e-commerce and online environments, the users are overloaded with lots of options from a large item space. The recommender systems has become a very valuable tool in helping the user to cope up with this explosive information overload and to provide accurate suggestions to users. Recommender systems are extensively used in all the possible fields though initially it was used only for product recommendation. These techniques are widely adapted by various organizations such as Amazon, Microsoft. Now recommendation strategies has changed the way of life in many ways, such as how students can choose their career based on various options, their options with higher studies based on their skill set. The Internet-based on line recruitment is a standout amongst the best business changes, which changed the candidate selection procedures adopted by various organizations. Recommender systems are different from information retrieval systems or search engines with respect to the fact that it retrieves only interesting, useful information based on individual choices. Typically, a recommender system have (i)Background data (ii)input data (iii)an algorithm which combines both background data and input data to come up with most appropriate suggestions.

II. RECOMMENDATION TECHNIQUES

There are various techniques adopted to provide recommendation. Assume that I is the set of items over which recommendations might be made ,U is the set of users whose preferences are known,u be the specific user whose recommendations need to be generated be some item for which we would like to predict u's preference. Based on the above assumptions the widely adopted four techniques are explained.

Content Based Filtering methods[1] recommends items that are similar to what the user has preferred in the past. The similarity is computed based on the features associated with compared items. It produces user specific recommendations of items based on rating patterns(explicit feedback) or its purchase history, browsing history, search patterns etc(implicit feedback). The item based techniques[2] uses various association rule mining algorithms to recommend product for the user.

Collaborative filtering techniques[3] works by filtering or evaluating items based on user opinions. This technique works on the principle of human nature of sharing the information and is most accurate when the neighborhood is well defined ie Filter based on U s preferences on I. The user profile in a collaborative system will have ratings of a set of users over I. Some of the ratings can be binary(like/dislike) or real valued indicating preference. These systems work by aggregating the user preference over items, identifying commonalities among users and then giving recommendations. The collaborative filtering techniques can either be model based or memory based. The memory based model can be derived based on user attributes or item based.

Knowledge based recommendation system[4] works with the help of functional knowledge about how useful the item will be in users life. In this method, knowledge about both the users and the items are utilized to come up with most accurate recommendations.

Hybrid recommendation systems[6] work by combining one or more of the above recommendation techniques in such a way that it is better than the individual ones.

The recommendation techniques are widely used in many areas like e-shopping, job recommendations, Academic course recommendation, career counselling recommendation etc. In this paper ,the framework of job recommendation system is discussed.

III. JOB RECOMMENDER SYSTEMS

The job recommender systems[7] for job recruiting domain have emerged and enjoyed explosive growth in the last decades. However, the recommendation of a job is yet a challenging domain and a developing zone of research. The kind of suggestions gave might be distinctive as indicated by the area of its utilization. In the case of job recommendation system, it will be favorable to give personalized and profile-based employment suggestions. Recruitment criteria for various organizations may require specific skills, types and amount of work experience, educational credentials, skills etc. Each candidate will expect to get a job which is highly relevant to their profile.

Job searchers aim is to discover the most satisfying jobs through enhancing their resumes and working knowledge. However always a need for proper guidance and expert advices are needed in finding the best job. Given an applicant x and occupation set j {j1, j2, j3, j4, j5, j6… jn}, the system should prescribe employments for x, x j -> r where r:{ j2, j4, j5… jm} with the end goal that r fulfil the four parameters: basic leadership, amass conduct, special cases, and shifting inclinations and fix in a large portion of the holes that are available in the current frameworks and furthermore enhance or improve the expectation precision. By fulfilling the four parameters, it is implied that the suggestions made to the competitor must deal with the gathering and also singular conduct or inclinations in regards to the employment, and additionally should deal with the uncommon transporter way applicants as well. Also, in this manner, must contribute to expanding the expectation precision rate or probability of the suggestions made to the individual competitor.

In this paper, we introduce some basic concepts of user profile and some common recommendation technologies based on the existing research. Finally, we survey some typical job recommender systems which have been achieved and have a general comprehension of job recommender systems. The workers' information is mostly recovered from the LinkedIn site and naive Bayes classifier algorithm[8] is used to find recommended jobs by classifying the profiles according to the probability

IV. EXISTING SYSTEM

The job seekers register in various organizations and waits for the job approval. Without proper guidance and expert advice there are high chances of candidates not getting a best suited job or the employers losing out talented candidates. An analysis of the existing system is done and the shortcomings of the existing system [9]are analyzed. Few of the problems discovered are

- Present frameworks that utilizes content-based separating match the profiles just based on content only .
- Present employment recommender frameworks that utilizes memory based synergistic sifting, first waitlist the applicants that have comparative looking profiles to the new client, at that point suggest occupations that these clients have connected for .

V. PROPOSED SYSTEM

In our proposed system, we assess the highlights of current representatives and group them in view of their organizations. The workers' information is mostly recovered from the LinkedIn site. The process starts with collection of the employee data from LinkedIn and then extracting the features from the collected data(employee's industrial experience like years in the industry, years in the current company ,past internship experiences, academic attributes of employees, for instance, the highest degree achieved and academic performance, number of skills listed LinkedIn homepage and the number of the endorsement of the most endorsed skill are present, and some personal attributes like gender etc). We then train several multinomial classification models[8], eliminating poorly uncorrelated features, and keep features with high correlation(we label the companies in this pattern: 0,1,2...k-1, here k is the number of companies as labeling is not so important in Naive Bayes Classifiers).We Choose the optimal classification model depending on the columns of interest and then predict the best-fit company based on features of that person.

Naive Bayes classifiers are used to find recommended jobs. They are linear classifiers that are known for being simple yet very efficient. On the basis of Bayes' theorem, the probabilistic model of naive Bayes is created. The word naive comes from the assumption that the features in a dataset are mutually independent. Naive Bayes classifiers still tend to perform very well under unrealistic assumptions and requires less data for training and provides a better prediction.

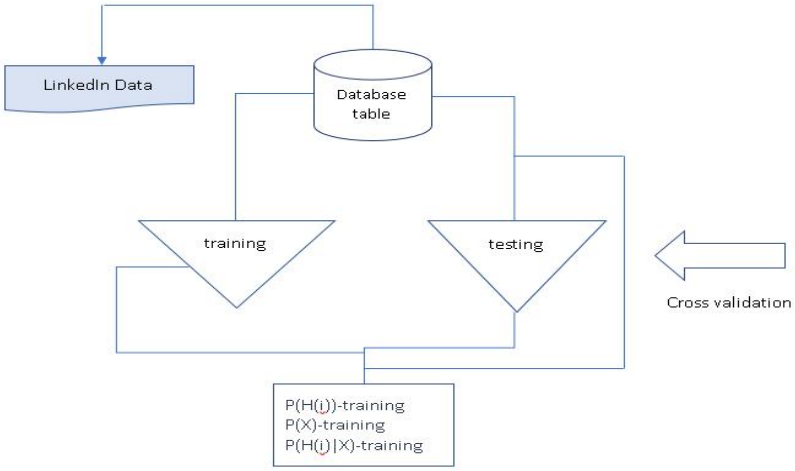

Fig:1 Naive Bayesian classifier

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The frame work of the proposed system is as given below

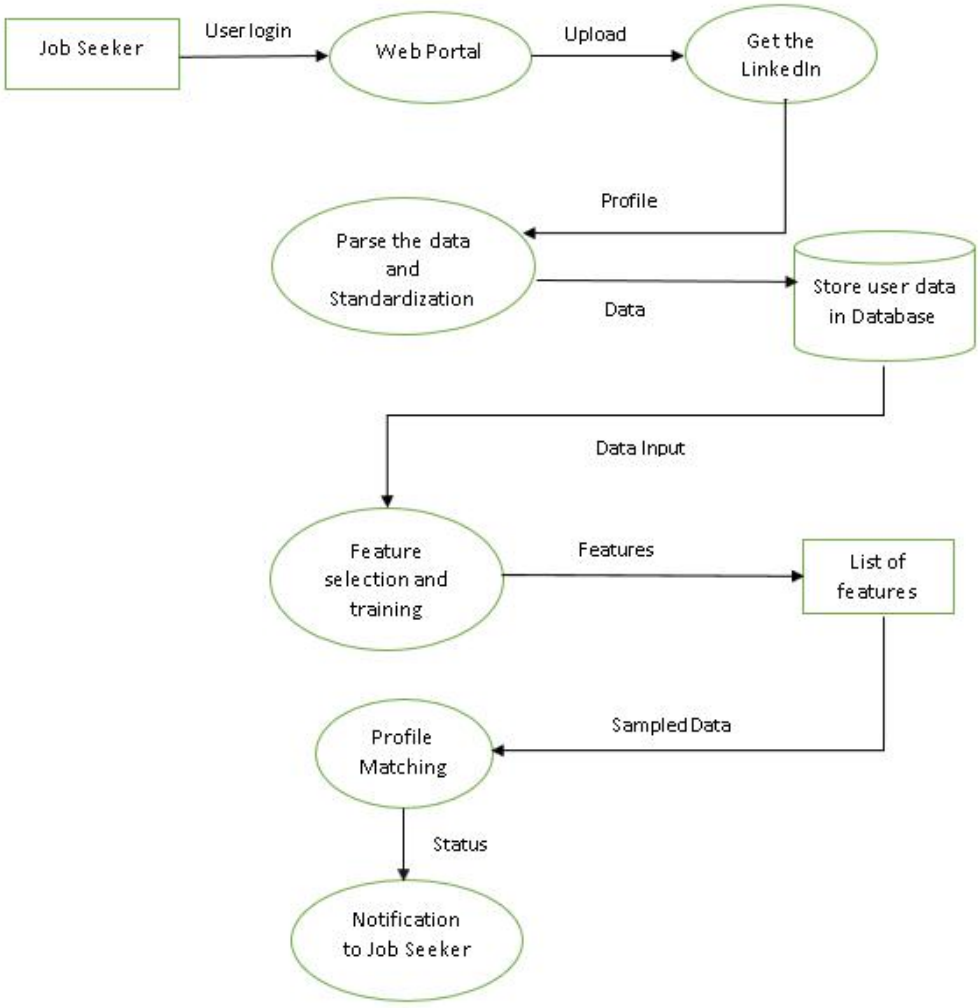

Fig:2 Framework Architecture of Proposed System

VI. RESULTS AND DISCUSSIONS

The proposed recommender system could do the suggestions in a better way than the existing system. The two popular measures are precision and recall[10]. In our proposed system, we could give suggestions with a precision of 82% on an average with various datasets.

VII. CONCLUSION

The recommender framework advancements have picked up a huge momentum in an exceptionally wide scope of users. The suggestions are fundamentally made out of assessing the highlights of current representatives and arranging them in light of their organizations. The process flow is by gathering worker information and concentrate highlights, then train distinctive multinomial arrangement models by wiping out ineffectively uncorrelated highlights, keep highlights with the high relationship; and then by Choosing the ideal grouping model. A sincere

effort is made in the proposed system such that it tries to foresee the best-fit organization in light of highlights of that individual.

REFERENCES

1. *Ashish Pal,Prateek Parhi,Manuj Aggarwal "An improved content based collaborative filtering algorithm for movie recommendations" in the proceedings of the Tenth International Conference on Contemporary Computing (IC3),2017,pp.384-386.*
2. *Uma.N , Prashanth C.S.R "A Survey and comparative study of the various algorithms for Frequent Itemset Mining" in the International Journal of Computer Sciences and Engineering,Vol.-6, Issue-5, May 2018,pp.761-765.*
3. *Ruisheng Zhang et al " Collaborative Filtering for Recommender Systems" in the proceedings of Second International Conference on Advanced Cloud and Big Data,20-22nd Nov,2014,pp 431–440.*
4. *A. Nakagawa,T. Ito "An implementation of a knowledge recommendation system based on similarity among users' profiles" in the proceedings of the 41st SICE Annual Conference. SICE 2002.pp 326-328.*
5. *Robin Burke "Hybrid Recommender Systems: Survey and Experiments" in the proceedings of User Modeling and User-Adapted Interaction 12(4),Nov 2002.pp.1-29.*
6. *Zheng Siting,Hong Wenxing,Zhang Ning,Yang Fan "Job recommender systems: A survey" in the proceedings of the 7th International Conference on Computer Science & Education (ICCSE),july 2017.pp 920-924.*
7. *Harry Zhang " The Optimality of Naive Bayes" in the proceedings of the Seventeenth International Florida Artificial Intelligence Research Society Conference, Miami Beach, Florida, USA,2017.*
8. *Shaha T. Al-Otaibi ,Mourad Ykhlef "A survey of job recommender systems" in the journal International Journal of the Physical Sciences Vol. 7(29), 26 July, 2012,pp. 5127-5142.*
9. *Zeynep Hilal Kilimci,Murat Can Ganiz "Evaluation of classification models for language processing" in the proceedings of International Symposium on Innovations in Intelligent SysTems and Applications (INISTA),Sept.2015.*
10. *Jiawei Han, Micheline* Kamber*, Jian Pei, Data-Mining.-Concepts-and-Techniques-3rd-Edition.*