



PERSONALIZED RECOMMENDATION OF TOPIC BY INFLUENCE ANALYSIS USING SUPPORT VECTOR MACHINE ALGORITHM

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Abstract

To design a recommendation system for the users to recommend the best topics among the users and to develop a system that promotes the interest of the user by recommending them with customized topics. LDA model is used for extracting all the topics of the user. Popular topics are then analysed and extracted. Influence analysis is carried out to find the influenced topics for the users and the topics are classified to positive and negative topics. Those topics are then ranked using SVM algorithm. Finally recommendation of topics are given to the users.

Introduction

A social networking site is an online platform where people build social relationship with people, organization, friends and peers. Social networking services can be used in desktops, laptops and mobile devices. People form social communities over the network and may share photos, videos, other trending news or real life activities and events with people in their network. Depending on the social media platform, people may contact other people they have connection to and making successfully bigger circles. The success of social networks are dominantly seen over the years with billions of people using them in regular basis. Popular social networks like facebook and twitter have 3 billion active users.

During the last few decades, with the rise of social platforms like youtube, Netflix, Amazon, Flipkart and many other services recommender systems are becoming a part of our lives. E-commerce suggest to buyers articles that interest them and online advertisement suggesting the right contents to users with their preference, recommender systems are unavoidable in our daily lives. Recommender systems are algorithms aimed at suggesting the users with the relevant items they wish. Recommendation can be made possible to all fields like movies, books, products or anything else. They also generate a high

volume of income if they are efficient. Twitter is a popular social networking platform where the users are restricted with sending 140 character messages called tweets. In this work tweets from the twitter platform are considered for recommendation. Once the user registers over twitter, twitter recommends user to follow some popular accounts from categories like music, politics, sports and technology.

When twitter suggests user with profiles and account, in this paper we generate topics for twitter users which is then considered for recommendation. Users live tweets are gathered from API and basic preprocessing techniques are carried out. After preprocessing of the tweets, necessary feature like User Id, User name, Date&Time and tweets are alone extracted. Tweets regarding comics are alone extracted by setting up a query and are used for next process. Tweet contents are analysed and topics are modelled for the tweets. Topic modelling gives the topics for the tweets. Here we have also taken probabilities of the topics to frame the topics for the tweets. On getting the topics for the tweets of the users, the topics are ranked with the frequency of occurrence of the topics to get the popular topic. Popular topics are all gathered and given a topic set. Popular topics are then inferred for influence analysis. Influence analysis of the topics are done by analysis the re-tweets, likes and comments for the tweets. Influenced topics are then classified into positive, negative and neutral comic topics, since comic characters are related to semantics. Generalized topics are taken as input for recommendation. Those topics are then ranked with RankSVM algorithm. Top ranked topics are then ranked with overall rank aggregation, finally getting the topics for recommendation. This work shows significant improvement in the performance and recommendation level when compared with other personalized algorithm. By performing popular topic extraction and influence analysis, more personalized recommendation of the topics are given to the user which may seem more relevant and interesting. We illustrate the capability of our algorithm by making experiments on live tweets. Experimental results show that the approach of influence analysis is effective for twitter users recommendation and has increased the performance of the system by a significant level.



Literature survey

MULTI CLASSIFICATION OF MICROBLOG'S COMMENT

Li Bai, "Multi-classification of microblog's comments based on feature combination" —Text classification algorithm develops rapidly in recent years, especially with the promotion of deep learning, the accuracy of various algorithms has reached a certain height. However, an obvious drawback of deep learning is that a large number of labeled samples is needed. In the case of unbalanced labeled samples, the result is not quite accurate of the category which has the minimum quantity. We consider that among a large number of comments, many of the top comments are positive but without involving valuable opinion. For the order depends on the user's level and the number of praises, while some really valuable comments may sink, it's hard for people to find them. The main work of this paper is to classify the comments into four types: valuable, negative, useless and normal. This paper has chosen ST-SVMs model, which realizes multi-classification through using SVM three times. At the same time, we proposed a concept of "Topic Proximity" which used LDA to extract the topic then used word2vec to

calculate the similarity between the comments and topic. Then we give a combined feature, which consist of vector for comments text, sentiment intensity and topic proximity as the input features of the ST-SVMs model.

MICROBLOG RECOMMENDATION

Huifang Ma, Meihuizi Jia, Di Zhang, Xianghong Lin, “Combining tag correlation and user social relation for microblog recommendation”(2017), For microblog users, recommending high quality information is a demanding service. This paper aims to investigate a joint framework to combine tag correlation and user social relation for microblog recommendation. This approach identifies users’ interests via their personal tags and social relations. More specifically, a user tag retrieval strategy is established to add tags for users without or with few tags, and the user-tag matrix is then built and user-tag weights are then obtained. In order to solve the problem of sparsity of the matrix, both inner and outer correlation between tags are investigated to update the user-tag matrix. Considering the significance of user social relation for microblog recommendation, a user–user social relation similarity matrix is constructed. Moreover, an iterative updating scheme is developed to get the final tag-user matrix for computing the similarities between microblogs and users. This metho gives best results for microblog recommendation. The challenge in this work is information overload is not addressed.

C.C. Tu, Z.Y. Liu, M.Y. Sun, Tag Correspondence model for user tag suggestion, They propose Tag Correspondence Model (TCM) to identify complex correspondences of tags from the rich context of microblog users. The correspondence of a tag is referred to as a unique element in the context which is semantically correlated with this tag. In TCM, they have divided the context of a microblog user into various sources (such as short messages, user profile, and neighbors). With a collection of users with annotated tags, TCM can automatically learn the correspondences of user tags from multiple sources. With the learned correspondences, they are able to interpret implicit semantics of tags. Moreover, for the users who have not annotated any tags, TCM can suggest tags according to users’ context information. They eventually represent semantic meanings of tags.

HYBRID ONLINE PRODUCT RECOMMEND

K. Choi, D.Yoo, G. Kim, Y. Suh, “A hybrid online product recommendation system: Combining implicit rating-based collaborative filtering and sequential pattern analysis” (2012), recommends online products for the users based on implicit rating of the user and forms a hybrid method for recommendation. Combines collaborative filtering (CF) and sequential pattern analysis (SPA) for better recommendation. They derive implicit ratings so that CF can be applied to online transaction data even when no explicit rating information is available, and the other is to integrate CF and SPA for improving recommendation quality. With the comparison of the performance between ours and others, they contend that implicit rating can successfully replace explicit rating in CF and that the hybrid approach of CF and SPA is better than the individual one. Products based on their rating for others is considered and

recommendation for them is decided. The challenge in this paper is, it considers only implicit rating of the users, where the explicit behavior may vary with implicit.

F. Abel, Q. Gao, G.J. Houben, K. Tao, Analyzing user modeling on Twitter for personalized news recommendations, introduces a framework for user modeling on Twitter which enriches the semantics of Twitter messages (tweets) and identifies topics and entities (e.g. persons, events, products) mentioned in tweets. They analyze the strategies for constructing hashtag-based, entity-based or topic-based user profiles benefit from semantic enrichment and explore the temporal dynamics of those profiles. The results reveal how semantic enrichment enhances the variety and quality of the generated user profiles.

H. Liang, Y. Xu, Y. Li, R. Nayak, X. Tao, Connecting users and items with weighted tags for personalized item recommendations, To eliminate the noise of tags, in this paper they propose to use the multiple relationships among users, items and tags to find the semantic meaning of each tag for each user individually. With the proposed approach, the relevant tags of each item and the tag preferences of each user are determined. In addition, the user and item-based collaborative filtering combined with the content filtering approach are explored for recommendation.

X.D. Song, B.L. Tseng, C.Y. Lin, M.T. Sun, Personalized recommendation driven by information flow, In this paper leverage users' access patterns to model information flow and generate effective personalized recommendations. First, an early adoption based information flow (EABIF) network describes the influential relationships between people. Second, based on the fact that adoption is typically category specific, they propose a topic-sensitive EABIF (TEABIF) network, in which access patterns are clustered with respect to the categories. Once an item has been accessed by early adopters, personalized recommendations are achieved by estimating whom the information will be propagated to with high probabilities.

D.R. Liu, P.Y. Tsai, P.H. Chiu, Personalized recommendation of popular blog articles for mobile applications, Providing value-added mobile services, such as blog articles, is increasingly important to attract mobile users to mobile commerce, in order to benefit from the proliferation and convenience of using mobile devices to receive information any time and anywhere. In this work, they propose a novel Customized Content Service on a mobile device (m-CCS) to filter and push blog articles to mobile users. The m-CCS includes a novel forecasting approach to predict the latest popular blog topics based on the trend of time-sensitive popularity of weblogs. Thus, the m-CCS further analyzes the mobile users' browsing logs to determine their interests, which are then combined with the latest popular blog topics to derive their preferred blog topics and articles. A novel hybrid approach is proposed to recommend blog articles by integrating personalized popularity of topic clusters, item-based collaborative filtering (CF) and attention degree (click times) of blog articles.

ONLINE RECOMMENDATION

Duen-Ren Liu, Kuan-Yu Chen, Yun-Cheng Chou, Jia-Huei Lee, Online recommendation based on dynamic adjustment of recommendation lists, knowledge based systems 161 (2018) 375-389, Online recommendations represent an important online trend. Furthermore, dynamically adjusting recommendation lists to increase users' click-through rates is important for limited online recommendation layouts. This research proposes a novel approach for the dynamic adjustment of recommendation lists to tackle the issue of limited recommendation layouts, and then develops novel online recommendation methods. This research designs novel methods based on non-negative matrix factorization (NMF) and latent Dirichlet allocation (LDA) to predict user preferences for activities, using analysis of browsing news and attending activities. They proposed a novel online activity recommendation approach, taking into consideration the interest scores and push scores, for dynamically adjusting the recommendation list. The Most Frequently Pushed (MFP) strategy gives priority to replacing the most frequently pushed activity, while the Not Frequently Clicked (NFC) strategy gives priority to replacing the not frequently clicked activity. This work enhances the effectiveness of recommendations.

The previous study thus made helps in understanding the patterns and methodology used in previous methods. The accuracy improvements which have been done in previous study helps in solving the mismatches. Multiple algorithms in multiple ways gives different results and accuracy patterns. Online recommendation process helps in analyzing the ways recommendation can be made. Tag correlation and ranking scheme from three different papers are taken as a ground work to proceed with the work.

System Design

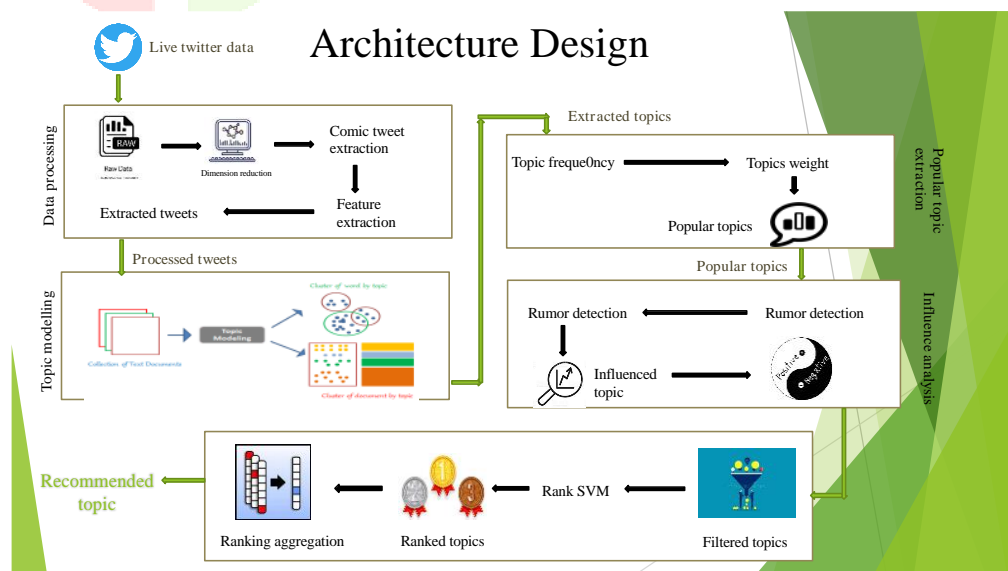


Fig 1: system design

Implementation

- Live twitter data is connected and the tweets are extracted based on the topic (ex:comics)
- Extracted tweets are analysed using LDA model and the topics are extracted
- Extracted topics are weighted for popular topic analysis
- Popular topics are taken and ranking is done (positive , neutral , negative)
Influenced topic are extracted
- Influenced topic are taken as input using SVM algorithm and topics are ranked
- This highly ranked topics are taken as recommendation

Performance analysis

Performance Evaluation Table 1:

No of Data	TP(%)		TN(%)		FP(%)		FN(%)		Algorithm					
	P	R	P	R	P	R	P	R	ITCAUSR			RANK AGGREGATION		
									P	R	F1	P	R	F1
500	96	98	94	95	2	21	3	29	82	76	78	83	76	78
1000	95	98	94	96	2	24	3	31	81	76	78	83	73	77
10,000	90	97	89	88	3	30	2	21	81	74	75	80	71	75
20,000	90	95	88	86	3	31	3	30	78	72	71	79	70	71
50,000	83	86	85	86	3	32	3	32	75	69	66	79	67	68
75,000	72	79	77	80	3	32	3	34	73	68	64	76	67	70
1,00,000	74	76	75	79	3	34	3	35	72	67	65	76	63	68

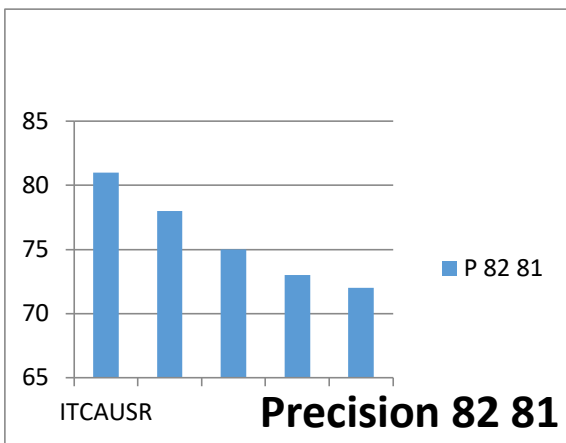


Fig 2: Precision for ITCAUSR

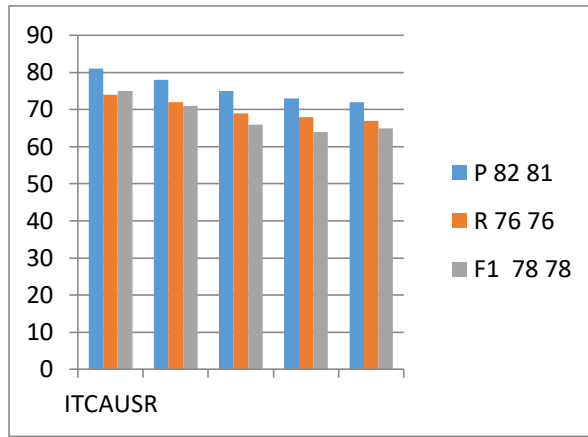


Fig 3: Evaluation for ITCAUSR

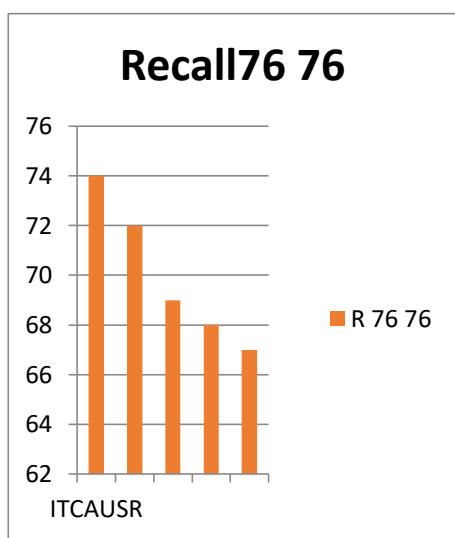


Fig 4: Recall for ITCAUSR

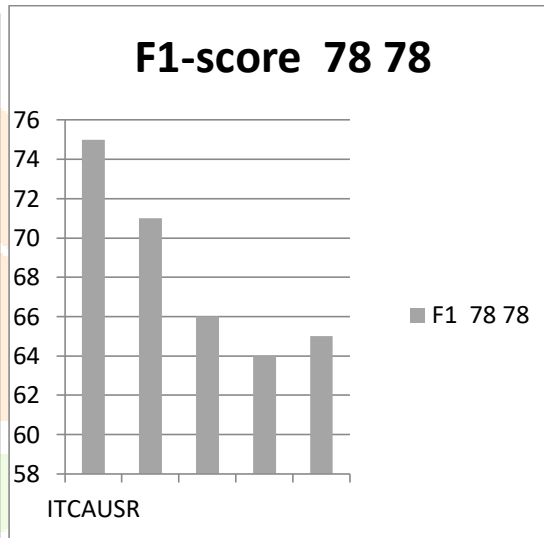


Fig 5: F1-score for ITCAUSR

RANK AGGREGATION

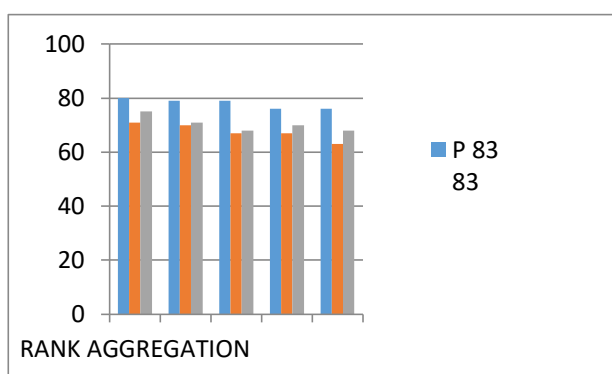


Fig 6: Evaluation for Rank Aggregation

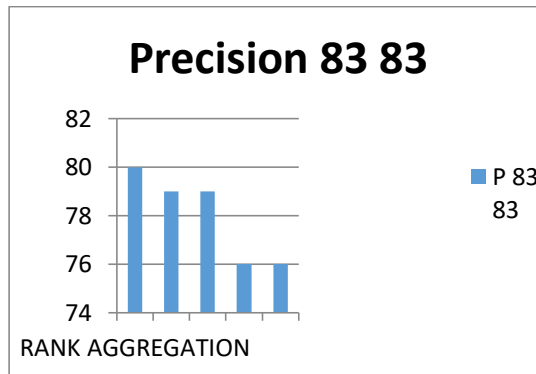


Fig 7: Precision for Rank Aggregation

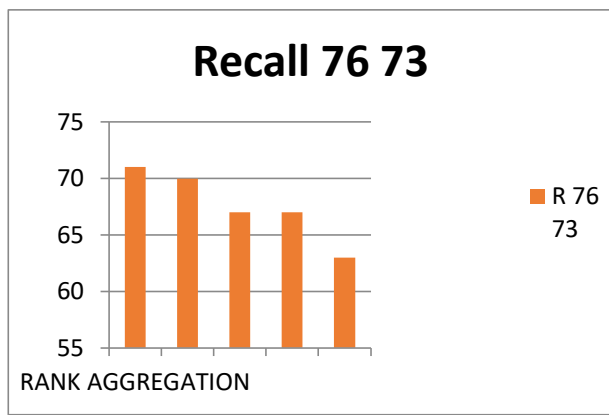


Fig 8: Recall for Rank Aggregation

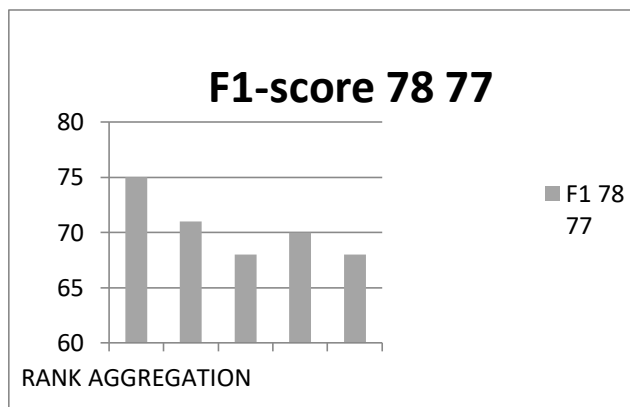


Fig 9: F1-Score for Rank Aggregation

Conclusion

Recommender systems are a powerful new technology for extracting additional value for a business from its user databases. These systems help users find items they want to know from their interest. Recommender systems benefit users by enabling them to view and find the items they like. Recommender systems are rapidly becoming a crucial tool in E-commerce on the Web. Recommender systems are being stressed by the huge volume of user data and will be stressed even more by the increasing volume of user data available on the Web. New technologies are needed that can dramatically improve the scalability of recommender systems. The goal of this work is thus to develop a recommendation system that recommends the user with the best news articles. Recommendation for the twitter users based on their tweets will enhance the recommendation quality and interest among the users. This work models the recommendation based on the tag correlation and ranking schema. Ranking of the users and tags are proposed to achieve the highly ranked tags for the users.

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