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A Novel Approach for Resolution Recommendation for Generated Tickets

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ABSTRACT: In our work, we develop techniques to recommend appropriate resolution for incoming events by making use of similarities between the shopping query events and historical resolutions of shopping related similar events. Built on the traditional K Nearest Neighbor algorithm, our proposed algorithms take into account false positives often generated by monitoring systems. An additional penalty is incorporated into the algorithms to control the number of misleading resolutions in the recommendation results.

Moreover, as the effectiveness of the K Nearest Neighbor algorithm heavily relies on the underlying similarity measurement, we proposed two other approaches to significantly improve our recommendation with respect to resolution relevance. One approach uses topic-level features to incorporate resolution information into the similarity measurement; and the other uses metric learning to learn a more effective similarity measure.

KEYWORDS: IT Service Management, Recommender System, K nearest neighbor, Latent Dirichlet Allocation, Metric Learning

I. INTRODUCTION

HIGH-QUALITY customer service is extremely important for companies. It is reported that 70% of the customers hit the road not because of the price or product quality issues but because they do not like the customer service. Current customer service (also called helpdesk, call center, etc.) involves a lot of manual operations, which require customer service representatives to master a large variety of malfunction issues. Moreover, it is difficult to transfer knowledge and experience between representatives. Thus, many companies attempt to build intelligent helpdesk systems to improve the quality of customer service. With the development of e-commerce, a substantial amount of research has been devoted to recommendation systems. These recommendation systems determine items or products to be recommended based on prior behavior of the user or similar users and on the item itself. An increasing number of user interactions has provided these applications with a huge volume of historical information that can be converted into practical knowledge. In this paper, we apply a similar approach and develop a method that finds a resolution for an event by making use of similarities between the events and previous resolutions of monitoring tickets. Most service providers keep years' worth of historical tickets with their resolutions. Each event is stored as a database record that consists of several related attributes with values describing the system status at the time this event was generated.

II. LITERATURE SURVEY

M. Deshpande and G. Karypis Proposed one such class of model-based recommendation algorithms that first determines the similarities between the various items and then uses them to identify the set of items to be recommended. The key steps in this class of algorithms are (i) the method used to compute the similarity between the items, and (ii) the method used to combine these similarities in order to compute the similarity between a basket of items and a candidate recommender item. Our experimental evaluation on eight real datasets shows that these item-

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based algorithms are up to two orders of magnitude faster than the traditional user-neighborhood based recommender systems and provide recommendations with comparable or better quality.[1]

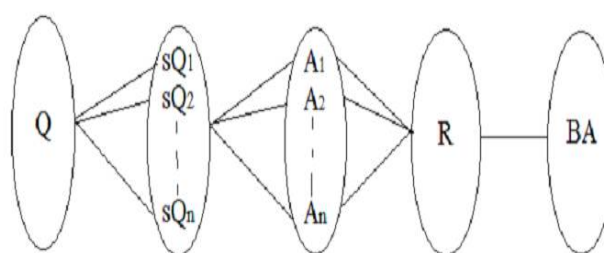
D. M. Blei, A. Y. Ng, and M. I. Jordan, This paper describes latent Dirichlet allocation (LDA), a generative probabilistic model for collections of discrete data such as text corpora. LDA is a three-level hierarchical Bayesian model, in which each item of a collection is modeled as a finite mixture over an underlying set of topics. Each topic is, in turn, modeled as an infinite mixture over an underlying set of topic probabilities. In the context of text modeling, the topic probabilities provide an explicit representation of a document. We present efficient approximate inference techniques based on variational methods and an EM algorithm for empirical Bayes parameter estimation. We report results in document modeling, text classification, and collaborative filtering, comparing to a mixture of unigrams model and the probabilistic LSI model.[2]

Naga Ayachitula, Melissa Buco, Yixin Diao, Surendra Maheswaran, Raju Pavuluri, Larisa Shwartz Chris Ward proposed a conceptual methodology for IT service management process automation that leverages the ontological relationships between process artifacts and resource artifacts to develop data aware processes for an effective automated approach to integrate both highly automated and human centric process models. The objective is to develop a systematic approach that addresses the needs of an IT organization in order that highly automated operational processes work in conjunction with collaborative human decision centric processes in order to effectively deliver IT services. In addition, we propose a complexity model to assist in identifying automation opportunities to satisfy the need for continuous efficiency and cost improvement.[3]

Dingding Wang, Tao Li, Shenghuo Zhu, and Yihong Gong . Develop iHelp, proposed an intelligent online helpdesk system, to automatically find problem–solution patterns from the past customer–representative interactions. When a new customer request arrives, iHelp searches and ranks the past cases based on their semantic relevance to the request, groups the relevant cases into different clusters using a mixture language model and symmetric matrix factorization, and summarizes each case cluster to generate recommended solutions. Case and user studies have been conducted to show the full functionality and the effectiveness of iHelp.[4]

Liang Tang and Tao Li, Florian Pinel and Larisa Shwartz, Genady Grabarnik describes a novel methodology and a system for minimizing non-actionable tickets while preserving all tickets which require corrective action. Our proposed method defines monitoring conditions and the optimal corresponding delay times based on an off-line analysis of historical alerts and the matching incident tickets. Potential monitoring conditions are built on a set of predictive rules which are automatically generated by a rule-based learning algorithm with coverage, confidence and rule complexity criteria. These conditions and delay times are propagated as configurations into run-time monitoring systems.[5]

III. MATHEMATICAL MODEL



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Where,

Q = User Entered Question

sQ1,sQ2,sQn = Similar query of customer

A1,A2..An = Multiple resolution already available.

R = Topic level feature and similarity measurement.

BA=Resolution to user entered Question

B] Set Theory

The following terms shows in detail working of project.

S=s, e, X, Y,

Where,

s = Start of the program.

Register to system.

Login to system.

X = Input of the program

X = Q,sQ,R

Where,

Q= User entered Question

sQ1,sQ2,sQn = Similar questions of customer

A1,A2..An = Multiple resolution already available.

R = Topic level feature and similarity measurement.

Y = Output of the program.

Y = BA

The output of program is top k resolutions.

e = End of the program.

Failures and Success conditions.

Failures:

1. Huge database can lead to more time consumption to get the information.
2. Hardware failure.
3. Software failure.

Success:

1. Search the required information from available in Datasets.
2. User gets result very fast according to their needs.

Above mathematical model is NP-Complete.

Time Complexity of Proposed System

Check No. of patterns available in the datasets= n

If (n>1) then retrieving of information can be time consuming. So the time complexity of this algorithm is less

Above mathematical model is NP-Complete.

IV.EXISTING SYSTEM APPROACH

In automated service management, the resolutions of false tickets reveal unhelpful comments, such as, “this is a false alarm,” “everything is fine” and “no problem found.” If a false ticket’s resolution is recommended for a real ticket, the system administrator might overlook the real system problem. Note that in a large enterprise IT environment, overlooking a real system problem may have serious consequences, such as system crashes. However, the traditional KNN-based algorithm has no mechanism to avoid such a case in the ticket resolution recommendation task. A traditional KNN-based (K Nearest Neighbor) [8] approach using attribute-level features has been first applied to

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provide resolution recommendations for incoming tickets in service management. However, the traditional KNN-based algorithm has one big drawback when applied to system management.

V.PROPOSED SYSTEM APPROACH

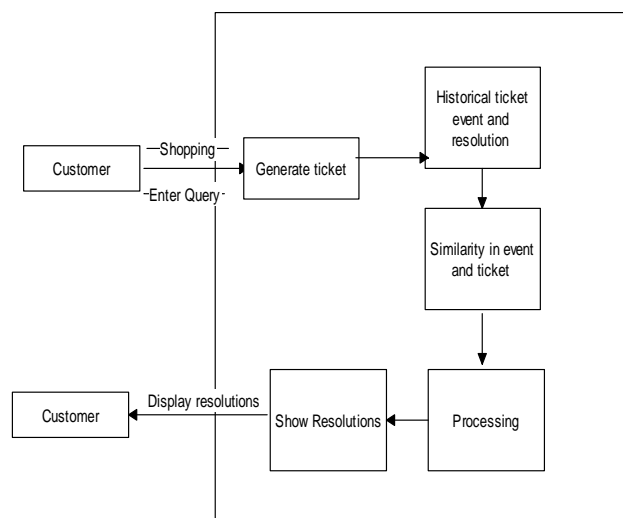


Fig.1 Block Diagram of Proposed System

In our work, we develop techniques to recommend appropriate resolution for incoming events by making use of similarities between the shopping query events and historical resolutions of buying of product similar events. Built on the traditional K Nearest Neighbor algorithm. Here customer enters the query according to query ticket will generate and after processing customer will get resolution for that query. We proposed two other approaches to significantly improve our recommendation with respect to resolution relevance. One approach uses topic-level features to incorporate resolution information into the similarity measurement; and the other uses metric learning to learn a more effective similarity measure. We first apply traditional KNN algorithm for event ticket resolution recommendation and extend it to two other resolution recommendation algorithms capable of eliminating misleading resolutions.

VI. SYSTEM ANALYSIS

In a following table we show the 4 different category like Mobile, Book, Electronic, Kids. Following graph shows Mobile 20 products. Book 15 product. Electronic 13 product and 17 product of kids.

Sr.No	Category	Number of Products
1	Mobile	20
2	Book	15
3	Electronic	13
4	Kids	17

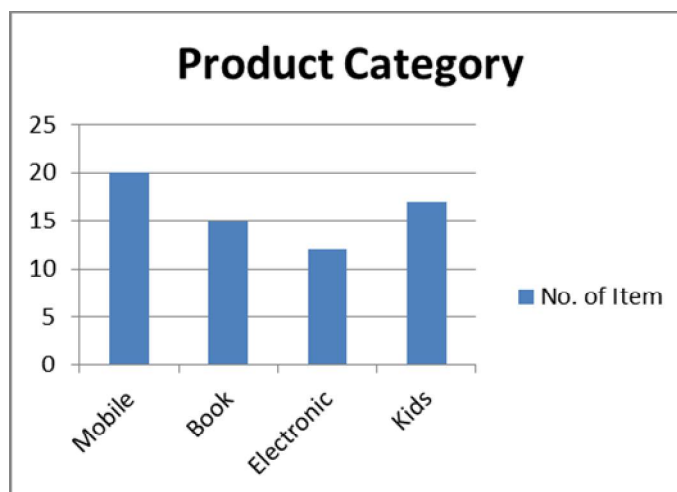
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VII. CONCLUSION

Proposed system will solve the issues of resolution recommendation for monitoring tickets in an automated shopping service management. Based on our prior work of KNN-based recommendation, we develop the similarity measure by utilizing both the query related product event and resolution information of shopping of product from historical tickets via a topic-level feature extraction using model. In addition, a more effective similarity measure is learned using metric learning when resolution categories are available.

ACKNOWLEDGMENT

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