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Inferring User Goals Using Customer Feedback and Analyzing Customer Behavior

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Abstract: Many enterprises devote a significant portion of their budget to new product development (NPD) and marketing to make their products distinctive from those of competitors, and to know better the needs and expectations of consumers. Hence, knowledge and suggestions on customer demand and consumption experience has become an important information and asset for enterprises. Inferring user search goals are very important in improving the efficiency. For this, feedbacks are obtained from the customer. The submitted feedbacks are clustered as feedback sessions. Pseudo-documents are generated to better understand the clustered feedbacks. K-means clustering algorithm is used to cluster the feedbacks. These feedbacks are very useful in development of new product. Ranking model is used to provide ranks to the products based on the customer feedbacks. Hence knowledge and feedback from customers has become important information. Product design is integrated with the knowledge of customers. Users may also pose their questions about the products which are added when it is suitable. Hence customer behaviour can be analysed from their posed questions and response. Finally, evaluation criterion is described to evaluate the performance of new product.

Keywords: feedback sessions, k-means, pseudo-documents, customer behaviour, ranking model

1. INTRODUCTION

Nowadays data mining has attracted a great deal of attention in the information industry and in society as a whole, due to the wide availability of large amounts of data and the imminent need for turning such data into useful knowledge and information. The information and knowledge gained can be used for many applications ranging from market analysis, customer retention, fraud detection, to production control and science exploration.

Clustering is the most important concept used here. Clustering analyzes data objects without consulting a known class label. The objects are grouped or clustered based on the principle of maximizing the intra class similarity and minimizing the inter class similarity.

Knowledge of the customers and the product itself reflect the needs of the market. Product design and planning for production lines be integrated with the knowledge of customers and market channels. The knowledge of customers and market channels is transformed into knowledge assets of the enterprises during the stage of NPD. The priori algorithm in data mining is a methodology of association rule, which is implemented for mining demand chain knowledge from channels and customers. Knowledge extraction is illustrated as knowledge patterns and rules in order to propose suggestions and solutions to the case firm for NPD and marketing. K-means clustering algorithm is a method of vector quantization originally from signal processing, that is mainly for cluster analysis in data mining. It aims to partition *n* observations into k clusters in which each observation belongs to the cluster with the nearest centre, serving as a prototype of the cluster.

In this paper, customers have the privileges to register their personal details and also have the privileges to create their own user name and password. Then Customer can login to enter which kind of product they want exactly and complaints about their product which they are used. Customers can provide the suggestions and ratings about the product. To get suggestion from every user individually is a difficult task for a manufacture company. Therefore from the customer feedbacks, feedback sessions are proposed. Then, we propose a method to map feedback sessions to pseudo-documents which can efficiently reflect user information needs. Ranking model is used to provide the ranking for the products. By providing the ranking for the product the dealers can clearly understand the betterment of products and can easily find out the frequently used products. This can be very useful in improving the product in the new product development stage. Apriori algorithm is a methodology of association rule of data mining, is used to find out the frequently used products. In addition to this a method is provided to analyse the customer behaviour. Here users can pose their questions, in which answers can give by other customers. From their responses we can predict the user expectations and needs. Since the evaluation of clustering is

also an important problem, evaluation is described to evaluate the performance new product.

1.1 Framework of Our Approach

Figure. 1 shows the framework of our approach. To sum up, the major contribution of our work as follows:

We infer the user goals by clustering, feedback sessions are proposed. Clustering the feedbacks can effectively reflect the user needs. Products can be improved effectively by providing ratings. So the user expectations can be obtained conveniently from the ratings. This can be very useful in new product development.

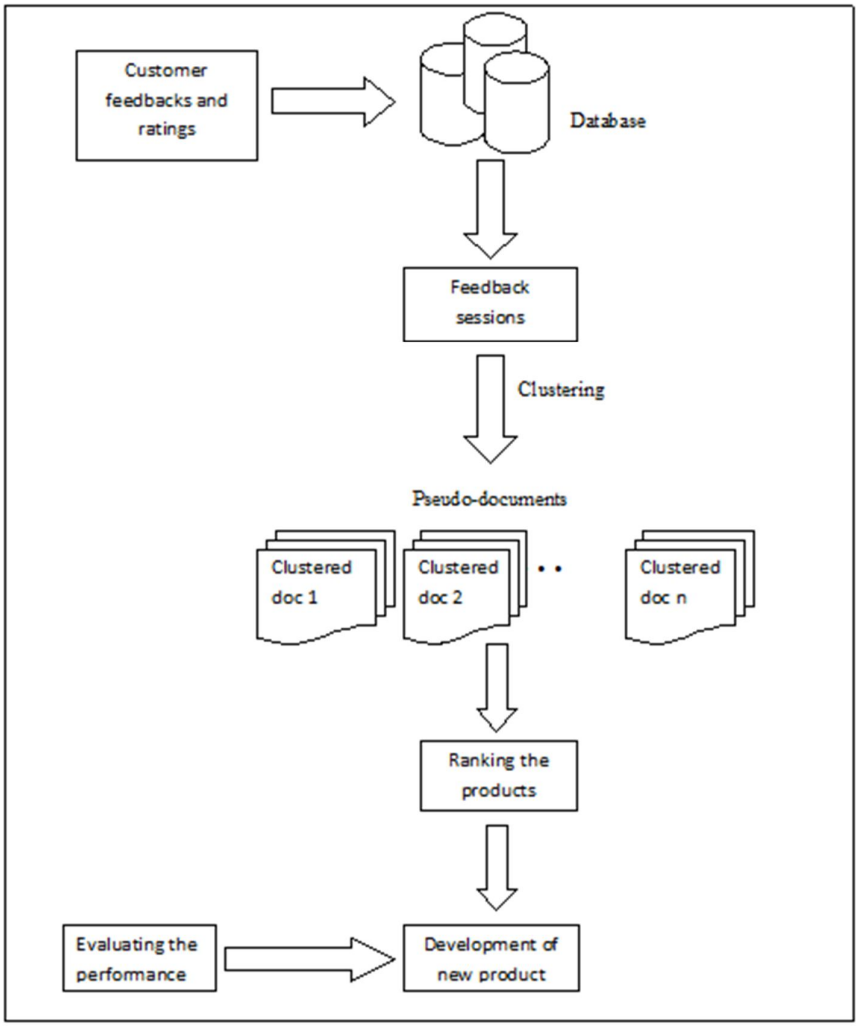

Figure.1 The framework of our approach

We propose the new product development. Through product development, it aims to meet the changing needs of its customers. Therefore organisation profits can be increase effectively.

We propose a method to analyse the customer behaviour. This helps in how the customer decision strategies differ between the products and how the marketing strategies more effectively reach the customer.

We propose the evaluation criterion to evaluate the performance of newly developed product. From this we can determine the user goals.

The rest of the paper is organised as follows: Related work is presented in section 2. The proposed feedback sessions and ratings are described in section 3. Section 4 describes the new product development. Analysing customer behaviour is presented in section 5. Section 6 deals with evaluation of product. Section 7 concludes the paper.

2. RELATED WORK

Many works about user search goals analysis have been investigated. In the case of search engine, the number of diverse user search goals for a query and depicting each goal with some keywords automatically [1]. Here the feedback sessions are formed with the series of both clicked and unclicked URLs and ends with the last URL that was clicked in a session from user click-through logs. [4], [8], [9], [12], [15] demonstrated the use of logs. In search engine the user goal can also be inferred by using the clickthrough data [7], [10]. It is more efficient to analyze the feedback sessions than to analyze the search results or clicked URLs directly. [13], [14] illustrated the work of inferring goals in search engine using clickthrough data. Users provide their own outcome and then answer questions that may be predictive of that outcome [2]. Models are constructed against the growing dataset that predict each user's behavioural outcome. Users pose their own questions that, when it answered by other users, then in the modeling process it become new independent variables.

Based on this we proposed feedback sessions by collecting the feedbacks about the products from the customers. Here we extend the work by forming the pseudo-documents. Pseudo-documents consist of clustered similar feedbacks. By clustering the feedbacks we can easily understand the user goals. So we can use these feedbacks in order to improve the products. Predicting the customer behaviour helps in the development of new product.

3. FEEDBACKS AND RATING

In this section, we first describe the feedback sessions and followed by ratings of the products. In this paper, we focus on inferring user search goals for a particular query. Each feedback session can tell what a user requires and what he/she does not care about. There are plenty of diverse feedbacks from the users therefore for inferring user search goals; it is more efficient to analyze the feedbacks.

Feedbacks are collected from every customer for each part of the product [5]. This helps in improving the product. Apart from feedbacks, ratings can also be given by the customers. Ratings are considered very important in comparing the product. Ratings benefit the customers and help them make informed purchasing decisions. Ratings increase confidence of consumer, and it enhance product visibility and ratings can dramatically increase sales. Ratings have the power to reach a large audience and be more influential than conventional marketing methods. One of the wonderful benefits of rating is that how the customers feel about brand, what they like and dislike about products and how can improve the overall product, which help products rank higher. H.-J Zeng [3] and J.-R Wen [6] illustrated the importance of clustering. Feedbacks for each part of product can be collected and can be effectively clustered by using k-means clustering algorithm which is effective and simple. We do not know the exact number of user search goals for each query, we set k to be different values and based on these values clustering is performed. User goals can also be predicted automatically. [11] and [17] shows the automatic identification of user goals. Compared to automatic identification collecting the customer feedbacks satisfy the user needs and expectations.

4. NEW PRODUCT DEVELOPMENT

Too many organisations suffer from customer amnesia, as though they have forgotten how to have routine conversations with their customers. When it comes to new product development, these organisations jump right to design of product, by assuming they know what customer expects, and then ships the finished product as soon as possible.

For successful reachability of product, find out what problems that organisation can solve for the customer before designing the product. Get early feedback on new product concepts from customers by showing them initial prototypes. These feedbacks can be collected from the customers by setting up the questions. Once the organisation has a system for collecting new product ideas and suggestions, it is easy to make up the product. Customers are a great resource for the product development feedback. Through product development, it aims to meet the changing needs of its customers and increases the customer total spend. Through offering more products and services it hopes to increase profits.

Customer feedbacks provide organization with valuable information that can be used to better position services or products in the marketplace. Still some companies are not asking the customers who buy their products and services what they want and need, while many companies do not incorporate customer suggestions into the product development process. Several reasons could explain that why some organizations do not include customer feedback into their product development and service improvement programs. Perhaps they do not realize the customer excellence is impossible to achieve without knowing or understanding what customers expects. Have they forgotten that the goal of collecting customer feedback regularly and proactively is to consistently exceed customer expectations? May be they are not aware that customer feedback programs can be used to create products or services that will ensure business success. Hence the customer suggestions are considered as very important in the development of new product.

5. ANALYSING USER BEHAVIOUR

Market research is often needed to ensure that what customer really wants. Analyzing customer behaviour helps organizations improve their marketing strategies by understanding how customers think and select between different alternatives. Customer motivation and decision strategies differ between products that differ in their level of importance. When the consumer behaviour and marketing strategy are intervened, marketers can expect success in their profit and sales, competitive sustainability and higher profit in the market place. The benefits of using consumer behaviour to create a marketing strategy are the knowledge marketer's gain about the needs and values of their target market. Once marketers understand this, their message will be delivered to the correct target in marketplace, resulting in an end sale. [18] introduced the

machine science model for analyzing the customer behaviour.

Here we proposed the customer behaviour by analyzing the questions posed by the customers about the products. Customers can pose their questions. These questions are analysed by the investigator to check whether the question is suitable, if it is suitable then the question is selected and added by the investigator. For these questions other customers can also propose their answers or responses. [16] and [19] demonstrated the behavioural outcome of customers. These responses can be analyzed to predict the customer behaviour (Figure. 2). This effectively reflects the user needs and expectations which help in the new product development and improve the market sales.

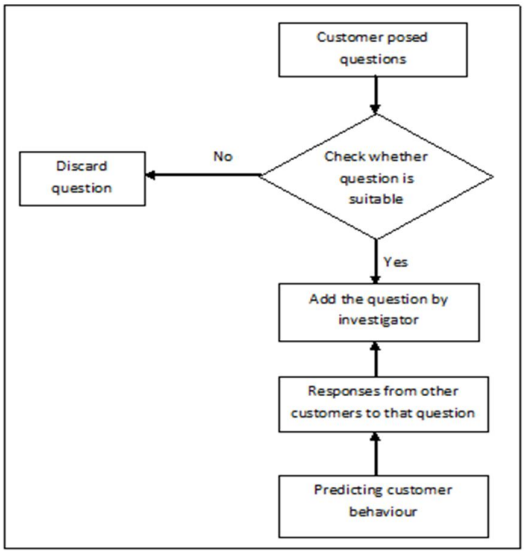

Figure. 2 predicting customer behaviour

6. EVALUATION OF PRODUCT

When developing a new product, an organisation should identify all the features. Determining the overall ranking of features by importance and relate the importance of each feature to its uniqueness reflects the importance of evaluation. The purpose of evaluation is to determine whether the outcome criteria have been met. It is done for the purpose of improvement. Some weaknesses can be found during evaluation.

Hence, evaluating the new product performance helps in identifying how far the product reaches successfully.

7. CONCLUSION

In this paper, user goals are inferred by clustering the feedbacks given by the customer. First the feedback sessions are proposed. Then the similar feedbacks are clustered to produce the pseudo-documents. Ratings which are given by the customers are collected. These feedbacks and ratings are used in the development of new product. Hence the knowledge and feedbacks from the customers has become important information. Customer behaviour has predicted by analysing the questions posed by the customers. The posed questions and responses are useful in predicting the user needs and expectations. Evaluating the new product helps in identifying the successful of product in market.

Through this, organization profit can be increased effectively. This helps in how the customer decision strategies differ between the products and how the marketing strategies more effectively reach the customer.

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