A REVIEW OF RARE ITEM SET MINING METHODOLOGIES

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ABSTRACT: In this paper, we present an overview of modern rare item set mining techniques using data mining algorithms. Rare item set mining in data mining takes a lot of data base scans. Therefore it is a computationally expensive task. So still there is a need to update and enhance the existing rare item set mining techniques so that we can get the more efficient methods for the same task. In this paper, a study of all the modern and most popular rare item set mining technique is also performed.

INTRODUCTION:

The use of data mining [1,2] is placed in various decisions making task, using the analysis of the different properties and similarity in the different properties can help to make decisions for the different applications. Among them the prediction is one of the most essential applications of the data mining and machine learning. This work is dedicated to investigate about the decision making task using the data mining algorithms. Therefore an application of heart disease is reported for providing the fruitful results from the algorithms.

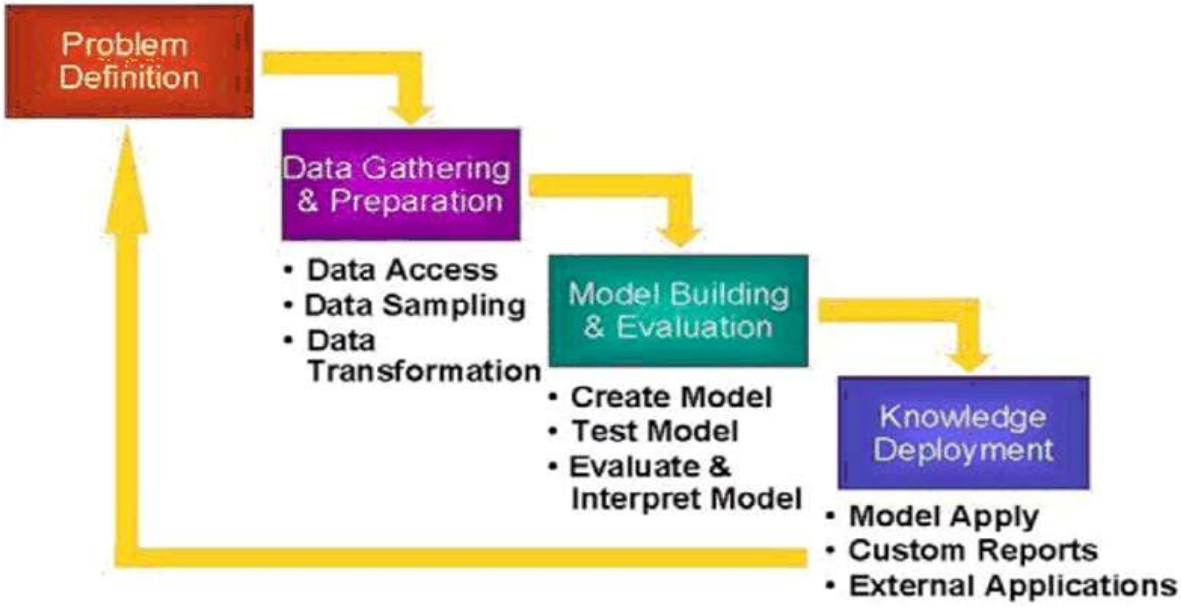

Figure 1: Data Mining

The point-of-sale records of customer purchases to send targeted promotions based on an individual's purchase history. By mining demographic data from comment or warranty cards, the retailer could develop products and promotions to appeal to specific customer segments.

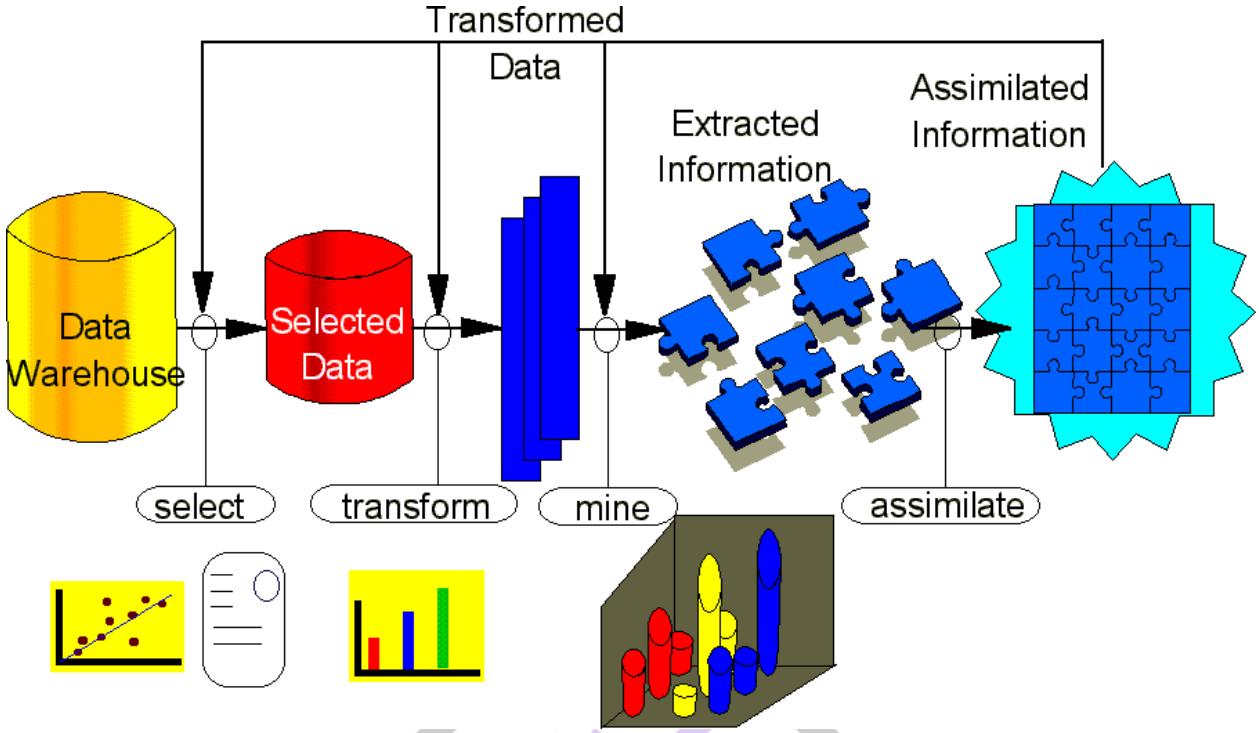

Figure 2: key steps in data mining

The data mining is a process of analysis of the data and extraction of the essential patterns from the data. These patterns are used with the different applications for making decision making and prediction related task. The decision making and prediction is performed on the basis of the learning of algorithms. The data mining algorithms supports both kinds of learning supervised and unsupervised. In unsupervised learning only the data is used for performing the learning and in supervised technique the data and the class labels both are required to perform the accurate training. In supervised learning the accuracy [5,6] is maintained by creating the feedbacks form the class labels and enhance the classification performance by reducing the error factors from the learning model.

Let I = {i1, i2, i3, i4……. im} be a set of m distinct literals called items; D is a set of transactions (variable length) over I. Each transaction contains a set of items i1, i2, i3, i4…….. ik I. Each transaction is associated with an identifier, called TID. Rare items are those items which has support count less than user specified threshold value [5], [6], [7].

LITERATURE SURVEY

In many cases it is useful to use low minimum support thresholds. But, unfortunately, the number of extracted patterns grows exponentially as we decrease. It thus happens that the collection of discovered patterns is so large to require an additional mining process that should filter the really interesting patterns. The same holds with dense datasets, such as census data. These contain strongly correlated items and long frequent patterns. In fact, such datasets are hard to mine even with high minimum support threshold. The Apriori property [2] does not provide an effective pruning of candidates: every subset of a candidate is likely to be frequent. In conclusion, the complexity of the mining task becomes rapidly intractable by using conventional algorithms.
Closed itemsets are a solution to the problems described above. These are obtained by partitioning the lattice of frequent itemsets into equivalence classes accordin to the following property: two distinct itemsets belong the the same class if and only if they occur in the same set of transactions. Closed itemsets are the collection of maximal itemsets of these equivalence classes.

When a dataset is dense, the number of closed itemsets extracted is order of magnitudes smaller than the number of frequent ones. This leverages the problem of the analyst of analyzing a large collection of patterns. Also, they reduce the complexity of the problem, since only a reduced search space has to be visited.

Rare cases deserve special attention because they represent significant difficulties for data mining algorithms [20]. However, the underlying mining problems have not yet been studied in detail. Indeed, the scarce literature on the subject is almost exclusively composed of work on adapting the general levelwise pattern mining framework around the Apriori algorithm [2] to various relaxations of the frequent itemset and frequent association notions [9, 12, 8]. Al-though these methods will typically retrieve large portions of the search space for itemsets and associations that lay outside its frequent part, this coverage nevertheless remains incomplete since many rare associations will not be discovered, either due to an excessive computational cost or to overly restrictive definitions. Hence, as it was argued in [10], these methods will fail to collect a large number of potentially interesting patterns.

In [4] Laszlo et.al presented generation of rare association rules for mining of infrequent itemsets. In this work presented a method to taking out rare association rules that stay hidden for traditional frequent itemset mining algorithms.

In [2] X. wu Efficient mining of both positive and negative association rules .They focused on identifying the associations among frequent itemsets. They designed a new method for efficiently mining both positive and negative association rules in databases. This approach is novel and different from existing research efforts on association analysis.

In [3] David et.al presented a new algorithm of MINIT, for finding minimal τ -infrequent or minimal τ -concurrent item sets. Firstly, a ranking of items is organized by estimating the need of each of the items and then generating a record of items in rising order of support.

In[5] Ashish Gupta e.al presented pattern-growth paradigm to discover minimally infrequent itemsets. They recommend a new algorithm based on the pattern-growth paradigm to find minimally infrequent itemsets. It has no subset which is also infrequent. This work uses novel algorithm of IFP min for mining minimally infrequent itemsets. Then the residual tree concept has been incorporated by using a variant of the FP-Tree structure which is known as inverse FP-tree. In order to mine the minimally infrequent itemsets, optimization of Apriori algorithm is performed. Finally the presented tree are used for mining of frequent itemset as well.

CONCLUSION:

The basic objective of rare item set mining is to find correlation among the items which are rare but important in the transaction data set. All the researchers are aware of the fact that they are required to deal with the voluminous data while performing mining on the data. So the goal is to device such algorithms which are time and memory efficient. This paper elaborates the rare item set mining and the work done by various authors to perform mining on the transaction data set.

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