

A Novel Approach to Prevent Direct and Indirect Discrimination in Dataset Retrievals

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Abstract— Data mining is an important technology for extracting useful patterns from large amount of data. There are some negative approaches in data mining like potential privacy incursion and potential discrimination. Discrimination consists of unfairly treating people on the basis of their belonging to a specific group. Automated data collection and data mining techniques such as classification rule mining have paved the way to making automated decisions, like loan granting/denial, insurance premium computation, etc. Discrimination occurs when people are given unfair treatment on the basis of their sensitive features like gender, race, religion etc. there are two type of discrimination. One is direct discrimination and other is indirect discrimination. Indirect discrimination is when there's a practice, policy or rule which applies to everyone in the same way, but it has a worse effect on some people than others. If you've been treated unfairly by someone simply because of who you are, this could be direct discrimination. The analysis of literature survey would give the information about what has been done previously in the same area, what is the current trend and what are the other related areas. We have prepare algorithm with the help of classification rules for discriminatory free dataset and we get accurate result without damaging original data.

Index Terms— Data mining, Discrimination, Pre-processing, In-processing, Post-processing

I. INTRODUCTION

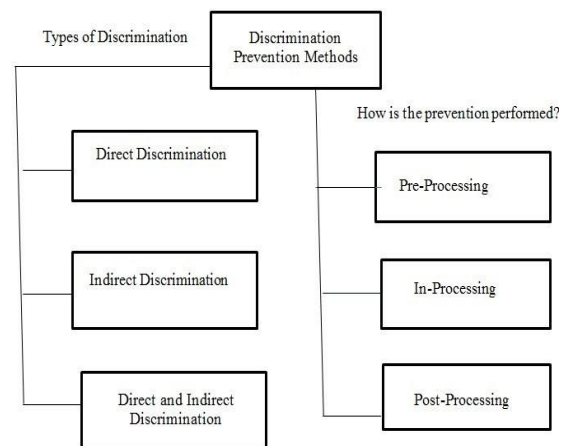
Data mining is the exploration and analysis of large quantities of data in order to discover valid, novel, potentially useful, and ultimately understandable patterns in data. Social point of view, sensitive and essential concern is Discrimination.

Discrimination is known as Partial or unequal treatment of people based on membership to a category or a minority, without regard to individual merit. The peoples are divided on bases of their race (color), gender, age, nationality etc. Decisions are made by the attributes like giving them a job, loan,

insurance, finance, social life, community relationship etc.

Direct and indirect are the types of discrimination. Indirect discrimination is when there's a practice, policy or rule which applies to everyone in the same way, but it has a worse effect on some people than others. If you've been treated unfairly by someone simply because of who you are, this could be direct discrimination.

There are three methods for prevention discrimination.



Pre-processing: Whenever data can be transferred the original data can be removed. After this process apply data mining algorithm. That's why the unfair or unequal decision rules can be mined. According to this we can easily say that data can be changes in this methods.

In-processing: The unfair decision rules does not contain by resulting node, this type of algorithm is updated. In nondiscriminatory methods are inbuilt in a decision tree learner with updating its splitting data and pruning strategy by means of leaf relabeling method. Algorithm can be changed like resulting models does not contain appropriate decision rule..

Post-processing :- This method changed the algorithm rather than cleaning the data set.

II. PROBLEM STATEMENT

In Data mining discrimination is a major issue. Discrimination is treating a person unfairly because of who they are or because they possess certain characteristics. We deal with discrimination avoidance in data mining and proposed novel method for discrimination prevention with the post processing approach. We projected Classification based on predictive association rules (CPAR) algorithm, which is a kind of association classification methods. The algorithm combines the advantages of both association classification methods and traditional rule based classification. In this approach, instead of cleaning the original data set, Post-processing approach modify the data mining model. Eliminating the discriminated attributes from the database for discrimination prevention. The proposed algorithm used the Apriori or FP-growth algorithm for getting the frequent result; these association rule mining algorithms generate the complete set of association rule and achieve higher classification accuracy than the traditional classification approaches. We differ from our base paper in a way. They have perception of discrimination we are trying to take it to a concrete way, measurement of solving and finding discrimination free dataset in direct and indirect way, has to be search out. We are pre-processing the data and storing it to a separate table, which will only be delivered to the required/demanded person/ purpose. We are trying to achieve discrimination free dataset so that unfair decision rules can be isolated and transformed data can be used to generated sure results and further analysis.

22 Proposed algorithm:- Input :- DB, FR, MR, Alpha, Discriminatory

Outout:- DB''

Step 1; For each record in MR

Step 2 : Fr= Fr- each record's value of DB

Step 3 : Calculate $CND = [|MR| - |MR'|] / |MR|$

Step 4 : For each base table in CND true than go to step 8 else step 5

Step 5 : find Impact calculation for each record in FR

Step 6 : Find each record's calculate support value

Step 7 : Compare value with the base support value until the data is sorted

Step 8 : Sort DB' tables

Step 9 : if confidence value of each record ≥ 1 , true then go to step 10, else 12

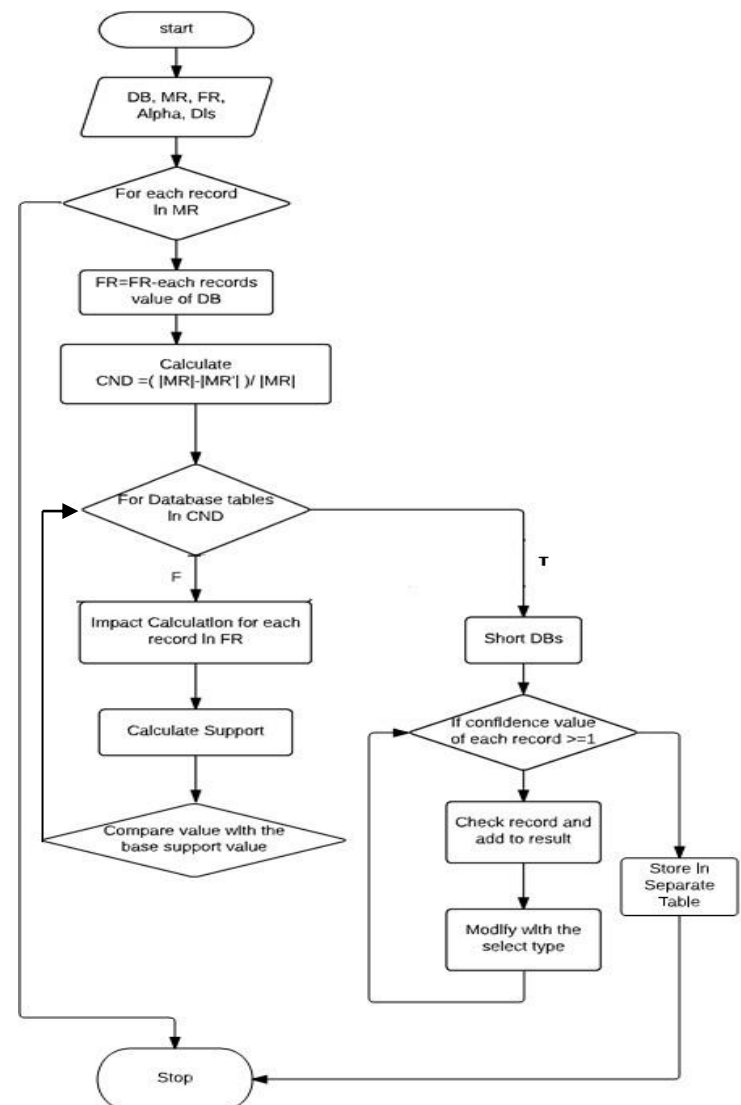
Step 10: Check records and add data to result

Step 11 : Modify with the select type

Step 12 : Store in separate table

Step:13: Stop

In the algorithm DB is my data base, FR is frequent classified record, MR is DB of direct discriminatory rules, CND is classified non-discriminatory rules, alpha is alpha discriminatory rules. In the step 1 all record are go to the MR. step 2 indicate that how many time each record are use with the other records. after that calculate CND. After that find impact calculation for FR. Compare that value with the support value. Sort DB's tables. modify after the results.

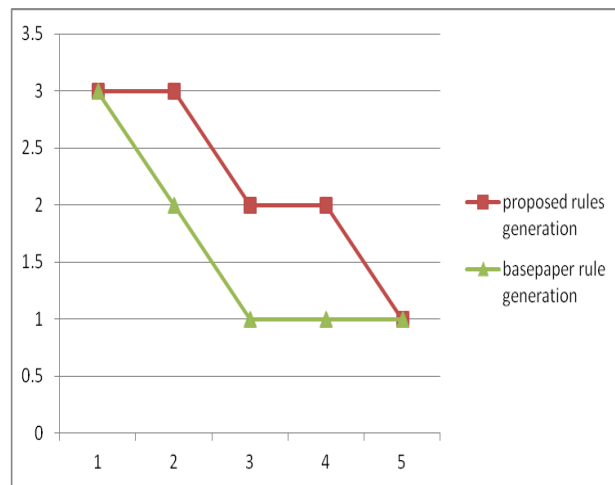


In step 9 we can find the confidence value of each record. If its value is greater than 1 so the data will to the new table. If the value is not greater than 1 so the data will go to the step 10 which is modify the select type of data and store the table.

III. EXPECTED OUTCOMES

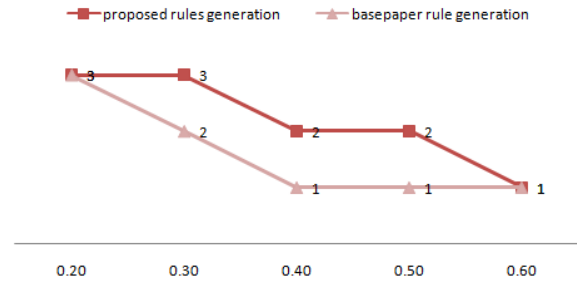
To evaluated discrimination i can use rule generation and rule protection rules. Compare both rules and show results in the chart graph.

comparison based on k-values		
k-values	proposed rules generation	Base paper rule generation
2	3	3
2	3	2
3	2	1
4	2	1
5	1	1



TWT	proposed rules generation	Base paper rule generation
0.2	3	3
0.3	3	2
0.4	2	1
0.5	2	1
0.6	1	1

Comparison based on TWT



IV. CONCLUSIONS

In this paper we study the method of discrimination prevention. From the survey, discrimination prevention is major issue. We conclude that different discrimination technique for evaluating data mining. And work on the different datasets. Finally, we are trying to achieve discrimination free data set so that unfair decision rules can be isolated and transformed data can be used to generate sure results and further analysis.

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