A Novel Approach for Discrimination Prevention and Privacy Preservation in Data Mining

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ABSTRACT

Recently increasing importance of Data Mining technology as it will help for extract important knowledge data from large amount of data. Hence there negative sociality able to see about data mining. Peoples belonging some categories on that based peoples are treating unfairly. Data mining and data collection techniques classified the mining rules which is covered automated decisions, e.g. grant or denied loan request, insurance premium computation. Discriminatory attributes are gender, cast, region, race etc. if data set biased on above attributes decision may emanate. Discrimination having two types one is direct and indirect. When on the base of sensitive attributes made decision it's called direct discrimination. When no any sensitive attribute include for made decision it's called indirect discrimination and which are relate with biased sensitive one. In these studies we focus on discrimination prevention in data mining and our proposed system used for direct or indirect discrimination prevention individually or both at the same time. We focus on how to data discrimination decision convert in anti - discriminatory as cleaning training data set and outsourced dataset. Also we define the new metrics for evaluate with our approaches and we compare these approaches. This experiment explain that the proposed system how effectively removing direct or indirect discrimination while store data quality.

Keywords : - *: Antidiscrimination, data mining, direct and indirect discrimination prevention, rule protection, rule generalization, Privacy.*

1. INTRODUCTION

 On the based on peoples sociology discrimination is harmful treatment for the individual membership in specific category or certain group. It contain which opportunities available for the groups these opportunities denied for the one specific group. To prevent the discrimination on the base of number of attributes e.g., race, age, gender, disability, marital status, nationality, and religion there are design some laws in various settings like credit or insuring, pubic services, training services etc. For example, the European Union implements the principle of equal treatment between men and women in the access to and supply of goods and services in [3] or in matters of employment and occupation in [4]. Some laws are against discrimination some are reactive or some non -proactive. Services are allow the automatic collection of large amount of data. These data used for the train association or classification rules for made decision like loan granting/denial, insurance premium computation, personnel selection, etc. first time the decision may give a sense of fairness: By personal preference classification rules not guide themselves. Thus released that classification rules learn by system at closer look like loan granting from the training data. If training data used biased for particular community like for foreigners, the learned model may show a discriminatory harmful behavior. The system may give denied for loan as he is foreigner. In [12] author define, data mining is source of both discrimination   and an important for discovering discrimination. Direct discrimination and indirect discrimination these are two types of discrimination. In direct discrimination some rules are not applicable for one specific group which is applicable for another groups or these groups based on discrimination attributes

which relate to group membership. Indirect discrimination is contain some rules   that will not describe in discrimination attributes.
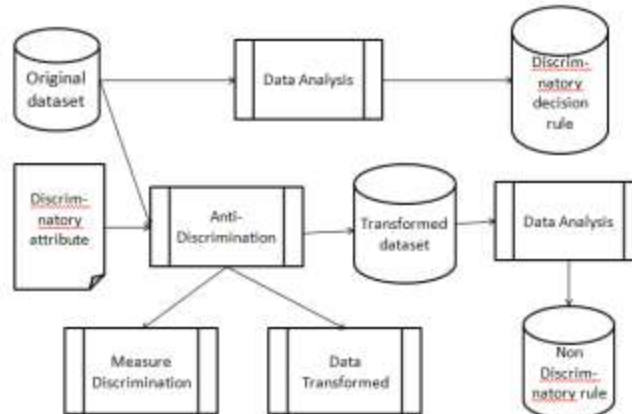

Fig-1: The process of extracting biased and unbiased decision rules.

Financial services providers are denied for the granted loan, mortgages or insurance in urban areas as it will be include in decline areas, it will be best example of indirect discrimination, although certainly not the only one. In this paper indirect discrimination will also be referred to as redlining and rules causing indirect discrimination will be called redlining rules [12]. The reason of indirect discrimination is some background rules. For example, some zip code described un-progress areas or areas with black population. The background knowledge might be accessible from publicly available data (e.g., census data) or might be obtained from the original data set itself because of the existence of nondiscriminatory attributes that are highly correlated with the sensitive ones in the original data set.

2. LITERATURE SURVEY

In [12] proposed that till 2008 data mining technique not received much attention and it was issue of antidiscrimination, in decision making the widely deployment of information system based on data mining technology. Some proposed systems work for the discovery of discrimination and prevention for the discrimination. Others deal with the measure of discrimination. The discovery of discriminatory decisions was first proposed by author in [12], [13]. These approaches based on the mining discrimination classification rules that was characterized by the inference of general laws from particular instance and reasoning on them by based on the inference of particular instance from a general law. For instance, US equal pay act states that a selection rate for any race, sex, or ethnic group which is less than four-fifths of the rate for the group with the highest rate will generally be regarded as evidence of adverse impact. In [13] author proposed that approaches are extracted pattern of discrimination. In [11] Oracle based tool has been implemented. Latest discrimination discovery method define each individual rules for analyzed discrimination without described other rules and comparison between them. Hence in these studies we also take into account the relation between rules for discrimination discovery, based on the existence or nonexistence of discriminatory attributes. In data mining another aim is discrimination prevention and anti-discrimination, if original data set is biased data mining include some pattern which is not lead to discriminatory decision. Three approaches are conceivable:

- Preprocessing.
Original data are removed the discrimination biased content thus no any unfair decision rule can be create from the transformed data in that way source data can be transformed and applying some data mining algorithms. Preprocessing approach can be adopted from the privacy preserving survey. The preprocessing approach is useful for applications in which a data set should be published and/or in which data mining needs to be performed also by external parties (and not just by the data holder).
- In-processing.
If there is made any changes in data mining techniques then also resulting model not contain unfair decision rules for e.g. In [2] discrimination can be cleaning from the original data set in another approaches .
- Post processing.

In post processing modify the resulting model in data mining instead of cleaning original data set or changing the data mining algorithms. For example, in [13], a confidence-altering approach is proposed for classification rules inferred by the CPAR algorithm. In the post processing approach cannot allow the data set to be published: rather than only modifying data set will be publish, however data mining can be performed by the data holder only.
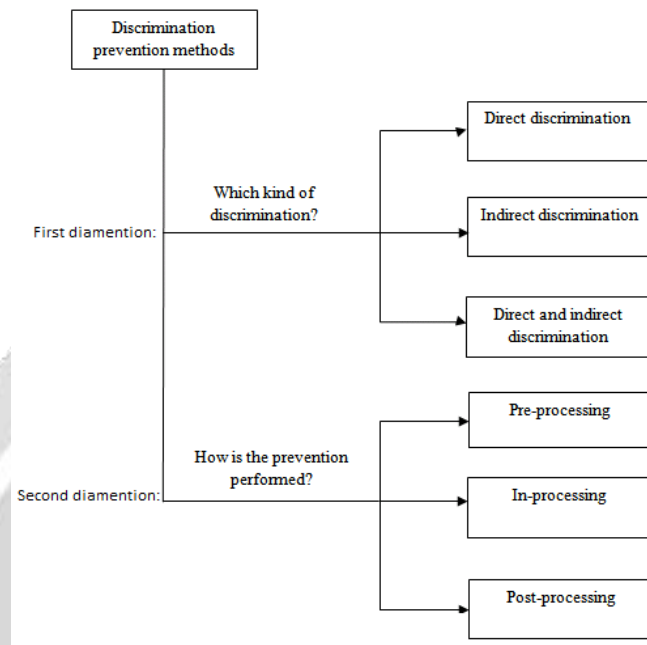

Fig-2: The taxonomy of discrimination prevention Methods.

Preprocessing approaches are just remove discrimination from the original data set it was straightforward approach of preprocessing. This would be resolved direct discrimination issue it will be caused of more data loss and generally it would be not resolve the issue of direct discrimination. However there is two important challenges of discrimination prevention first is considering both direct and indirect discrimination instead of only direct discrimination .The second challenge is to find a good way of balanced achieved between two desirable but incompatible features between the discrimination removal and the maintain the quality of the resulting training data sets and data mining models. For above approaches already been define approach and discrimination stay a large explore avenue. In these studies we focus on preprocessing which is based on discrimination prevention as preprocessing approach is much flexible than other one and like in processing not required changing in standard data mining technique and it allows data publishing, unlike the post processing approach.

3. TITLE-3 Discrimination prevention methods based on preprocessing published so far [7], [8] present some limitations, which we next highlight:

3.1   Based on the single measure and one attribute of discrimination detect discrimination from the original data. But there is no guaranty of provided transformed data set is discrimination free, as it is known that is discrimination items are hidden behind other several discrimination and even combination of discriminations.

3.2   Direct discrimination has been considered there

3.3   There is no any measure how to discrimination removed and how much information loss has been incurred.

In our studies we overcome above limitations. On measure of direct and indirect discrimination our data transformation method was developed and able to deal with among discrimination. We provide utility measures hence in our approach is best prevention for discrimination. As we using rules protection and rules generalization for the direct discrimination, we no gave experimental result. In [6], as well as we provide rules protection in another way for the indirect discrimination and define some preliminary results. We developed a metric which can explain that which records should be changed and how much record should be change. In addition, we propose new utility

measures to evaluate the different proposed discrimination prevention methods in terms of data quality and discrimination removal for both direct and indirect discrimination. Based on the proposed measures, we present extensive experimental results for two well-known data sets and compare the different possible methods for direct or indirect discrimination prevention to find out which methods could be more successful in terms of low information loss and high discrimination removal. The rest of this paper is organized as follows.
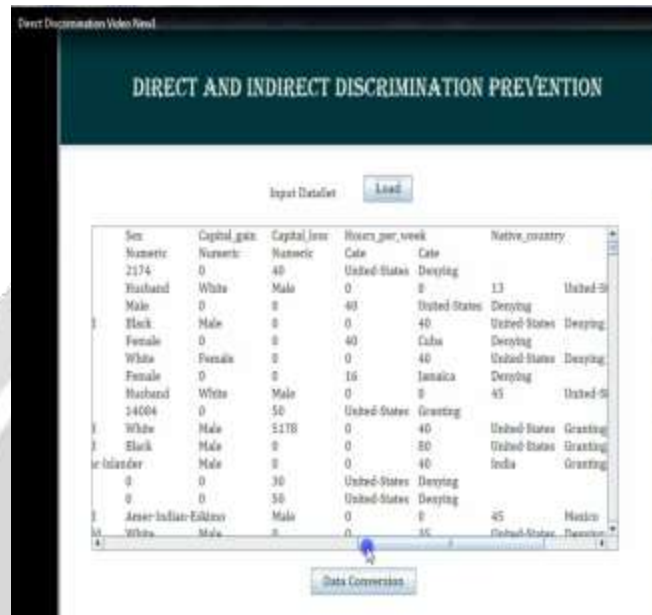
4. EXPERIMENTAL RESULT

Fig-3: Loading the dataset.

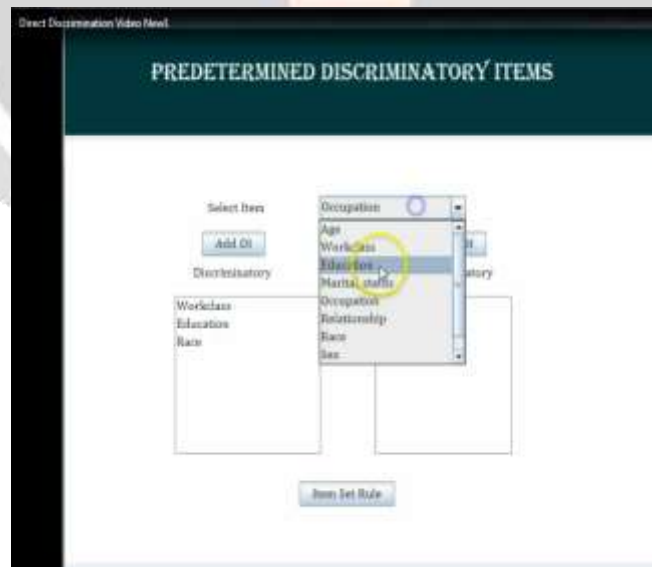Input the dataset for the divide in direct discrimination and indirect discrimination.

Fig-4: Adding Discriminatory Items.

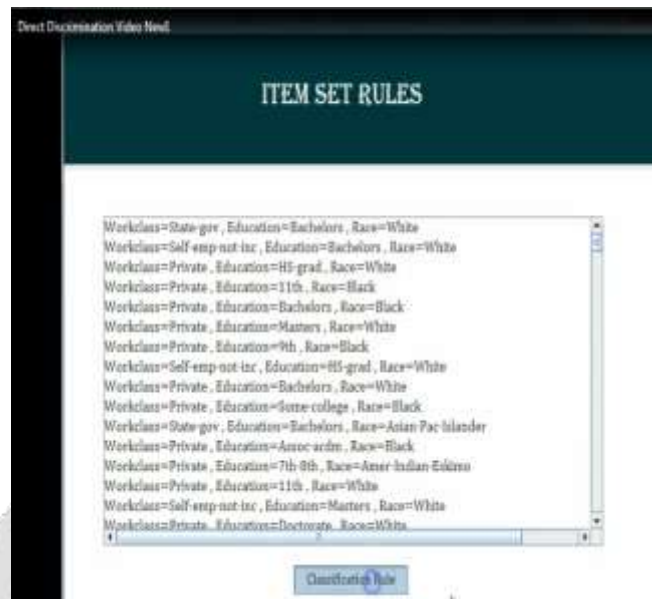Add the discrimination items in two category's direct discrimination and indirect discrimination.

Fig-5: Classification of rules

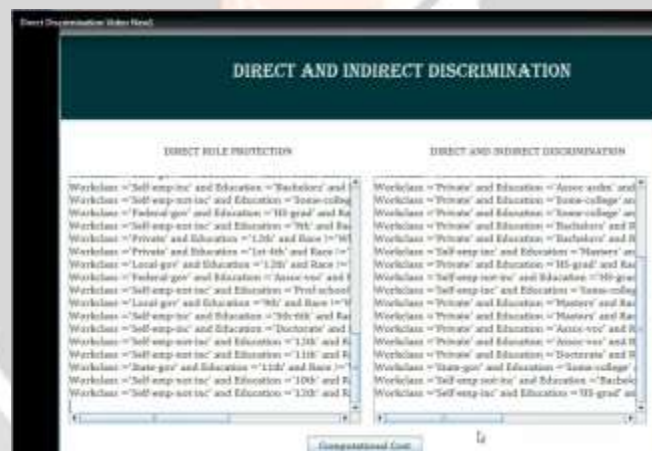On the base of discrimination attributes classified rules.

Fig-6: Computational Cost

Computing the cost between the direct rule protection and direct and indirect discrimination.

5. CONCLUSION The experimental results reported demonstrate that the proposed techniques are quite successful in both goals of removing discrimination and preserving data quality. The perception of discrimination, just like the perception of privacy, strongly depends on the legal and cultural conventions of a society. Although we argued that discrimination measures based on elift and elb are reasonable, as future work we intend to explore measures of discrimination different from the ones considered in this paper. If substantially different discrimination definitions and/or measures were to be found, new data transformation methods would need to be designed. Last but not least, we want to explore the relationship between discrimination prevention and privacy preservation in data mining. It would be extremely interesting to find synergies between rule hidings for privacy-preserving Data mining and rule hiding for discrimination removal. Just as we were able to show that indirect discrimination removal can help direct discrimination removal, it remains to be seen whether privacy protection can help antidiscrimination or vice versa. The connection with current privacy models, like differential privacy, is also an intriguing research avenue.

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