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Direct and Indirect Discrimination Prevention in Data Mining

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Abstract

Discrimination is a presuppose privileges where provide to the each separate group for the safety of the data which is stored. Discrimination is two types, direct and indirect discrimination. Direct discrimination is based on sensitive information .Indirect discrimination is based on non-sensitive information. In existing system standard algorithm is used. Sometimes the data should be lost. In that data model, sensitive information should be free. It does not successfully handle the indirect discrimination problems which are associated to direct discrimination. The system using the new techniques is to protect the sensitive information .Discrimination deterrence methods. In term of data quality and discrimination detach for both direct and indirect discrimination.

Keywords: direct and indirect discrimination, privileges, data mining, optimization

Introduction

In sociology, discrimination is the prejudicial treatment of an individual based on their membership in a certain collection. It involves denying to members of one group opportunities that are available to other groups. There is a catalog of antidiscrimination acts, which are laws designed to avoid discrimination on the basis of a number of elements (e.g., race, religion, gender, nationality, disability, marital status, and age) in various settings (e.g., employment and training, access to public services station, credit and insurance, etc.). For example, the European Union implements the primary of equal treatment between men and women in the access to and supply of goods and services in or in matters of employment and occupation in. Although there are some laws abutting discrimination, all of them is reactive, not proactive. Technology can add proactively to legislation by contributing discrimination discovery and prevention techniques. Services in the information society allow for automatic and routine collection of large amounts of data. Those data are often used to train association/classification rules in view of making automatic decisions, like loan granting/denial, insurance premium computation, personnel selection, etc. At first place, automatic decisions may give a sense of fairness: classification rules do not guide themselves by personal favorite. However, at a closer look, one realizes that classification rules are actually learned by the system (e.g., loan granting) from the training data. If the training data are essential biased for or against a particular community (e.g., foreigners), the learned model may show a discriminatory prejudice behavior. In other words, the system may infer that just being foreign is a legitimate reason for loan denial. Find such potential biases and eliminating them from the training data without harming their decision-making utility is therefore highly necessary. One must data avoid mining from becoming itself a source of discrimination, because of data mining tasks generating discriminatory models from biased data sets as part of the automated decision making. In, it is demonstrated that data mining can be both a source of discrimination and a means for discovering discrimination. Discrimination is classified two types direct or indirect (also called systematic). Direct discrimination consists of rules or procedures that integrally mention minority or disadvantaged groups based on sensitive discriminatory attributes related to group membership. Indirect discrimination consists of law or process that, while not explicitly mentioning discriminatory.

Literature Survey

Classification with no discrimination by preferential sampling

We can remove the sensitive data instead of relabeling it. The new solution to the CND problem by introducing a sampling scheme for making the discrimination free instead of relabeling the data set. The algorithm is used in this paper is classification algorithm. The goal of classification is to accurately predict the target class for each care in the data. Predicts categorical labels and classify the data based on the training set and the values in a classifying attribute and uses it in classifying new data. The techniques used in this paper is Pre-processing, Preferential sampling, Over sampling, Uniform sampling. In preprocessing if there is much irrelevant and redundant information present or noisy and un reliable data, then knowledge discovery during the training phase is more complicated. Data preparation and filtering steps can considerable amount of processing period. Data pre-processing includes cleaning, normalization, transformation, characteristic extraction selection. In Preferential sampling arises when the process that determines the data location and the process being modeled are stochastically dependent. In the over sampling is the process of sampling a signal with a sampling frequency significantly higher than the twice the band width or highest frequency of the signal being sampled. Over sampling helps avoid aliasing, improves resolution and reduces noise. The equation is used $fS=2bb$ Where fs is the sampling frequency and b is the bandwidth or highest frequency of the signal. The nyquist rate is then 2b.the Uniform sampling defined as each Data objects probability is uniform. In this paper disadvantage is Discrimination were removed in ethical and legal region

Three naive bayes approaches for discrimination free classification

In this method naive bayes is modify for discrimination classification. Discrimination laws do not allow the use of these rules of attributes such as gender, religion. Using decision rules that base their decision on these attributes in classifier. The approaches are used in this paper Navies bayes model, Latent variable model, and Modified naives bayes. The naives bayes model is a bayes classifier is a simple possibility classifier based on applying bayes theorem with strong statistical independence assumption. Depending on precise nature of the probability model, naives bayes classifiers can be trained very efficiently in supervised learning. A latent variable model is a numerical model that relates a set of variables to set of latent variables. The responses on the indicators or manifest variables are the results of an individual's position on the latent variables. The modified navie bayes is Modify the probability distribution p(s/c) of the sensitive attribute values s given the class values.

Fast algorithm for mining association rules

Fast algorithm is an efficient algorithm used to avoid the discrimination in data mining. In this paper algorithm apriori, aprioritid, AIS algorithm, apriori hybrid algorithm .The apriori algorithm is The large item sets of the previous pass were extended to get the new candidate item .pruning was done using the fact that any subsection of repeated item set should be frequent. In the aprioritid is related to the apriori algorithm and uses apriori function to determine the candidate sets. The difference for determining the support the database is not used after the first pass. In the AIS algorithm .In the AIS algorithm involves two concepts are extension of an item set, determining what should be in the candidate item set .The apriori hybrid algorithm is Uses apriori in the early passes and later shifts to aprioritid .In this paper disadvantages is An extra cost is sustained when shifting from apriori to aprioritid.

Proposed Methodology

Discrimination prevention in data mining for intrusion and crime detection

In this paper techniques is used the anti-discrimination techniques. Antidiscrimination law refers to the law on the right of people to be treated equally. In the political participation people must be dealt with on equal basis in any case of sex, age, race, nationality. The approaches are used preprocessing, post processing. The preprocessing is data preprocessing is the important process in the data mining. In there is much irrelevant and redundant information present or noisy and unreliable data, and then knowledge discovery during the training phase is more difficult. The analyzing data that has not been carefully screened for such problems can produce misleading results. The post processing is data mining is the process of sorting through large amounts of data and picking our relevant information .Data mining in relation to enterprise resource planning is the statistical and logical analysis of large sets of transaction data. The algorithm used in this paper is not efficient this is main drawback of this paper.

Visual data mining for higher-level patterns: discrimination- aware data mining and beyond

In this paper, we propose a visualization approach that can on the one hand be applied to any (classification or association) rules, but that is appropriate to bringing out characteristic of mined patterns that are especially important in discrimination-aware and privacy aware data mining. We define new interestingness proceeding for items and rules and show various ways in which these can help in highlighting information in communicating settings. We conclude by arguing how this approach can lead to a new generation of feedback and awareness tools. The need to inspect mining results carefully for such meta-level relationships between features and outcomes becomes even stronger when specific data, rules and other patterns become the object of scrutiny: The flipside of data mining is that it may make relationships visible that various stakeholders do not wish to become explicit, and that the patterns it finds may suggest actions that various stakeholders do not wish to be taken. Such concerns may lead to a new approach to keep and/or treat these data as private.

Our Proposed data transformation methods rule protection and rule generalization are based on measures for both direct and indirect discrimination and can deal with several discriminatory items. We present a unified approach to direct and indirect discrimination anticipation, with finalized algorithms and all possible data transformation methods based on rule protection and or rule generalization that could be applied for direct or indirect discrimination prevention. 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. Direct and indirect discrimination discovery includes identifying discriminatory rules and redlining rules.

Using the above transformation methods effectively to identify the categories and remove direct and indirect discrimination method. Finally, discrimination free data models can be produced from the transformed data set without seriously damaging data quality. Discrimination prevention methods in terms of data quality and discrimination removal for both direct and indirect discrimination. The proposed techniques are quite successful in both goals of removing discrimination and preserving data quality.

Results and discussion

Along with privacy, discrimination is a very important issue when considering the legal and ethical aspects of data mining .It is more than noticeable that most people do not want to be discriminated because of their gender, religion nationality, age, and so on exceptionally, when those attributes are used for making decisions about them like giving them a job, loan, insurance, etc. The purpose of this paper was to develop a new preprocessing discrimination prevention methodology including different data transformation methods that can prevent direct discrimination indirect discrimination or both of them at them at the same time. To attain this objective, the first step is measure discrimination and identify categories and groups of individuals that have been direct and indirect discriminated in decision making process. The second step is to transform data in proper way to remove all those discrimination biases at last, discrimination free data models can be produced from the transformed data set without seriously damaging data quality.

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