Automated Model for Reduction of Traffic Accidents

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Abstract:
Road Accident is a major instance of traumatic events that causes major loss. Likelihood of accidents and accident-prone locations are predicted by Data Mining methods and tools. The study of reasons behind the traffic accidents is an important factor for ensuring traffic safety. Association rule mining is used in this paper to generate different item sets, using that item sets we can find what are the factors causing traffic accidents, which can be used to reduce the traffic accidents and also security improvement measures can be taken to reduce accidents which ensures increased traffic safety level of a particular city. Accident and incident data gathered from the traffic data and data related to construction sectors is modeled in present city. The main objective of this project is to reduce the traffic accidents.

1. INTRODUCTION

Transportation system development Not only brings the convenience but also causes traffic safety problems. People, cars, roads or the environment are the influencing factors of traffic accidents according to recent surveys. In-order to identify dangerous driving behaviors researchers studied on drivers behavior. The road condition also impacts on the accidents. Different data mining approaches are used in traffic safety research. Association rule mining is considered to be efficient among all the Data mining approaches because it analyzes the relation between the influencing factors of traffic accidents. In-order to find the network hidden in the accident data strong association rules is used. To find them, we could measure the importance and credibility of the rules with the two thresholds Support and Confidence, and sort the validity of the rules by Lift. An automated modelling algorithm is finally built using association rules which would better promote the practical application of association rule mining in existing intelligent transportation system.

2. RELATED WORK

Current system is manual, we also get many tools and software to maintain traffic accidents, these tools just collects the data stores in server but no analysis is done.

[1]"A Data Mining Approach to Identify Key Factors of Traffic Injury Severity"
This paper outputs the most important factors which affect traffic injury severity of drivers. Output indicated that seat belt is the most important factor associated with injury severity of traffic accidents. While Decision Trees are generally robust to outliers, due to their tendency to over fit, CART models are prone to sampling errors.

[2]"Mining road traffic accident data to improve safety in Dubai"
Multilayer Perceptron and Bayesian network generated a set of rules that can be used by Dubai for Traffic Safety. Classification of accidents is done within reasonable accuracy. Multilayer Perceptron algorithm is considered to be the best classifier for all classes. Multilayer Perceptron have the ability to learn and model non-linear and complex relationships, which is really important because in real-life, many of the relationships between inputs and outputs are non-linear as well as complex.

[3]"Usingdata mining techniques to road safety improvement in Spanish roads": This paper collected information about hazardous points on the Complementary Road Network of Andalusia, Spain. With this information a database is created. The relationship between ESMs, number of crashes and hazardous sections is the output of the paper. This paper is based on neural networks, decision trees or association rules. With the data set provided by the Government of Andalusia the relationships between roads conditions and crashes is obtained.

[4]"Analysis of traffic injury severity: An application of non-parametric classification tree techniques"
In this paper CART model identifies relationships between severity of injury and driver characteristics. By using Back propagation Neural Network and Logistic Regression, results showed that the most major factor associated with traffic crashes is the type of vehicle. Output showed that motorcycle and bicycle riders have more probability of getting injured than other vehicle types in road accidents.

[5]"Descriptive and predictive mining on road accidents data"
The possibility of how to use the collected data to mine frequent patterns is proposed in this paper. This paper made use of the data sample given by United kingdom from the years 2005 to 2015.This sample contains three datasets accidents, casualties and vehicles. Descriptive mining resulted into interesting association rules have been generated by Apriori algorithm.

[6]" Prediction of the cause of accident and accident prone location on roads using data mining techniques"
To predict the likelihood of accident and accident prone locations

data mining methods are used. This paper finds the probability of accidents on roads with State Highways and Ordinary District Roads by finding the traffic severity of accidents based on accident type and other factors.

3. METHODOLOGY

In this paper we use Apriori algorithm to do association rule mining. In this algorithm there are three steps to evaluate the rules, they are support, confidence and list.

A.Setting train parameters:
As Apriori algorithm is efficient for both large and small datasets we use this for association rule mining. There are three steps for extraction of data from SQL server. First it sets some support value that means datasets contains some possibility of accidents with lesser number that will be ignored if the value is less than the support value.

B.Strong rule acquisition method:
After applying the mining rules it produces the large number of rules, in this many are invalid rules or weak rules, to overcome that we use confidence value. Confidence value is threshold value. The generated rules value must be more than the confidence value.

C.Strong rules selection method:
Majority of the rules with higher Confidence have lower Support, Majority of the rules with higher Lift have lower Support. It means that its impossible to get the rules with higher Support, higher Confidence and higher Lift at the same time. Hence there is a need to choose one of these three indicators to sort the rules.

4. SYSTEM ARCHITECTURE
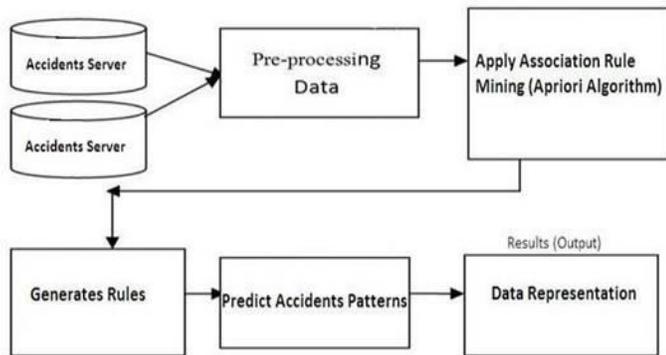
Architecture Diagram

The architecture Diagram shows the work flow of the system. The module server contains the three actor's administrator, city traffic in-charge and public. The administrator have authority to allocate the city in-chargers. The city traffic in-charger have all access to add accident data to the server. The public have only access to the data, they are not allowed to add any data to server. The pre-processing module is used to extract the required data from the server. Because the server contains all other various data too. In next module we apply association rule mining (Apriori algorithm). It generates the different rules for the accident data that we have given as input, then it predicts the different accident patterns that can be happened in particular road or city.

ADVANTAGES OF THE SYSTEM

1. System can be used by the public to know the accidents patterns and the type of the accident in a particular area or city.

2.Possible hidden relations and connections between various factors are identified by the proposed system.

3.Proposed system is a real time and government sector application which finds the common accidents that may cause for new roads.

5. CONCLUSION

In this survey, there are various methods depicted to control traffic accidents. The above mentioned related works have one or other disadvantages. In-order to overcome these disadvantages we have used Apriori algorithm in our project for future enhancement. The advantage of using Apriori algorithm is that multiple scans are generated for candidate sets. Apriori is devised to operate on a database containing a lot of transactions. In-order to derive more number of rules, Predictive Apriori algorithm is used.

6. REFERENCES

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