KANSAS DEPARTMENT OF TRANSPORTATION

RESEARCH SUMMARY

DATA MINING THE KANSAS TRAFFIC-CRASH DATABASE*

*Available Electronic Only

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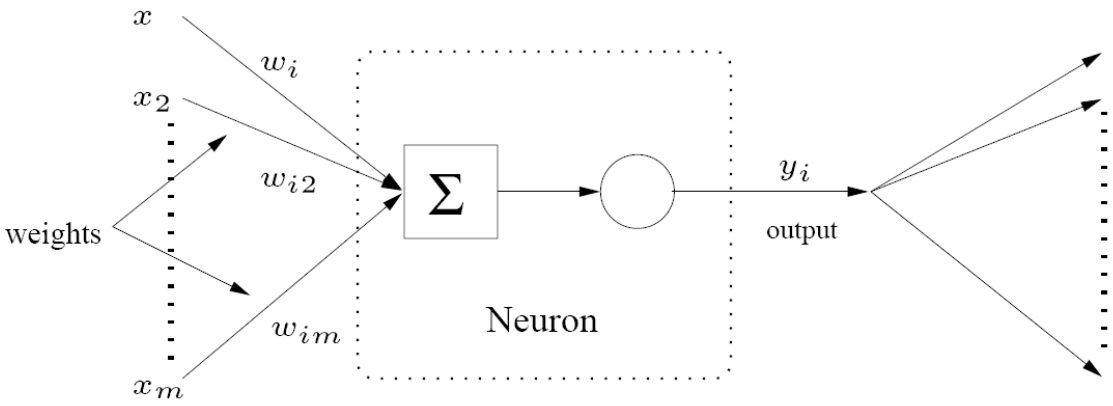
Introduction

Traffic crashes results from the interaction of different parameters which includes highway geometrics, traffic characteristics and human factors. Geometric variables include number of lanes, lane width, median width, shoulder width, roadway section length, and shoulder width while traffic characteristics include AADT, Percentage of Heavy Vehicles and Speed. The effect of these parameters can be correlated by crash prediction models that predict crash rates at particular roadway section.



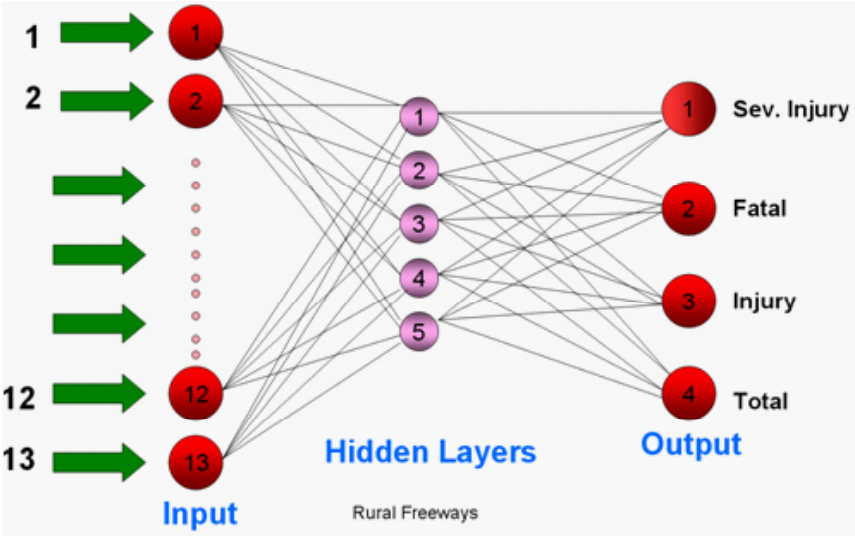
Transportation Agencies and State Departments of Transportation are continuously faced with decisions concerning the safety of highways. The evaluation and comparison of alternative long-range highway plans should include the safety implications of respective plans. The commonly available models for safety analysis are crash prediction models. By performing an in-depth analysis of crash databases and developing crash rate prediction models, better decisions can be taken in regard to future traffic planning operations.

Project Objective

The main objective of this study is to utilize artificial neural network techniques and develop crash rate prediction models for Kansas road networks. Six networks have been studied and crash prediction models for each network have been developed. Four crash rate categories have been considered in this study. They are:

- Total Crash Rate (TCR) [Injury + Fatal + Property Damage Only]
- Injury Crash Rate (ICR) [Disabling Injury + Possible Injury + Non-Incapacitating Injury]
- Severe Injury Crash Rate (SICR) [Disabling + Fatal]
- Fatal Crash Rate (FCR) [Fatal]

Project Description



The models developed for each of the road networks are unique and show that geometric variables and traffic have a significant impact on the crash behavior. The models developed in this study would be utilized by Kansas Department of Transportation in evaluating roadway design features, reconstruction impacts and to make decisions in regard to future traffic planning operations. Sensitivity analysis was performed on all the geometric variables in the models. It has been found that all the continuous variables have different effects on different networks. It is very difficult to generalize the behavior of a particular variable. The same results were observed for categorical variables, too.

Project Results

Vehicle Type, Driver age and seat belt use by drivers have also been studied and it has been found that Driver Age Group (18-20) has the highest involvement in crashes on all road networks. Passenger cars have the highest crash involvement among vehicle types and among all vehicle types; bus drivers have the highest seat belt compliance for all networks.

This research serves as a starting point to demonstrate the use of artificial neural networks to develop crash rate prediction models that could present useful insight to the potential corresponding safety and traffic operation performance.

Report Information

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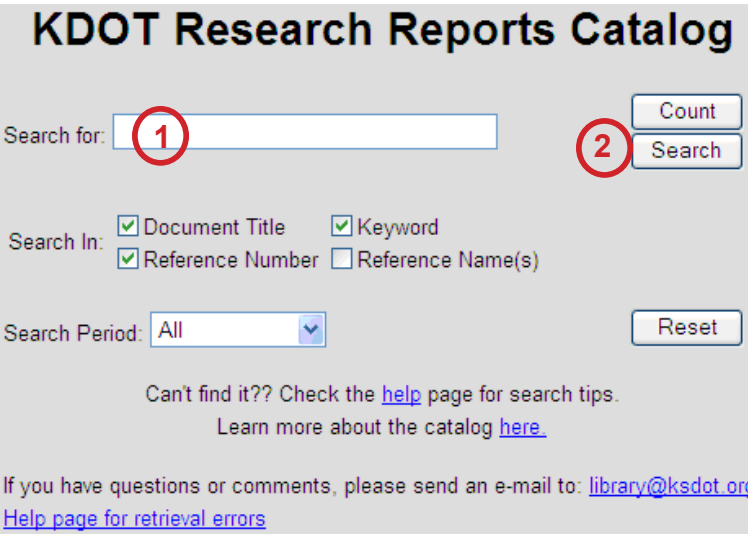

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