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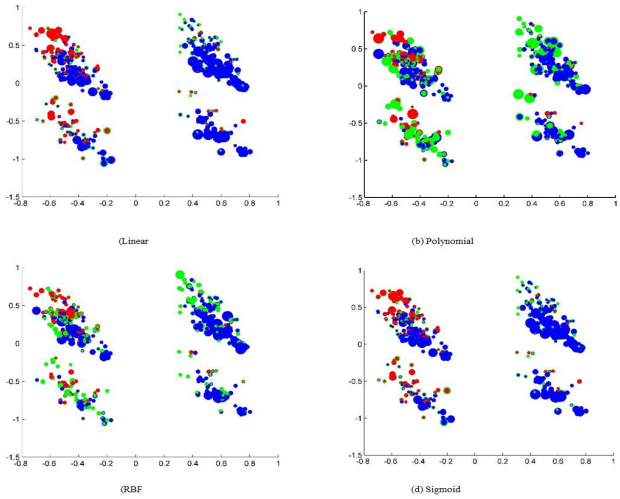


Research Paper

Application of Support Vector Machine for Crash Injury Severity Prediction: A Model Comparison Approach.

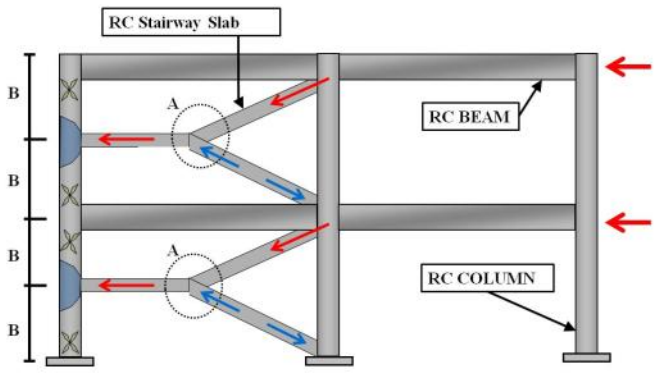
Aghayan I., Hadji Hosseinlou M., Metin Kunt M.

J. Civil Eng. Urban., 5(5): 193-199, 2015; pii:S2252043015000031-5

Abstract

The study presented in this paper investigated the application of using support vector machine with different kernel functions for crash injury severity prediction. A support vector machine model was developed for predicting the injury severity related to individual crashes based on crash data. The models were developed using the input parameters of driver's age and gender, the use of a seat belt, the type and safety of a vehicle, weather conditions, road surface, speed ratio, crash time, crash type, collision type and traffic flow. Also, three injury levels were considered as output parameters for this study (i.e. no injury, evident injury and fatality). The overall prediction accuracy of the support vector machine model was compared to the multi-layer perceptron, genetic algorithm, combined genetic algorithm and pattern search. The results demonstrated that the constructed multi-layer perceptron's performance was slightly better than the support vector machine for injury severity prediction. Whereas, support vector machine involves much lower computational cost than multi-layer perceptron because of using a straight forward algorithm in learning phase. The percent of prediction accuracy for the multi-layer perceptron model was 86.2%, which was higher than the support vector machine model with polynomial kernel (81.4%) followed by the combination of the genetic algorithm and pattern search (78.6%) and genetic algorithm (78.1%). The classification results of the two-level (no-injury and evidence injury/fatality) support vector machine found to be 85.3% was higher than multi-class classification (81.4%).
Keywords: Crash Injury Severity Prediction, Genetic Algorithm, Multi-Layer Perceptron, Pattern Search, Support Vector Machine

[Full text- PDF] [DOAJ]



Research Paper

Seismic Structural Failure Potentialities of Newly Constructed Buildings in Iran.

Mohajerani P.

J. Civil Eng. Urban., 5(5): 200-209, 2015; pii:S225204301500032-5

Abstract

As Iran is located at high seismic risk region and future ground motions are predicated by seismologist, thus, A Case study was conducted to investigate the major seismic structural failure potentialities due to design and constructional flaws in two province of Iran, Tehran and Esfahan, the former with high seismic risk and the latter with an intermediate risk. More than forty buildings were inspected to find the four major failure potentialities in these two provinces. Two imperfections were found in steel structures and two in reinforced concrete buildings. Design and constructional imperfections in protected zone in steel structures and latticed column details are two main points threaten newly constructed steel structures. In reinforced concrete structures, stairway constructional flaws and wrong pipe passing constructional details are the two main defects covered in this study for this type of structures. This paper also presents solutions for each failure potentiality and recommends some constructional and design hints to increase the safety of structure and make them ready for future seismic excitations.

Key words: Structural failure potentiality, Constructional imperfection, Earthquake, Risk mitigation, Steel structure, Reinforced concrete structures, Iran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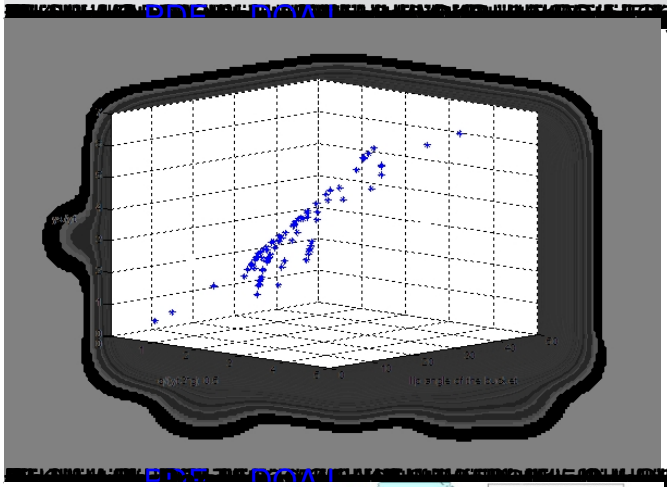


Iranian Provinces, 2006
Ahwaz
Persian Gulf
Caspian Sea
Gulf of Oman
EAST AZERBAIJAN
WEST AZERBAIJAN
ARDABIL
GILAN
GOLESTAN
NORTH KHURASAN
ZANJAN
MAZANDARAN
KURDISTAN
QAZVIN
TEHRAN
KHURASAN RAZAVI
SEMNAN
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