Crash Analysis Using Artificial Neural Network and Decision Tree

A Kasasbeh and R Shabbar

Department of Systems Science and Industrial Engineering State University of New York at Binghamton Binghamton, NY 13902, USA

Corresponding author's Email: akasasb1@binghamton.edu

Abstract: Roadway crashes have a very devastating impact on the society in general and on human resources in specific. According to the National Highway Traffic Safety Administration (NHTSA), 35,092 people lost their lives in roadway crashes in U.S. in the year of 2015, which is higher from 32,744 in the year of 2014. The previous represents a 7.2% increase, which is the highest increase percentage in the last 50 years.
For the first time in the State of Wyoming, this paper investigated the applicability of using Artificial Neural Networks Multilayer Perceptron and Decision Tree approaches to identify crash hotspot or roadway segments of high tendency toward having a crash in the future. The paper used ten years of crash data (2004-2013) on Two-Way Two-Lane rural highways (TWTL) having a posted speed higher than 60 miles per hour (mph). The analysis was carried out using WEKA software (Waikato Environment for Knowledge Analysis). The obtained results showed that the ANN and DT could be used as a useful crash prediction tool with a reasonable accuracy.

Keywords: Traffic Safety, Roadway Crashes, Artificial Neural Network, Decision Tree, Two-Way Two-Lane rural highways (TWTL)