

Macrocategoria: Geometria e Sicurezza

Titolo articolo: Defining machine learning algorithms as accident prediction models for Italian two-lane rural, suburban, and urban roads

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Abstract: Four Accident Prediction Models have been defined for Italian two-lane rural, suburban, and urban roads by exploiting different Machine Learning Algorithms. Specifically, a Classification and Regression Tree, a Boosted Regression Tree, a Random Forest, and a Support Vector Machine have been implemented to predict the number of Fatal and Injury crashes on a 905-km network, which experienced 5,802 FI crashes in 2008-2016. The dataset incorporates geometrical, functional, and environmental information. Several performance metrics have been computed, such as Determination Coefficient, Mean Absolute Error, Root Mean Square Error, and scatterplots. Outcomes suggest that Support Vector Machine outperforms the other Machine Learning Algorithms for predicting Fatal and Injury crashes. In Addition, the computation of Predictor Importance shows that traffic flow, the density of intersections, driveway density, and type of area are the most impacting factors on crash likelihood. Road authorities may use these findings for conducting reliable safety analyses.

Keywords: Accident prediction models, crash prediction models, machine learning algorithms, Fatal and injury crashes, two-lane roads, road safety

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