

Title: Towards a Smart Intelligent Fuzzy System in Assessing Traffic Crash Risks Among Female Teen Drivers: A Genetic Algorithm Approach Using Driving Simulator Research

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Abstract: It is noted that technological advancements such as Artificial Intelligence (AI), Machine Learning, Big Data, Internet of Things (IoT), Geographic Information Systems (GIS), Global Positioning System (GPS), Simulators, and others can provide practical methods for recognizing and providing details on variables impacting road safety, such as user behavior, physical road characteristics, and accident severity. To further traffic safety investigations, this study uses a driving simulator and feature selection based on genetic algorithms (GAs) to examine road accidents among female teenage drivers which continue to be represented in crash fatalities and injuries, particularly in nighttime and rainy weather circumstances. The objective is to find the best feature combinations that affect the probability of an accident by integrating fitness functions that are represented by predictive models. While navigating the feature space, the genetic algorithm chooses combinations that maximize prediction accuracy. The study's results identified pivotal features crucial for road safety among female teen drivers. Selected attributes encompassed an array of variables including steering, RPM, Speed, Ambient temperature, and Weather conditions which represent driving dynamics, vehicle performance, environmental conditions, and meteorological influences. Little studies have been done into the effects of weather conditions on young female drivers at night. GAs perform better, which is why we can use them in this particular situation.

Keywords: Road safety Driving simulator Genetic algorithms (GAs) Feature selection Predictive modeling Female teenage drivers Accident probability analysis

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