

Macrocategoria: Geometria e Sicurezza

Titolo articolo: Mining of the association rules between driver electrodermal activity and speed variation in different road intersections

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Abstract: It is commonly acknowledged that the human factor and the interaction between the human factor and the road environment are among the most common causes of road accidents. Physiological signals can provide a real-time assessment of the driver's state because they can be collected continuously without interfering with the driver's task performance or the drivers' perception of the road. This study presents a method for measuring and quantifying drivers' physiological responses when approaching T-junctions and roundabouts using electrodermal activity and speed variations. Speed and electrodermal activity were collected continuously during a driving study which took place on a test environment based at Cranfield University and surrounding roads. Twenty participants were involved in the study. The analysis focused on four crossing manoeuvres on two T-junctions and a roundabout. The association Rule with the Apriori algorithm was used in order to evaluate associations between the variables related to electrodermal activity, i.e. the number and amplitude of the SCR peaks (assessed by the Electrodermal Impact Index in aggregate form), and the variables related to speed, i.e. the speed variation and its sign (positive or negative), for each type of intersection. The main results of this study can be summarized as follows: 1) the rules obtained for the manoeuvres on the T-Junctions show that the T-junctions induce low variations in the electrodermal activity and are often associated with a significant speed increase (between 20% and 30%); 2) the rules obtained for the manoeuvres on the roundabout highlights that the roundabout induces high variations in the electrodermal activity and is associated with a significant speed reduction (between 20% and 40%).

Keywords: Roundabouts; T-junctions; EDA; SCR; -Apriori algorithm

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