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## Factors associated with severity of road accidents in Gampaha police division in Sri Lanka

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Road accidents are main social problem in Sri Lanka, which causes immense damages and injuries unintentionally and unexpectedly. There are numerous factors, which contribute road accidents such as time of the day, road surface, weather, light condition, location, traffic density, traffic control availability, vehicle type, vehicle age, driver's gender, driver's age, license availability, usage of alcohol and etc. This study aims to identify the factors that mainly contribute to road accident severity in *Gampaha Police Division* through formulating an effective model. Altogether, 1375 data were collected from 2015 to 2017 from Police report of the *Gampaha Police Division* and the above mentioned 13 factors were considered. In this research 25% of the data were used for the validate the model and remain 75% of the data were used for build the model. Severity of accidents were categorized as fatal, grievous, damage only and non-grievous accidents. Chi-square test of independence has detected that road surface, light condition, location, traffic density, traffic control availability, vehicle type, driver's age and usage of alcohol are the significant factors. The Location variable removed due to multicollinearity and remain significant factors used for Multinomial logistic model to model the severity of road accidents. The area under the *ROC* value was 59.2% for model building data and the area under the *ROC* value was 58.4% for model validation data. That means the developed model more accurately predicts the severity of accidents than the prediction in baseline model. Based on the results, it is discovered that traffic control availability increases the effect on the probability of a fatal accidents and fail of alcohol test, road surface and vehicle type decreases the effect on the probability of a fatal accidents. Moreover, traffic control availability and traffic density increase the effect on the probability of grievous category and alcohol test, vehicle type have negative impact on the probability of damage only accidents. Traffic density have positive impact on damage only accidents. The analysis shows different factors contribute a significant impact on the severity of road accidents. The result of this research is useful for police to understand factors affect on severity of road accidents and decrease the number of road accidents in future.

**Keywords:** Multinomial logistic regression, road accidents, ROC, traffic density