

Predicting Serious Injuries due to Road Traffic Accidents in Malaysia by means of Artificial Neural Network

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Abstract. Malaysia has recorded a steady increase in the number of road traffic accidents from year to year at an alarming rate of 5%. Serious injuries due to the accidents, which could lead to permanent disability, might cause a long-term problem to the nation economy-wise. Predicting the number of serious injury cases in the future is important in understanding the trend of road traffic accidents to help policymakers in proposing a countermeasure. Time-series model has been employed to predict the occurrence of road traffic crashes including fatalities. Nonetheless, the prediction of serious injury cases, which should not be taken lightly due to its potential impact, has not been proposed especially with regards to Malaysian road traffic accident data. This study attempts to employ Artificial Neural Networks (ANN), a machine learning algorithm, to predict the number of serious injury cases in Malaysia based on the road traffic accident data of the past 20 years. Machine learning has increasingly been adopted in recent years owing to its ability to predict as well as catering for the non-linear behaviour of the data examined. A single-hidden ANN model was developed based on seven features, namely the number of registered vehicles, population, length of federal road, length of FELDA road, length of federal institutional road, length of federal territory road, and length of the expressway in order to predict the number of serious injuries. It was established from the present investigation that the developed ANN model is capable to predict the number of serious injuries from 1997 until 2017 with a mean absolute percentage error of only 3%. This demonstrates the capability of the developed machine learning in road traffic accident prediction, and it could be useful in outlining an action plan to mitigate the number of serious injuries in Malaysia.

Keywords: Road Traffic Accident, Prediction, Serious Injuries, Machine Learning, Artificial Neural Network.

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