RNN and LSTM based Approach to predict the severity of traffic accidents of Highway System: A case study from southern expressway, Sri Lanka

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Due to the growing population and respective use of vehicles on the road, traffic congestions have become a major problem in the cities and the transport systems today. The factors that lead to road traffic accidents are generally grouped into different categories as human factors (road users), vehicle defects, road factors, environmental factors, etc. The current research is focused on developing the ANN method for Traffic Accident Severity Prediction for highway transportation systems. Machine learning and Data mining based approach is proposed to predict better solutions for these scenarios. Simple ANN, RNN +LSTM, and clustering methods are applied in this study. The highway accident data that was considered from 2016 to 2019 for this research was gathered from the Expressway police division Hewagama, Kaduwela Sri Lanka. The Highway accident data set consists of nearly 2200 records that happened in all the 3 highways (E01, E02 and E03) lines in Sri Lanka. According to the last two years (2018/2019) statistics, 488 Accidents (62.48%) happened out of 781 have occurred in the daytime. Clear weather has more impact on road accidents than rainy weather. 74.5% of accidents happened in clear weather. While in rainy conditions only 16.9% of accidents happened on the Highway. Most of the serious accidents happened in with 21.63% fatal accidents. The results showed that 82.4% (location label based model) of the highest accuracy, followed by 73.56% with 2nd model (Range label-based) ANN, then 76.79% with Simple ANN.

Key words: *Traffic Accidents Severity Prediction, Data Mining Methods, Knowledge-based Systems*

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