Comprehensive Analysis of Indian Road accident data to Enrich Road Safety

ABSTRACT

Objective:

As per MoRTH 2016 report, the number (150,785) of road accident fatalities are increasing every year in India. Also, Accident Severity increase by 7.9% compared to CY2015. Hence, there is a necessity to find out the accident characteristics on Indian roads and implement cost effective safety measures to reduce the fatalities. The objective of this study is to reduce the road safety issues in India using MoRTH and ADAC, NATRIP accident databases based on a triple-layer approach (i) “Society” related to infrastructure (ii) “Individual” related to Human factors and (iii) “Vehicle” related to contributing factors from the Vehicle.

Methodology:

At first, macro analysis was performed on MORTH 2016 data and then followed by micro analysis was carried out with ADAC, NATRIP data (National Highway-08). In order to identify the characteristics for those NH-08 accidents, a data mining technique, Self-Organizing Maps (SOM) was applied. Please note that a commercial software Viscovery was used to perform the SOM analysis. Macro-analysis is a statistical investigation to understand general characteristics of the accident causation using MoRTH 2016 data.

Results:

Macro-analysis results show that 50% Road fatalities involve in Vulnerable Road users includes Two/Three Wheeler users & Pedestrians. Tamil Nadu (TN) state has the highest number of road accidents and it has the second highest number of fatal accidents, after Uttar Pradesh (UP). Chennai city has the recorded the highest number of road accidents, followed by Delhi. Two wheelers contribute to max. number of accidents (33.8%), followed by passenger cars & taxis (23.6%). Max. number of accidents are caused by drivers exceeding lawful speeds. Micro-accident analysis results indicate that Rear crashes (54%) and angled/side crashes at junctions (14%) are the major ones in the NH-08 Highway. Improper driving manner (30%), improper lane-change (16%), failing to use restraint system (29%) are the important elements related to human factors causing the accidents and injuries. Accidents at junctions (26%) are happened due to non-availability of signal (56%) are related to infrastructures.

Disclaimer (Limitations):

(a) The data of ADAC, NATRIP used for this analysis, is only a set of some accidents on Gurgaon-Jaipur stretch of NH-08 where attempt was made to collect In-depth data out of all accidents happened in that stretch during that period. (b) This data does not represent the entire numbers of accidents for that period and does not represent any national or regional statistics.

What does the paper offer that is new in the field in comparison to other works of the author?

Clustering method using “Self-Organization Map” was used to identify the critical features in Micro level accident analysis. Safety Issues in India are reviewed based on “Triple-Layered Safety Approach”.

Conclusion:

In Depth accident data collection is necessary to understand the inherent root cause and plan appropriate C/Ms. Needs more attention in rural regions than urban regions due to higher frequency of accidents. Traffic safety education can create awareness to road users, Speed limit adherence, Helmet & Seatbelt usage can reduce fatalities. 2wheelers involved in major fatalities, compared to other road users. Safety technologies like ABS & SBR system can reduce fatalities.