

## **Determining Hotspots of Road Accidents Using Spatial Analysis Across North-South Expressway**

S.Sarifah Radiah Shariff\*, Hamdan Abdul Maad, Nursyaza Narsuha Abdul Halim and Zuraidah Derasit

Centre for Statistics and Decision Science Studies, Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia  
radiah@tmsk.uitm.edu.my

### **Abstract**

Road accidents continuously become a major problem in Malaysia and consequently cause loss of life or property. Due to that, many road accident data have been collected by highway concessionaries or build–operate–transfer operating companies in the country meant for coming up with proper counter measures. Several analyses can be done on the accumulated data in order to improve road safety. In this study the reported road accidents cases in North South Expressway (NSE) from Sungai Petani to Bukit Lanjan during 2011 to 2014 period is analyzed. The aim is to identify spatial pattern and hot spots across this longest controlled-access expressway in Malaysia as hotspot represents the location of the road which is considered high risk and the probability of traffic accidents in relation to the level of risk in the surrounding areas. As no methodology for identifying hotspot has been agreed globally yet; hence this study helps determining the suitable principles and techniques for determination of the hotspot on Malaysian highways. Two spatial analysis techniques are applied, Nearest Neighborhood Hierarchical (NNH) Clustering and Spatial Temporal Clustering, using CrimeStat® and visualizing in ArcGIS™ software to calculate the concentration of the incidents and the results are compared based on their accuracies. Results identified several hotspots and showed that they vary in number and locations, depending on their parameter values. Further analysis on selected hot spot location shows that Spatial Temporal Clustering (STAC) has a higher accuracy index compared to Nearest Neighbor Hierarchical Clustering (NNH). Several recommendations on counter measures have also been proposed based on the details results.

**Keywords:** Concentration of incidents, road safety, predictive accuracy index