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## **Spatial Analysis of Crash Frequency: A Statewide Study**

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### **Abstract**

In this paper, a non-parametric approach was used to model spatial distribution of crashes on the road network. Two statistical methods of spatial autocorrelation index and kernel method were used and compared. While kernel method was applied to find black zones in terms of concentration of crashes, the spatial autocorrelation was used to explore clusters and outliers in terms of crash frequency. Both methods are explained in terms of theoretical background as well as operational results and applications. To illustrate operational value of both methods, an application to the road network of Washington State is presented. The result of spatial autocorrelation showed different crash frequency patterns for different geographical classifications (i.e. urbanized versus un-urbanized). In addition, the black zones on the road network were found by kernel method.

**Keywords: crash frequency, kernel density function, spatial autocorrelation**