

Graph analysis for space-time scan statistics

Marcelo A. Costa*

Universidade Federal de Minas Gerais, Minas Gerais, Brazil

macosta@ufmg.br

The space-time scan statistic is a widely-used method for cluster detection in which both geographic locations and the temporal length of the cluster are unknown. It relies on a cylinder scanning window in which the base represents geographic locations, whereas the height represents the time component, simultaneously. Due to the strict shape of the scanning window, different geometries and graphical representations have been proposed to generate irregular cluster shapes. However, creating irregular cluster shapes from graph structures is not trivial. In addition to increased computational cost, detected clusters are normally very large and oddly shaped. Alternatives, such as growing clusters based on most connected vertices have improved detection and delimited the cluster shape. Nevertheless, graph statistics such as in-degree, betweenness centrality, etc., can be explored as potential measures for growing clusters. Furthermore, if the graph structure represents flow of populations in space and time, then dynamic graph statistics can be applied to grow cluster candidates.

Key Words: scan statistics, graph analysis, space-time scan statistics