IDENTIFICATION OF CONCEPTUAL NEIGHBORHOODS

AND TOPOLOGICAL RELATIONS IN $\mathbb{Z}^2$

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Topological relations are an essential element of spatial queries and reasoning about spatial information. The predominant model for topological relations in geographic information systems—the 9-intersection—identifies sixteen different relations between groups of pixels (called raster regions) given a set of conditions restricting the composition of the regions interior and boundary. Several of these relations are dependent on the raster region sizes to be realized. An example, '*Completely Inside*' would require raster regions to be sufficiently different in size for one raster to entirely encompass the other. By developing an iterative computational model, this work generates conceptual neighborhood graphs that outlined the relationships generated between binary topological regions constrained by size, and topology. Regions are considered which range in pixel dimension from 1:1 to 10:10. Three hypotheses are presented: first, structural similarities exist between conceptual neighborhoods whereby rasterized conceptual neighborhoods share a similar structural framework as their continuous counterparts. Second, categorizing the relations in the resulting neighborhood graphs according to the classifications proposed by Dube et al. [1], the continuous neighborhoods identified by Egenhofer and Al-Taha [11] will be identified. Third, variations in the size of rasterized regions will impact the availability of topological relations and precipitate changes in potential connections generating intermittent and weak connections or persistent and strong connections.