A Framework for Quantitative Spatial Reasoning Based on the Connection Patterns of Regions

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Abstract: We propose a new framework called PLCA for qualitative spatial reasoning. PLCA provides a symbolic representation for the figure in two-dimensional space, that focuses on the connections between regions. It is based on the simple objects: *points*, *lines*, *Circuits*, and *areas*. The entire figure is represented as a combination of these objects. Pair of areas, circuits or lines never cross. PLCA provides not only mereological reasoning between regions, but also topological reasoning. Moreover, spatial semantic reasoning is possible by adding attributes, such as the properties that hold in the regions. We compare PLCA with existing qualitative spatial reasoning methods, such as RCC and the 9-intersection model, and show that PLCA is upper compatible with them.