UNIVERSITY of GUELPH

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SCHOOL OF COMPUTER SCIENCE

MSc Defence

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Relative Position Φ–Descriptor Computation for Complex Polygonal Objects

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ABSTRACT:

As a part of regular conversation, one often will refer to the spatial relationships between objects by way of their positioning relative to each other. Relative Position Descriptors (RPDs) are a type of image descriptor tuned to extract this spatial relationship information from pairs of objects within an image. Of the existing RPDs, the Φ-descriptor encapsulates the widest variety of spatial relationships. Currently, algorithms exist for its computation in the case of both 2D raster and 2D vector objects. However, the algorithm for its calculation in the 2D vector case can only handle pairs of simple polygons and lacks some key features, including support for objects made of disjoint parts, objects with holes, objects sharing vertices or with parallel overlapping edges, and various spatial relationships.

This thesis presents an approach for complex polygonal object Φ-descriptor computation built upon the previous vector approach. The new algorithm breaks the problem down into the analysis of object boundaries, polygon edges that represent changes in the membership of objects and spatial relationships, and brings it more in line with the design of the 2D raster approach.