Master's Thesis Project in Mathematical Morphology

Mathematical morphology operations are usually defined on a regular grid (for example square and cubic grids). The discrete representation and operation produce a result different from what would be obtained by the corresponding continuous-domain operation for the following reasons (i) The extrema (max/min) are typically not well represented on the sampling grid, (ii) the morphological operators output points where the derivative is not continuous and (iii) the structuring element depends on the sampling grid.

In this project, mathematical morphology on irregularly sampled signals is developed to overcome the limitations listed above. Examples of topics for this master's thesis project include developing the methodology for non-flat structuring elements and utilizing extracted information such as gradient direction and curvedness for processing the images. The developed methodology is applicable where better precision or more efficient algorithms are required.

The project will be carried out at Centre for Image Analysis at the Department of Information Technology.

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