# Parameters estimation of active contour models for the problem of automatic cellular filaments tracking

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**Abstract**

Active contour models or snakes [1] are widely used and have large application area in computer vision, image analysis and especially in the analysis of biomedical and microscopic images. In this work we apply gradient vector flow-based [2] active contour models for segmentation and tracking of cellular intermediate filaments. As a part of the cell's cytoskeleton, these filaments have notable diversity between different cell-types and play a crucial role in the mechanical behaviour and properties of living cells [3].

The best fitting position of the active contour (snake) to an observed filament on the selected image can be obtained by minimizing a parametrized "energy" functional of the snake, which incorporates elastic properties of the contour as well as the image data term. The latter can be replaced, according to [2], by a vector field called "gradient vector flow", which provides better convergence [2] of the method in case of concavities compared to [1].

In this work we focus on the problem of automatic estimation of the model's free parameters [4] based on an image data driven approach. The resulting method is incorporated into our image analysis framework comprising automatic filaments detection and tracking.

## References

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