

CellCognition – Analysis of live cell imaging data

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CellCognition is a tool dedicated to the automatic analysis of live cell imaging data in the context of High-Content Screening (HCS). It contains algorithms for segmentation of cells and cellular compartments based on various fluorescent markers, features to describe cellular morphology by both texture and shape, tools for visualizing and annotating the phenotypes, classification, tracking and error correction. Events such as mitosis can be automatically identified and aligned to study the temporal kinetics of various cellular processes during cell cycle (Held et al. 2010). We also present how state-of-the-art outlier detection methods can be used to autonomously discover novel phenotypes in a large amount of high-throughput imaging data.

CellCognition can be used by novices in the field of image analysis and is applicable to hundreds of thousands of images by parallelization on compute clusters with minimal effort. The tool has been successfully applied to quantitative phenotypic profiling of cell division, yet machine learning enables CellCognition to be used for the analysis of other dynamic processes. CellCognition is based on VIGRA and python and is a common software project between the IMBA Vienna, Institut Curie, and EMBL Heidelberg.