Morphological Quantification of Bioimages for Advanced Phenotyping

Challenge

- The morphological diversity of cells, shaped through evolution, closely relates to their inherent functions and to their interactions within their microenvironment.
- Cellular morphology analysis provides critical insights into cell shape, size, density, form or structure, and is essential to better understand or predict phenotype and function.
- Diverse methods are currently used to quantify cellular morphology, in both 2D and 3D, using human-defined (not sure this is the best wording) parameters to capture relevant information.
- Those parameters alone are most often not sufficient to fully understand biological systems.
- It is essential to make sense of visual information in image data sets and provide trustworthy interpretations that would be accessible to all.

Technology *(TRL6 and above)*

Our group offers a portfolio of methods to extract quantitative descriptors of morphology from images, in an as-automated-as-possible and general manner, relying on principles from computational geometry, computer graphics, and machine learning. Our methods are applicable to 2D and 3D images, static or dynamic, and compatible with any imaging modality. To enhance our models and advance the understanding of living systems across scales we bridge the gap between mathematical modelling and image data. Our seasoned experts engage in quantitative analysis of extracted shapes at individual and multiscale levels. We explore collections of shape models as distributions and create generative shape models based on statistical shape analysis concepts.
With our expertise, we empower image analysts to derive meaningful insights and significant findings from morphological parameters.

Intellectual Property

☒ Know-how based

☒ Copyright

Commercial Opportunity

We create image analysis technology and seek collaboration opportunities for further development.

Seeking:

☒ Development partner

☒ Commercial partner

☒ Licensing

Internal EMBLEM Reference

2024-002

Key Inventors

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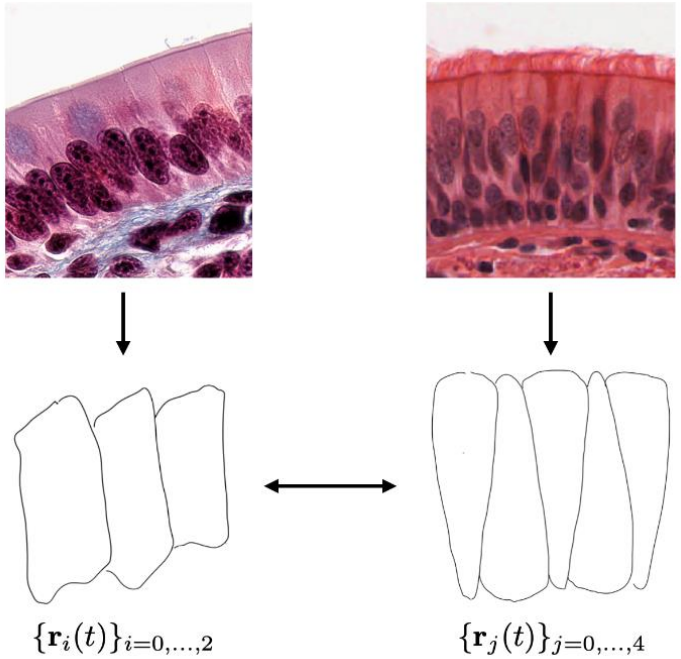
Applications

- **Healthcare**: medical imaging, digital pathology and diagnosis …
- **Pharmacology**: development of new biomarkers, high-content screening, drug development, …
- **Biological research**: 3D image modelling, shape analysis, structure analysis, mining of microscopy data, phenotyping, …



Using mathematical representations of geometry to quantify biological shape across imaging modalities.

Benefits

- Streamlining image analysis processes through standardized methods
- Expertise in image processing and automated phenotyping

Further Reading

DOI: 10.1111/jmi.13208
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Keywords

#Bioimage analysis
#Image quantification
#Machine learning
#Phenotyping
#Quantitative Phenotyping
#Microscopy Image Quantification

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