Shape analysis for phenotype characterisation from high-throughput imaging

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Title: Shape analysis for phenotype characterisation from high-throughput imaging
Date: 2017-10-17

Propositions

Belonging to the thesis

"Shape Analysis for Phenotype Characterisation from High-throughput Imaging"

by Yuanhao Guo

1. Hybrid methods, derived from generic approaches, include context specific heuristics which makes them outperform their generic counterpart. [Ch. 2]

2. Surface concavities cannot be recognised by the shape-based 3D reconstruction method. Nevertheless, such method is suitable for 3D reconstruction of zebrafish due to the convexity of its shape. [Ch. 3]

3. An empirical study of the proper initialisation in the voxel residual volume maximisation algorithm is a key to obtain accurate 3D shapes from light microscopy using the shape-based 3D reconstruction method. [Ch. 3]

4. Axial-view microscopy is a special case of multi-view imaging, however, multi-view stereo methods are not per se suitable for 3D modelling in axial-view microscopy. [Ch. 4]

5. The 3D modelling of specific signals requires the use of different imaging modalities, as we always need a good shape reference. [Ch. 5]

6. To characterise phenotypes, variation in the annotated training data is essential to obtain remarkable results from deep convolutional neural networks. [Ch. 6]

7. Our fast and accurate 3D reconstruction with the VAST-BioImager outperforms the CSLM for high-throughput imaging. [This Thesis]

8. In scientific research, the presenter should demonstrate in-depth understanding of the work through an explicit and balanced presentation.

9. "Nature of the universe takes the simplest form" is the basic idea in Taoism and Occam's razor. So, although the predicate western/eastern might suggest otherwise, there is more overlap than difference in philosophy.

10. An important outcome of tough moments in our life seems to be the mental growth, therefore, such experiences should be more appreciated.

Leiden, 17 October 2017