Bachelor’s Thesis / Master’s Thesis
Deep learning methods for image data fusion of confocal microscopy image sequences (2D+t)

In vivo confocal microscopy enables the imaging, visualization and morphological characterization of the cellular structures of the cornea and thus has enormous potential for the diagnosis of diseases of the ocular surface. However, eye movements (e.g. microsaccades) during the acquisition process lead to motion artifacts in the image data and may affect their further processing and analysis. Especially for image data fusion of extensive image sequences (2D+t) these image artifacts have to be corrected precisely. A complex, classical image registration process chain for this purpose exists in the working group. The task of this bachelor’s or master’s thesis is to develop and test alternative processes based on deep learning approaches, and to evaluate the results by comparison to the classical process chain.

Tasks:
• Literature review on the state of research
• Development and implementation of at least one deep learning method for image registration of confocal microscopy image sequences
• Evaluation of the results and comparison to the results of the classical process chain

Education, Experience, and Skills:
• Motivation to familiarize yourself independently with a practical subject area
• Programming skills required (preferably in Python or Matlab)
• Knowledge in the field of machine learning methods desirable

Die Abschlussarbeit kann auch in deutscher Sprache verfasst werden.

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