

Project Title:

Image processing of computed tomography data for quantitative assessment of joint health

Academic Supervisors:

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Project Description:

Joints are a primary target of destructive processes like arthritis, which can cause damage to bone and loss of function. Data captured with micro-computed tomography is used to understand disease and develop clinical solutions.

A large data collection of 3D microstructural images of human and animal joints is available for analysis using custom morphometric imaging processing. The image processing scripts need to be adapted for the data, the data needs to be pre- and post-processed in preparation for analysis, and then systematically evaluated for a range of metrics that define joint changes due to arthritis disease. Statistical analysis and reporting of the data will then be performed

Data evaluation and reporting tasks include:

- compile a database of all image sets available
- update existing and code new algorithms
- pre-process data for analysis; filtering & segmentation
- post-process data and extract quantitative metrics
- perform statistical analysis
- prepare research report for scientific publication

Preference will be made for students possessing image processing skills. The student must be a keen learner, creative, possess effective written and oral communication skills in English, and have good time management skills.

Tasks

10% literature review & project planning;

70% scripting/programming, and data processing;

10% statistical analysis

10% report & presentation preparation.

Suitable as either a year-long (two semester), a single semester project, or an international internship.

Keywords micro-computed tomography; image processing; computer programming

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