Bachelor / Master Theses: *Machine Learning for Analysis of Musculoskeletal Tumours*

**Abstract**

Early diagnosis of musculoskeletal tumours is crucial for successful therapy and treatment. The sooner a potential malignant growth is detected, the more effective the next steps in therapy and the better a prognosis usually becomes. The rarity of musculoskeletal tumours, potentially inexperienced clinicians with this certain entity, as well as unspecific anamnesis and clinical manifestations may delay the final diagnosis. Whereas currently available imaging modalities yield considerable insights into tumour staging and grading, biopsy remains the gold standard for final diagnosis. Yet, the planning of a successful biopsy yielding sufficient material might require time aside from a high level of experience and may delay the final diagnosis even further.

The complexity in conjunction with multimodal approaches in fully grasping this disease provide a very suitable foundation for modern artificial intelligence (AI) algorithms. Not only for diagnostic purposes, but also for treatment planning or prognosis prediction, machine learning and deep learning algorithms are popular techniques in many disciplines at this time.

**Tasks**

Several projects can be offered. A specific project can be developed and discussed together with the student, also depending on the student's prior knowledge and interests.

Some topics, but not limited to, include:
- Multimodal image classification
- Multi-entity classification based on text and images
- Machine Learning prediction with tabular data
- Etc.

**Offer**

- Very rare medical data with high potential for publication
- Highly educated & interdisciplinary environment
- Top level hardware for scientific computing
- Constant dialog with experts from medicine and informatics

**Prerequisites**

- Advanced knowledge of machine or deep learning
- Beneficial but not necessary: experience in medicine / oncology

**References**


If you are interested, please send your application to: florian.hinterwimmer@tum.de