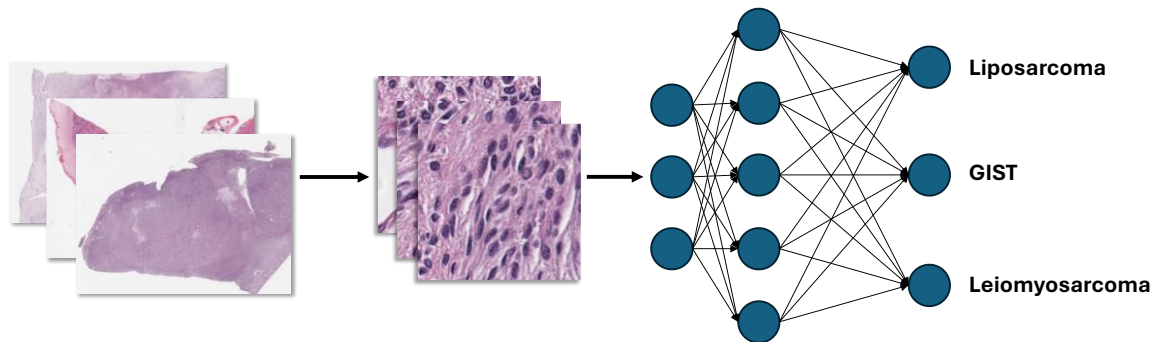# AI-Based Phenotyping of Soft Tissue Tumors from Histopathology Images

Research Line: Artificial Intelligence for Integrated Diagnostics (AIID)
Project type: Master Project
Approx. duration: 6 to 9 months

Background

Soft tissue tumors are a heterogeneous group of mesenchymal neoplasms that vary widely in morphology, behavior, and clinical outcome. Accurate phenotyping from histopathology is essential for diagnosis and treatment but remains challenging due to their rarity and diversity. Moreover, current AI models in digital pathology are often trained on narrow disease-specific datasets, limiting their generalizability. There is growing interest in building large foundational models for computational pathology that can capture the spectrum of tumor morphology and be fine-tuned for downstream tasks such as grading, prognosis, or mutation prediction. This project aligns with that vision by focusing on phenotyping based on routine H&E-stained slides.

Aim

The aim of this project is to contribute to the development of a deep learning model for broad phenotyping of soft tissue tumors. The student will work with high-resolution whole slide images, apply or adapt neural architectures for patch-level and slide-level analysis, and experiment with representation learning techniques. Depending on interest, the focus can be narrowed to a subtype (e.g., liposarcomas) or extended to multi-class classification and clustering of phenotypic patterns. The resulting model will form part of a larger framework that can later be fine-tuned for specific clinical outcomes, such as prognosis prediction or therapy response.

Related research

- https://doi.org/10.1016/j.jpi.2024.100368
- https://doi.org/10.1016/j.ajpath.2023.03.012

Interested in this project?

Supervisor(s): Karthik Prathaban, Martijn Starmans, Farhan Akram, Stefan Klein
Email: k.prathaban@erasmusmc.nl