

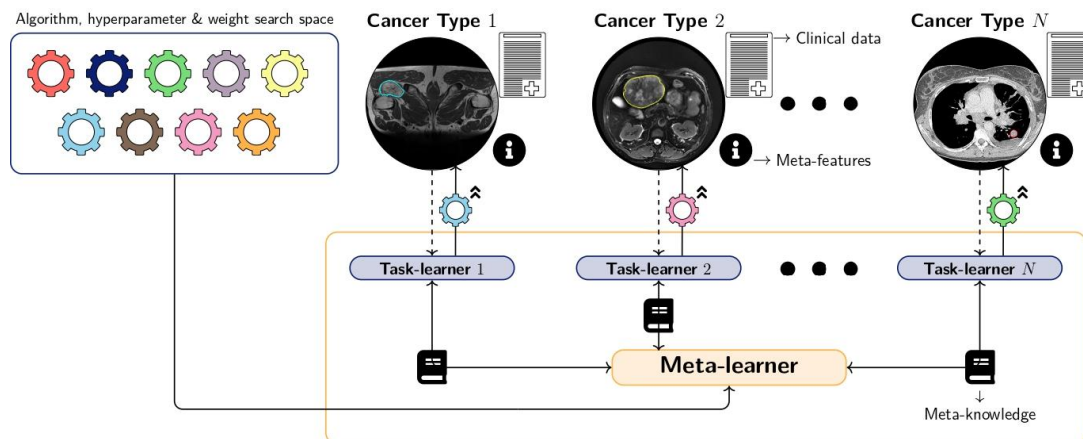
# Automated Deep Learning for Soft-Tissue Tumor Classification Using Meta-Learning and AutoML



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

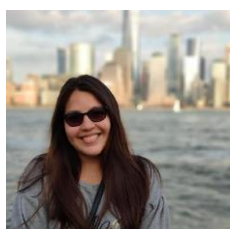
**Background** AI models in medical imaging are usually developed from scratch using disease-specific datasets. While this works for common diseases, it poses a major bottleneck for rare cancers like soft-tissue tumors (STTs), where labelled data is scarce. Unlike humans, who can learn new concepts from just a few examples by drawing on prior experience, current AI systems require large amounts of task-specific data due to how they are trained. This project addresses that limitation by combining meta-learning and automated machine learning (AutoML) to enable knowledge transfer across clinical and reducing reliance on large datasets.

**Aim** The aim of this project is to develop a novel methodology that integrates automated machine learning and meta-learning for medical image classification. Instead of trial-and-error model design, we will automate model selection and tuning using prior experience on related tasks and datasets. By learning from previous clinical applications, the system will be able to generalize across different diseases and imaging modalities, particularly in the context of rare cancers where data is limited. The project will involve designing model search strategies, incorporating knowledge transfer mechanisms, and evaluating the approach on real-world clinical datasets. Note that this project is quite technical.



Hutter, F., Kotthoff, L., & Vanschoren, J. (Eds.). (2019). *Automated machine learning: Methods, systems, challenges*. Springer.

Hospedales, T., Antoniou, A., Micaelli, P., & Storkey, A. (2021). Meta-learning in neural networks: A survey. *IEEE transactions on pattern analysis and machine intelligence*, 44(9), 5149-5169.



## Interested in this project?

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