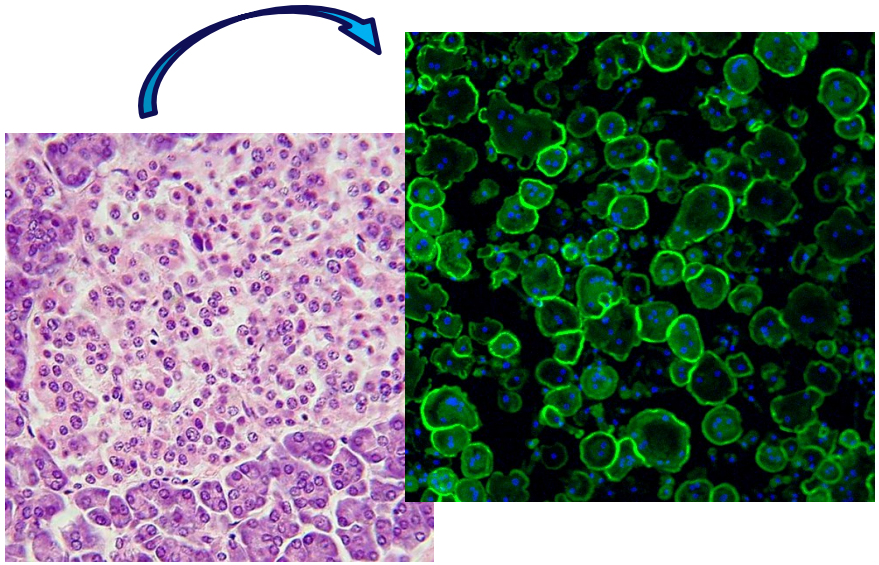
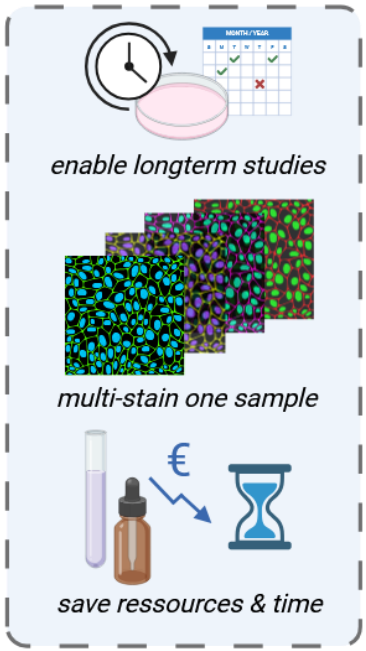
Transfer Learning in Virtual Staining





BIOMEDICAL IMAGING AI

AI IN MICROSCOPY

Background

Virtual staining using deep learning offers a fast and resource-efficient alternative to traditional staining protocols in microscopy. In this project, a neural network previously trained for virtual Hematoxylin and Eosin (H&E) staining of cellular images will be adapted via transfer learning to support fluorescence-based staining methods. The goal is to enable accurate, label-free visualization of fluorescence markers, reducing experimental effort and cost. This project combines biomedical image processing with state-of-the-art AI methods.

Tasks

- Select state-of-the-art H&E model
- Prepare data and model for transfer learning
- Training of the network
- Evaluation and comparison of networks

python

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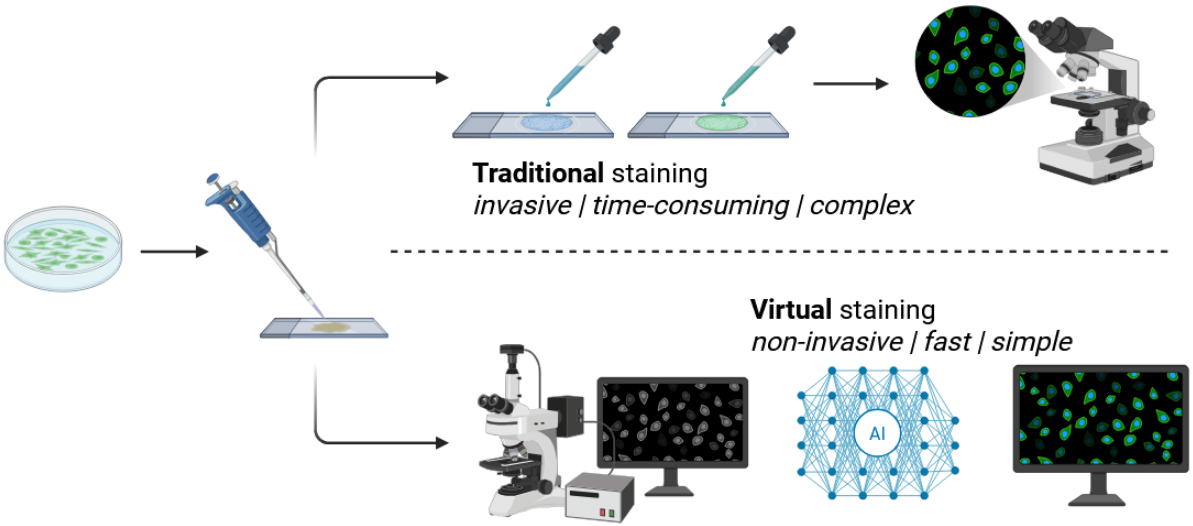
Explainable Virtual Staining



BIOMEDICAL IMAGING AI

AI IN MICROSCOPY

MICROSCOPY

Background

Virtual staining models based on deep learning enable label-free visualization of fluorescence markers in microscopy images. While these models offer impressive performance, their decision-making processes remain largely opaque. This project aims to investigate the explainability of these networks through an augmentation-based study. By systematically altering input images and analyzing the network's response, we will identify critical image features that influence virtual staining outcomes and contribute to model transparency in biomedical AI applications.

Tasks

- Analyse input data from current dataset
- Prepare augmented input images
- Test network based on input images
- Evaluation of results

python

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