

Explore Fungal Behavior through Image Analysis and Machine Learning

Main goal: The main goal of the project is to process microscope images of fungal mycelium and conduct dimensionality reduction and hierarchical clustering to find out hidden traits of hyphal growth behaviours.

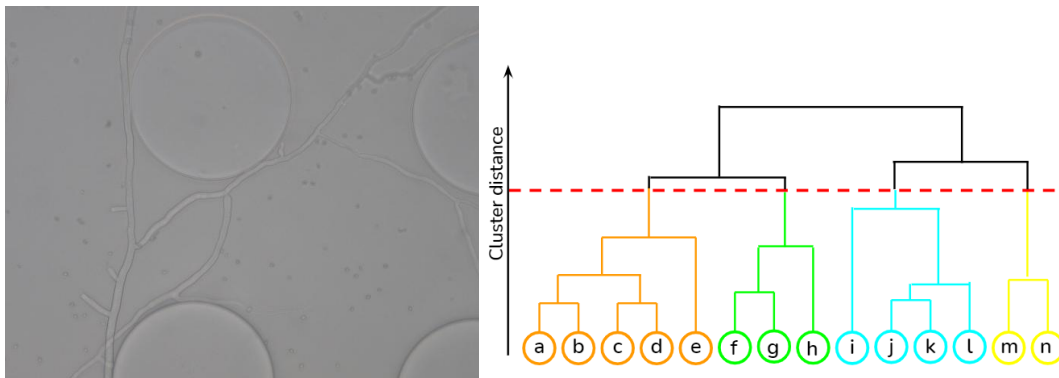
Description:

Fungal behavior, especially at the microscopic hyphal level, remains largely unexplored due to the difficulty of studying fungi in natural environments like the opaque soil matrix. We are addressing this challenge by monitoring the growth patterns and strategies of various fungal species using a microfabricated "Soil Chip" system. This system simulates key aspects of soil pore space and its micro-spatial heterogeneity.

However, the human interpretation of mycelial growth is limited and subjective. We aim to use machine learning to uncover hidden patterns in hyphal growth behaviour. A major challenge in this work is highlighting hyphae in microscopy images, as they occupy only a small portion of the visual data. Without careful preprocessing, algorithms tend to focus on artificial structures instead of the hyphae themselves.

As part of this project, you will focus on preprocessing these microscope images to extract hyphal features for further analysis, including dimensionality reduction and hierarchical clustering. A basic knowledge of Python coding is essential.

This project is interdisciplinary task within biology and engineering. You will primarily work with Dr. Kristin Aleklett, Dr. Hanbang Zou. This project is designed for a MSc student (optimally 60 cr).



Start Date: Flexible

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