PhD Program in Plant Sciences:
Introduction to Machine Learning in Plant Sciences – Module 2

Lecturers: Prof. Dr. Jan Dirk Wegner (UZH)
Location: ETHZ center, tbd
Dates: 25.-26.11.2024 and 11.12.2024 (3 full days & homework)
Time: 9:30 – 16:30
Credit Points: 2 ECTS (Module 2)

Course Description

This course will introduce machine learning with emphasis on plant sciences. In Module 1 we will discuss topics like data pre-processing, feature extraction, clustering, regression, and classification. In Module 2, we will take first steps towards modern deep learning. Both modules consist of 50% lectures and 50% hands-on programming in python, where students will directly implement learned theory as a software to help solving problems in plant sciences. Module 2 also includes homework that has to submitted. On 11th December, a feedback session in the morning will allow participants to receive feedback regarding their homework, while participants will give short talks about their own PhD projects in the afternoon to get advice from machine learning experts.

Course Program / Learning Objectives

Students with a non-technical background will be introduced to machine learning. Emphasis is on hands-on programming and implementation of basic machine learning concepts to demystify the subject, equip participants with all necessary insights and tools to develop their own solutions, and to come up with original ideas for problems related to the context of plant sciences. Specific importance is placed upon the reconciliation of the predictions, which have been generated by automated processes, with the realities. By the end of the course, students will be able to decide where (and where not) to use machine learning, what method to choose for what research task, and how to critically evaluate model outputs in the context of plant sciences.

Prior Knowledge:

Students should bring their laptops to the exercises because we will program on laptops directly. It is required that students enrolling in this course have successfully passed a course in basic data science and are familiar with programming (preferably in Python). Teaching assistants will help with all programming exercises.

Individual Performance and Assessment:

Participation in Module 1 and Module 2 and successful fullfilment of the homework assignments yields in total 3 ECTS.

Number of Participants: 16

Open for PhD students. Priority will be given to the PhD programs in Plant Sciences, Science & Policy and Evolutionary Ecology. Postdocs if places available.

Special Note: Module 1 is a prerequisite for taking Module 2 and receive the 3 ECTS.