Introduction to Machine Learning in Natural Science: Modeling and Applications

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Wednesday and Thursday, 29-30 November 2023, 9 am-12 noon

1 Introduction

Welcome to the **" Introduction to Machine Learning in Natural Science: Modeling and Applications (Series 1: Supervised Learning)"** workshop! In this workshop, we will explore the application of state-of-the-art machine learning models in the field of natural science, using real-world examples and various data sets. Our goal is to equip participants with the necessary knowledge and skills to apply machine learning in their research and scientific papers, and applications (whenever is needed).

2 Outlines and structure

The workshop will mainly consist of lectures and discussions, complemented by hands-on practice with R codes. The structure will be as follows:

- Day 1 (November 29, 9:15 am –12 noon)
    1. Introduction to machine learning
    2. Logistic Regression, Penalized Logistic Regression, Boruta variable selection
    3. Decision Trees, Random Forest (with variable importance)
    4. Refreshment in R and Examples of Machine Learning in R programming Language
- Day 2 (November 30, 9:15am –12 noon)
    1. Support Vector Machine (linear and non-linear)
    2. Artificial Neural Networks (single and multiple layers)
    3. Examples in R programming language
    4. Discussion and questions

3 Location

The workshop will be held on Zoom and the link will be sent to the email of the participant (See the Registration).

4 Target Audiences

The workshop is designed for Master's and Ph.D. students, researchers, and faculty members from all disciplines within SLU who are interested in applying machine learning models to their field of study.

5 Learning outcomes

Upon completion of this workshop, participants will have a basic to intermediate understanding of :

1. Why, when, and how to apply some supervised machine learning approaches in real data sets.
2. How to train and test some of the machine learning models for optimal performance.
3. How to interpret the outcomes of specific machine-learning algorithms for scientific papers and applications.

6 Requirements

Some basic knowledge in R programming language and statistics (basic concepts of regression).

7 Registration

Registration is required to participate in the workshop. Please click on the Registration Form here.