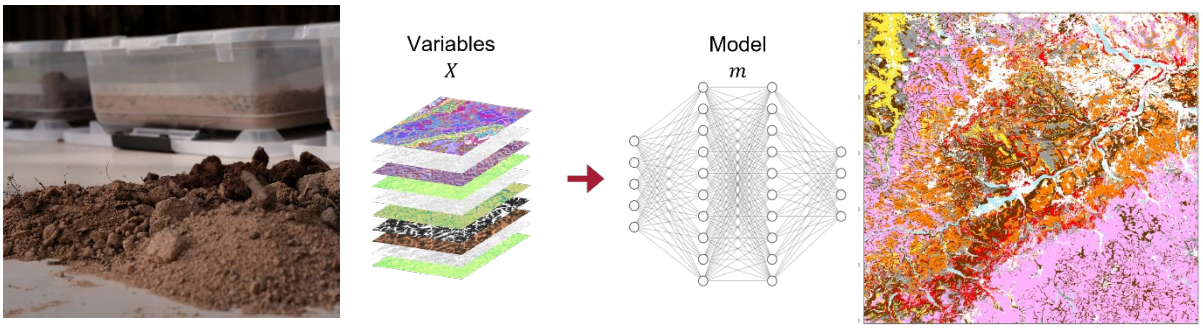
Mapping of soil types with random forests and model uncertainty estimation in the South German Scarplands

Abschlussarbeit am Lehrstuhl für Bodenkunde und Geomorphologie (M.Sc.)



Background

Over the past two decades the research area of pedometrics evolved as an overlap between soil science and machine learning (ML). Approaches mainly comprise regression and supervised classification, analysis of feature importance, validation, feature construction, the analysis of uncertainty and sampling design. The focus is on spatial modelling, i.e. generating soil property maps. In the excellence cluster *Machine Learning: New Perspectives for Science*, we aim at developing and improving methods for digital soil mapping, and the related questions of feature construction and model uncertainty to develop a better understanding of the factors that play a role in the genesis and spatial distribution of soil properties.

Objectives

- Aggregate and prepare relevant environmental data for the machine learning model.
- Create a state-of-the art model with random forest as comparison to newly developed models.
- Compare, interpret, and explain observed differences to other model implementations in close cooperation with a PhD student working on this project.

Contact

If you are interested in linking innovative methods of soil science and geodata analysis with machine learning, please contact Dr. Tobias Rentschler (t.rentschler@uni-tuebingen.de), Kerstin Rau (kerstin.rau@uni-tuebingen.de) and Prof. Dr. Thomas Scholten (thomas.scholten@uni-tuebingen.de).

Literature

McBratney, A., Mendonça Santos, M. & Minasny, B. (2003) On digital soil mapping. Geoderma 117, 3–52. https://doi.org/10.1016/S0016-7061(03)00223-4.

Rentschler, T. (2021) Explainable machine learning in soil mapping: Peeking into the black box. Dissertation, University of Tübingen. http://dx.doi.org/10.15496/publikation-57960.