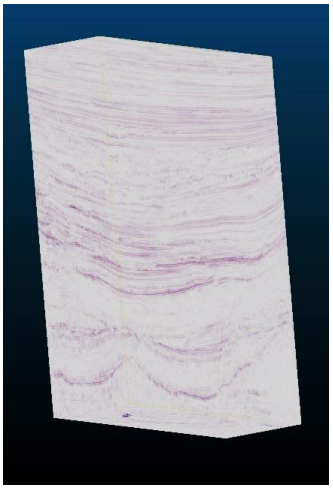
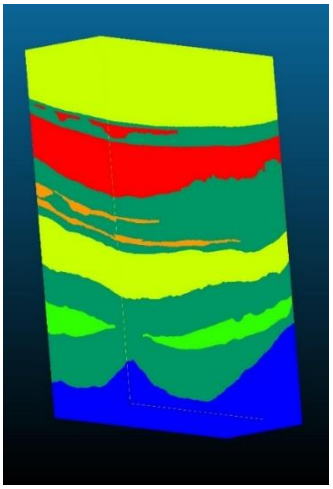
Graz University of Technology
Institute for Rock Mechanics and Tunnelling
Institute for Soil Mechanics, Foundation Engineering and Computational Geotechnics

Master Thesis (MA, 30 ECTS)

Machine Learning Blind-test Challenge at SEG 2020





Description

Geophysical investigation methods are key components of most geological investigation campaigns. Characterized by big amounts of data, an application of machine learning (ML) technology is only logical. Successful applications in geotechnics are however few in number, so a starting point would be to look to other disciplines where the development has progressed further.

The “Machine Learning Blind-test Challenge” is a ML classification competition that is held in the course of the SEG 2020 conference (Society of Exploration Geophysics) where a dataset of 3D seismic data including 3D labels was made public and the goal is to classify the data with the highest possible accuracy.

The thesis aims at getting a first look into the world of ML applications for geophysical data interpretation. Learned skills (handling of big data, training ML classifiers etc.) are increasingly in demand for scientific but also industrial workflows and sought after by companies.

Workflow:

1. Literature research concerning ML applications for geophysical data classification.
2. Acquiring of Python programming skills and knowledge of supervised ML classification.
3. Development of an algorithm (e.g. support vector machine, artificial neural network…) to classify the data.
4. Evaluation of the results and identification of possible applications to geotechnics.
5. Writing of the thesis.

Due to the big amount of data, the analysis will require skills beyond MS Excel. Programming skills (Python) are necessary but can also be acquired during the thesis.

Start: January 2021

Supervisor	Affiliation	Contact
Georg Erharter		erharter@tugraz.at
Thomas Marcher		thomas.marcher@tugraz.at
Franz Tschuchnigg		franz.tschuchnigg@tugraz.at