

## Master's Thesis (MT, 30 ECTS)



FMT

### Mining TBM Data as a Prediction Tool and real-time Update of the Geotechnical Prognosis

During TBM driven tunnels, lots of data is generated, including penetration depth, gripper force, thrust force etc. in order to control the advance rates of the TBM. In addition, geophysical and drilling programs are conducted since the actual tunnel face and rock mass is more or less oblique to the geologists and geotechnical engineers.

However, since lots of data is at hand, data mining (DM), combined with machine learning (ML) algorithms might provide the possibility to predict the geological conditions ahead of the excavation.

This project aims at a preliminary study whether DM is applicable on the gathered data or to which extend the data has to be modified, weighted, or supplemented by other input sources. The elaboration continues the research from the preliminary Master's Project and focusses on the following aspects:

- Which parameters from the TBM data can be correlated with the prognosis model?
- Can further correlations be found by combining input values?
- Can the geological/geotechnical situation be predicted, according to the correlations?
- Are the predictions valid in comparison with the existing prognosis model?

For the elaboration, advanced skills in data analysis/programming are of advantage. This project is consecutive to a Master's project and shall lead to a method to apply ML on TBM driven tunnelling for a real time update of an existing prognosis model by using machine data and exploration measures (geophysics, drilling).

Templates for the scientific report can be found on the institute's homepage. There is also a guideline for scientific writing free downloadable at the homepage, whose compliance is mandatory. The language for the report can either be in English or in German.

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**Start** by appointment

**Duration** ca. 6 Months

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