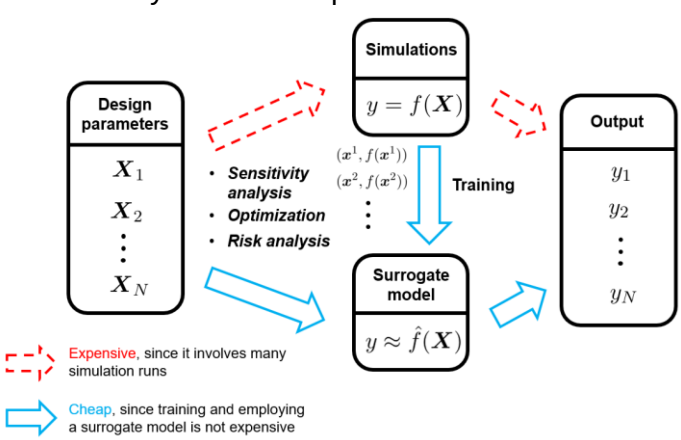
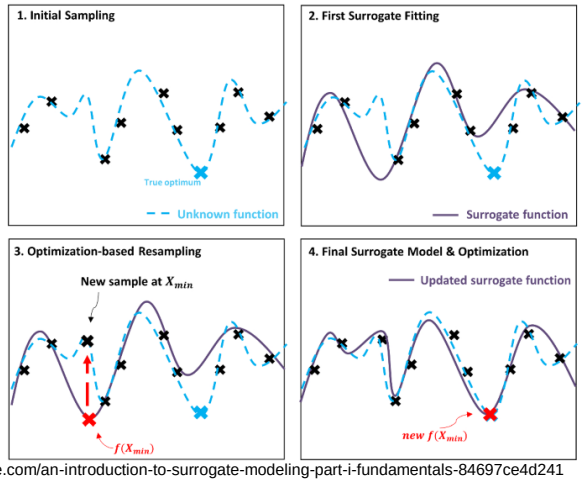
The Institute for Geotechnical Engineering of the University Stuttgart
offers the **Graduation Project (Bachelor/ Master)** to the following topic:

Surrogate Modelling / Meta Modelling in Geotechnical Engineering

Surrogate modelling or also called meta modelling is a mathematical approximation technique related to machine learning. The goal is to estimate the output of a numerical finite element model using a simplified non-physical calculational model with hyperparameters. This technique is applied to obtain an equivalent, simplified model of a complicated model with considerably smaller computational effort.





Source Picture 1: https://towardsdatascience.com/an-introduction-to-surrogate-modeling-part-i-fundamentals-84697ce4d241

Source Picture 2: Machine learning-based surrogate modeling for data-driven optimization: a comparison of subset selection for regression techniques

Contents of this graduation project:

- Literature review for surrogate modelling methods and applications in geotechnical engineering
- Implementation of identified methods in a programming language (i.e. Matlab/Python)
- Analysis of geotechnical benchmark examples using identified methods
- Evaluating model performances with a comparison to conventional modelling approaches
- Post-processing of the results, drawing conclusions, providing recommendations and an outlook

Recommended prerequisites: geoengineering knowledge, Python/Matlab, numerical basics

Interested students please contact:

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