

MSc thesis proposal

Probabilistic machine learning for natural hazard loss predictions

Background

Losses caused by natural hazards are constantly increasing, but accurate models for these losses are still lacking, mostly due to lack of appropriate data. In this project, we have access to a data set of the building insurance company for the Swiss Canton of Fribourg, ECAB, which documents insured properties and natural hazard incidents.

Objectives and methodology

This project aims to conduct an in-depth exploratory analysis of the available data with the goal of understanding their potential for risk modeling. Leveraging cutting-edge probabilistic machine learning techniques, the objective is to unearth latent insights and construct predictive risk models for natural hazard losses. An additional focus should be put on continuous updating of these models with newly available data. These models will establish a relationship between available features and historic losses of various natural hazards such as storms, hail, floods, landslides, avalanches, fires, and more. Additionally, the available database might be enriched with further features from tertiary sources. The project methodology prioritizes a rigorous, data-centric approach and will serve as a basis for an envisioned ECAB risk-modelling platform.

Requirements

Students should have

- strong background in probabilistic modeling
- first experience with machine learning
- Python or Matlab skills

Starting date:

Flexible, as soon as possible

Supervised by

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In collaboration with:

- Dr. Paul Wagner, Matrisk GmbH
- ECAB (<https://www.ecab.ch/>)