The **Energy and Technology Group (EPG)** within the *Department of Humanities, Social, and Political Sciences* of **ETH Zürich** offers a Master's Thesis on

Measuring technology complexity to inform climate technology investment strategy

Research field and tasks

Given the limited time left for climate action, it is important that investments into climate-relevant technologies are effectively allocated based on their potential impact. Understanding the feasibility of impact (determined by a technologies' learning rate) can fundamentally inform governments and the private sector how best to allocate scarce resources. Recent research at our group has found that the learning rate of a technology is related to its **product (design) and process (manufacturing) complexity**[1].

However, literature on measuring product and process complexity is still underdeveloped and needs refinement. The aim of this thesis will be to **implement a variety of measurements of product and process complexity, compare them and draw insights for policymakers**. The measurements will be based on natural language processing (NLP) and information theory, and will utilize patents and scientific publications as datasets.

The newly developed measurements will be compared to more widely used methods based on ease of recombination of related patent classification codes, and the number of exporting countries[2].

Requirements

The ideal candidate would have:

-Strong coding experience with NLP libraries and large datasets

-Interest in NLP and information theory is a plus

-Engineering background is a plus

-Interest in the intersection between technology and climate policy is desirable

Conditions

The student will directly work with Dr. Anurag Panda and Lingxi Tang and be supervised by Dr. Bessie Noll and Prof. Tobias Schmidt. The duration of the thesis is 6 months, and the ideal starting date is mid-Nov 2024. Applications from non-ETH students are welcomed.

Your application

Please send your CV and transcript of records (with grades) in one PDF file to lingxi.tang@gess.ethz.ch and anurag.panda@gess.ethz.ch. We will review applications on a rolling basis until the position is filled.

Interview

The interview for the role will involve a code review of one of the students' previous projects. And a discussion of the underlying concepts around the papers cited below and newly proposed measurements.

[1] DOI: 10.1016/j.gloenvcha.2016.02.005, 10.1016/j.joule.2020.09.004

[2] https://atlas.cid.harvard.edu/rankings/product, https://doi.org/10.1016/S0048-7333(00)00135-9