

# Research Proposal: Introduction to Causal Machine Learning

In this research proposal, you are asked to use the methods discussed in the course to answer a research question in economics and business analytics. The proposal should be structured as follows:

- **Research Question:** Is the research question predictive or causal? Is it an applied or methodological research question?
- **Hypothesis:** Formulate a hypothesis about the possible outcome of the research, which must be justified theoretically, through literature review or economic arguments.
- **Data:** Consider the best data to answer the research question.
  - **Ideal Data:** Describe what the ideal data would look like.
  - **Realistic Data:** Discuss what data you could realistically obtain and the necessary steps to acquire it.
  - **Descriptive Analysis:** If available, perform a small descriptive analysis or simulate hypothetical data.
- **Machine Learning Methods:** Discuss which ML methods you would use to answer the research question and what to consider.
  - **Advantages and Disadvantages:** Point out the advantages and disadvantages of different methods in your specific application. Consider factors such as different data formats, model complexity and interpretability, computational complexity, and robustness to noisy or missing data.
  - **Preliminary Analyses:** Ideally, conduct some preliminary analyses with the available data. Describe the different steps in more detail if no data is available. This could involve exploratory data analysis, feature engineering, or data preprocessing to prepare the data for modeling. If no data is available, discuss hypothetical scenarios and outline the steps you would take to analyze the data.
- **Conclusion:** Summarize the key points of the research proposal and outline the next steps in the research process.

The proposal should be **2-3 pages** in length, excluding tables, figures and references, using a standard academic font (e.g., Times New Roman, Arial) and a font size of 12 points. Your research proposal must be submitted by **September 29, 2024** to [anthony.strittmatter@unidistance.ch](mailto:anthony.strittmatter@unidistance.ch).