Lars Kutschinski

+1 281 706-6566 lars.kut31@gmail.com linkedin.com/LarsKutschinski github.com/LarsKut

Education

University of Toronto June 2024
Master of Science in Statistics (GPA: 3.85 / 4.00) *Toronto, Ontario*

- **Relevant Coursework:** Statistical Modeling and Validation, Machine Learning, Neural Networks, Regression, Bayesian Methods, Time Series, Mathematical Finance

University of Heidelberg April 2023
Bachelor of Science in Mathematics (GPA: 4.0/4.0) *Heidelberg, Germany*

- **Relevant Coursework:** Linear Algebra, Calculus, Probability Theory, Deep Learning, Algorithms and Data Structures, Databases, Graphical Theory, Functional Data Analysis

Projects

Retrieval Augmented Generation (RAG) Chatbot | *2024*

- Developed AI chatbot application in Python using large language model from Meta and Groq API
- Utilized NLP libraries to create a vector database for storing documents
- Dynamically leverages over 10 documents to enhance query responses and decision-making accuracy.

Canonical Correlation Analysis for Metric Space Data | *2024*

- Developed a new procedure that determines correlations between complex data objects such as medical images
- Provided theoretical justification of the algorithm by showing that it reduces to regular canonical correlation analysis for simpler data types
- Obtained accurate practical results through simulation in R with less than 5% computation error

Predicting Developments of Renewable Energy Production in the Foreseeable Future | *2024*

- Generated forecasts based on autoregressive time series models combined with bayesian methods
- Concluded that renewable energy production levels will increase by up to 5% by 2027 in countries such as the United States, Canada and Germany
- Predicted negative developments (5% to 10% decrease) for rapidly developing economies such as China and India

Demand Forecasting for City Bike Share Systems | *2023*

- Generated hourly bike demand forecasts for the next day using tree-based models in R
- Performed time series cross-validation and compared model performance using metrics such as MAE and RMSE
- Increased productiveness of city-wide bike allocation by making forecasts with an average error of 47 bikes/hour

Hypothesis Testing in the Functional Linear Model | *2023*

- Studied methodology for hypothesis testing in regression problems with functional data
- Produced test statistics based on the norm of the empirical cross-covariance operator of the data and derived asymptotic distributions
- Implemented procedure in R to perform Monte-Carlo Simulations, yielding empirical levels with a mean error of 1% under null hypothesis and maintaining statistical power between 80%-95% under the alternative hypothesis

Experience

University of Heidelberg 2021 – 2023
Data Analyst *Heidelberg, Germany*

- Monitored and maintained data base of over 10,000 library records at the faculty
- Collected and analyzed Covid-policy-related data, directly impacting the adjustment of critical Covid regulations
- Created visualizations and analyzed trends in R

Skills

Programming Languages: Python, R, SQL, Stan, C++, C#
Data Visualization: Matplotlib , Ggplot2
Data Manipulation: NumPy, Pandas, Tidyverse
Machine Learning: PyTorch, Tensorflow
Languages: English (fluent), German (fluent), Mandarin (intermediate), French (intermediate)