Kartik Ravisankar

Linkedin | Github | kravisan@umd.edu | 765.409.6831
Research Interests: Mechanistic interpretability and Multilinguality of LLM-s

EDUCATION

UMD COLLEGE PARK
MS Applied Mathematics, Statistics, and Scientific Computing (AMSC)
Current | College Park, MD
Cum. GPA: 3.93 / 4.0

PURDUE UNIVERSITY
MS: Industrial Engineering
May 2016 | West Lafayette, IN
Cum. GPA: 3.71 / 4.0

COURSEWORK

Mathematical Statistics
Linear Statistical Models
Natural Language Processing
Statistical Pattern Recognition
Bayesian Statistical Analysis
Linear Programming
Advanced Numerical Optimization
Foundations of Deep Learning
High Dimensional Statistics

SKILLS

Programming Languages
Python • R • SQL
Technologies/Frameworks
Pytorch • Tensorflow • Stan •Huggingface •Sklearn •numpy •einops
Version control
git

ACADEMIC PROJECTS

THE ROLE OF CROSS-LINGUAL ALIGNMENT IN MULTILINGUAL PERFORMANCE OF LLMS Advisor: Dr.Marine Carpuat
Fall 2023 - Present | College Park

- Analyzed the ability to align representations of parallel sentences in English and non-English sentences in the intermediate layers of the transformer on multilingual natural language understanding of LLMs.
- Conceptualized the Discriminative Alignment Index (DALI), which measured whether cross-lingual alignment of parallel premise+option pairs across languages exceeds mismatched pairs in a layer-wise manner that enables us to measure alignment for each sample in a discriminative task.
- Demonstrated empirically that cross-lingual alignment doesn't vary between correct vs incorrect samples, thus indicating that LLMs resort to other mechanisms or use language priors to solve multilingual tasks.
- Currently under review at *Conference on Language Modeling (COLM) 2025*.

TOKEN-LEVEL ENSEMBLING OF MODELS WITH DIFFERENT VOCABULARIES Advisor: Dr.Matt Post
Summer 2024 - Present | Johns Hopkins University, Baltimore

- Conceptualized a token-level ensembling algorithm for ensembling language models with arbitrarily different vocabularies, which was impossible before, as a part of the Machine Translation Marathon 2024 (MTMA).
- Demonstrated the generalizability of the algorithm by ensembling different transformer architectures (seq-to-seq+seq-to-seq, seq-to-seq+LLM, and LLM+LLM) to generate translations.
- Achieved an increase of **0.4** BLEU score by generating translations using the proposed algorithm on the WMT'23 dataset by ensembling NLLB and M2M models with different vocabularies.
- Currently under review at *Association of Computation Linguistics (ACL)* 2025. Preprint available on arxiv.

WORK EXPERIENCE

EVIDERA Senior Research Associate - Modeling and Simulation
April 2020 - Present | College Park

- Conceptualized and developed health econometric simulation models to assess the effectiveness of healthcare interventions.
- Managed projects with an annual budget of **$5 million**, ensuring efficient allocation and delivery within scope and timelines.
- Led a cross-functional team of **5**, including health economists, statisticians, and medical writers, to deliver project outcomes.
- Used the `survfit` package to fit standard and flexible survival curves to extrapolate treatment effect beyond the observed clinical trial period.

AXTRIA | Project Lead - Health Economics and Outcomes Research
June 2016 – May 2020 | Berkeley Heights, NJ

- Built a Monte Carlo simulation model to demonstrate the benefit of cholesterol reduction, which supported multiple manuscripts.
- Transformed legacy patient-level simulation models built in VBA to Python which improved the performance by a magnitude of **20x**.