Milena Rmus

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EDUCATION

University of California, Berkeley PhD, Cognitive Science

Brown University

BS, Cognitive Neuroscience (Magna Cum Laude)

EXPERIENCE

Helmholtz Institute for Human-Centered AI

Research Scientist

- · Led a team of researchers to develop and test LLM-based approaches for reverse-engineering interpretable cognitive models from behavioral data
- · Applied prompt engineering and model evaluation techniques to systematically improve prediction accuracy and plausibility of LLM-generated models
- · Published a proof-of-concept framework demonstrating that LLM-generated cognitive models can outperform literature baselines in accuracy and parsimony

Lawrence Livermore National Laboratory

Data Science Intern

- Optimized amino acid sequences as mathematical expressions using Pareto optimization in Deep Symbolic Regression
- Achieved a 2+ term reduction in model complexity while preserving performance
- Built random forest classifiers (AUC = 0.88) to predict compound binding affinity from molecular descriptors

Princeton University

Research Specialist

- · Oversaw experiment rollout, cross-site data integrity, and ran fMRI scanning sessions
- Developed a web app hosted on Amazon Mechanical Turk in JavaScript (iQuery, isPsych) to run decision-making experiments, and stored data on Firebase
- Analyzed behavioral data using machine learning tools (SVMs, PCA, and clustering) in Python

SELECTED PROJECTS

Using artificial neural networks for fitting cognitive models

- · Simulated artificial agents using generative cognitive models (reinforcement learning, Bayesian inference) in Python
- Estimated cognitive model parameters with traditional Maximum Likelihood Estimation and Approximate Bayesian Computation as benchmarks. Conducted model comparison using likelihood-based (AIC/BIC) metrics
- Created and trained custom LSTM and GRU neural networks in Keras/TensorFlow for cognitive model parameter estimation and model identification. Achieved 3x higher accuracy and 4x faster performance in parameter estimation. and nearly 2x better accuracy and at least 3x faster speed in model identification compared to traditional methods

Using Large Language Models to generate Computational Models of Behavior

- · Developed a framework using LLMs (GPT, Llama3, Qwen2.5, R1) to generate executable Python code for cognitive models based on behavior data
- Achieved proof-of-concept results demonstrating LLM-generated models outperform literature models on prediction accuracy and parsimony
- · Engineered a feedback loop for automatic scientific error correction and model revision

Technical Skills

- Languages: Python (expert), MATLAB (expert), JavaScript (fluent), R (fluent), LaTeX (fluent), SQL (prior experience)
- Libraries/Tools: Pandas, NumPy, Scikit-learn, TensorFlow, Keras, PyTorch, Matplotlib, Seaborn, ggplot2, Git

Aug. 2019 - May 2024 Berkeley, CA

Aug. 2014 - May 2018 Providence, RI

Jun. 2018 - Jun. 2019 Princeton, NJ

May 2022 - Aug. 2022

Livermore, CA

May 2024 -

Munich, Germany