




Milena Rmus

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EDUCATION

University of California, Berkeley

PhD, Cognitive Science

Aug. 2019 – May 2024

Berkeley, CA

*Focus: Using artificial neural networks to fit cognitive models to behavioral data
Application of computational models of learning*

Brown University

BS, Cognitive Neuroscience (Magna Cum Laude)

Aug. 2014 – May 2018

Providence, RI

EXPERIENCE

Helmholtz Institute for Human-Centered AI

Research Scientist

May 2024 –

Munich, Germany

- Utilized large language models (LLMs: GPT-4, LLAMA 3.1) to convert human behavioral decision-making data into simplified algorithms, revealing decision heuristics and strategies
- Achieved proof-of-concept results demonstrating LLMs' ability to reason through and analyze behavioral data**
- Led a team of research scientists and doctoral researchers in applying cognitive science principles to identify key elements of effective prompt design for LLMs

Lawrence Livermore National Laboratory

Data Science Intern

May 2022 – Aug. 2022

Livermore, CA

- Optimized amino acid sequences as mathematical expressions using Pareto optimization in Deep Symbolic Regression
- Pareto-optimized framework discovered simpler (reduced expression complexity by at least 2 terms) and equally accurate mathematical expressions.** DSR has since been implemented for optimizing amino acid sequences.
- Trained random forest models in Python (Scikit-learn) to classify protein compound binding affinity based on molecular descriptors, **with an area under ROC curve of .88**

Princeton University

Research Specialist

Jun. 2018 – Jun. 2019

Princeton, NJ

- Collaborated with a principal investigator and postdoctoral researcher to **conceptualize, execute and write a research paper** on the project contrasting the impact of mental state dynamics (transitions between states) and static features (e.g. associated facial expressions) on mental state representation
- Developed a web app hosted on amazon mechanical turk in JavaScript** (jQuery, jsPsych) to run psychological experiments on mental state dynamics, and stored data on Firebase
- Utilized machine learning tools (SVM classifiers, PCA, clustering) in Python and R to analyze behavioral data from online experiments

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**

Exploring The Synergistic Potential of Cognitive Science and Large Language Models

- Engineered cognitive models in Python by integrating large language models LLMs to interpret and analyze patterns in human behavioral data
- Leveraged LLMs for model identification and optimization, improving the accuracy of cognitive simulations
- Applied principles of cognitive sciencesuch as reasoning and learningto design effective task instructions and prompt engineering for LLMs

SKILLS

Languages: Python (expert), Matlab (expert), JavaScript(fluent), R(fluent), SQL (prior experience), LaTeX(prior experience)

Frameworks and tools: Pandas, Keras, TensorFlow, NumPy, Scikit-Learn, jQuery, jsPsych, Matplotlib, Seaborn, ggplot2, Git, Notion, Trello, Adobe Illustrator, Adobe Photoshop