Milena Rmus

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EDUCATION

University of California, Berkeley Aug. 2019 – May 2024
PhD, Cognitive Science Berkeley, CA

Brown University Aug. 2014 – May 2018
BS, Cognitive Neuroscience (Magna Cum Laude) Providence, RI

EXPERIENCE

Helmholtz Institute for Human-Centered AI May 2024 – present
Research Scientist Munich, Germany

- Led a research project on **reverse-engineering interpretable algorithms from behavioral datasets using Large Language Models (LLMs; Llama 3, Qwen 2.5, R1)**, with applications in human decision modeling and behavioral model discovery.
- Built model-fitting and evaluation tools and workflows using **Python, Hugging Face Transformers, PyTorch, and SciPy to support automated scientific discovery**.
- Developed benchmarking workflows with **Bayesian model selection, automated error checking, and iterative model revision via natural language feedback loops.**
- Supervised a cross-disciplinary team of junior researchers and collaborated with ML engineers to translate cognitive modeling insights into practical, scalable systems.

Lawrence Livermore National Laboratory May 2022 – Aug. 2022
Data Science Intern Livermore, CA

- 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.

UC Berkeley Sep. 2020 – Dec. 2020; Sep. 2023 – Dec. 2023
Graduate Student Instructor (Computational Models of Cognition) Berkeley, CA

- Designed and delivered discussion materials on algorithmic and neural architecture parallels between cognitive science and artificial intelligence.
- Synthesized advanced course content into accessible formats for diverse student backgrounds.
- Set up and maintained course infrastructure in collaboration with UC Berkeley Data Lab, deploying Jupyter Notebook servers for interactive, reproducible problem sets.

Princeton University Jun. 2018 – Jun. 2019
Research Specialist Princeton, NJ

- Oversaw experiment rollout, cross-site data integrity, and ran fMRI scanning sessions.
- **Developed a web app hosted on Amazon Mechanical Turk in JavaScript** (jQuery, jsPsych) 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 Large Language Models to generate Computational Models of Behavior

- Designed a framework leveraging LLMs (GPT-4, LLama 3, Qwen 2.5, DeepSeek R1) to generate executable Python code for computational cognitive models based on behavioral input data.
- Demonstrated that LLM-generated models **outperform traditional cognitive models in behavioral model fit and parsimony, surpassing literature baselines in 80% of evaluation domains**.
- Developed an automated feedback loop to detect scientific inconsistencies and iteratively refine model hypotheses through natural language interaction and code validation.

Using Artificial Neural Networks for fitting Computational Cognitive Models

- Simulated artificial agents in Python using generative cognitive models, including Reinforcement Learning and Bayesian inference frameworks.
- **Designed and trained custom LSTM- and GRU-based recurrent neural networks (RNN) in TensorFlow/Keras** for parameter recovery and model classification.
- Benchmarked the RNNs against the traditional parameter estimation methods (Maximum Likelihood Estimation, Approximate Bayesian Computation).
- Neural models achieved 3Œ higher accuracy and **4x faster performance in parameter estimation, and nearly 2x better accuracy with 3x speedup** in model identification compared to traditional approaches.

Detailed research interests and publications available at: **https://milenaccnlab.github.io/MilenaCV.pdf**.

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, Adobe Illustrator, Procreate