JAMES MOONEY

moone174@umn.edu | James Mooney | +1 651 955 9951

Education

University of Minnesota - Twin Cities Jan 2023 - Present
Ph.D. Computer Science *Minneapolis, MN*

University of Minnesota - Twin Cities Jan 2020 - Dec 2022
M.S. Computer Science *Minneapolis, MN*

University of Minnesota - Twin Cities Sep 2015 - Dec 2019
B.S. Computer Science (Math Minor), Magna Cum Laude with High Distinction *Minneapolis, MN*

Awards/Honors

John T. Riedl Memorial Graduate TA Award Apr 2021
University of Minnesota - Twin Cities *Minneapolis, MN*

Maroon and Gold Leadership Award Sep 2015
University of Minnesota - Twin Cities *Minneapolis, MN*

Publications

- Reference Quantization: Product Quantization of Activations in LLMS (*In Preparation*)
- Constrained Sparsity: Effects on Speculative Decoding, Intermediate Model Serving and Constrained Generation (*In Preparation*)
- Mooney, James. (2022). Classification with Mixture of Experts Models. Retrieved from the University of Minnesota Digital Conservancy, https://hdl.handle.net/11299/252470

Experience

Research Science Intern Jun 2024 - Aug 2024
Grammarly *San Francisco, CA*

- Performed experiments to identify areas where model efficiency may be improved on copy-related tasks
- Created a novel method which increases computational efficiency for large model decoding
- Expanded on existing benchmarks to extend them for use with the above method

Graduate Teaching Assistant Jan 2021 - Present
University of Minnesota - Twin Cities *Minneapolis, MN*

- Teaching Assistant for CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, Programming
- Answered student questions surrounding parallel programming languages/paradigms, parallel programming metrics/evaluation, and parallel architectures
- Created solutions and tests for programming problems involving CUDA, OpenMP, OpenMPI
- Created grading rubrics for evaluation of homeworks, quizzes, and labs

Co-Founder & CTO Dec 2022 - Nov 2023
SpectateVR *San Francisco, CA*

- Lead development of shared browser for VR
- Set up backend networking, server monitoring and metrics for application

Lecturer Jan 2023 - May 2023
University of Minnesota - Twin Cities *Minneapolis, MN*

- Lecturer for CSCI 5512 - Artificial Intelligence II
- Develop curriculum around probabilistic graphical models (PGMs), reinforcement learning (RL), and machine learning (ML)
- Construct homeworks and tests (and their solutions) for problems involving ML, RL, and PGMs
- Teach concepts in AI and Machine Learning to $\sim$ 70 undergraduate and graduate students

Graduate Research Assistant Jun 2022 - Aug 2022
University of Minnesota - Twin Cities *Minneapolis, MN*

- Extract laws from the Federal Register using OCR techniques
- Use deep topic modelling methods to determine how topics of laws change between administrations and agencies of the federal government

Engineering Development Intern May 2019 - Aug 2019
Mathworks *Boston, MA*

- Developed a company-wide internal testing and development tool
- Integrated development tool into internal company development ecosystem
- Responded to client bugs and issues in working with Matlab and Simulink

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Research Projects

Applying Sequence Learning Methods to Multi-Modal Fusion Jun 2019 - Dec 2019
with Prof Catherine Zhao *UMN - Twin Cities*

- Used sequence-to-sequence deep learning methods
- Compared various architectures and fusion methods for performance on a simulated dataset
- Presented findings for undergraduate honors thesis

HCAL Depth Segmentation in LHC Dec 2015 - Apr 2017
with Prof Jeremiah Mans *UMN - Twin Cities*

- Conducted simulations for the Large Hadron Collider using ROOT (a C++ library) on Unix
- Minimized radiation damage to the CMS detector (for tracking particle collisions)
- Presented findings to staff in the UMN physics department and to the CMS group at CERN

Additional Research Projects May 2019 - Present
UMN - Twin Cities

- Improving the Interpretability of Convolutional Networks on Recognition Tasks
- Inferring Semantic Class Relationships in Image Recognition Tasks
- Searching for Output Labels in Neural Networks

Personal Projects

Founder Apr 2018 - Dec 2018
Banter *Minneapolis, MN*

- Created a real-time sports chat application on iOS for people to talk about games as they happen.
- Developed Model-View-Controllers in Swift for the iOS version of the application
- Developed cron-jobs using Firebase and Google Cloud to poll for updates to scores of games and messages between groups