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Objective

Eager to harness an extensive background in computer science, I am deeply interested in advancing the fields of Large Language Models and knowledge graphs through high-performance computing and natural language processing. With a rich academic foundation and hands-on research, I aim to contribute to innovative projects that bridge theoretical chemistry, national security, and robotics. I am particularly motivated to explore opportunities that allow for the creative utilization of my diverse skill set to advance understanding and innovation in these cutting-edge areas.

Self Assessment

Over the past year, I started incorporating the work I was doing into my PhD focus. This included tensors and matrix decompositions. At first, I struggled to see the connection between the work I had done in the IRAL lab and the tensor group. However, as the winter comes to a close, the research has picked up traction. I worked on several papers that were most directly related to tensors, but this has begun to morph into large language models, which have extensive overlap with robotics, the primary focus of my time in the IRAL lab, and being heavily nested within NLP work. The most recent work that I have done in this regard is related to constructing knowledge graphs to serve as knowledge bases for LLMs. The LLMs can operate as robotic mind components, and so this is where I have set my sights to refine as I work toward my portfolio and, ultimately, my proposal. Future work exists for the synchronous operation of LLMS, robotics, and tensors.

Education

Doctor of Philosophy in Computer Science (*Present*)
University of Maryland Baltimore County (UMBC)

Master of Science in Computer Science (May 2023) GPA: 3.74
University of Maryland Baltimore County

College Teaching and Learning Science Certificate (May 2023)
University of Maryland Baltimore County, 2023

Bachelor of Science in Computer Science GPA: 3.756 (Magna Cum Laude) (Jan. 2021)
University of Maryland Baltimore County

Bachelor of Arts in Political Science GPA: 3.756 (Magna Cum Laude) (Jan. 2021)
Honors: Pi Sigma Alpha: Political Science Honor Society
University of Maryland Baltimore County

Academic Appointments

Adjunct Lecturer, Department of Computer Science, University of Maryland Baltimore County (UMBC), Aug 2022 - Jul 2023

- Instructed various computer science courses emphasizing programming, data structures, and data science. Courses:
 - CMSC 201: Introduction to Computer Science I (Python)
 - CMSC 210: Advanced Programming (Python)
 - CMSC 310: Data Analysis and Structures (Python)

- CMSC 462: Introduction to Data Science (Python)
- CMSC 341: Data Structures (C++)

Graduate Research Assistant (GRA), Los Alamos National Laboratory (LANL), 2022-2024

- Engaged in cutting-edge research in the fields of Large Language Models (LLMs), knowledge graphs, tensors, high-performance computing, and natural language processing,
- Collaborated with the Theoretical Chemistry and Cybersecurity Analytics teams to apply advanced computational techniques to solve problems in cybersecurity and chemical discovery.

Graduate Teaching Assistant, Computer Science Department, University of Maryland Baltimore County (UMBC), Jan 2021 - Jan 2023

- Principles of Computer Security (CMSC 426): Supported Spring 2022 class by Professor Joyce.
- Natural Language Processing (CMSC 473/673): Assisted Dr. Ferraro in Fall 2021; responsibilities included constructing answer keys, grading assignments, delivering a guest lecture, and hosting office hours.
- Social and Ethical Issues in Information Technology (CMSC 304): Instructed Summer 2021 class periods under Dr. Dixon, held office hours, and graded papers.
- Operating Systems in the C Programming Language (CMSC 421): Aided Professor Tompkins in Spring 2021 with creating test cases for system calls, utilizing GitHub API for project compilation, conducting office hours, and grading projects.

Undergraduate Teaching Fellow & Assistant, Department of Computer Science, University of Maryland Baltimore County (UMBC), Aug 2019 - Dec 2020

- C++ Data Structures (CMSC 341): Served as a Teaching Fellow in Fall 2020 for Dr. Donyaee, resolved peer coding issues, conducted office hours, and graded projects.
- Python Programming (CMSC 201): Worked as a Teaching and Lecture Assistant for Dr. Johnson and Professor Hamilton in Fall 2019 and Spring 2020; tasks included teaching discussion periods, holding office hours, scoring exams, assisting active learning in lectures, and addressing peer coding queries.

Publications

Submitted:

- "Cyber-Security Knowledge Graph Generation by Hierarchical Nonnegative Matrix Factorization", *March 2024*.

Accepted:

- "Catch 'em all, Classification of Rare, Prominent, and Novel Malware Families", *March 2024*.
- "Robust Adversarial Defense by Tensor Factorization", *September 2023*.
- "Interactive Distillation of Large Single-Topic Corpora of Scientific Papers", *September 2023*.
- "Head Pose as a Proxy for Gaze", *May 2023*.
- "Lessons from a Small Scale Robot", *March 2023*.
- "A Comparative Analysis of VR-Based and Real-World Human-Robot Collaboration for Small-Scale Joining", *March 2023*.

- "Head Pose for Object Deixis in VR-Based Human-Robot Interaction", *September 2022*.
- "A Collaborative Building Task in VR vs. Reality", 2022
- "A Spoken Language Dataset of Description for Speech Based Grounded Language Learning", 2021.

Research Projects

- Dense Domain-specific Knowledge graph construction for LLM knowledge bases
- Exhaustive Robotics Scientific publication organization and categorization
- Training datasets for LLM fine-tuning
- Matrix decomposition methods for large, irregular text patterns

Skills and Technologies

- Programming Languages: Python, C, C++, GO, Fortran, UNIX,
- Software & Tools: Git, Docker, LaTeX
- Other Relevant Skills: Teaching, Robotics, NLP, Machine Learning, Tensors

Certifications

- **Neo4j-backed Chatbot**
 - Issuer: Neo4j
 - Issued: November 2023
 - Credential ID: a6ddc733-a6c6-4755-aeb9-f476db78b789
- **Neo4j & Large Language Models Fundamentals**
 - Issuer: Neo4j
 - Issued: November 2023
 - Credential ID: b6a2a7f6-9e62-4922-a034-42661ec675cc
- **Applying the QM Rubric**
 - Issuer: QM Quality Matters
 - Issued: October 2021
- **Social/Behavioral Research Course**
 - Issuer: CITI Program
 - Issued: May 2021
 - Expires: May 2026
 - Credential ID: 42413546
- **Research with Data or Laboratory Specimens**
 - Issuer: CITI Program
 - Issued: May 2021
 - Expires: May 2026
 - Credential ID: 42415242

Professional Affiliations None

Conferences and Presentations None

References Available upon request.

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