Helen Jenne

Data Scientist

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OBJECTIVE

Eager to leverage data-driven tools to address diverse business challenges. Highly motivated data scientist with a passion for facilitating decision-making in the digital world through cutting-edge mathematical applications.

EXPERIENCE

Pacific Northwest National Laboratory, Seattle, WA

Post Doctorate RA *02/2022 - Present*

Projects:

Cyber situational awareness using topological data analysis

- Headed the Interpretability Task, leading a team of four data scientists employing diverse analytical methodologies. Guided the synthesis of findings, ensuring a comprehensive understanding of how distinct analyses intersect and collectively inform data-driven insights.
- Analyzed large (264GB) temporal cyber dataset using graph and hypergraph representations; identified patterns indicative of malicious events from data set ground truth using innovative techniques from topological data analysis. Analysis required use of HPC clusters.
- Spearheaded the writing of a group paper communicating research findings to a general technical audience, earning an Outstanding Performance Award for this achievement.

Deep Data Profiler: An ML Interpretability Framework

- Specialized in interpretability for image classification CNNs, leveraging discrete math to identify crucial neurons for various classes and uncover relationships between neurons and features.

Deep Learning and mathematical reasoning

- Applied deep learning techniques to derive a novel result in combinatorics, specifically within the realm of 0-1 matrices corresponding to certain representations of permutations.
- Trained CNN on a dataset of 100,000 matrices, calculated feature attribution representations using Shapley values, and conducted a thorough analysis via *k*-means clustering on the attribution representations. (See paper accepted to the MATH-AI workshop at NeurIPS'23 for details.)

PhD Intern *Summer 2015, 2017, 2018, 2019*

- Improved graph visualization through the development of Python code, successfully reducing the size of intricate network traffic graphs to 10% of their original size, substantially enhancing clarity and interpretability.

CNRS, Institut Denis Poisson, University of Tours, France

Postdoctoral Researcher *09/2020 - 08/2021*

University of Oregon, Eugene, OR *09/2014 - 06/2020*

Instructor of record for 10 quarters.

EDUCATION

University of Oregon

Ph.D. in Mathematics *06/2020*

M.S. in Mathematics *12/2017*

Specialization: discrete math

Whitman College

B.A. in Mathematics and Psychology *05/2013*

Graduated summa cum laude with honors in both majors

PROGRAMMING SKILLS

Python and Python libraries (PyTorch, PANDAS, NetworkX, NumPy, SciPy, Matplotlib, SciKit-Learn), MATLAB, SageMath

COMMUNICATION

Demonstrated excellence in creating engaging presentations, adept at tailoring content to suit the technical proficiency of diverse audiences. (Refer to CV for comprehensive list.)

AWARDS

- Accepted to Rising Stars in Computational & Data Sciences, 2023
- Postgraduate Laboratory Mission Award Finalist, 2022
- Early Career Invited Lecture Award, University of British Columbia, 2021
- Jack and Peggy Borsting Award for Scholastic Excellence, 2020
- UO CAS Dissertation Research Fellowship, 2019-20

SERVICE

- Reviewer for ICML 2023 Topological Deep Learning Challenge.
- Member of organizing committee for FPSAC 2020 Online.
- Mentor in UO grad student mentoring program.