Michael Scutari

Education

2021–Present

Duke University, Pratt School of Engineering,
BSE in Electrical and Computer Engineering, BS in Computer Science, GPA: 3.76
Honors: Pratt Research Fellow, Dean's List with Distinction (3x)
Relevant Coursework: Data Structures and Algorithms (A), Theory and Algorithms in Machine Learning (A), Machine Learning and Deep Neural Nets (A+), Digital Signal Processing (A), Probability and Statistics (A), AI for Protein Design (Spring 25), Probabilistic Machine Learning (Spring 25)

Work Experience

Dec 2024 – Present

Interpretable Machine Learning Researcher, *Rudin Lab*
- Developing new deep learning methods for interpretable image recognition via prototype learning.
- Focus on applied mathematics and mathematical proofs to develop rigorous solutions.
- One of 5 selected from a pool of 125+ applicants to work with Professor Rudin.

Aug 2024 – Present

Protein Machine Learning Researcher, *Singh Lab*
- Researching application of LLMs in drug discovery and protein interaction prediction.
- Applying machine learning and statistical analysis to predict protein-chemical interactions, managing large datasets.
- Special focus on development of new model architectures and diffusion-based generative modeling.

Aug 2024 – Present

Teaching Assistant, *Duke ECE Department*
- Instruction of ECE 110 Lab, mentoring 16 students to victory in the inter-lab competition.
- Leading weekly lab sessions, grading assignments, and providing feedback on student projects.
- Ranked number one of all ECE 110 TAs in student evaluations.

Sep 2023 – Aug 2024

Electrical Systems Researcher, *General Robotics Lab (GRL)*, generalroboticslab.com
Summer 2024: Full-time Research Associate as part of the Pratt Fellowship, leading to CORL 2024 submission.
- Operated under the guidance of Dr. Boyuan Chen, collaborated with 3 undergraduate students and 1 post doc.
- Led electrical and control systems development for an experimental humanoid robot platform.
- Engaged in a professional lab environment including weekly meetings, presentations, funding demonstrations, paper reviews, and paper writing.

Aug 2023 – March 2024

Project Lead, *Ranker Program Refactor (Java)*
- Initiated collaboration with the University of Notre Dame's Amboseli Baboon Research Project.
- Led a team of 3 developers, overseeing both front-end and back-end improvements to the Ranker program's GUI.
- Implemented AI algorithms which improved the program's ranking accuracy.

Projects

Jan 2024 – May 2024

Low-cost 3D-Printed Robot Design, *ME555 - Robot Studio*
- Designed a low-cost, 3D-printed quadruped robot from scratch incorporating Fusion360, Python, and ROS.
- Developed algorithms for sensor data processing and robot navigation, simulating scenarios using Isaac Sim to validate models.

Nov 2023 – Feb 2024

Independent Study, *Ethics of Machine Learning in Education*
- Conducted an independent study under the guidance of Dr. Shani Daily to explore the ethical implications of large language models (LLMs) for use in education.
- Investigated the potential for LLMs to exhibit bias and the nature of the potential bias.

Sep 2018 – July 2022

CEO and Team Member, *SEAL Robotics Team*, sealroboticsteam.com
- Directed a multidisciplinary team of 10 in designing and operating an underwater ROV.
- Achieved 5th and subsequently 1st place in the world rankings.
- Twice personally honored with the MVP Award for Outstanding Engineering.

Done for fun!, *Personal Projects*
- Used ChatGPT API to create a medical chatbot that indexes a RESTful API to provide diagnostic assistance. Created as part of Duke University's Generative AI hackathon.
- Developed Python LLM trained on the works of Shakespeare. Based on GPT-2 and *Attention is All You Need*.

Technical Skills and Proficiencies

- Languages: Python (PyTorch, TensorFlow, scikit-learn, pandas, NumPy), C++, Git, SLURM.
- Machine Learning: GPU cluster utilization, model development and optimization, hyperparameter tuning, data processing and analysis.
- Mathematics: Advanced linear algebra, calculus, probability, proof-based techniques, statistical modeling.

Interests and Hobbies

- Diffusion Structure and AI Models Reading Group.
- Manager/Sound Engineer for the band *Weekend Therapy*.
- Member and Competitor in Duke's Brazilian Jiu-Jitsu Club.

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