Vashisth Tiwari

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Education

Carnegie Mellon University — Pittsburgh, PA
Master of Science in Artificial Intelligence Engineering — *Dec 2024*
- **Courses (Fall'23):** Applied Stochastic Processes, Introduction to Convex Optimization, Introduction to Machine Learning, Systems and Tools for AI Engineering

University of Rochester — Rochester, NY
Bachelor of Science in Physics, Bachelor of Arts in Mathematics (GPA: 3.97/4.00) — *May 2023*
- **Courses**: Deep Learning, Data Structures & Algorithms, Modern Statistics & Exploration, Honors Linear Algebra

Experience

Mana — May 2022 – Aug 2022
Research Intern — *San Francisco, CA*
- Utilized statistical techniques to analyze stock price distributions and quantify investment risk, resulting in predictive machine learning models for assessing expected yields on potential investments
- Contributed to automation of smart-contract decoding using Python and Solidity, to track transactions, logs, etc.
- Developed a demonstrative project prototype illustrating the feasibility of directly tracking data (ingestion, indexing, and visualization) from the block-chain for Ethereum on UniSwap, eliminating reliance on third-party data streams

Los Alamos National Laboratory — Jun 2021 – Aug 2021
Research Intern — *Los Alamos, NM*
- Modeled complex quantum system (atom interferometer beam splitting) using Python and utilized numerical differential equation solvers in Mathematica and Python
- Discovered optimal laser pulse parameters through high-dimensional data optimization and parameter estimation using SciPy, CvxPy, and reinforcement learning
- Improved the system performance by 5% beyond the current state-of-the-art pulse parameters using optimized pulses

Dark Energy Spectroscopic Instrument (DESI) — Jan 2020 – May 2021
Undergraduate Research Assistant — *Rochester, NY*
- Designed multi-class CNNs for spectral data with TensorFlow, scikit-learn to find galaxies with supernovae
- Enhanced network performance by applying noise-removal techniques like binning, filtering to preprocess spectral data
- Achieved 95%+ accuracy and high precision for supernovae classification tasks in the DESI data pipeline

Projects

Quantifying Noise in Superconducting Qubits @Bloc Lab (Univ. of Rochester) — Sep 2021 - May 2023
- Characterized the noise in a quantum computer by comparing the probability distributions of the lab data with the expected distributions from quantum and statistical physics
- Utilized neural networks to classify readouts of different quantum states and reduced readout errors in the setup

How good is your pose? (Univ. of Rochester) — Dec 2022
- Worked with 3 team members to build CNNs and modify ViTPose (Vision Transformer for Pose Estimation) to quantify lifting form and suggest improvements

PersonaLearn @HackMIT (MIT) — Oct 2022
- Collaborated with 4 hackers to build an education assistance tool to reinforce the topics the student found confusing
- Wrote the backend with YouTube and OpenAI apis to process user input, generate transcription summaries, and create better recommendations from Youtube based on user input of what topics were confusing to them

Awards & Leadership

- Harry W. Fulbright Prize (2023); Undergrad Teaching Award (2023); Semi Finalist Rhodes Scholarship, India (2022)
- Winner Citadel Securities x CMU Trading Challenge: Worked on algorithms to maximize return in a game (2023)
- (President) Society of Physics Students: Spearheaded an initiative to promote STEM education through interactive DIY activities for students at Rochester City School District; won outstanding chapter award

Skills

Programming Languages: Python, Java, Mathematica, Solidity, SQL
Libraries: PyTorch, TensorFlow, Keras, NumPy, Pandas, Scikit-Learn, Qiskit, SciPy, Spark
Math: Ordinary & Partial Differential Equations, Probability, Calculus, Analysis, Abstract Algebra, Linear Algebra

Publications & Presentations

[1] Uzun C., Pandey S., **Tiwari V.**, et al. "High-efficiency Bose-Einstein condensate splitting using tailored optical standing-wave pulses". In: Atoms (2022) [Submitted]

[2] Cusenza A., Dunkelberg A., Huffman K., Ke D., Kleber D., Miller S. J., Mizgerd C., **Tiwari V.**, Ye J., and Zheng X. "Bounds on Zeckendorf Games". Fibonacci Quarterly (2020)

[3] Kevin Ke, Carl Ye, **Vashisth Tiwari** "Zeckendorf Games" Young Mathematicians Conference (2020)

[4] Wasserman A., **Tiwari V.**, et al. "Using ML to Develop a Transient Identification Pipeline for DESI" AAS (2021)