Pratik Shukla

pratiks2@umbc.edu ❖ (848) 234-4459 ❖ Halethorpe, MD

WORK EXPERIENCE

University of Maryland Baltimore County Aug. 2022 – Present *Graduate Research Assistant Baltimore, MD*

- Developed a groundbreaking neural network paradigm that revolutionizes long-term predictions in S2S forecasting. Our approach integrated Daubechies Wavelet Decomposition, Convolutional Neural Networks, and transformer-enhanced Adaptive Neural Operators to decode intricate spatiotemporal patterns in climate data. The model's transformer-based architecture excels in sequence modeling, resulting in significantly improved predictions for 2m Temperatures compared to conventional methods, with Root Mean Squared Error (RMSE) and Anomaly Correlation Coefficient (ACC).
- Applied our innovative neural model to address the escalating risk of wildfires in Boreal forests across North America and Eurasia. Focusing on subseasonal-to-seasonal predictions, we harnessed the model's capabilities to forecast annual CO2 emissions, considering potential evapotranspiration and 2m Temperatures. This approach can potentially simulate short-term droughts and significantly contributes to understanding climate-wildfire interactions, particularly within the context of global Boreal Forests and the development of Wildfire Digital Twins.

Cohere AI Oct. 2022 – May 2023 *Machine Learning Intern - NLP Remote Work*

- Developed and fine-tuned GPT-based language models to enhance their performance across diverse natural language processing applications, encompassing text generation, summarization, and sentiment analysis.
- Worked in close collaboration with seasoned machine learning engineers to conceptualize and execute innovative deep learning frameworks tailored to the specific requirements of NLP tasks, leveraging the powerful capabilities of GPT models.

University of Maryland Baltimore County Aug. 2021 – Jul. 2022 *Graduate Teaching Assistant Baltimore, MD*

- Assisted professors with lesson plans, lectures, group discussions, office hours, and led weekly sessions, resulting in high student satisfaction and department head approval.

Snorkel AI Mar. 2021 – Jul. 2021 *Technical Content Writer - Machine Learning Palo Alto, CA*

- Produced and authored top-tier blog posts, white papers, and technical documentation focused on machine learning subjects, significantly boosting website traffic, and enhancing lead generation.
- Conducted in-depth research into the latest machine learning developments and trends, crafting original and captivating content that fostered greater engagement on social media platforms.

Towards AI Jan. 2019 – July 2021 *Machine Learning Engineer and Lead Technical Content Writer Pittsburgh, PA*

- Designed and deployed machine learning algorithms, enhancing accuracy by incorporating supervised and unsupervised models, deep learning, and reinforcement learning.
- Conducted extensive analysis of large datasets using Python and SQL, leading to a 20% improvement in data accuracy and a significant 30% reduction in processing time.

SKILLS

- **Programming:** Python(PyTorch, TensorFlow, Keras, SciPy, Scikit-learn, NumPy, Pandas, Matplotlib, Seaborn), R, C, C++, JavaScript, PHP, SQL
- **Software Tools:** IDLE, PyCharm, NetBeans, Atom, Git, Gitlab, Jupyter Notebook, Tableau, Power BI
- **Core Competencies:** Model Development, Predictive Analysis, Explanatory Data Analysis, Data Analysis, Statistical Modeling, Data Mining, Data Visualization, Clustering and Classification, Object Oriented Programming, Software Development, Web Scraping, Cloud Computing, Data Structures and Algorithms, Reinforcement Learning, NLP, Computer Vision
- **Certifications:** Coursera - Machine Learning Certification, IBM - Data Science Professional Certificate, Google - TensorFlow Developer Certification, AWS - Certified Machine Learning – Specialty

PRESENTATIONS

- Accepted to present the research paper titled 'Decoding Climate Complexity: Novel Approaches to S2S Forecasting through Advanced AI Technology' at the American Meteorological Society's 23rd Conference on Artificial Intelligence for Environmental Science, which is part of the 104th AMS Annual Meeting scheduled for January 28 - February 1, 2024, in Baltimore, MD, and virtually.
- Accepted to present the abstract titled 'A Multimodal AI Neural Operator Architecture Approach for Digital Twin Simulations: An Application to Climate Feedback Processes from Boreal Forest Wildfires' at the AGU23 Meeting, which will be held in San Francisco, CA, and virtually from December 11 to 15, 2023.
- Accepted to present the abstract titled 'Atmospheric Interactions with Boreal Forest Wildfires: A Vicious Cycle' at the AGU23 Meeting, which will be held in San Francisco, CA, and virtually from December 11 to 15, 2023.
- Delivered a presentation on the ceilometer project at the FASMEE 2023 final presentations, effectively communicating project findings and insights to a diverse audience.
- Delivered a presentation on 'A Data-Driven AI/Machine Learning Approach to Conduct OSSEs' at the American Meteorological Society (AMS) 2023 conference.

PUBLICATIONS

- Published a book - Descriptive Statistics for Data-driven Decision Making with Python
- Proving the Convexity of Log-Loss for Logistic Regression
- How did Binary Cross Entropy Loss Come into Existence?
- The Gradient Descent Algorithm
- The Non-Convexity Debate in Machine Learning
- Unlocking the Power of Concave and Convex Functions in Machine Learning
- Mastering Derivatives for Machine Learning
- Mathematical Intuition Behind the Gradient Descent Algorithm
- The Gradient Descent Algorithm and its Variants
- Why Probability and Likelihood Are Not the Same Thing
- The Sigmoid Function: A Key Building Block in Neural Networks
- Neural Networks from Scratch with Python Code and Math in Detail
- Natural Language Processing (NLP) with Python
- Moment Generating Function For Probability Distribution with Python
- Survival Analysis with Python Tutorial - How, What, When, and Why
- Machine Learning Algorithm for Beginners with Code Examples in Python
- Main Types of Neural Networks and its Applications - Tutorial
- Monte Carlo Simulation: An In-depth Tutorial with Python
- Diving Deep into Pandas DataFrame Join -- pd.join()
- Handling Missing Values in Pandas
- Understanding Pandas Melt -- pd.melt()
- The Seven Planet Riddle

EDUCATION

University of Maryland Baltimore County — **Expected May 2026**
Ph.D., Computer Science — *Baltimore, MD*

University of Maryland Baltimore County — **Aug. 2021 - May. 2023**
M.S., Computer Science (GPA: 3.76/4.0) — *Baltimore, MD*

Gujarat Technological University — **Aug. 2015 - May. 2019**
B.E., Computer Engineering (GPA: 9.71/10.0) — *Ahmedabad, Gujarat*