Yash Diggikar

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LinkedIn — GitHub — Website

Experience

Research Assistant – Center for Accelerated Real-Time Analytics (CARTA), UMBC 2024 – Present
Advisor: Dr. Milton Halem

- Developing and testing transformer-based architectures and physics-informed neural networks to advance AI-driven weather and climate forecasting.
- Running large-scale experiments with GraphCast (DeepMind), FourCastNet v2 (SFNO, NVIDIA), and Aurora (Microsoft); incorporating data assimilation frameworks into inference to evaluate the impact of satellite observations with AI-based forecasting systems and to study how these models learn and represent the underlying physics of weather.
- Developed an AI-based OSSE (Observing System Simulation Experiment) framework — a method for evaluating the impact of current or future satellite observing systems using simulated observations; **abstract accepted to the American Meteorological Society (AMS)**.
- Performing extensive ensemble forecast experiments on HPC clusters.
- **Master's Thesis (in progress):** Fine-tuning **Aurora (1.3B parameters)** on **CERRA** reanalysis at **5.5 km** (Europe) to increase spatial resolution, improve regional downscaling skill, and advance high-resolution regional AI-based forecasting.

Teaching Assistant – Operating Systems (CMSC 421), UMBC Spring 2025

- Assisted students with programming projects on threading, file systems, and networking.
- Managed setup and maintenance of student virtual machines (VMs), including account creation, permissions configuration, and technical troubleshooting.

Research and Development Intern – Tata Consultancy Services, Hyderabad, India Jul 2023 – Jun 2024

- Worked on a study to improve wafer yield and operational efficiency in the semiconductor industry through multi-objective optimization.
- Used machine learning libraries including pymoo, scikit-learn, and TensorFlow to develop algorithms tailored for wafer yield optimization.
- Conducted data analysis with ML models, PCA, and clustering to find insights such as early defect indicators and maintenance patterns, supporting anomaly detection and predictive maintenance.

Projects

AI-Based OSSE – FourCastNet v2 (SFNO), Aurora

- OSSE with **FourCastNet v2 (SFNO)** - Source Code
- OSSE with **Aurora** – Source Code

AI Surgical Navigator – YOLO, ResNet, React, MongoDB, Node.js – Source Code

- Built an AI app for surgical instrument/procedure detection (ResNet segmentation, YOLO detection) with a responsive React front-end and MongoDB/Node.js backend.

Neural Bird Classifier – TensorFlow, InceptionV3, Flutter – Source Code

- Achieved 95% accuracy training InceptionV3; deployed a Flutter mobile app for real-time species prediction.

Skin Cancer Detection – CNN, OpenCV, Data Augmentation

- Developed a custom CNN; showed that augmentation (rotations, flips, brightness) and feature extraction improved robustness vs. ResNet/VGGNet/InceptionNet.

Education

University of Maryland, Baltimore County (UMBC) 2024 – Present
Master of Science in Computer Science

Keshav Memorial Institute of Technology (KMIT), Hyderabad 2020 – 2024
Bachelor of Technology in Computer Science (AI-ML)

Technical Skills

Programming: Python, Java
Frameworks/Libraries: PyTorch, TensorFlow, Keras, JAX, scikit-learn, spaCy, pymoo, pandas, xarray, numpy, matplotlib, cartopy, netCDF4, Node.js, React
Core Skills: Physics-Informed Neural Networks (PINNs), Neural Operators, Transformers, Spatiotemporal Deep Learning, Scientific Machine Learning (SciML), Data Assimilation, Geophysical Time-Series Modeling, Machine Learning, Deep Learning, Data Visualization, Problem Solving
Tools/Platforms: Linux, Git, Docker, HPC (A100/H100 GPUs, Distributed Training, NetCDF/GRIB/Zarr Handling, Data Engineering