Akshath Raghav Ravikiran

765-404-8121 araviki@purdue.edu linkedin.com/in/akshathrr github.com/AkshathRaghav

Education

Purdue University **West Lafayette, IN || August 2022 – May 2026**

Bachelor of Science in Computer Engineering *GPA: 3.97*

Activities: AWS OpenSearch (Cluster Benchmarking), Purdue-BIDC VIP (Software Lead), ML@Purdue (Operations Officer)

Publications

Time-Driven Fire Risk Forecasting: Leveraging Historical Trends for Enhanced Seasonal Modeling

Report on modelling systems that achieve 90%+ accuracies across pertinent metrics; validations against government forecasts.

Experience

TensorFlow Model Developer **August 2023 – Present**

Google ML X Purdue Duality Lab (Prof. James Davis, Purdue-ECE) *West Lafayette, IN*

- Re-engineering the state-of-the-art **MaskFormer** model, focused on panoptic segmentation, for Google's **TensorFlow Model Garden**. Conducted experiments on GPUs & TPUs to rectify issues in the existing architecture & dataloaders.
- Implemented functions to ensure data consistency and layer precision throughout the model and worked on evaluation scripts, including the implementation of the Panoptic Quality (PQ) metric for accurate model assessment.

Software Lead **September 2023 – Present**

Claridge Lab (Prof. Shelly Claridge, Purdue-BME) *West Lafayette, IN*

- Deployed a **U-Net** architecture for segmenting ROIs within custom-processed Z-Stacks, obtained from **Confocal Microscopy** experiments, towards analyzing the efficiency of the lab's route of designing 1-nm materials.
- Leveraging Z-Stack intensities for 3D structural mapping, and using the generated point cloud to identify areas of improper monolayer placement (on graphene) for assessing the material's desorption resistance.

Data Science Intern **March 2023 – July 2023**

Ambee (Climate Intelligence) *Bangalore, India*

- Created a global forest-fire forecasting system (F3) that was integrated into Ambee's proprietary **API** dashboard, enabling comprehensive risk assessment. Developed modularized components implemented within an end-to-end **AWS** lifecycle ensuring tri-monthly forecast generation, complimented by robust **ETL pipelines**.
- Co-authored a research paper outlining unique strategies targeting historical Fire Weather Index, enhancing a **Boosted Multi-Target RF Regressor's** performance to surpass government forecasts (NIFC & CWFIS) in risk classification.

Data Science Lead **December 2022 – April 2023**

Lightning Wildfire Lab (Prof. Yuan Wang, Purdue-EAPS X NASA) *West Lafayette, IN*

- Supervised codebase development for short-term wildfire forecasting; Responsible for bundling netCDF data on the basis of temporal, spatial and spatio-temporal features to package into **LSTM**, **CNN** and **ConvLSTM** models.
- Automated API requests for large scale fire data collection from USGS and Copernicus; Developed scripts using **Xarray**, **GeoPandas** and **netCDF4** to process Landsat and GeoTIFF data from NASA/NOAA satellites.

Projects

AutoRecruit - HackHarvard '23 *Django, Modal, ElevenLabs, Deepgram, OpenCV2*

- Implemented a context-mapped custom knowledge-graph to help an LLM dynamically generate interview questions considering real-time context, and maintain accurate conversational flow to guide the system's evaluation of applicants.
- Fine-tuned a Multi-layer Perceptron for audio analysis and integrated **DeepFace** for emotion detection, deploying these through Modal. Integrated React and Django using WebSockets for real-time speech transcription with **Deepgram** and used **ElevenLabs** for streaming text responses.

genCollab - CalHacks '23 *Flask, Discord, OpenAI, Redis*

- Integrated GenCollab within Discord for AI-assisted software development collaboration; Enabled the system to automatically develop roadmaps, allocate tasks based on roles and track it's own developed project structure.
- Engineered a end-to-end RAG-like flow on Redis-scraped data to ensure that GPT-4 holds enough context to generate code that can be easily integrated into the evolving codebase. Utilized a **hierarchical long-term memory system** that allows for a tree-traversal mechanism to gather more context.

Technical Skills

Languages: Python, C, Java, JavaScript, PostgreSQL, MATLAB, R
Frameworks: TensorFlow, PyTorch, Xarray, GeoPandas, OpenCV2, GDAL, NumPy, Pandas, Rasterio, Django, Node.js
Tools: Docker, MindsDB, Google Cloud Platform (Compute), AWS (S3, SageMaker)