Anjali Kaushik

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EDUCATION

Arizona State University   **Tempe, Arizona, USA**
Master of Science, Computer Science, *August 2024 - Present*   GPA: 3.77/4
- Fall'24 Coursework - Deeplearning Applications, Image Processing & Analysis, Multimedia & Web Databases
- Spring'25 Coursework – Reinforcement Learning, Machine Learning Acceleration, Cloud Computing

Vellore Institute of Technology   **Bhopal, Madhya Pradesh, India**
Bachelor of Technology, Computer Science and Engineering, *July 2018 - May 2022*   GPA: 8.99/10

EXPERIENCE

Arizona State University   **Tempe, AZ, USA**
Knowledge Discovery & Data Mining Group - Research Assistant   *March 2025 – Present*
- Working on the applications of Reinforcement Learning in Causality. Training an agent to discover causal relationships in complex environments and datasets.
- Conducting a comparative study with different methods of measuring causal relationships and losses.

Shell PLC   **Bengaluru, Karnataka, India**
Associate Analytics Engineer   *August 2022 – August 2024*
- Worked on large complex financial data using Alteryx and SQL databases to automate workflows which resulted in 40% reduction in the workload of the team. Built an interactive dashboard to provide a holistic view of the finances.
- Collaborated with a global team on a deep learning-based image analysis project for lube monitoring. It involved developing a python-based model for ROI detection and classification. Worked with Linux clusters to enhance workflow efficiency.
- Automated geo-mechanical experiments with python which lead to a drastic reduction in the time to generate reports by 50% per lab technician.
- Developed a process automation framework for business-critical deployments for disaster recovery involving more than 100 applications. This led to a reduction in the workload of 3 business days per team member.
- Developed an interactive dashboard to track 150+ business continuity services, including disaster recovery and enterprise recovery for business-critical applications.
- Collaborated with 20+ application owners, stakeholders, and vendors to ensure the seamless execution of the disaster recovery process being a disaster recovery focal point.

HabitUp   **Remote**
Software Development Engineer (Intern)   *March 2022 – June 2022*
- Developed a habit tracking android application using the flutter framework. Successfully published the app on the google play store. Enabled over 100,000 users to successfully track their habits through the app.

Technocolabs   **Remote**
Machine Learning Engineer (Intern)   *February 2021 – April 2021*
- Worked on machine learning algorithms/models using python. Developed a minor individual project on "Toxic Comments Classification' (web app).
- Lead a team of five members for a major group project on 'Predicting Movie Ratings' (web app).

PUBLICATIONS & PATENTS

Vellore Institute of Technology   **Bhopal, Madhya Pradesh, India**
Advanced Deepfake Detection using Inception-ResNet-v2   *August 2021 – May 2022*
- Published in ICCIS'23 by the Soft-Computing Society of India: Deepfake Detection using Inception-ResNet-V2 with an interactive GUI.- Advanced Deepfake Detection Using Inception-ResNet-v2-paper-link

Shell PLC   **Bengaluru, Karnataka, India**
MITRA (Patent Pending)
- Marine Inspection Tool for Rating and Assessment: A solution in lube monitoring used for image classification with 90% accuracy.

PROJECTS

Arizona State University   **Tempe, Arizona, USA**
Reinforcement Learning for Assembly Planning with the Burr Puzzle   *January 2025 – Present*
- Developed an offline reinforcement learning pipeline to solve complex mechanical assembly tasks using the Burr Puzzle as a proxy for multi-part object assembly under physical constraints.
- Designed a novel vertex-based action space enabling collision-free, gravity-aware assembly moves, and implemented a pruned n-step lookahead with greedy rollout for efficient planning.
- Accelerated planning via Assembly-by-Disassembly strategy, reducing search complexity and achieving successful six-piece puzzle assembly with up to 35 % fewer stages compared to traditional one-arm methods.

Implementation of Flash Attention in CUDA   *January 2025 – Present*
- Implementing Flash Attention for large language models (Llama 3), reducing inference latency and memory bandwidth through operator fusion and SoftMax tiling.
- Using Triton compiler to create attention modules, minimizing HBM transfers and enhancing memory access, resulting in improved throughput.

Edge-Based Face Recognition Pipeline using AWS IoT Greengrass   *April 2025 – May 2025*
- Designed and deployed a distributed face recognition pipeline by integrating AWS IoT Greengrass, MQTT, Lambda, and SQS for low-latency edge processing.
- Implemented real-time face detection on simulated IoT edge devices using MTCNN and Python components deployed via custom Greengrass components.
- Enabled secure device-to-cloud communication by configuring AWS IoT Core policies, certificates, and MQTT bridges for message exchange.
- Triggered cloud-based FaceNet-based face recognition via SQS queues and Lambda functions, maintaining a privacy-preserving and scalable architecture.

Serverless Face Recognition Pipeline with AWS Lambda & ECR   *March 2025 – April 2025*
- Developed a face recognition service using AWS Lambda, Docker, and Elastic Container Registry (ECR) to enable serverless ML inference on streaming video frames.
- Built and containerized custom Lambda functions for face detection (MTCNN) and recognition (FaceNet) with PyTorch models, deployed via ECR.
- Integrated AWS SQS for decoupled communication between detection and recognition stages, ensuring scalability and low latency.

Cloud-Based Face Recognition System Architecture and Optimization   *February 2025 – March 2025*
- Designed a scalable cloud-based face recognition system on AWS using S3, SQS, and dynamic EC2 instances for efficient image processing.
- Built a responsive Python web tier to handle HTTP requests, manage cloud storage, and coordinate communication between the UI and processing layer.
- Engineered the application tier for deep learning inference with PyTorch, processing images from cloud storage and returning results via asynchronous message queues.
- Developed an auto-scaling controller to dynamically provision resources, optimizing costs and ensuring system responsiveness with zero idle instances.

Self-Supervised Dense Point Tracking in Turbulent Videos   *August 2024 – December 2024*
- Developed a benchmark for point tracking in videos with induced atmospheric turbulence, enhancing the DINO-Tracker with RAFT-based optical flow refinement.
- Diagnosed robustness gaps in DINO-Tracker, revealing a 32 % average-Jaccard drop under moderate turbulence and mapping failure modes in occluded, high-blur frames.
- Estimated the strength of turbulence using the trajectories of points in the turbulent videos.

Swin Transformer for Vision Tasks   *August 2024 – December 2024*
- Used Swin Transformer for classification, localization, and segmentation on ChestXRay14, NODE21, and ChexMask datasets to optimize pipelines and improve performance in medical image analysis.
- Achieved 72.64% accuracy training a model from scratch and 81.78% accuracy fine-tuning on ImageNet for ChestXRay14 classification.

Comparative Study of Video Retrieval Methods   *August 2024 – December 2024*
- Implemented dimensionality reduction techniques (PCA, SVD, LDA, K-Means) on ResNet, HOG, HOF, and Color Histogram feature spaces to rank and retrieve videos based on similarity.
- Developed centroid-based ranking and label prediction models, achieving improved retrieval accuracy and demonstrating SVD's effectiveness in preserving latent structures.

Vellore Institute of Technology   **Bhopal, Madhya Pradesh, India**
Metamorphosis Automation   *August 2021 – May 2021*
- A model trained on CCTV camera clips to detect car accidents and send alerts. ResNet34 was used as the base model.

COVFeed   *June 2020*
- An android mobile application that serves as a semi-news platform for doctors, nurses and health-care workers of a region. The application was developed as part of the International Flutter Hackathon, Hack'20 - GitHub-CovFeed

TECHICAL SKILLS

Languages: Python, C++, MATLAB, R

Tools/Technologies: Linux, SQL, Alteryx, Flask, Git, Power Bi, GCP, AWS

Specializations: Computer Vision, Deep Learning, Image Processing, Reinforcement Learning, Cloud Computing, LLMs