Ashna Abraham

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Objective

Software Engineer with Master's in Artificial Intelligence and a strong foundation in software development porcess. Passionate about applying AI to real-world challenges and contributing to impactful, innovative solutions.

Education

Friedrich-Alexander-Universität Erlangen-Nürnberg *2022 – Present*
MSC in Artificial intelligence

- **GPA**: 1.4
- **Coursework:** Advanced Deep Learning, Reinforcement Learning, Statistics, Optimization, Generative Models, LLM, Transformer architecture for vision and NLP

Mahatma Gandhi University, India *2011 – 2015*
Bachelor of Technology - Electrical and Electronics Engineering

- **GPA**: 8.37/10 - First Class with Honors

Technologies

Languages: Python, JavaScript, TypeScript, R

Python Libraries: PyTorch, Pandas, NumPy, Flask, Seaborn, Scikit-Learn, NLTK, OpenCV, SciPy

Web: HTML5, CSS3, Node.js, React, Redux, GraphQL, Progressive Web Apps (PWAs), npm, REST APIs

CI/CD: GitHub Actions, Spinnaker, Jenkins

Tools/Platforms: Git, Cuda, Conda, PyEnv, AWS, Heroku, Docker, Wandb, HPC Clusters, Nvidia Jetson

Experience

Thesis - Deep learning based real-time DC Series arc fault detection *Erlangen, DE*
Siemens AG *Nov 2024 – Present*

- Design and Develop robust deep learning algorithms for detecting DC series arcs in diverse operating conditions
- Methods for improving model generalization and robustness for out-of-distribution data
- Uncertainty estimation using probabilistic models and ensemble methods and adaptive learning
- Optimization of model deployment on resource-constrained environments using model compression methods

Student research assistant in applied deep learning - Machine Vision *Berlin, DE*
Fraunhofer IPK *May 2024 – Nov 2024*

- 6D Position Estimation of Automotive Components for Automated Robotic Assembly using PVNet model
- Synthetic data generation algorithms to improve generalization and performance
- Research methods on high-dimensional sensor image data for identifying anomaly detection use cases

Software Engineer *Berlin, DE*
Delivery Hero *Aug 2021 – Mar 2024*

- Development of Vendor Onboarding and Incubation Plugin to automate vendor "go live" for delivery
- Architecting and developing reusable User Interfaces and ReactJS-based libraries and microservices
- Setting up automated CI/CD pipelines using GitHub Actions, Spinnaker and AWS
- Development and maintenance of Node. JS-based microservices and integration with backend services
- Conduct end user interviews, product launch plans, feasibility studies and code quality maintenance

Software Engineer *Banglore, IND*
Cisco *April 2019 – Aug 2021*

- Leading development of Device Installation, Network Design and Logging systems
- Implemented dynamic user-defined workflows and navigation paving way for improved product adoption
- Design and development of User Telemetry dashboard to internally identify key customer interests and preferences
- Improved page loading time and provided offline support using Progressive Web Apps methodology

Senior Engineer, Product Development *Trivandrum, IND*
Envestnet INC *June 2015 – Feb 2019*

- Development of java services to ingest, enhance and load daily trading data into financial platforms
- Development of key customer facing pages of Client and Advisor Portals including Accounts, Service Request and Budgeting

Projects

Stain Normalization for Domain generalization in digital histopathology *git*

- The project explores how generative model-based stain normalization improves model generalization in histopathological images, particularly under significant distribution shifts (out-of-distribution data)
- The study assesses the impact of these techniques on downstream tasks across domains, particularly when distribution shifts occur due to variations in scanners, tissue morphology, and species
- Methods: Computer Vision, GAN and diffusion-based models, Object detection, Python, Pytorch

Score-Based Diffusion Model for MRI Reconstruction

- The study examines the effectiveness of diffusion-based MRI reconstruction techniques using the in-domain fastMRI knee dataset and the out-of-distribution fastMRI brain dataset
- Implementing re-training strategies to enhance the model's adaptability to out-of-distribution datasets, with a focus on improving reconstruction quality, especially for brain scans
- Methods: Computer Vision, Diffusion probabilistic models, Ensemble methods, Python, Pytorch, sklearn

Infant vision-based Curriculum Learning for computer vision tasks *git*

- This project implements Curriculum Learning that simulates various stages of infant vision development. The objective is to verify if pre-training on low-quality images improves model performance
- The approach involves training models in phases according to the vision capabilities of different age groups ranging from 1 month to 12 months
- For evaluation of downstream tasks, multiple ResNet-18 architectures are trained on the Tiny ImageNet dataset for classifying 200 categories

Diffusion Image Generator *git*

- Implementing forward and reverse Diffusion processes trained on the CIFAR-10 dataset
- Training an Attention-Unet model to perform denoising tasks and subsequent image generation
- Additionally, implementing diffusion techniques with and without classifier-free guidance

Vision Transformer for Image Classification

- Applying Transformer architecture to computer vision tasks using Self-Attention and Cross-Attention mechanisms to extract image embeddings from patches, capturing long-range dependencies between them
- The attention scores are used to train an image classifier on the CIFAR-10 dataset for image classification

Achievements

- Hero Power: under We deliver solutions initiative - Delivery Hero July 2023
- Hero Power: under Win as a team initiative - Delivery Hero March 2022
- Connected Recognition: You Amaze 1 award for 'Innovate Everywhere' initiative - Cisco May 2021
- Connected Recognition: You Accelerate 2 award for 'Connect Everything' initiative - Cisco September 2020
- Connected Recognition: You Amaze 3 award for 1st Prize in Hackfest 2019 - Cisco December 2019