

Vrushank Changawala

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Professional Summary

- 2+ years of experience in developing deep learning models using multiple frameworks and libraries. **6+ months of work experience in the ocean sector.**
- Excellent understanding of deep learning, machine learning, and generative AI algorithms such as CNNs, RNNs, LSTMs, GANs, AutoEncoders, Attention mechanism, Transformers, Diffusion, Stable Diffusion, YOLO, SAM, CLIP, BLIP, Regression, KNN, SVM, etc.
- Well-developed ability to read and implement research papers; ability to rapidly prototype code/APIs for benchmarking.
- Proficient with PyTorch, NumPy, Pandas, and related libraries; limited experience with TensorFlow and Figma.
- Experience in utilizing AWS Sagemaker, EC2, and S3 to train models in a cost-efficient way and deploying traced models using NVIDIA's Triton Inference server.
- Experience in setting up CICD pipelines on GitLab which triggers Cloud Build jobs that automate the deployment of code onto Google Cloud Run.

Skills

Programming: Python | C | HTML | CSS | SQL | JavaScript

Libraries, and Frameworks: PyTorch | Keras | Scikit-learn | OpenCV | OpenMMLab | Huggingface | Weights & Biases | Flask | FastAPI | Docker

Cloud: AWS S3 | AWS EC2 | AWS Lambda | AWS SageMaker | AWS API Gateway | Google Cloud-Build | Google Cloud Run | Google Cloud Repository | Google Cloud Functions | Nvidia Triton Inference Server | Git

Professional Experience

MACHINE LEARNING ENGINEER | [INNOVASEA & DEEPPSENSE](#) | MAY 2023 – PRESENT | HALIFAX, CANADA

- Working on advancing their current fish-tracking system, which involves segmenting a fish's travel path.
- Developed scripts to clean the data and convert raw sensor data into images. Compared to older scripts, it **processes data 10x faster**.
- Brainstormed ideas to make new version more accurate and efficient, also implemented the data generation, training, and inference scripts.
- The newer version of fish-tracking is **~8x faster and 5x more cost-efficient** than the previous version.
- **Integrated our latest fish-tracking model into the data annotation platform** using **Label-Studio** to make the data-annotation process more efficient and achieve the goal of **active learning**.

COMPUTER VISION ENGINEER | [SPYNE AI](#) | JUNE 2022 – NOV 2022 | GURUGRAM, INDIA

- Took a **lead on the Background removal problem**. Researched and Developed a Background Removal solution across all the categories which led us to discard the dependency on the third-party Background removal services while achieving higher accuracy. **It Increased profits by 20% and throughput by 30%.**
- Developed a **custom algorithm to automate Photoshop's "Liquify" tool** using classical Computer Vision. It usually takes a human editor around 3-5 minutes to liquify a single image while this algorithm outputs the liquified image in a couple of seconds. **Currently used by Amazon India and Walmart to process Grocery and food Packet images.**
- Worked on custom colour correction algorithm and Image Harmonization for food images. **Currently Used by India's food delivery giant Swiggy.**
- Developed a Shadow-generation model for Ecommerce Products. **Currently used by Walmart & Amazon India.**
- Refactored the code for our e-commerce products and added the Shadow generation model. Used by **a dozen of e-commerce startups and Companies** all over the world.
- Was in-charge of developing the **POC of Virtual Try-on project**. Experimented with different **semantic segmentation models** for human-parsing and Image generators for it, and got promising results.
- Regularly connected with product managers and data team to identify the failure cases and improve the models' accuracy and efficiency.

COMPUTER VISION INTERN | [SPORTSSEAM](#) | JAN 2022 – MAY 2022 | PUNE, INDIA

- Worked on mapping NFL player activities on the canvas from the input videos without any sensors, to create a bird's eye view.
- Suggested and developed a method for detecting yard digits and arrows which **Increased the internal metric from 75% to 85%.**
- Processed videos of volleyball games and generated a suitable dataset to train the Volleyball Action recognition model. Benchmarked various Action Recognition models from **OpenMMLab's MMAction2** library and **improved the test accuracy from 72% to 87%** using some clever techniques.
- Generated various visualizations of the data and results, and presented them to clients biweekly.

Education

Masters in Applied Computer Science (MACS) | Dalhousie University, Halifax, Canada | Jan 2023 –April 2024 (Expected) | GPA: 3.9/4.0

Relevant Coursework: Advanced Cloud computing, Cloud Architecting, Deep Speech Technologies (Machine Learning for Audio and Speech)

Bachelors in Computer Engineering | C.K. Pithawala College of Engineering & Technology, Surat, India | 2018 – 2022 | CGPA: 9.41/10

Relevant Coursework: Data-mining, Data Science using Python, Algebra & Calculus, Probability & Statistics, Software Engineering, Data structures and algorithms, Natural Language Processing, Information retrieval

Selected Projects

TEACHING ASSISTANT 2.0 USING AWS

- A web app where you can upload lecture videos (or any video) and chat with its content.
- Architected the whole system on AWS using AWS EC2, S3, Lambda, Transcribe, and API-Gateway. Used open-sourced embedding models and LLMs from Huggingface and finetuned it using Langchain.
- Inference pipeline was deployed on Lambda labs for cost-efficiency.

FEW-SHOT OBJECT COUNTING

- Given one to three example images of an object to count, this network returns the total count of that object in the image.

MINI-DIFFUSION

- A small lightweight diffusion model implemented in PyTorch.

IMAGE ENHANCEMENT

- Low-light-enhancement: Achieves 22.97 PSNR on LoL Dataset's evaluation set.
- Image Deraining: A neural network that removes rain from images; achieves 26 PSNR on the Rain100H dataset.
- Super-resolution: Implemented ESRGAN and trained it on Div2K Dataset.

Research Experience

Averting from Conventional CNNs for medical image classification

(Published in IEEE SPICSCON 2021)

- A comparative study of newly introduced and conventional CNN architectures on a medical image dataset.
- Performed qualitative and quantitative analysis of architectures such as VGG16, ResNets, DenseNet, InceptionNet, MLP-Mixer, and Involution.