Jay Lal

jayashok@buffalo.edu | +1 (716)-520-8003 | linkedIn.com/in/jay-lal | github.com/thejaelal

Availability for Summer '23 Internship: *22 May 2023 to 3 September 2023*

Education

University at Buffalo, SUNY, NY, USA *Jan 2022 - Present*
Masters in Computer Science and Engineering (GPA 3.83/4)
Coursework: Machine Learning, Computer Vision & Image Processing, Deep Learning for Biometrics, Information Retrieval, Natural Language Processing (NLP), Distributed Systems

University of Mumbai, India *June 2018*
Bachelors in Computer Engineering (GPA 8.17/10)
Coursework: Artificial Intelligence, Digital Signal Processing, Algorithms, Data Structures, Operating Systems

Experience (~ 4 years)

SUNY Research Foundation - *A2IL* *(Graduate Research Assistant)* *March 2022 - Present*

- ***Chart Infographic Data Extraction*** *- Extracting data from line chart images*
  - Improved accuracy of **data extraction** by 12% in multi-line chart images by modeling it as a Graph Min-Cost flow problem, analogous to **Multi-Object Tracking** and solved using **Linear Programming**.
  - Isolated background grid lines in chart images, and segmented chart lines of different styles (solid, dashed, etc.) using **Local Binary Patterns** and Color Histogram features.
  - Developed a pipeline for generating synthetic degradations to digital chart images using Image Processing to mimic noises in archived document images.

Publication: *LineFormer - Rethinking Line Chart Data Extraction as Instance Segmentation (Under Review)* *International Conference on Document Analysis and Recognition (ICDAR) 2023*

Karza Technologies *(Data Scientist - Computer Vision)* *April 2020 - January 2022 (1.8 years)*

- ***Robust Document Text Recognition & Script Classification:***
  - Reduced Text Recognition **Character Error Rate** by **11%**, by making the model invariant to different image distortions using synthetic feature supervision & **spatial transformer networks.**
  - Improved accuracy of the Script Classification model by **8%** by using an auxiliary text recognition loss, also resulting in **better generalization** on out-of-domain text images.
- ***Document Quality Estimation*:**
  - Developed a system to evaluate OCR-suitability of an image based on several parameters such as Blurriness, Noise, Resolution etc. using Deep Learning and Image Processing.
- ***ML Deployment, Optimization and Security***:
  - Increased throughput and **reduced inference time** by **10-15%** for several Deep Learning models serving more than 10K requests/day in production using **TensorRT** inference engine, and other techniques like model quantization, batch inference, etc.
  - Developed scripts for **securing ML models** using obfuscation for deployment on mobile apps.

Artivatic Data Labs *(Computer Vision Engineer)* *August 2019 - March 2020 (8 months)*

- Developed a template-based Handwritten-Forms data extraction pipeline involving **Image Registration**, **Denoising, Word Recognition,** all optimized for mobile deployment.

Barclays Bank *(Graduate Analyst)* *July 2018 - August 2019 (1 year)*

- Contributed to the development of a Robotic Process Automation framework, by identifying desktop GUI elements (buttons, scrollbars, text boxes) using Image Processing and OCR.

Academic Projects

American Sign Language (ASL) Recognition *April 2022*

- Modeled a Deep CNN for classification of ASL words from acoustic signals captured as spectrogram images and obtained a test accuracy of 93.5%

Pitchfork Music Rating Prediction *March 2022*

- Used music meta-data data for predicting pitchfork review score using **Decision Tree Regression**, exploring **feature selection** using Lasso on, and interpreting them to identify key factors influencing review score.

Volunteered Distributed Computing Architecture (VoDCA) *Smart India Hackathon 2018*

- Proposed a system for utilizing public compute nodes for scientific computation tasks like Aerial Image Stitching.
- Explored distributed execution of **Image stitching** pipeline, involving - Feature Extraction (SIFT, SURF), Matching, Homography & Image Blending.

Technologies

Languages : Python, Java, C/C++ | **ML Toolkit**: PyTorch, Tensorflow, Scikit-Learn, OpenCV, Numpy, Pandas
Deployment: TensorRT, AWS Neuron, TFLite, ONNX, Flask/Django, Git/GitHub

Accomplishments

- Recipient of *RF Tuition Scholarship SEAS (Spring'23)* for contributions in research at A2IL.
- Delivered a well-received tech-talk on '***Demystifying Deep Learning***', to an audience of over 100, including VPs, & Directors of corporate banking at Barclays.