

Jay Lal

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

Education

University at Buffalo, SUNY, NY, USA

Masters in Computer Science and Engineering

Jan 2022 - Present

(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

Bachelors in Computer Engineering

June 2018

(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 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

- Core contributor in the Document AI team at Karza winning the award for **NASSCOM AI Challengers 2021**
- Delivered a well-received tech-talk on '**Demystifying Deep Learning**', to an audience of over 100, including VPs, & Directors of corporate banking at Barclays.