

EDUCATION

North Carolina State University, Raleigh

Aug 2022 – May 2024 (anticipated)

Master of Science, Electrical and Computer Engineering

GPA – 4.0/4.0

Coursework: Computer Vision, Pattern Recognition, Digital Imaging Systems, Advanced Machine Learning, Automated Learning and Data Analysis, Data Science, Neural Networks and Deep Learning, Mechatronics, Object Oriented Design and Development

National Institute of Technology Bhopal, India (NIT-B)

Jul 2016 – Jun 2020

Bachelor of Technology, Electrical Engineering

GPA – 7.9/10

Coursework: OOP in C++, MATLAB, Modern Control Systems, Digital Signal Processing, Electrical Measurement and Instrumentation, Industrial Electronics

TECHNICAL SKILLS

Programming Languages: Python, SQL, C++, C#, MATLAB, R Programming, HTML5, CSS, JavaScript, VBA (Excel Macros)

Frameworks & Libraries: PyTorch, TensorFlow, Keras, OpenCV, scikit-learn, Pandas, Seaborn, Matplotlib, NumPy

OS & Tools: Linux, PowerBI, RoboFlow, MVTec Halcon, Cognex ViDi, Dataiku, JMP, ROS, Git, AutoCAD, Docker, REST API, Jupyter Notebook, Trello, Office 365

Miscellaneous: Experienced in statistical analysis and conveying narratives through data visualization. Knowledge of machine learning concepts, computer vision algorithms and strong mathematical skills in statistics, probability theory, and geometry. Knowledge of imaging fundamentals and lens/camera selection.

PROFESSIONAL AND RESEARCH EXPERIENCE

ML Research Intern

Oct 2023 – Present

Sozzani Lab NCSU

Raleigh, North Carolina

- Spearheaded the development of **CNN and BiLSTM** models, while demonstrating resilience against data overfitting. Achieved robust performance in predicting transcriptional Activation Domains (ADs) within Arabidopsis gene expression, surpassing established benchmarks.
- Presently engaged in establishing a correlation between phosphoproteomic data (heat and control treatment intensity values) and physiological data (photosynthesis and transpiration rates) to effectively forecast **agronomic outcomes** such as seed production, seed weight, and biomass values for soybean plants.
- Initiated ongoing Exploratory Data Analysis (EDA) on **50,000+** diverse protein sequences and genomic data samples using SQL and Python. Effectively communicated the efficacy of generated models through data-based results (**Explainable AI**).
- Contributed to the research paper-style documentation (**publication in-review**), outlining used algorithms and learning methodologies.

Data Science Intern

May 2023 – Aug 2023

Schlumberger Limited (SLB)

Houston, Texas

- Improved predictive maintenance workflows for Remaining Useful Life (RUL) of electronic sensor boards on oil drilling tools, by implementing **classical machine learning models** (XGBoost, Random Forest, GBM) with exceptional accuracy and recall scores of approximately **92%**.
- Enhanced dataset balancing using **SMOTE** oversampling and Generative Adversarial Network (GAN). Leveraged advanced statistical features (histograms, quantiles, probability mass function) to integrate **data-driven insights** with domain knowledge.
- Conducted **ETL** operations on multiple 80GB datasets of raw and unstructured sensor data, streamlining it for subsequent failure analysis.
- Applied **clustering and processing techniques**, such as K-means, Interactive Clustering, and Anomaly Detection, to analyze datasets from **1,500+** electronic channels. This effort identified meaningful correlations across these channels, contributing to improved decision-making.

System Engineer

Aug 2020 – May 2022

Larsen & Toubro Limited (L&T)

Vadodara, India

- Utilized data analysis and visualization techniques using **RStudio and PowerBI** to conduct relay coordination studies. Identified and implemented optimal protective configuration settings in thermal power plants using **PLCs and HMIs**, resulting in a substantial **30% reduction** in operational downtime.
- Collaborated with LTTS on researching and developing **2D vision systems** utilizing MVTec Halcon, contributing to lens selection procedure from Edmund Optics in a manufacturing setting. This initiative enhanced quality control measures and boosted operational efficiency.
- Orchestrated seamless collaboration with **cross-functional teams** spanning various engineering departments, and with third-party suppliers. Coordinated Factory Acceptance Tests (FAT) for various customers. Implemented data-driven optimizations, yielding substantial **cost savings** across **6 unique projects** in India.
- Facilitated the creation of **automatic sizing and calculation sheets** for electrical and instrumentation packages such as UPS battery packs, plant illumination, switchgears, and SCADA, lowering the potential for human error. Additionally, conducted **root cause analysis** for failures in electrical and mechanical systems.
- Demonstrated proficient **leadership** skills to guide and mentor prospective hires of engineering and procurement departments.

ACADEMIC PROJECTS

- Deep Learning – Deepfake Images Detection Algorithm** ([GitHub](#)) | Python (PyTorch, sklearn) Feb 2023 – May 2023
 - Generated **120,000** fake images from CelebA real images dataset for different **GANs** (DCGAN, PGGAN, WGANs) and trained a combined **Siamese Network** (Common Fake Feature Network + Classification Network) for fake/real images annotations.
 - Utilized **CUDA High Performance Computing** to expedite model training and achieved impressive accuracy of 99.37% and recall of 99.31%.
- Machine Learning – 2-D Object Detection for Autonomous Vehicle** ([GitHub](#)) | Python (TensorFlow, Keras) Jan 2023 – Feb 2023
 - Trained **YOLOv3** model with DarkNet-53 architecture as codebase and for MSCOCO dataset with **10,000+** car dashcam images.
 - Surpassed model performance over other algorithms in terms of Frames Per Second (FPS) and mean Average Precision (mAP) scores.
- Computer Vision – SIFT Key Descriptor – Blob Detection in Images** ([GitHub](#)) | MATLAB Nov 2022 – Dec 2022
 - Engineered frequency domain filtering in images from scratch, to speed up the process of convolution to mere **20 milliseconds**.
 - Constructed Laplacian scale space for multiple images and implemented **Harris' Non-Max Suppression** for effective blob detection.
- Mechatronics – EV3 Robot for Path Tracking, Platooning and Parking** ([GitHub](#)) | MATLAB Oct 2022 – Dec 2022
 - Designed and built EV3 robot featuring in-house developed **color and ultrasonic sensors**, attaining 95% accuracy in path tracking and 98% in parking.
 - Implemented **PID controller** to compute error signals with a precision rate of 99%, significantly improving the bot's functionality and efficiency.

CERTIFICATIONS AND EXTRACURRICULARS

- Secured 3rd place in the Machine Learning track at the annual N.C. PSI **Hackathon** as a member of team of four students.
- Dataiku DSS – “[Machine Learning Practitioner](#)”, “[Core Designer](#)”, NVIDIA – “[Deep Learning Fundamentals](#)”, “[Image Segmentation Techniques](#)”
- Vice Chairperson (Administration) – IEEE MANIT Student Branch – Won **Darrel Chong Activity Award** (Gold Category).