# ADARSH PURI

919-637-5266 | apuri3@ncsu.edu | https://www.linkedin.com/in/adarshpuri/

## EDUCATION

**North Carolina State University** **Aug 2019 - May 2021**
Master of Science in Electrical Engineering **GPA: 3.875/4.00**
Course Work: Computer Vision, Pattern Recognition & Machine Learning, Neural Networks, Mechatronics, Random Processes, Algorithms & Optimization, Automated Learning & Data Analysis, Computer Networks, Experimental Statistics, Image Systems

**National Institute of Technology, Kurukshetra, India** **Jul 2012 - Jun 2016**
Bachelor of Technology in Electronics & Communication Engineering **GPA: 4.00/4.00**

## TECHNICAL SKILLS

**Proficient with:** C++, MATLAB, Python (OpenCV, Pandas, Scikit-Learn, Numpy, Seaborn), SQL, Keras, PyTorch, Fast.ai, Decision Trees, CNNs, RNNs, LSTM, GANs, XGBoost, SVM, PointNets, Clustering, Prediction, Classification, Simulink, Auto-Encoders, Supervised and Unsupervised Learning, TensorFlow, CUDA, PowerBI, LaTex, Welch's t-test, Time Series Modelling
**Miscellaneous:** Strong Mathematical Background (Probability theory, Linear Algebra, Statistics, Vector Calculus), Graph Theory, DS

## EXPERIENCES AND INTERNSHIPS

**Plant and Microbial Biology Lab, NC State University** (*Machine Learning Research Assistant*) **March 2021 - Present**

**EcoPRT Lab, NC State University, Raleigh** (*Graduate Student Researcher, ECE Team*) **Jan 2020 – March 2021**

- Worked on the PointNet implementation for Object Detection and Classification in Autonomous Driving using Pointpillars, outperforming the VOXELNET and YOLO models in speed and accuracy by 5-10% in different scenarios.

**Tata Motors Limited, India** (*Senior Manager-Automation Engineer*) **Aug 2016 - Dec 2017**

- Managed a team of 10 members and 3 summer interns that installed the First Digital Picking System at the kitting area using Mitsubishi PLCs and AIOI's controllers with MES integration leading to its plant level implementation.
- Upgraded and tuned the PID microcontroller and its integration with Siemens PLCs throughout the plant sites to reduce process cycle time and throughput time by 12.48%.

## ACADEMIC PROJECTS

**Quora Question Pair Classification (Natural Language Processing Models)** | TensorFlow **Aug 2020 - Oct 2020**

- Explored a data mining problem using the Kaggle Dataset by pre-processing the data and performing the Feature extraction obtaining features like Bag of words, n-grams, TF-IDF, Word2Vec and Glove Embeddings.
- Classified the duplicate question pairs on these features, using the Multinomial Bayes, Logistic Regression, XGBoost, LSTM, TD-CNN Statistical Models, reaching the best testing accuracy of 83%.

**Leaf Wilting Detection in Soybean** | Python, Keras, FastAI **Jan 2020 - Apr 2020**

- Build a Deep Convolutional Neural network using transfer learning approach with FastAI and Resnet-50 to predict the leaf wilting, preventing further crop failure getting a test accuracy of 59.88%
- Performed data augmentation using SMOTE for Imbalanced data, improving accuracy by 20%

**Face Classification- Statistical Modelling, Viola Jones Algorithm and CNN** | Pytorch **Jan 2020 - Apr 2020**

- Prepared the dataset (subset of WiderFace Dataset) by parsing annotations and cropping considering the IoU.
- Build and compared the performance of Single Gaussian, Mixture of Gaussian, t-Distribution, Mixture of t-Distribution, Factor Analyzer and Mixture of Factor Analyzer based on ROC curve, Classification rates, accuracy (70-90%), F1 score.
- Implemented the Viola Jones algorithm from scratch by extracting Haar features and observed performance by varying the number of weak classifiers in the ensemble. Got 97.60% testing accuracy on the data.
- Further build a feed forward CNN based LeNet5 architecture reaching accuracy of 98.79%.

**Trained a Multilayer Perceptron (MLP) for digit recognition using the MNIST dataset** | Python **Jan 2020**

- Trained the network with 3,000 samples in training, 10,000 samples in validation and 10,000 samples in testing.
- Modified Hyperparameters and recorded the Validation and training loss values and accuracy values.

**SIFT Key Descriptor- Blob detection in images** | Python **Nov 2019**

- Constructed a Laplacian Scale space by varying image size which helped increase the speed, and Harris' Non-Max Suppression for blob detection to highlight the key points(blobs) with circles of corresponding radii.
- Implemented a frequency domain filtering for the images from scratch to speed up convolution to 0.016 milliseconds.

**Monte Carlo Simulator** | Python **Sep 2019**

- Designed a Monte Carlo Simulator for Bit Error Rate Estimation, learned the method of calculating confidence interval.

**Compute shortest route between two cities in North Carolina** | Python **Aug 2019**

- Assuming pixel values in an Image matrix to represent each city, utilized OpenCV and python to execute A* algorithm for finding shortest route, where any pixel intensity value other than that of the road was considered an obstacle.

**Energy efficient clustering (EC) solution for Wireless Sensor Networks** | MATLAB **Oct 2015**

- Modified the EC algorithm improving the efficacy by 10%, comparing the performance of EC clustering algorithm with HEED and UCR.