Xian Sun

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EDUCATION

Duke University, Durham, North Carolina **Aug 2019 - May 2021**
Master of Science in Computer Engineering GPA: 3.97 (Max: 4.0)
Relevant Coursework: Computer Vision, Machine Learning, Deep Learning, Random Signal and Noise, Systems Programming & Engineering, Software Engineering

Jilin University, Changchun, China **Aug 2015 - Jun 2019**
Bachelor of Science in Electrical Engineering (Rank 1/127) GPA: 3.90 (Max: 4.0)
Relevant Coursework: Advanced Mathematics, Probability and Statistics, Digital Signal Processing Embedded Systems, Signal and Systems, Linear Algebra

RESEARCH & PROJECT EXPERIENCE

Research Assistant, Computer Vision Lab, Duke University **June 2020 - Present**
Advisor: Dr. Carlo Tomasi

- Built deep learning models to segment damages (semantic segmentation) on the leaf dataset whose imbalance ratio=400.
- Developed Leaf-Image-Editor to clean the dataset and designed a copy/paste data augmentation algorithm to further improve the accuracy. Working on a two-stage model to improve the overall performance.

Research Intern, Deep Learning (DL) & ReRAM Research Group, Duke University **Oct 2020 - Apr 2021**
Advisors: Dr. Krishnendu (Krish) Chakrabarty, Dr. Biresh Joardar

- Saved more than 80 percent of crossbars (128x128) for VGG and ResNet, via extremely sparse networks by iterative magnitude pruning.
- Designed one-shot pruning with the threshold, which enabled sparse networks (the sparsity < 2%) for AlexNet and VGG.

Research Assistant, Almost Matching Exactly Lab, Duke University **July 2020 - Apr 2021**
Advisors: Dr. Cynthia Rudin, Dr. Sudeepa Roy, Dr. Alexander Volfovsky

- Developed the Python package for Fast Large-scale Almost Matching Exactly on Database (FLAME-DB) Algorithm and R package for Adaptive Hyper Box Matching (AHB) Algorithm. Both packages support missing data handling, average treatment effect (ATE), average treatment effect on treated (ATT).
- Improved the speed of the FLAME-DB, with the combination of fixed and adaptive weight matching. The time Complexity is reduced to O(N) from O(N^2).

Improved Regularization of Convolutional Neural Networks, Duke University **Dec 2020**

- Implemented Cutout and Mix-up to address overfitting problems for ResNet18, 34 and 50.
- Found the best combination of Cutout and Mix-up by grid search on ResNet18-CIFAR10 and transferred it to other datasets like SVHN and Fashion MNIST.

Exploring Probabilistic Classifiers on Binary Classification, Duke University **Apr 2020**

- Implemented Bayes classifier with different assumptions regarding covariance structure of dataset and linear discriminant classifier and logistic discriminant to four different 2-dimensional datasets.
- Applied cross-validation to estimate classifier performance using the available training data and compared three classifiers and analyzed the advantages and disadvantages of them.

Software Development: RISK Game in Java, Duke University **Apr 2021**

- Designed the game server, chat server with NIO, and state machine.
- Handled concurrency requests with multi-thread programming from multiple users and server-client communication with TCP socket programming.

Software Development: Mini Linux Command Shell, Duke University **Nov 2019**

- Designed a miniature version of Linux Command Shell functionally with C++
- Implemented command processing functions and functions to modify environment variables.

INDUSTRIAL EXPERIENCE

Machine learning Intern, Neocova, the United States **June 2020- Aug 2020**

- Built a linear regression model that calculates the percentage change in valuation of the model and a binomial logistic model that calculates the probability of positive/negative growth.
- Selected 5 most significant statistically variables with LASSO and 5 demographic variables with Decision Tree from more than 500 variables.

Electrical & Software Intern, Firmenich Aromatics (China) Co. Ltd **Apr 2019 - Jun 2019**

- Designed and developed a wireless scoring board that allowed blind participants in food assessment lab to rate various features of food products, that then sent data to a computer automatically.
- Improved the lab working efficiency by streamlining the data collecting process.

RELEVANT SKILLS

- Languages: Python, Java, C++, R, C, SQL, Markdown, LaTeX, basic HTML/CSS
- Frameworks: PyTorch, Scikit-learn, NumPy, Pandas, TensorFlow
- Software: Conda, Jupyter Notebook, Tensorboard, PyCharm, IntelliJ, Overleaf, RStudio, PostgreSQL

TEACHING EXPERIENCE

- Instructor in Inspirit AI: AI Scholars and Deep Learning System Design (middle & high school) 2021
- TA to Dr. Carlo Tomasi for CS527 (grad): Computer Vision 2021
- TA to Dr. Ivan Mura for ECE650K (grad): System Programming & Engineering 2021
- TA to Dr. Loren Nolte for ECE581 (grad): Random Signal and Noise 2020
- TA to Dr. Elchanan Solomon for Math216 (undergrad): Linear Algebra & Differential Equations 2020

HONORS & AWARDS

National

- China National Scholarship, China Ministry of Education 2017&2018

University

- ECE Merit Scholarship, Duke University 2020
- Valedictorian for 2019 Commencement, Jilin University 2019
- Top Ten Outstanding Student, Jinlin University (10 recipients, academics, service and leadership) 2019
- Outstanding Volunteer, Jilin University (>600 volunteer hours) 2018
- CASC Scholarship, China Aerospace Science and Technology Corporation (10 recipients, academics) 2018