Brandon Zhao

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EDUCATION

Duke University **August 2017 - May 2021**
B.S., Mathematics and Computer Science (Double Major) Durham, NC
Minor: Statistical Science

- **GPA:** 3.9 / 4.0, Dean's List (x4)
- **Relevant Coursework:** Graduate Machine Learning, Design/Analysis of Algorithms, Applied Stochastic Processes, Advanced Probability, Measure and Integration

RESEARCH EXPERIENCE

Undergraduate Researcher **May 2019 - Present**
Duke Computer Science Department – CODE+ Program Durham, NC

- Designed interpretable prototype-based neural network to classify images from large datasets into fine-grained subcategories
- Investigated different ways to interpret and improve network decisions with visualizations and addition of different prototype regularizations
- Increased performance and interpretability of previous model through addition of recurrent, explainable attention mechanism and secondary fine-grained prototype network

SURF Research Fellow **June 2020 - August 2020**
NASA JPL – Machine Learning and Instrument Autonomy Group Pasadena, CA (Remote)

- Designed and trained neural networks for finding and classifying objects of interest in unlabeled Mars Rover panoramic camera images using transfer learning technique
- Created custom multi-label dataset both for algorithm training and for use as a guideline for future human-labeling efforts
- Explored interpretable techniques for improving minority class performance with supervised learning through supplementary image annotations

Research Assistant **May 2018 - July 2018**
Duke Mathematics Department – DOMath Program Durham, NC

- Investigated properties of epidemic models on random graphs, specifically periodic trees, in small group environment
- Improved previous results by giving tighter bounds on significant growth rates for period three alternating trees
- Worked with group to summarize findings in paper and presentation at program conclusion (see Jiang, et al.)

Biostatistics Research Assistant **May 2017 – August 2017**
Texas A&M Health Science Center College Station, TX

- Assisted in evaluating and understanding usefulness of novel piecewise exponential model for survival data in comparison to various well-known survival models
- Simulated large-scale random survival data in MATLAB through procedural generation, fit data to piecewise exponential survival model to calculate and compare resulting errors and metrics to existing models

PUBLICATIONS

Conferences:

"Mars Image Content Classification: Three Years of NASA Deployment and Recent Advances"
Kiri Wagstaff, Steven Lu, Emily Dunkel, Kevin Grimes, Brandon Zhao, Jesse Cai, S.B. Cole, Gary Doran, Raymond Francis, Jake Lee, and Lukas Mandrake
The Thirty-Third Annual Conference on Innovative Applications of Artificial Intelligence (IAAI-21).

Published:

"The piecewise exponential distribution"
Gang Han, Brandon Zhao, Kendall Pye, Hongwei Zhao
Significance, 14(6), pp.10-11. 2017.

arXiv:

"The Contact Process on Periodic Trees"
Yufeng Jiang, Remy Kassem, Grayson York, Brandon Zhao, Xiangying Huang, Matthew Junge, Rick Durrett. 2018.

TEACHING EXPERIENCE

Teaching Assistant - Graduate Machine Learning (CS 671) **August 2019 - December 2019**
Duke University Computer Science Department Durham, NC

- Assisted in grading problem sets and exams, held office hours, provided miscellaneous help to students through E-Mail or Piazza

Teaching Assistant - Graduate Basic Analysis (Math 531) **August 2018 - December 2018**
Duke University Mathematics Department Durham, NC

- Graded and wrote LaTeX solution documents for problem sets, assisted in grading midterm exams, provided help to students through E-Mail or by appointment

SKILLS, LANGUAGES, ACTIVITIES

Languages: Mandarin (Conversational)
Programming Languages: Familiar: Python, PyTorch, SQL, LaTeX, Competent: MATLAB, C, Java
Activities: Member of Delta Kappa chapter, Alpha Epsilon Pi fraternity