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Ngu Dang

Summary

I am a fifth-year Ph.D. candidate in Computer Science. I am interested in Complexity Theory and Algorithm Designs, particularly the hardness and lower bounds of natural computational problems. During my undergraduate studies, I did some research on Computer Vision. I occasionally did individual machine learning-related projects for personal enrichment.

Education

Department of Computer Science, Boston University — Boston, MA
Ph.D. in Computer Science — 2020 - 2026 *(expected)*

- Advisor: Prof. Steven Homer
- Research area: Circuit Complexity and The Minimum Circuit Size Problem (MCSP)
- GPA: 3.93/4.00

Department of Computer Science, Clark University — Worcester, MA
B.A. in Computer Science — 2018 - 2020

- Minors: Data Science and Mathematics
- GPA: 3.93/4.00 — Graduated with Summa Cum Laude and High Honors
- First Honors Dean's List in 2018, 2019, and 2020.

Publications

1. Marco Carmosino, **Ngu Dang**, Tim Jackman. **Finding Circuit Extensions For XOR in Polynomial Time**. 2024. *Symposium On Theory of Computing 2025 (STOC' 25)*. Under Submission.
2. Marco Carmosino, **Ngu Dang**, Tim Jackman. 2023. **Minimal XOR Circuits: The One True Shape is a Binary Tree**. Unpublished Manuscript. This work was integrated with *Finding Circuit Extensions For XOR in Polynomial Time* above. A set of slides presenting this work can be found here.
3. Mariah Papy, Duncan Calder, **Ngu Dang**, Aidan McLaughlin, Breanna Desrochers, and John Magee. 2019. **Simulation of Motor Impairment with "Reversed Angle Mouse" in Head-Controlled Pointer Fitts's Law Task**. *In Proceedings of the 21st International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '19); ACM, Pittsburgh, PA, USA*. DOI

Teaching Experience

Teaching Fellow | Boston University — 2021 - present

- CS131: Combinatorics Structures — Summer 2022, 2023
- CS132: Geometric Algorithms — Summer 2022
- CS235: Algebraic Algorithms — Spring 2021
- CS237: Probability in Computing — Summer 2024
- CS332: Theory of Computation — Spring 2023, Fall 2023, 2024
- CS630: Advanced Algorithms — Fall 2021

Grader | Boston University — 2023 - present

- CS535: Complexity Theory — Fall 2023

Undergraduate Teaching Assistant | Clark University — 2018 - 2019

- CS120: Introduction to Computer Science — Fall 2018
- CS121: Data Structures — Spring 2019
- CS180: Automata Theory — Fall 2019

Projects

Edible Mushroom Classifier
. *Kaggle's Challenge — Github Link* 07.2024 - 08.2024

- Implemented a Random Forest model in Python that classifies edible mushrooms from toxic ones based on physical characteristics.
- The dataset used in this project (train and test) was generated from a deep learning model trained on the UCI Mushroom dataset. The training set contains 3116945 data points; the test set contains 2077964 data points, with 22 features.
- The model achieved an accuracy score of 0.987 on the hidden test set.

Disaster Tweets Classifier
. *Kaggle's Challenge — Github Link* 04.2024 - 05.2024

- Implemented a model classifying disastrous Tweets from regular ones in Python using DistilBERT by HuggingFace, which was trained on over 7000 tweets.
- The model achieved an accuracy score of 0.818 on the hidden test set.

Digit Recognizer
. *Kaggle's Challenge — Github Link* 10.2023 - 11.2023

- Implemented a Digit Recognizer model in Python using a Convolutional Neural Network (CNN), which was trained on the MNIST dataset.
- The model achieved an accuracy score of 0.988 on the hidden test set.

House Price Predictor
. *Kaggle's Challenge — Github Link* 07.2022 - 08.2022

- Implemented a House Price predictor model using CatBoost Regression in Python where the data contains 2919 entries, each with 79 explanatory features describing most aspects of residential homes in Ames, Iowa.
- The model achieved an RMSE score of 0.13 on the hidden test set.

Past Experience

Undergraduate Research Assistant | Worcester, MA 05.2019 - 05.2020

- Contributed to computer vision and computational geometry research projects in the Computer Science Department.
- Implemented experiments, statistical analysis, visualization, and geometrical simulations in Python and Java.

CMS Assistant | Worcester, MA 04.2018 - 08.2018

- Participated in building Clark University's new website on WordPress with the University's Marketing Department.
- Fixed 300 broken links as they were encountered and edited contents as needed.
- Handled tickets from other departments in the university that resolved their problems with accessing new website features.

Skills

Programming: Python, Java, C, C++, MySQL, MATLAB.

Libraries: Pandas, Numpy, Tensorflow, PyTorch, Natural Language Toolkit (NLTK), Scikit-Learn, Seaborn

Tools: Git, Jupyter, Google Colab, Visual Studio, Microsoft Office Suite

Scripting: LaTeX, HTML, CSS

OS: Windows, Linux

Languages: English (fluent), Vietnamese (native).

Awards and Honors

- **Outstanding Academic Achievements,** awarded by the Department of Computer Science at Clark University.
- **Inducted to Phi Beta Kappa,** Lambda of Massachusetts at Clark University on 05.24.2020

Academic Services

Reviewer for: *Journal of Computer and System Science (JCSS)*

Organizer for: *Boston University Computer Science's Theory Seminar (Spring 2021)*

Vice President for: *Clark University Computer Science's Competitive Programming Club*