

Tianchi (Maverick) Mo

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EDUCATION

Stony Brook University

Ph.D. in Computer Science (Thesis proposal passed) | GPA: 4.0/4.0

Stony Brook, NY, USA

Aug. 2018 - Aug. 2025

Advisor: Michael A. Bender.

Thesis: *Theoretical and Experimental Studies on Strongly Adaptive Filters and Parallel Paging.*

Coursework: Data Science Fundamentals, Analysis of Algorithms, Machine Learning, Theory of Database Systems, and Computational Geometry.

Central South University

Master of Engineering in Software Engineering | GPA: 3.9/4.0

Changsha, China

Sep. 2014 - Jun. 2017

Central South University

Bachelor of Engineering in Software Engineering | GPA: 91/100

Changsha, China

Sep. 2010 - Jun. 2014

CORE SKILLS

Programming Language: Python, C, C++, Java, MATLAB, SQL, Shell.

Computer Science: Algorithms, Data Structures, Data Analysis and Visualization, Database Systems, Linux, and Machine Learning.

PROJECTS

ML-advised/Heuristic Paging Algorithm (Research project for Ph.D. degree)

Jan. 2022 - Present

- Modern operating systems may perform poorly when multiple processes running in parallel compete for fast memory like RAM. Meanwhile, the green paging algorithm aims to reduce the energy consumption of a *single* process through optimizing memory allocation. This project focuses on utilizing machine-learning advising and heuristic algorithms to create a green paging algorithm with good average-case performance and a worst-case guarantee, which can be further applied to a parallel paging algorithm to shorten the completion time of processes running in parallel.
- Collected and analyzed the performance data from a Linux server running CPU- and RAM-intensive programs in parallel with C/C++, Python, and Shell scripts.
- Created and implemented a dynamic programming algorithm to find the offline optimal solution for green paging, which could be used in training machine learning models for memory allocation.
- Designed algorithm frameworks to apply machine learning techniques/heuristic algorithms to green paging and parallel paging; tested the frameworks in an initial experiment with XGBoost's advice.

Adaptive Filter: Analysis and Implementation (Research project for Ph.D. degree)

Feb. 2020 - Dec. 2024

- The filter is an approximate dictionary data structure designed to block negative queries (i.e., queries whose keys do not exist in the system). The filter is widely used in many computational systems, including browsers, database systems, AI servers, bioinformatical systems, etc, in order to increase their running speed. Filters can have false positives.
- Established mathematical bounds of false-positive rates of 3 kinds of adaptive filters: broom filter, telescoping adaptive filter, and cache-augmented filter.
- Implemented the broom filter and the cache-augmented filter with C++. The implementation of the broom filter was the first after it had been proposed in theory.
- Experimentally compared broom filter, telescoping adaptive filter, and cache-augmented filter with the standard (nonadaptive) quotient filter and adaptive cuckoo filters.
- Published a 9-page paper in the 2021 Symposium on Algorithmic Principles of Computer Systems (APOCS). Submitted a journal paper with new theoretical results and vastly expanded experimental results in December 2024, which is under review.

Generating Anime Faces with GANs (Course project of graduate Machine Learning course)

Nov. 2019 - Dec. 2019

- Implemented DC-GAN and W-GAN with PyTorch to generate anime faces.
- Explored parameter tuning of deep neural networks.
- Deployed a Progressive Growing GAN (PG-GAN) on Amazon Web Services (AWS) to generate better-quality anime faces.

- Analyzing the Pop Songs Lifespan** (Course project of graduate Data Science Fundamental course) Nov. 2018 - Dec. 2018
- Collected the data of 25K songs from different sources, including Billboard and Spotify, for analysis.
 - Performed feature engineering and applied LightGBM to analyze what properties (e.g., singers, awards, themes, lyrics, and genres) could make music's popularity endure.
 - Applied Python tools (e.g., Pandas, JSON, Matplotlib, and Seaborn) to analyze and visualize our results.

WORKING EXPERIENCE

Department of Computer Science | Stony Brook University

Stony Brook, NY, USA

Research Assistant

Jan. 2020 - Present

- Collaborating with my Ph.D. advisor, lab colleagues, and other researchers from Rutgers University, Berkeley Lab, and the University of Padova (Italy) on research projects about adaptive data structures, caching and paging algorithms, heuristic algorithms, and machine-learning-advised algorithms. Please refer to the PROJECTS section for more information about what we have been working on since 2020.

Department of Computer Science | Stony Brook University

Stony Brook, NY, USA

Teaching Assistant

Jan. 2023 - May. 2025

Teaching Assistant

Aug. 2018 - Dec. 2019

- Assisted in teaching undergraduate-level courses (CSE 385 Analysis of Algorithms: Honors, CSE 373 Analysis of Algorithms, CSE 216 Programming Abstractions, and CSE 150 Foundations of Computer Science: Honors) and a graduate course (CSE 548/AMS 542 Analysis of Algorithms).
- Designed assignments and exams to improve students' ability to solve problems and inspire their creativity.
- Created automatic graders in Python, Java, and OCaml to grade students' programming assignments.
- Taught classes (e.g., dynamic programming in CSE 385) and offered office time (1-3 hours per week) to help students.

Tata Consultancy Services | Professional Training Project

Online

Data Analyst

Sep. 2023 - Oct. 2023

- Completed a training project on data visualizations for Tata Consultancy Services. See the [certificate](#).
- Created visuals of revenue/geographic/website log data analysis with Microsoft PowerBI to help senior entrepreneur leadership (e.g., CEO and CMO) get valuable information from different angles and make effective decisions.

School of Economy & Management | Changsha University of Science & Technology

Changsha, China

Website Developer/Team Leader

Aug. 2012 - May. 2013

- Led a freelance team of 7 students in developing 2 management websites for the School of Economy & Management of Changsha University of Science & Technology.
- Utilized Java, Microsoft SQL Server, Apache Struts 2 + Spring + Hibernate, HTML, and JavaScript to build the websites from scratch. Wrote ~30K lines of code.
- Communicated with the clients weekly to collect the requirements and keep them updated.

SELECTED PUBLICATIONS

- An anonymous journal paper under review. 2024.
- Michael A. Bender, Rathish Das, Martin Farach-Colton, **Tianchi Mo**, David Tench, Yung Ping Wang. [Mitigating False Positives in Filters: to Adapt or to Cache?](#). Symposium on Algorithmic Principles of Computer Systems (APOCS). 2021. (This is a theory paper. Authors were sorted alphabetically. I am the corresponding author and presenter. See my presentation [here](#).)
- Hongxiao Fei, **Tianchi Mo**, Yang Wang, Zequan Wu, Yihuan Liu. [The Searching Ranking Model Based on the Sharing and Recommending Mechanism of Social Network](#). Advances in Services Computing: 9th Asia-Pacific Services Computing Conference. 2015. (The first author is my advisor. I am the second but primary author. It was traditional in China to let the advisor be the first author.)
- **Tianchi Mo**, Hongxiao Fei, Li Kuang, Qifei Qin. [Identifying Users' Interest Similarity Based on Clustering Hot Vertices in Social Networks](#). 8th Asia-Pacific Services Computing Conference. 2014.