Yuan Chang (Merlin)

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Education

- **University of California, San Diego** — La Jolla, California
  Master of Science - Computer Science and Engineering; GPA: 3.97/4.0 — *Sept 2022 - June 2024*
  Courses: *Probabilistic Reasoning, Software Engineering, Reinforcement Learning, NLP, Convex Optimization, Recommender Systems.*
- **University of California, Davis** — Davis, California
  Bachelor of Science - Computer Science; GPA: 3.9/4.0; Graduated with Honors — *Sept 2018 - June 2022*
  Minor: *Mathematics (Number Theory, Modern Algebra, Linear Algebra, Numerical Optimization & Scientific Computation)*
  Courses: *Operating Systems, Data Structures, Algorithms Design, Artificial Intelligence, Machine Learning, Computer Architecture.*

Internships & Experiences

- **Amazon AWS** — Seattle, WA (Onsite)
  Software Developer Engineer Intern (High Performance Computing group) — *June 2023 - Sep 2023*
  - Designed and implemented internal Restful APIs that configure computing instances with cluster management and job scheduling systems.
  - Developed public API within AWS CLI to enable direct interactions of our service for customers.
  - Developed database managers which queried a single-table DynamoDB storing both cluster and node level data.
  - Simplified dependency graph within the team project and incorporated dependency injections to handle complex and nested object-oriented codebase.
  - Implemented API orchestration that simplified complex distributed workloads into a simple and seamless API invocation.
  - Incorporated unit, integration and load tests into the CI/CD production pipeline which achieved over 85% test coverage to ensure workflow validity.
- **UC Davis Applied Mathematics Research Project** — Davis, CA (Hybrid)
  Research Assistant & Software Engineer — *June 2021 - June 2022*
  - Developed automated reasoning pipeline that computed undiscovered Ramsey constants.
  - Utilized symmetric breaking and optimization techniques to reduce the search space by 6x with preprocessing.
  - Optimized the computation to achieve up to 10x improvements in source generation.
  - Leveraged parallel computing to speedup SAT computation time by 2x.
  - Research paper and artifacts published on *ACM (ISSAC 2022)*.

Projects

- **Minimization of CA Wildfire Impact(Web Mining, Convex Optimization, KKT, Lagrangian, Data Analysis)**: Constructed connectivity matrix of CA counties based on humidity and fire probability. Formulated the CA wildfire problem into a constraint optimization problem and solved through integer programming techniques. Computed counties with highest priorities based on 2021's historical data, while minimizing each counties' financial, social and geological impact.(2023)
- **Terminal UI board-game in Haskell(Haskell, Functional Programming, QuickCheck, Genetic Algorithm)**: Implementing the TUI version of the classic board-game, Mastermind, in Haskell. Monadic and functional programming. Implemented 10 QuickCheck property testings. Implemented genetic algorithm-based AI player using minimax techniques. Github Link (2022)
- **Computations with Rado numbers and degree of regularity(Automated Reasoning, Theory of Computation, Number Theory, Combinatorics)**: Advancement in terms of Rado Numbers and the degree of regularity. Discovery of nearly 500 new mathematical constants. Results collected and formulated into research paper accepted into 2022 ISAAC conference. Co-author with Prof. Jesús De Loera and William Wesley. Github Link (2021)

Publications

- **Rado Numbers and SAT Computations (with J. A. De Loera and W. J. Wesley).**
  Proceedings of the 47th International Symposium on Symbolic and Algebraic Computation (ISSAC 2022). Pages 333-342, available online at https://dl.acm.org/doi/10.1145/3476446.3535494.

Volunteer Experience

- **UC Davis Undergraduate Research Conference** — Davis, California
  Ramsey Theory and Automatic Theorem Proving. Presentation Link. — *Oct 2021*
- **Teaching Assistant for Robotics Class at Davis Senior High** — Davis, California
  Taught essential programming paradigms through the language RobotC to a class of 30. — *Sept 2019 - Dec 2019*

Technical Skills Summary

- **Programming Languages**: Python, C++, Java, Typescript, Rust, MATLAB, R, Bash, Swift
- **Libraries/Tools**: Git, pdb, UNIX, Scikit, TensorFlow, pandas, NumPy, SymPy, Pytorch
- **Cloud service/Model/Interface**: AWS, SaaS, IaaS, Restful API, Docker