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Nil Mamano

Education

PhD + Masters in Computer Science   University of California Irvine, GPA 3.83/4 — Sep 2015 – Dec 2019

B.E. in Computer Science   Polytechnic University of Catalonia, GPA 3.8/4 (99th percentile) — Sep 2011 – Jul 2015

Skills

Languages: C++, C, Python, Java, HTML, CSS, Javascript, Bash.   **Tools:** Git, Github, Linux, Oracle Grid Engine.

Experience

University of California Irvine

PhD Student Researcher — Sep 2015 – Dec 2019

- Co-authored 9 peer-reviewed articles on algorithm design.

- Designed data structures for matching drivers and passengers on a road network dynamically. Leveraged the topology of road networks to optimize the data structures and scale them to statewide networks with 100k+ edges. [Java]

- Led a research project: came up with an original research problem, engaged 3 colleagues to work on it, and collaborated with them to solve it, write a paper, and get it published. We designed an optimal algorithm for the knight tour problem. [Javascript]

- Designed clustering algorithms for partitioning data into balanced clusters, and applied them to gerrymandering prevention: they can partition a geographic region into compact and equal-population districts. Built a desktop application with a GUI to visualize and benchmark the algorithms. [C++, OpenGL, Javascript]

- Improved the runtime of the multi-fragment algorithm for Euclidean TSP from $O(n^2)$ to $O(n \log n)$.

- Designed a parallel algorithm for DNA sequencing.

Teaching Assistant — Sep 2016 – Jun 2018

- 100+ sessions teaching algorithms to groups of 50+ students, with excellent student evaluations.

- Championed the use of online automated grading to provide immediate feedback to the students and reduce the grading load. Led a study with 100+ students to measure the effect of automated grading.

Undergrad Researcher — Feb 2015 – Jul 2015

Created SANA, a biological network alignment software that uses simulated annealing to predict the function of proteins. Ran large-scale experiments in a computing cluster to fine-tune the algorithm and managed to outperform the leading algorithms in accuracy and runtime simultaneously. [C++, Bash, Oracle Grid Engine]

Polytechnic University of Catalonia

Research Intern — Feb 2014 – Sep 2014

Contributed to RACSO, a free online judge (automated grading tool) for compiler and automata theory courses. Built an interpreter for a C-like language used by the students to write their solutions, following Test-driven development. [C++]

Selected projects

Built an efficient in-memory key-value Cache that supports timeouts, using templates and C++17 features. It implements Redis' algorithm to remove expired entries and has an LRU eviction mechanism. [C++]

Selected publications

- "Euclidean TSP, Motorcycle Graphs, and Other New Applications of Nearest-Neighbor Chains" N. Mamano, A. Efrat, D. Eppstein, D. Frishberg, M.T. Goodrich, S. Kobourov, P. Matias, V. Polishchuk, International Symposium on Algorithms and Computation 2019

- "Stable-Matching Voronoi Diagrams: Combinatorial Complexity and Algorithms" G. Barequet, D. Eppstein, M. T. Goodrich, and N. Mamano, International Colloquium on Automata, Languages and Programming 2018

- "Reactive Proximity Data Structures for Graphs" D. Eppstein, M.T. Goodrich, and N. Mamano, Latin American Theoretical Informatics Symposium 2018

- "SANA: Simulated Annealing far outperforms many other search algorithms for biological network alignment" N. Mamano and W. Hayes, Bioinformatics: Oxford Journals 2017