Maximilian Vötsch

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Work Experience

University of Vienna
Feb 2021 - Ongoing

Prae-Doc Assistant in the Theory and Applications of Algorithms (TAA) group

- Researched how tools from classical algorithm research can be used to design efficient algorithms for unsupervised learning objectives
- Implemented, benchmarked, and optimized algorithms in C++ following algorithm engineering practices
- Organized workshops and conferences, co-organizing the Queer in AI workshop at ICML 2024 and local organizer of the SEA 2024 conference
- Collaborated internationally with researchers from academia and industry (Stanford, CMU, TU Munich, IIT Delhi, Google, ...)
- Acted as an expert reviewer for high profile conferences (NeurIPS, KDD, ICML, ALENEX, ICALP, SEA, ...)
- Co-supervised a Bachelor's thesis and a Masters thesis. Taught the courses "Advanced Algorithms" and "Algorithms and Data Structures for Computational Science". Taught the exercise class for "Mathematical Foundations of Computer Science 1" for six semesters.
- Received the faculty award for significant contributions in the category Publications in Highest Ranking Venues in 2023

Projects

XCut (published at KDD 2024)
May 2023 - Ongoing

First practical algorithm using expander decomposition to cluster a graph.

XCut solves the normalized cut problem by sparsifying a graph to a tree and it is the current state of the art solver for this problem. I co-designed the algorithm, implemented it in *C++*, and performed all experiments and data analysis using *Python*. This project received the audience appreciation award at KDD 2024, which is awarded to papers that garner significant public interest.

PRONE (published at NeurIPS 2023)
February 2023 - Ongoing

New algorithm for solving Euclidean k-means and creating coresets for downstream applications.

The algorithm has a running time of $O(nnz(A) + n \log n)$. It has been made available as a *Python* package, with its main implementation in *C++*, and *Cython* wrappers provided to make it available to data scientists. I co-designed the algorithm, implemented it for preliminary experiments, analyzed and plotted data using *pandas* and *pyplot*, and provided the resulting algorithm as a Python package.

Education

University of Vienna
February 2021 - Ongoing

Dr. techn. Computer Science
Supervisors: Univ.-Prof. Dr. Monika Henzinger and Ass.-Prof. Dr. Kathrin Hanauer, B.Sc. M.SC.
Thesis Title: Efficient Algorithms for Problems in Clustering and Fairness

University of Vienna
March 2018 - August 2020

M.Sc. Mathematics, Thesis title: Cofinitary Groups

University of Vienna
October 2016 - January 2021

B.Sc. Computer Science, did not graduate

University of Vienna
October 2014 - March 2018

B.Sc. Mathematics, Thesis title: Lattice Path Matroids

Skills

Languages	C++, Python, Haskell, Rust, German (native), English (fluent)
Technologies	Linux, git, shell, cmake, uv, vim, Docker, GitLab CI
Libraries	Blaze, OpenMP, OpenMPI, Catch2, pandas, numpy, scikit-learn, pytorch

Personal Interests

Bouldering, Analog and Digital Photography, Electronics, Guitar