

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 on "Graph Clustering: A Comparison of Louvain and Leiden" and a Masters thesis on the topic "Repetition Free Longest Common Subsequence". 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 - March 2025

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 2014 - March 2018

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

Skills

Languages

C++, Python, Haskell, Rust, German (native), English (fluent)

Technology

Linux, git, unix shell, cmake, poetry, clang-tidy, vim, Docker

Libraries

Blaze, OpenMP, OpenMPI, Catch2, pandas, numpy, scikit-learn, pytorch

Personal Interests

Bouldering, Analog and Digital Photography, Electronics, Guitar