

Maximilian Vötsch

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in maximilian-vötsch 🌀 boredoms 🐙 voetschm

Work Experience

University of Vienna

Feb 2021 -

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 ran experiments with algorithms in C++
- Co-supervised a Bachelor's thesis on "Graph Clustering: A Comparison of Louvain and Leiden" and a Master's 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" 6 times. Assisted in teaching "Algorithms and Data Structures 2" once.
- 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, ...)
- 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 - Present

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 helped design the algorithm, implemented it in C++, and performed all experiments and data analysis using *Python*. The project received the audience appreciation award at KDD 2024, which is awarded to papers with high public interest.

PRONE (published at NeurIPS 2023)

February 2023 - Present

New algorithm for solving Euclidean k -means and creating coresets for downstream applications. The algorithm has a running time of $O(nnz(A) + n \log n)$. Made available as a Python package for the data science community. Main implementation in C++, with *Cython* wrappers provided to make it available to data scientists using *Python*. I helped design the algorithm, implemented it in C++ for preliminary experiments, the data of which was analyzed and plotted using *pandas* and *pyplot*, as well as provided it as a *Python* package.

Education

University of Vienna

February 2021 - (expected) 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, pandas, numpy, scikit-learn, pytorch

Personal Interests

Bouldering, Analog and Digital Photography, Electronics, Guitar