



Scholarship in High-Dimensional Geometric Algorithms

There is an opening for a scholarship for 6 months starting from October 2024, under the NCN grant “High-Dimensional Data Processing using Sample Compression and Dimensionality Reduction”, which aims to develop efficient algorithms for processing high-dimensional data using geometric and probabilistic tools. Typical areas involve developing geometric algorithms for processing data in non-Euclidean metrics and more general distance functions, reducing data dimensionality, sample compression schemes, etc. The candidate must be enrolled in a Polish university or institute.

The principal investigator is dr. Kunal Dutta <https://www.mimuw.edu.pl/~kdutta/>.

The project aims to design algorithms needed for processing high-volume and high-dimensional data, with Euclidean or non-Euclidean metrics and more general dissimilarity functions, providing theoretical guarantees on their efficacy and computational complexity. We would also like to design compressed and low-dimensional representations and data structures for storing such data, with proven guarantees on their size and correctness of approximation. Another aim is to analyze existing heuristics for such processing and prove theoretical bounds on their output, and for problems where theoretical guarantees are not feasible, to design practical heuristics with some theoretical indications of their effectiveness. Finally, we would like to provide implementations and software libraries of our algorithms and sample compression schemes, whenever possible.

These problems can include working with various ℓ_p -based metrics, KL and Bregman divergences, kernel-based dissimilarity functions, VC-dimension based bounds, random projections, etc.

We are looking for a student who

- Is a graduate in Computer Science, Mathematics or related areas. Strongly motivated undergraduates in these areas are also encouraged to apply.
- Is motivated to pursue research problems involving several areas, such as algorithms (especially randomized and geometric algorithms), probabilistic combinatorics, computational geometry and topology.
- Has a strong background in discrete mathematics, probabilistic combinatorics and algorithms. Some familiarity with computational geometry, real analysis and topology would be a plus, but is not essential.
- Is proficient in English.

We offer

- Exciting and challenging research problems.
- Collaboration with researchers within and outside MIM UW.
- Travel funding for conferences and research visits.
- Salary: 3000 PLN per month (brutto).

Contact: K.dutta@mimuw.edu.pl.

To apply for the position, please send a CV and a brief description of your research interests.

Application deadline: September 25, 2024.