FACULTY
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TECHNOLOGY
CTU IN PRAGUE

Assignment of master's thesis

Title:	Distrubuted Sparse Matrix-Vector Multiplication
Student:	Bc. Boris Rúra
Supervisor:	doc. Ing. Ivan Šimeček, Ph.D.
Study program:	Informatics
Branch / specialization:	Computer Science
Department:	Department of Theoretical Computer Science
Validity:	until the end of winter semester 2022/2023

Instructions

1) Review existing libraries for multithreaded sparse matrix-vector multiplication (SpMV) at least [1,2].
2) Review existing approaches to distributed SpMV [1].
3) Discuss distributed SpMV with selected libraries from point 1).
4) Implement ideas from point 3) using OpenMP and MPI libraries.
5) Measure the resulting performance and speedup. Compare the performance of the implementation with similarly focused libraries.

[1] Kozický. Parallel Joint Direct and Transposed Sparse Matrix-Vector Multiplication, diploma thesis, CTU FIT, 2019
[2] W. Liu and B. Vinter. 2015. CSR5: An efficient storage format for cross-platform sparse matrix-vector multiplication. In Proceedings of the 29th ACM on International Conference on Supercomputing. ACM,339–350.
[3] J. Eckstein and G. Matyasfalvi. Efficient distributed-memory parallel matrix-vector multiplication with wide or tall unstructured sparse matrices.CoRR, abs/1812.00904, 2018.

Electronically approved by doc. Ing. Jan Janoušek, Ph.D. on 13 August 2021 in Prague.