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Czech Technical University in Prague
Faculty of Information Technology
Department of Theoretical Computer Science

Bachelor's thesis

Impact of sparse matrix storage format on efficiency of multiplication of sparse matrices

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Supervisor: Ivan imeek

18th January 2014

Acknowledgements

THANKS

Declaration

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Nesrovnal, Tomáš. *Impact of sparse matrix storage format on efficiency of multiplication of sparse matrices.* Bachelor's thesis. Czech Technical University in Prague, Faculty of Information Technology, 2014.

Abstract

Summarize the contents and contribution of your work in a few sentences in English language.

Keywords Replace with comma-separated list of keywords in English.

Abstrakt

V několika větách shrňte obsah a přínos této práce v českém jazyce.

Klíčová slova Replace with comma-separated list of keywords in Czech.

Contents

List of Figures

Introduction

Matrix multiplication

Matrix multiplication is one of the basic linear algebra operations.

Chapter 1

State-of-the-art

Chapter 2

Analysis and design

Chapter 3

Sparse matrices

3.1 Sparsity

A matrix is called sparse, when contains a lot of zero elements.

When working with a sparse matrix, we can take in advantage its zero elements. In case of sparse matrix multiplication, we can use sparsity in two ways. First, a sparse matrix storage format doesn't have to store zero elements. Second, we can skip multiplying by zero elements.

The disadvantage of sparse matrix storage formats is we cannot directly get a single element by its x and y coordinate.

3.2 Coordinate format

3.3 Compressed sparse rows

3.4 Block Sparse Rows

3.5 Quadtree

Chapter 4

Realisation

Conclusion

Appendix A

Acronyms

SpMMM Sparse matrix-matrix multiplication

SpMVM Sparse matrix-vector multiplication

Appendix B

Contents of enclosed CD

- `readme.txt` ..... the file with CD contents description
- `exe` ..... the directory with executables
- `src` ..... the directory of source codes
  - `wbdcm` ..... implementation sources
  - `thesis` ..... the directory of LaTeX source codes of the thesis
- `text` ..... the thesis text directory
  - `thesis.pdf` ..... the thesis text in PDF format
  - `thesis.ps` ..... the thesis text in PS format