The Name of the Title is Hope

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ABSTRACT

A clear and well-documented LaTeX document is presented as an article formatted for publication by ACM in a conference proceedings or journal publication. Based on the "acmart" document class, this article presents and explains many of the common variations, as well as many of the formatting elements an author may use in the preparation of the documentation of their work.

CCS CONCEPTS

• **Computer systems organization** → **Embedded systems**; *Redundancy*; Robotics; • **Networks** → Network reliability.

KEYWORDS

datasets, neural networks, gaze detection, text tagging

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1 INTRODUCTION

Graph querying, Context-Free Path Querying (CFPQ), applications in different areas. Performance is important for practical tasks.

Matrix-based algorithm. Pretty simple. Performance problems. CPU/GPGPU based implementation. Investigate and compare.

There is no publically available standartized dataset for algorithms evaluation. We collect some data and propose possible candidate for it.

Research question: comparison of differend implementations of matrix-based CFPQ. We implement and compare peformance.

Contribution

- Implementation. Source code is available on GitHub:!!!!!!
- Evaluation
- Dataset for evaluation. Available. Data format. Reference values.

This paper is organized as follows. !!!!

2 MATRIX-BASED ALGORITHM FOR CFPQ

Matrix-based algoritm for CFPQ was proposed by Rustam Azimov [1]. This algorithm ... It was shown that GPGPU utilization for queryes evaluation can significantly improve performance.

Pseudocode and notes. Performance-critical section is matrix multiplication!

We implement this algoritms by using different approaches for matrices multipliation.

3 IMPLEMENTATION

Hypotisis which we wont to check.

- CPU vs GPGPU
- Sparse vs Dense
- !!!
- !!!

Approaches for comparison. Why we choose these. Brief overview of approaches.

Generic notes on optimizations. Notes on data transferring. On matrix changes tracking (we should multiply pair of matrices only if one of them changed in last iteration)

3.1 m4ri

Descriprion of impl 1

*Both authors contributed equally to this research.

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$$S \to SS$$

Figure 1: grammar 1

$$S \to SS$$

Figure 2: grammar 2

$$S \to SS$$

Figure 3: grammar 1

$$S \to SS$$

Figure 4: grammar 1

3.2 Pyton sparse CPU

Descriprion of impl 2

3.3 CUDA naive

Descriprion of impl 3

3.4 CUDA 4 russian method

Descriprion of impl 4

3.5 Python + CUDA

Descriprion of impl 5

3.6 Smth else?

Descriprion of impl n

4 EVALUATION

For evaluation we use PC with the next characteristics.

- OS
- CPU
- RAM
- GPU
- Libs versions
- Pyton runtime

Compiler options, Python runtime, etc.
Cases:
Random sparse graphs and same generation query. Form paper [**?**
]
RDFs and two tipes of queries. Form paper []
Worst case and same generation query.
Cycle which fills to full graph and two queryes.

4.1 Input Data Format

Results: tables, graphics, etc

5 DISCUSSION

Discussion of evaluation results.

6 CONCLUSION AND FUTURE WORK

We present !!!

Our evaluation shows that !!!

First direction for future research is a more detailed CFPQ algorithms investigation. We should do More evaluation on sparse matrices on GPGPUs.

Also it is nesessary to implement and evaluate solutions for graphs which is not fit in RAM. There is a set of technics for huge matrices multiplication. Is it possible to dopt it for CFPQ

Another direcion is a dataset improvement. More data. More grammars/queries.

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REFERENCES

[1] Rustam Azimov and Semyon Grigorev. 2018. Context-free Path Querying by Matrix Multiplication. In *Proceedings of the 1st ACM SIGMOD Joint International Workshop on Graph Data Management Experiences & Systems (GRADES) and Network Data Analytics (NDA) (GRADES-NDA '18)*. ACM, New York, NY, USA, Article 5, 10 pages. https://doi.org/10.1145/3210259.3210264