k Nearest Neighbour Search with CUDA

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Outline

Motivation

Problem Statement

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Concepts & Methods
Experiment Results
Conclusion

Brute Force
kd-Tree

Parallel kNN Search

Brute Force

- simply implementable

- highly parallelisable

- low memory requirements

- quadratic runtime

kd-Tree

- hard to implement

- only search part
  parallelisable

- memory-intensive

- linear runtime

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Matrix Multiplication

image of matrix multiplication

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Pseudocode

> **for all** points in data **do**
>> calculate distances to all other points
>> **repeat**
>>> count neighbours in distance of ε
>>> adapt ε
>> **until** number of neighbours in distance $\varepsilon = k$
>> get neighbours in distance of ε
> **end for**

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Results

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