Cluster-Computing and Parallelisation for the Multi-Dimensional PH-Index

Master Thesis

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Abstract

Here comes the abstract.

Contents

1 Introduction

1.1 Motivation

Meta - will be removed after editing. This subsection will describe the context in which this work is placed and why this work is needed.

1.2 Objectives

Meta - will be removed after editing. Describe the objectives of this thesis: the distribution of the index and the addition of the concurrency support

1.3 Thesis outline

Meta - will be removed after editing. Give an overview of what each chapter will contain

2 Background

Meta - will be removed after editing. This section should provide an overview of the PhTree. It should also present important previous work concerning distributed indexes and parallel data structures.

This is an example of how to cite a scientific publication [1] from your bibliography (BibTeX[1] file). And this example shows how you create links within your documents, e.g. link to section 1.3.

2.1 The PhTree

Meta - will be removed after editing. Provide on overview of the PhTree. Should not go into too many details here, refer to PhTree paper.

2.2 Related work

Meta - will be removed after editing. Present the relevant related work.

2.2.1 Distributed Indexes

2.2.2 Concurrent data structures

[1] http://en.wikipedia.org/wiki/BibTeX

3
Index distribution

Meta - will be removed after editing. This chapter should focus on how the distributed index was implemented: how the data was split across the cluster nodes, the manner in which the queries are executed and how the entry load balancing is performed.

3.1 Challenges

Meta - will be removed after editing. Present the callenges of implementing a distributed system : scalability, load balancing, etc. Should not focus on issues like security, availability as those are not relevant to this report.

3.2 Distibution strategies

Meta - will be removed after editing. Present the possible ways in which the entries can be distributed across the cluster nodes. Talk about the advantages and disaadvantages of each approach. Say which approach was chosen and why.

3.2.1 Hashing

3.2.2 Spatial splitting

3.2.3 Z-Order curve splitting

3.3 Algorithms

Meta - will be removed after editing. This section should explain how the queries should be executed on the distributed system. Present the load balancing algorithm.

3.3.1 Point queries

3.3.2 Range queries

3.3.3 Nearest neighbour queries

3.3.4 Entry load balancing

3.4 Architecture

Meta - will be removed after editing. This section should explain how the queries should be executed on the distributed system. Present the load balancing algorithm.

4
Concurrency

Meta - will be removed after editing. Present the concurrency strategies that could be added to the PhTree and explain the consistency model associated with each strategy.

The PhTree does not currently support concurrent write operations. There are several strategies that could be employed to add concurrent writes.

4.1 Challenges

4.2 Concurrency strategies

4.2.1 Copy-on-Write

4.2.2 Locking

5 Implementation

Meta - will be removed after editing. Present the implementation architecture and the techologies used.

5.1 System description

Meta - will be removed after editing. Describe the system, include class/deployment diagrams.

5.2 Technologies

Meta - will be removed after editing. Describe the technologies used, the reasons for which these technologies were chosen and any alternatives.

6
Evaluation

Meta - will be removed after editing. Explain how the system should be evaluated, present and explain the benchmarks

7
Conclussions

Meta - will be removed after editing. Conclude the report. This should reiterate the main points of the report and try to mirror the introduction

8
Future work

Meta - will be removed after editing. Present the points that were not tackled by the thesis and talk about possible future work.

List of Figures

List of Tables

Acknowledgements

Bibliography

[1] Alfonso Murolo. Designing wordpress themes by example. Master's thesis, ETH Zurich, 2013.