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Abstract

All the papers either solve the problem of a more efficient cache in a specific domain, or use the network domain, which are both relevant, but not really useful when looking at shortest path caching.

The papers show some interesting ways to use cache, but ultimately their approaches are very domain or query specific so their approaches to caching and cache replacement/invalidation can not be applied directly.

1. Related work reference

reference support for related work section.

1.0.1. On effective presentation of graph patterns: a structural representative approach. They develop an approach that combine two focuses when mining patterns in graphs. 1. they introduce a method to relax the tightness of the pattern subgraph pattern matching, so they can have high support for subgraphs which are very similar, but not exact. 2. as many mining approaches return allot (often very similar) patterns, they propose a method to collapse similar patterns so the user is presented with something that is easier to get an overview of and gain an understanding of the data. [1]

1.1. Cache Invalidation and Replacement Strategies for Location-Dependent Data in Mobile Environments

They develop two cache replacement and invalidation techniques for mobile clients communicating with a LBS. They argue that in the setting of spatial data and LBS then it is important to consider more than just the access time when doing cache replacement. They look at the spatial area where an object in the cache is valid as well as the direction the user is moving. They do this besides calculating the probability that this object will be accessed again.

Assumes all POI objects are fixed size and no updates will be made. [2]

1.2. Nearest-Neighbor Caching for Content-Match Applications

[3]

1.3. Caching Content-based Queries for Robust and Efficient Image Retrieval

They study how to do caching with Content-based Image Retrieval, and they support range and kNN queries. They focus on how to do caching when many of the queries are similar, but not the same (e.g. picture cropped or color changes) without polluting the cache. Their approach works in metric space and they develop an approximate method to check if the result can be satisfied by the cache. They archive good results, getting few direct cache hits, but still satisfying many queries from similar queries in the cache.

[4]

1.4. Caching Complementary Space for Location-Based Services

They develop the notion of Complementary Space(CS) to help better use a cache on a mobile client. CS is different levels for representing the objects on a map within MBRs. At the lowest level they just show the object, and as the levels go up they include more and more objects within MBRs, looking at the trade of in communication up/down link from a mobile client. They always have the entire world represented within the clients cache, at different levels, and offer no solution to how they will handle server updates to the map.

This is very similar to [5], although the approach does not formally depend on an R-tree, they still use one and offer no viable alternative, which lessens the difference even more. Their results are better than their competitors, including [5], though it seems that they stop their graphs just before [5] beats them.

1.5. Proactive Caching for Spatial Queries in Mobile Environments

They develop an approach which uses the index of an R-tree to add context to a cache of spatial object on a mobile client. They develop several communication and space saving techniques by representing less important parts of the R-tree in more compact ways, or just not storing the lower nodes/leaves of the tree. They also formally prove the asymptotic bounds of their algorithms.

[5]

1.6. Cache-Oblivious Data Structures and Algorithms for Undirected Breadth-First Search and Shortest Paths

[6]

1.7. Cached Shortest-Path Tree: An Approach to Reduce the Influence of Intra-Domain Routing Instability

They assume a network setting and try to reduce the time and computational load it takes when network topology changes, as well as prevent any links from being unreachable if the topology changes often. They propose a cache with shortest-path trees, arguing that even if the topology changes often, then it is mostly between the same configurations (e.g. a computer/router is turned off/on) meaning that a cache with the most common seen configurations will be able to drastically reduce the amount of computation needed to recalculate routing tables.

[7]

1.8. On Designing a Shortest-Path-Based Cache Replacement in a Transcoding Proxy

[8]

1.9. Optimizing Graph Algorithms for Improved Cache Performance

[9]

References

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