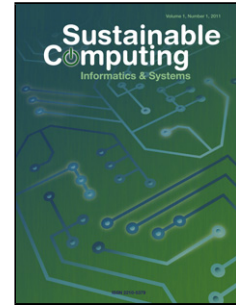


Accepted Manuscript



Title: Energy-Efficient Algorithms for Data Retrieval from Indexed Parallel Broadcast Channels

Authors: Ali R. Hurson, Sahra Sedigh, Mike Wisely

PII: S2210-5379(17)30292-5

DOI: <https://doi.org/10.1016/j.suscom.2017.09.006>

Reference: SUSCOM 191

To appear in:

Received date: 4-8-2017

Accepted date: 29-9-2017

Please cite this article as: Ali R.Hurson, Sahra Sedigh, Mike Wisely, Energy-Efficient Algorithms for Data Retrieval from Indexed Parallel Broadcast Channels, Sustainable Computing: Informatics and Systems <https://doi.org/10.1016/j.suscom.2017.09.006>

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Energy-Efficient Algorithms for Data Retrieval from Indexed Parallel Broadcast Channels

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Highlights for “Energy-Efficient Algorithms for Data Retrieval from Indexed Parallel Broadcast Channels”

This work is the extended version of the article presented during IGSC 2016 conference and was invited for the special issue. The following highlights the scope of extension:

- Section 1 has been rewritten and extended to satisfy the journal audience.
- Section 2 has been modified and extended to make the article more appealing to the audience.
- Section 3 was extended by introducing additional energy/performance algorithms (i.e., the so called rPOS and eSES).
- Section 4 was extended to be compatible with the additional materials added in Section 3. This includes additional simulation runs, and analysis of new results.

Abstract

The advances in mobile device and wireless communication techniques have enabled anywhere, anytime information access. Information being accessed, whether structured or unstructured, can be classified into three categories: private data, shared data, and public data. Private and shared data are usually accessed through on-demand-based services, where user request is pushed to the server(s) and response to the request is generated and passed to the user (i.e., two way communication). Public data, on the other hand, can be most effectively disseminated using broadcasting technique (i.e., one way communication). In broadcasting, server(s) generates the broadcast contents and disseminate it through the air channel. The mobile user in search of public data, tunes to the air channel and pulls the desired information. The characteristics of mobile device and limitations of wireless communication technology pose challenges on broadcasting strategy as well as data retrieval algorithms. To reduce the access time and power consumption, major research issues include indexing techniques and data organization on air channel, broadcasting over single and parallel channel(s), data distribution and replication strategy, conflict resolution, and data retrieval methods. This article is intended to articulate these challenges, propose several solutions, and through comprehensive simulation demonstrate the validity of the proposed solutions.

Keywords: Algorithm/protocol design and analysis, query processing, retrieval models, ubiquitous

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