A Hybrid Approach for Retrieving Geographic Information in Wireless Environment Using Indexing Technique

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Abstract The wireless data transmission has emerged as a residential data distribution process which is nowadays used for dissemination of public users in order to cater a large integer of mobile users. In this research paper, we have proposed a hybrid indexing schemes for data transmission which is based on the dispersion of indexing using hash table with Huffman-tree index coding. In the proposed work, we have theoretically explained the performance of existing indexing scheme using a detailed study and afterward have compared their performances. In our proposed approach we have used an indexing technology for retrieving geographic information in Wireless Environment. The proposed technology has been evaluated in terms of efficiency and time difficulty and proved to be very efficient during our experimental analysis.

Keywords Data radio casting · Tuning time · Indexing scheme · Access latency

1 Introduction

In the field of wireless transmission the area that has received a lot of attention in the area of GIS (Geographic Information system). Recent advancements in the communication hardware have made possible the accomplishment affordability of these types of systems for many broadcasting organizations. In the wireless sensor, networking organization efforts have been given in making possible that many public broadcasting organizations are working on the development of the spatial data-based communication infrastructures that will make possible for them to share their geographical-based informational data. Many of the data chronicles that are stored in

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electronic libraries and record archives incorporate geographic innuendo within their texts. For example, newscast documents depict the spot where the incident occurred and sometimes the place where the document has been produced. Geographical location innuendo can also be affixed to Internet pages by using details from the location of the webpage text, web server, and many other webs-based informational elements. However, the geographic location plugs of these Internet documents are scarcely used in the geographical informational recuperation systems. Few geographical informational recuperation algorithms or index structures include the spatial nature of geographic innuendo entrenched within these documents. The pure expurgated textual indexing techniques concentrate only on the phonological pragmatics of the documents and pure spatial techniques concentrate only on the topographical aspects of the Internet base documents. Not any of them are appropriate enough as a combined approach to the process of Internet-based geographical information retrieval because they totally ignore the other type of informational structures. Consequence to which, there is a total paucity of system architectures, index structures, and query languages that includes both types of gens.

In recent years, wireless data transmission has become more popular due to its scalability and elasticity to distribute public users in turn to a large numeral of mobile users with common interests because it can accommodate all awaiting requirements for same data in a comeback. Customers in the efficient area can access the broadcast channel, investigate for compulsory data item and wait for the data item to appear before downloading it [1]. In fact, many practical applications use data broadcast technology, where movable clients have a frequent attention in certain data groups [2]. Since most mobile devices have incomplete battery power or limited life, access delay and adjustment time are the two main criteria for evaluating the presentation of data transmission systems. In this research paper, we have proposed hybrid indexing schemes for data transmission which is based on the dispersion of indexing using hash table with Huffman-tree index coding. In the proposed work, we have theoretically explained the performance of existing indexing scheme using a detailed study and afterward have compared their performances. In our proposed approach we have used an indexing technology for retrieving geographic information in Wireless Environment which is based on wavelet wood data structure for text indexing or spatial indexing thereby establishing a new evaluation strategy.

2 Some of the Wireless Indexing Techniques

Indexing technology has been used to condense the tuning time of data transmission systems. An index is an explicit data arrangement that contains position in order for data elements. Indexing technology has evolved rapidly in current years or it is fair or just to choose the most advanced design for assessment. To trounce above shortcomings, we strive to compare the presentation of unusual indexing techniques in all possible situations. In general, indexing system can be divided into 3 categories,

namely Hashing schemes, B + tree-based schemes and Huffman wood compression-based schemes.

2.1 Hash-Scheme

This scheme uses less power, has a shorter transmission or a shorter access time. It can also connect errors flexibly. In the case where most customers need short comeback time or minimal power consumption, the hash method is the best choice because hash method can achieve almost the best adjustment time. It works better in scheme that does not involve frequent updates because it may take some time to construct a broadcast sequence. Similarly, the hash function may need to be further modified for dissimilar datasets.

2.2 B + Tree-Based Schemes

In the implementation of database indexes, a B + contains pointers to lower level nodes in the tree and an ordered list of keys. To insert an element search for or search for element into the tree, one must loads up the root node, based on searched-for value in between try to find the adjacent keys, and follows to the next node in the tree using the corresponding pointer the tree.

2.3 Huffman Wood Compression-Based Schemes (H.T.D.)

The Huffman-tree is a small index tree that considers the potential for data entry, where the more popular data has a shorter path from root to path, thus reducing the moderate adjustment period. It works better in search, above all for datasets with high contact probability and small index boxes. It has flexibility, short transmission or best time effectiveness, uses less energy and can sometimes connect faults flexibly. When mainly clients need the shortest comeback time or lower energy expenditure, the service provider should consider the Huffman-tree schema, especially when the data element has a rather skewed access probability in dataset. Though, when the dataset needs to be updated frequently, this may not be a good choice.

3 Related Work

In this section of the paper, we have carried out a literature review on the work related to the indexing technology for retrieving geographic information in Wireless Environment.

Sun et al. [3] have presented a new proposal for two-dimensional spacing, which can provide the general status of the files placed in server, which is useful for retrieving XML data in of the request mode. Firstly, they have proposed cutting method or double arrangement greatly condense size of the index. Secondly, their two-tier system allows the client to implement an effective access protocol, which can further reduce correction time during index indexing.

Dimitrios et al. [4] have proposed their work for energy saving and access efficiency are two key goals competing with non-functioning communication networks. To address the energy loss caused by queuing searches, they have recommended adjusting the indexes and data. While there is a significant contribution to indexing, indexing has one or more of the following issues. First, they all consider the complete arrangement between the broadcast data, and none of them consider the partial subscription case in general. Second, they are balanced systems and do not fit into "linear (one-dimensional) system" of wireless media, where an unbalanced structure can provide obvious advantages. Third, they do not consider the reduction of access patterns that hinder greater profits.

Ping et al. [5] have proposed their work on broadcasting in an effectual way of distribute information to many consumers using mobile devices in a wireless world. This requires customer to actively listen to the channels to get information that interests them, which will increase battery consumption. However, so far, the battery of the mobile device is still a container, which limits size of mobile application. In their proposed work, they have presented a specific measurement conversion strategy (PFInd), which can be used to adjust the exchange between access competence or power savings according to customer supplies. Experimental results show that this process has better presentation or efficiency compared to some of latest indexes.

Chinmayananda et al. [6] have addressed the problem of a dual sender unicast account that has two senders, and each sender has a different message. Some messages may be similar to two senders. Each recipient needs a unique message or has a message piece called a sub-message. The sender uses the knowledge of all recipient margins to send a coded message so that all recipients can solve their needs. The goal is to find the total number of opt-in senders for the length of the message (also known as maximum number of messages sent with a limited number of messages), and the value of limit if message lengths tend to be unlimited (also known as good audio transmission rate). It also provides the best coding system.

Zhu et al. [7] have considered the characteristic properties of variable data sizes across multiple channels, by offering a recording technique using a reference tree to reduce the average time and average correction time. The results show that programmatic programs can have a high quality index and are very effective in transmitting heterogeneous data.

Yon et al. [8] have presented a naming scheme for the efficient processing of energy saving and the delay of full text search on wireless radio stations. Although many access methods and indexing arrangement for full text search have been proposed in the past, they are all targeted to the data in disk archive, rather than to non-broadcast channels. In order to perform a full text search on a wireless radio station, they have introduced the naive list operation method, in which the list goes before the data in wireless channel. To reduce the waiting time header, they have offered two-level indexing, which adds another index structure to the index style list.

Kuvano et al. [9] have presented their work on JoyTV, which is PC-based PC-watching software. They have automatically noticed the changes and the music on stage and accepted superimposed text on television broadcasts. It uses the function of images to connect TV content and Web sites.

4 Proposed Work

Huffman-tree indexing is an efficient indexing technique for the wireless broadcast environment because when we are constructing and codes the Huffman-tree it takes into account how much is the user access probability is there for an Internet data items. When we start the Huffman-tree traversing from the root, in Huffman-tree we place the popular page of data over the Internet with highest probability which lives in closer to the root, that is results in reduction of the search time for a popular Internet data page over the web using mobile data network. Further considering the flat broadcast, we have found that to a Huffman-tree-based broadcasting scheme over the wireless network, the distributed method can be extended over and applied to the base stations that is a very innovative idea and can be taken into consideration as an efficient index technique for the wireless indexing schemes. In this section, we have discussed the architectural configuration of data bucket and index bucket in H.T.D. is as similar as in a BTD. The first step is to bit by bit gradually create a Alphabetic Huffman-Tree that is k-ary-based, catalyzed by the following steps which are being introduced during the construction and development process that is based on the access frequency of datasets of the Internet clouds in Fig. 1. An Alphabetic Huffman-Tree would be raised up further to prepare and composing the formalized earth base station access frequency in a integrated uniform manner as shown in Fig. 2. In this, following algorithm would be used to construct this H.T.D.

Data Item Key	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Frequency	23	4	12	10	17	31	15	21	29	19	7	12	16	14	20	48

Fig. 1 Given dataset of H.T.D. index

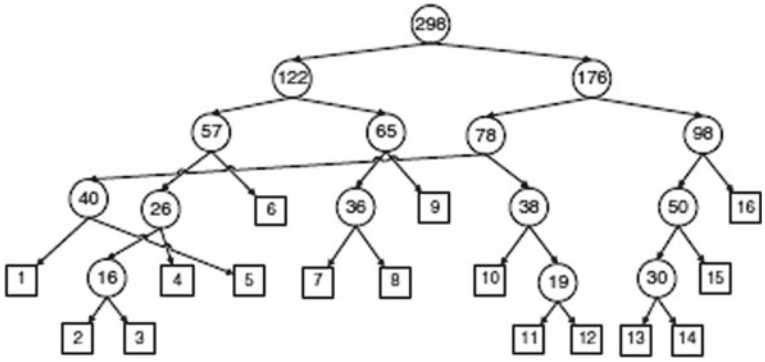


Fig. 2 Construction of Huffman code-based tree

Stage 1: Let us consider a Binary Huffman-tree data nodes → di, dj as nodes as candidates to be unified. we will create a new index node-based tree di with a data frequency which would be equal to the total sum of the nodes di's and dj's data item frequencies, and will replace the data item nodes di, dj with a new data node d'i during the construction sequence H.T.D. Index.

Stage 2: When there would be no leave nodes among them, At stage 2, For every data di note and observe the level of each leaf data node of T0. The root node would be at level 1. Considering from bottom level to the root level H.T.D. Index, for each level rearrange the pointers in such a way that the leftmost two nodes of Huffman-Tree would then have the same parent, and so on then the next two and soon. In this way, alphabetic Huffman-Tree T would be generated, without altering the level of each node in tree T0, as shown in Fig. 3

Stage 3: The sum of the Nodal frequencies would be minimum, Now we will cut the final Huffman-tree T at level l after generation of the alphabetic Huffman index tree T based on the mobile index bucket information, and we will perform a distributed traversal final Huffman-tree T as stage 4 (Fig. 4).

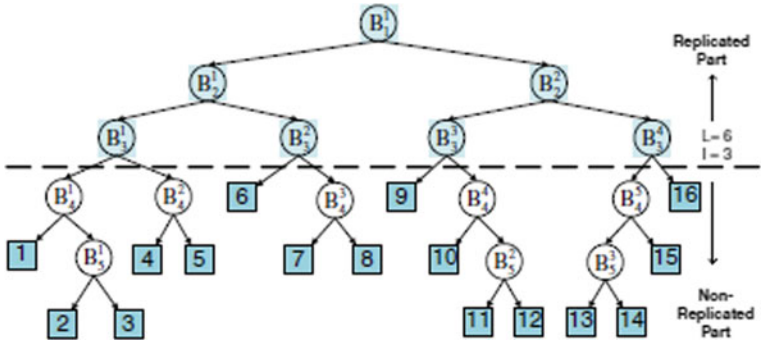


Fig. 3 The Huffman coded-tree index T

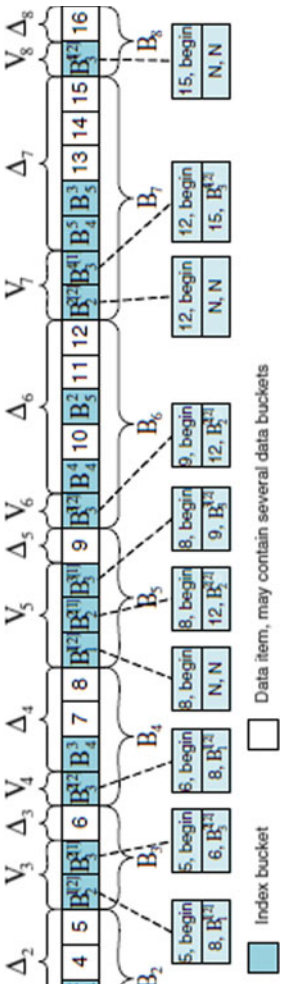


Fig. 4 Huffman-tree-based index-based broadcast bucket sequence

```
Input→ keyreqd , {Where Input id the key value of request data is
equal to dreq}
Output:→dreq .
Do the Access →in a randomized order on to the broadcast
channel;
Declare the value of B0 is equal to current bucket;
if (B0 is equal to data bucket &&  B0 .bId is equal to (keyreq, 1,
sreq )) then declare
{
 Download data dreq ;
 } end if;
else if  (B0.bType  is equal to control) then
{
Doze B0.bOffset time till the next control index;
B0 → current bucket;
} end if
Follow B0's control table and go to the pointed bucket;
Download data dreq ;
```

Fig. 5 Algorithm for retrieving data from The broadcasting sequence of a Huffman-tree-based index

Stage 4: Let di, dj → would be the left most nodes available among all candidates. During stage 4 when we are searching in a Huffman-tree *T* control table, the client check the first node record entry in the control table with using the key value of a request data packet; algorithm which is given in Fig. 5. will be used for while retrieving the indexing data from the broadcast sequence of a Huffman-tree-based index as shown in Fig. 5

5 Experimental Results

In this section, we have used experimental miniature simulation for obtaining the results for evaluating the actions of the indexed H.T.D. Index Scheme. We have implemented our system is on an AMD Ryzen computer with 8 GB memory using Java NetBeans, and Windows 10 v6.1 operating system.

5.1 Experimental Settings

While using a single broadcast communication channel we have simulated a base station which is broadcasting a data collection archive with 10,000 data items [9], where a series of multiple clients are based on these mobile stations that are requesting

various sets of data items depending upon the user need which is having a varying size as shown in Fig. 6.

5.2 *Simulation Results*

From Fig. 7, we can see and analyze that the results for evaluating the actions of the indexed H.T.D. Index Scheme and can conclude that: (1) It reduces response time significantly, and (2) it is more energy efficient.

6 Conclusion

In this research paper, we have proposed hybrid indexing schemes for data transmission which is based on the dispersion of indexing using hash table with Huffman-tree index coding. In the proposed work, we have theoretically explained the performance of existing indexing scheme using a detailed study and afterward have compared their performances. In our proposed approach we have used an indexing technology

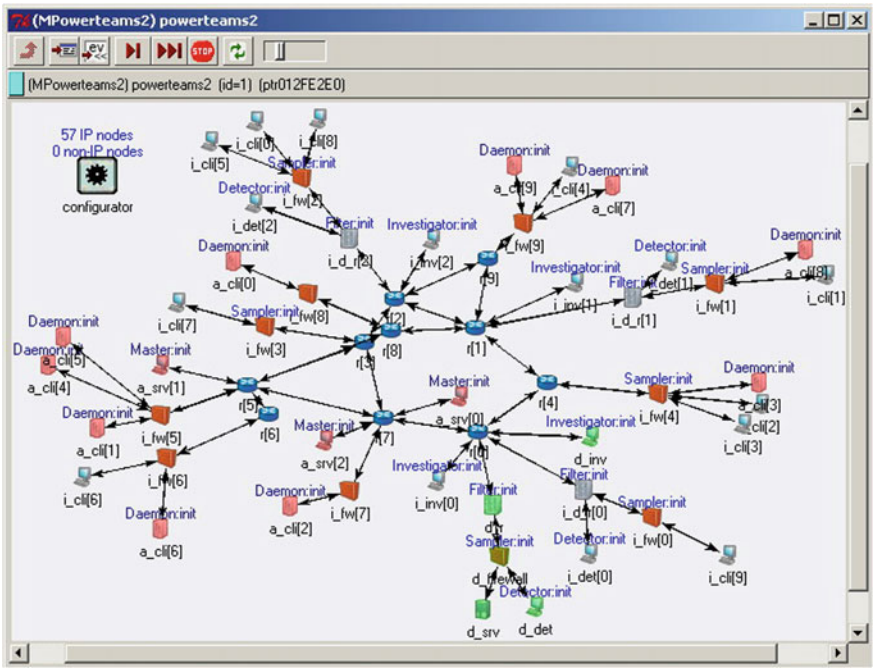
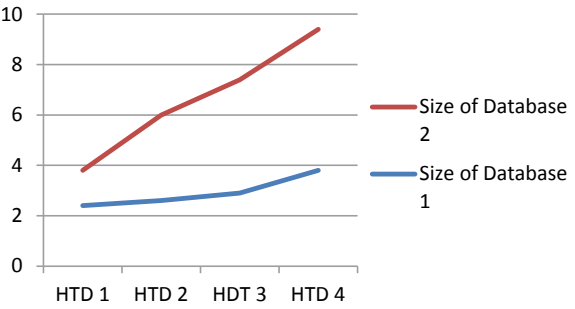


Fig. 6 To show a base station which is broadcasting if done using Huffman indexing

Fig. 7 AAL w. r. t. |*D*|



for retrieving geographic information in Wireless Environment which is based on wavelet wood data structure for text indexing or spatial indexing thereby establishing a new evaluation strategy. After by analyzing each scheme under the controlled environment and with selected criteria, our simulation results show two major advantages of the proposed H.T.D.: (1) It reduces response time significantly, and (2) it is more energy efficient.

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