Study on Improving Transaction Processing Speed Using B-tree in RFID Environment

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Abstract. This study aims to research on the improving data processing performance of previous RFID(Radio-Frequency Identification) transaction re-implementation using B-tree. With the recent development of wireless communications, many studies are implemented on RFID transaction model. For previous RFID transaction re-implementation process is constituted of sequential composition, there is a problem of overhead increase. Thus, this study suggests processing using B-tree in RFID transaction re-implementation for faster and accurate data processing.

Key Words: B-tree, RFID, Transaction, Transaction model, Wireless communications

1   Introduction

For recent development in communication skills, RFID (Radio-Frequency Identification) using wireless communication is used in various areas, thus requiring faster and accurate data processing techniques [1-9]. Asynchronous Reprocessing RFID Transaction Model was suggested for more accurate and continuous data processing in RFID environment [8]. Asynchronous Reprocessing RFID Transaction Model models tag calculation as RFID transaction, thus guaranteeing the consistency of data. However, Asynchronous Reprocessing RFID Transaction Model is constituted in sequential composition, thus requires more time in transaction processing. Thus, in this study, we suggest new directions improving problems occurred in Asynchronous Reprocessing RFID Transaction Model.

2   Related Studies

2.1   RFID

RFID does not get in contact with the Reader and deciphers information on Tag to record. RFID system is composed of Tag, Reader, and Backend Database. The specific role of RFID system is as follows. RFID First, RFID tag is composed of antenna coil that wirelessly communicates with microchip reader that both calculates

and saves data. Second, Reader acknowledges information and communicates with tag using wireless frequency. It is composed of RF module, control unit, and antenna. Third, backend database saves and manages data that reader collects, and performs complex calculation. Furthermore, it saves distinguishable information beforehand to confirm tag data transmitted from reader through confirmation information [3-6].

RFID is a wireless communication using RF signal between tag and reader. It is more convenient compared to previous barcode and recognizes essence code per code more quickly and accurately, actually distinguishing the product [4]. However, there are some problems in the exposure of tag information, vulnerability of security, and code standard problem of tag identification. Furthermore, due to irregular communication obstacle, there also is a problem on communication's consistency [7, 8].

2.2   RFID Transaction Model

In order to improve data inconsistency and redundant saving problem in previous wireless communication environment, RFID transaction modeling was implemented for tag calculation. However, when implementing RFID transaction tag calculation, the implementing sequence kinetically changes, and if the calculation result is evaluated as incomplete, the tag is not completed in the reader area, thus unable to complete other calculation related to the tag's event.

2.3   Asynchronous Reprocessing RFID Transaction Model

In order to guarantee transaction completion and data consistency in case of unstable transaction, Asynchronous Reprocessing RFID Transaction Model was suggested. As a result, through simultaneous control based on continuous interrogation, the problem was solved [8]. However, for this model, when the implemented tag event result is evaluated as incomplete, it immediately creates re-implementation transaction for unprocessed data. When analyzing re-implemented calculation, sequential implementation is required for guaranteeing consistency. At this moment, many overhead occurs regarding analysis.

3   Transaction model suggestion technique applying B-tree

In order to solve disadvantage of Asynchronous Reprocessing RFID Transaction Model, we suggest transaction model applying B-tree index. The suggested model in this study is B-tree Index Reprocessing Directory Transaction Model to implement data process.

3.1   Composition of B-tree Index Reprocessing Directory Transaction Model

In B-tree Index Reprocessing Directory Transaction Model, if the tag stopped with processing is recognized, it searches the database log where the tag information is stored. When searching for the log, it uses B-tree index, thus processing speed is much faster than previous technique. As a result, saving overhead for processing time in reprocessing transaction is possible.
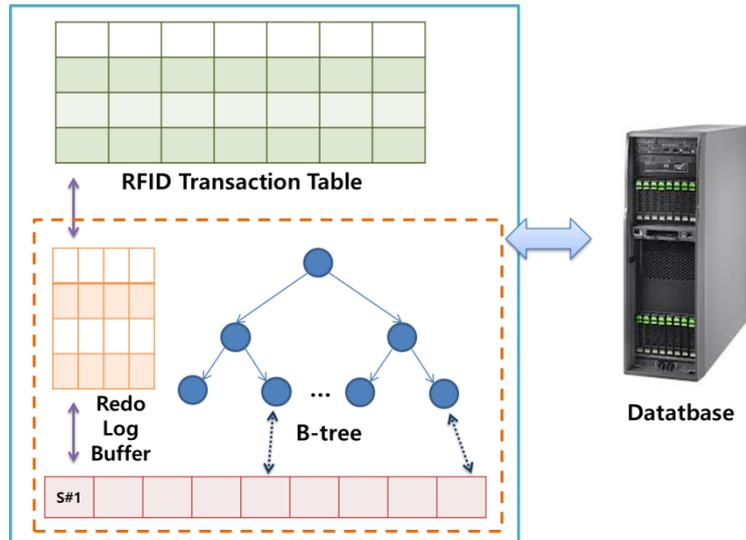

Fig. 1. B-tree Index Reprocessing Directory Transaction Model Architecture

4   Conclusion

Recently, due to the development of wireless high speed internet and ubiquitous technique, RFID using wireless communication technique is applied in many areas. Especially, due to the development of costly small nods, RFID is applied in various areas including distribution and manufacturing in factories. As a result, many studies for accurate and reliable data processing in RFID environment are in process. However, Asynchronous Reprocessing RFID Transaction Model studied previously stores data in sequential manner, so there is a possibility of overhead problem during search and insert processing. In order to improve such problems, we suggested B-tree Index Reprocessing Directory Transaction Model using B-tree. And after technique evaluation, it was found that B-tree Index Reprocessing Directory Transaction Model has improved a lot compared to previous technique. In future, we plan to study simultaneous control technique using B-tree Index Reprocessing Directory Transaction Model.

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