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DATA COMPRESSION SECURING DATA IN CLOUD

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Abstract: The rapid development of information technology over the last decade means that data appears in a wide range of sensor data, tweets, photos, raw data and unstructured data formats. With such an overwhelming flood of information, current data management systems cannot scale to this enormous quantity of raw, unstructured data — Big Data, today. We show the basic concepts and designs of big data tools, algorithms and techniques in the present study. We compare the classical data mining algorithms with the Big Data algorithms by using Hadoop / Map Reduce as the core scalable algorithm implementation of Big Data. We implemented the K-means and A-priori algorithms on a 5-node Hadoop cluster with Hadoop / Map Reduce. We use MongoDB as an example to explore NoSQL databases for semi-structured, massive data scaling. Finally, we show the performance of these two algorithms between HDFS (Hadoop Distributed File System) and MongoDB data storage.

I. INTRODUCTION:

1.1. DATA MINING

Data Mining is the advanced process which extracts the potential and effective and comprehensive mode from the vast amounts of Data in accordance with the established business goals. Many people consider data mining as commonly term of knowledge discovery, while others simply put data mining as basic steps in the process of knowledge discovery. It appeared in the late 1980s, which is new areas with a great researching value in the study of the database, and overlapping subject, combined with artificial intelligence, database technology, pattern recognition, machine learning, statistics, data visualization, and other fields of theory and technology. As a kind of technology, the life cycle of data mining is in unclear stage, experts need takes time and energy to research, develop and propel to be mature gradually, eventually been accepted . Data mining is a kind of technology, which combines the traditional data processing methods with different algorithms, to analyze new data types and extract knowledge from huge amounts of data. Found in huge amounts of data, there are two kinds of knowledge, one is on-line analytical processing (OLAP), the other is a data mining (DM). Both are analysis tools based on data warehouse, but on-line analytical processing appears earlier than the data mining, based on a multidimensional view, emphasizing the execution efficiency and quick response for user commands. And data mining is pay attention to the useful model to people hiding in the depths of data, and it is done by automation, without participation of customers.

1.2. ON WHAT DATA MINING

Data mining can examine any type of data and information flow, its difficulty is relative with database type.

1. **Mining for relational database**: A relational database is the set of tables; table is composed of attributes group, depositing large number of tuples. Usually use ER model to represent the connection between the database and the real. Excavating from a relational database, the trends and data model can be obtained. For example, the customer's income, age, education level, and other information can be obtained and by commercial relational database for mining, then making targeted marketing for customer and avoiding fraud, and shape a company's strategy.
2. **Mining for data warehouse**: Data warehouse is a subject oriented, integrated, non-volatile and time-variant collection of data, which contains consistent data used in enterprise decision support. The data warehouse is the data environment that can be used as the single integrated source of data for processing information. Data warehouses deposit aggregated data, which are processed to find hidden patterns and relation to structure analytical model to classify and forecast.
3. **Mining for new database**: The new database includes spatial database, time database and text database and multimedia database. These data include spatial data, text, data, image and audio data and streaming data and web data. The data structure is more complex and dynamic change, more difficult to handle. For example, through the data mining technology can find the evolution of the object characteristics and trends; streaming data are clustered and compared to find interesting patterns.

1.3. THE EVOLUTION PROCESS OF DATA MINING

In 1960, database technology, and information technology has gradually developed from the basic document processing system to more complex and more powerful database system, such as hierarchical and network database are typical representative of this era with little data independence and abstraction. 1970s, relational databases appear, allowing users access to a flexible data access language and interface, OLTP technology make the relational database technology application gained popularity; Mid-1980s, the rise of a powerful database system, and put forward many advanced data models. for example expanding the relational model, object-oriented model, the interpretation of the model, etc. by the end of 80 advanced data model and application oriented database were developed

After 2000, the ability to store large amounts of data is over the capacity of human analysis and understanding; there is no suitable tool to help extracting information and knowledge from the data. The existence of specific patterns and rules can be found by data mining tools in a large amount of data, which can provide the necessary information for commercial activity, scientific exploration and medical research and many other areas. Business intelligence (BI) based on data mining has become the new darling of the IT industry. Currently the data mining has been successfully applied in retail goods basket data analysis, financial risk prediction, product quality, molecular biology, genetic engineering, discovery of Internet site access patterns, the information search and classification and many other fields.

1.4. OBJECTIVES

1. The motivations and objectives of this research are to:
2. Explore Big Data technologies, tools, and concepts.
3. Explore the new database shift paradigm in databases, with what is called NoSQL databases. We focused on document-oriented databases – an example of it being MongoDB database.
4. Implement the common data mining algorithms. Specifically we implemented Apriori algorithm and K-means clustering algorithm by using the Map Reduce model. Then we show the performance between HDFS (Hadoop Distributed File System) data store and MongoDB data store.

II. SYSTEM ANALYSIS

2.1 EXISTING SYSTEM

Relational databases were built based on mathematical foundation introduced by E. F. Codd specifically based on set theory and relational algebra. Relational databases have specific schema design, where data is stored in a table format, and each table may have a relation with another table through some constraints. Data retrieval tasks in RDBMS can be done through SQL (Structured Query Language), which is the standard for storing and retrieving data from a relational database. However, the large growth in data, the different varieties of format, and the need for scalable web applications drove the requirements for a new database development. This new database paradigm is called NoSQL (Not Only SQL). NoSQL is a non-relational databases systems, schema-free, web scalable, BASE (does not support full ACID property) where data is stored in semi-structured or in raw format.

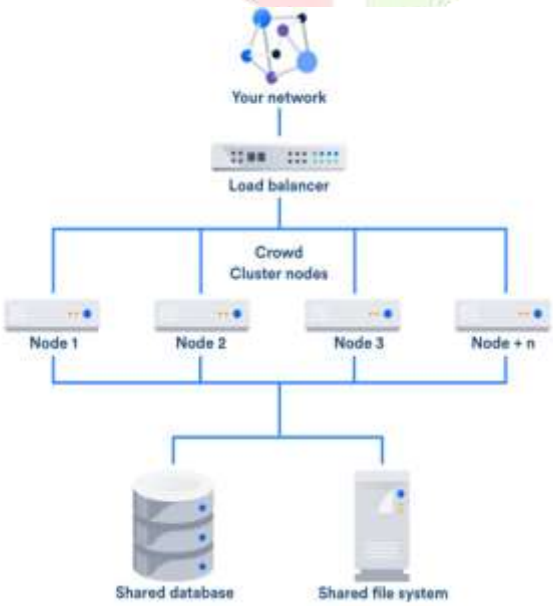
2.2. PROPOSED SYSTEM

As explained earlier, the model is the algorithm that is applied to the data to find similarities, patterns, data summarizations. In this section A-priori algorithm and Kmeans algorithm are covered in detail.

ADVANTAGES

1. **M**DFS store large amount of information
2. MDFS is simple and robust coherency model
3. That is it should store data reliably.
4. MDFS is scalable and fast access to this information and it also possible to serve s large number of clients by simply adding more machines to the cluster.
5. MDFS should integrate well with Matlab MongoDB, allowing data to be read and computed upon locally when possible.
6. MDFS provide streaming read performance.
7. Data will be written to the MDFS once and then read several times.
8. The overhead of cashing is helps the data should simply be re-read from MDFS source.
9. Fault tolerance by detecting faults and applying quick, automatic recovery
10. Processing logic close to the data, rather than the data close to the processing logic

2.3 PROPOSED ARCHITECTURE



III. MODULE SPECIFICATION

According to the system we divided the total system into three modules they are,

3.1. DATA LAYER

As mentioned above, data layer can be database and/or data warehouse systems. This layer is an interface for all data sources. Data mining results are stored in data layer so it can be presented to end-user in form of reports or other kind of visualization.

3.2. DATA MINING APPLICATION LAYER

This layer is used to retrieve data from database. Some transformation routine can be performed here to transform data into desired format. Then data is processed using various data mining algorithms.

3.3.FRONT-END LAYER

This layer provides intuitive and friendly user interface for end-user to interact with data mining system. Data mining result presented in visualization form to the user in the front-end layer

IV. CONCLUSION

Big Data is new field of study in computer science that applies knowledge from different scientific, technical, and practical applications to seek new answers. Smart phones, digital cameras, smart cars, GPS -- of these devices generate huge amounts of data that have a lot of potential for financial return. For instance, GPS data can be used by insurance companies to track their customers where it helps to predict how likely this driver is to get into an accident and so on.

However, Big Data is defined as having four dimensions or 4Vs. Big Data has volume, which means the data are massively large – TBs, PBs and more. Big Data has velocity, meaning that data need to be processed almost in real time. Big Data also has variety, both semi-structured and unstructured. Finally, the fourth dimension of Big Data is veracity, meaning the truthfulness and the accuracy of an inference model for making decisions.

This thesis research encapsulates common Big Data tools and concepts. In Chapter 3, Hadoop, the core of Big Data, was covered in detail. The Hadoop file system can store up to hundreds of Terabytes of data. More importantly, Hadoop implements the MapReduce computation paradigm, a simple yet powerful computing model. It helps hide the complexity of parallel programming from developers, so they only need to write their Map and reduce function. An implementation of the Hadoop cluster was done through this work – 5 of its nodes were deployed on MET IT VMware's server.

Furthermore, an integration of Hadoop MongoDB was also done as a Big Data technology. Hadoop MongoDB has a high potential, and it is a fully open source. Also, MongoDB can be used to build a real time application on top of it. While the heavy computation can be done offline in a Hadoop cluster, the results can be stored back to MongoDB for presentation. Finally, an implementation of A-priori Algorithm and K-means Algorithm were done on both data stores – MongoDB and MFDS.

4.1. FUTURE WORK

A lot potential for future work is contained in this research, summarized below:

1. Practical implementation of Hadoop MongoDB technology stack such as implementing a recommender system on top of MongoDB, with Hadoop used for offline computational power.
2. Design of software packages for data pre-processing using Hadoop MapReduce.
3. Exploration of data visualization for Big Data.

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