

Exploring Competitive Intelligence By Extracting Frequent Pattern of Data Mining in Mobile Computing Environment

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ABSTRACT

Competitive intelligence is vital part of Data Mining System in which Client Server model can invasive with mobile computing for communication now a days. This paper explores Competitive intelligence used for data discovery through data mining system. Data is mined from data warehouse based on knowledge discovery for further decision. As knowledge plays vital role for competitive intelligence during decision making. For this approach data should be fetched or cached through client who is mobile in state. As client sends the request and get response data which further analysed for taking proper decision. Each client try to keep itself in competitive state with other client for their work. This paper exploring some basics of Competitive Intelligence (CI) through Data Mining (DM) in Mobile Computing.

Keywords

Data mining, Competitive intelligence, Mobile miner, Mobile computing

1. INTRODUCTION

Competitive intelligence is part and parcel of artificial intelligence which make user capable to take decision .As their is competitive approach between client –server network for proper and quick response to request. We know that for proper decision it needs information for that it uses knowledge of decision support. The broad application of CI is gathering information providing access to analyse data for purpose of helping server to give proper response to client. As all comprehensive knowledge affect CI.

A information is gather from data warehouse on the action of competitor and decision are made on basis of this information. This information is discovered using DATA MINING technique for gathering competitive data through Data warehouse. This is also called Knowledge Discovery (KDD). In this large amount of data, extracting by pertinent information and tuning that information into knowledge upon which action can be taken.

The repository of data is Extract Transform Load (ETL) lead to increase speed and collection of data for various communications such as on mobile client. The mobile device and transportation are equipped with sensors. They move through trajectories and generate a large amount of data ensuing.

2. COMPETITIVE INTELLIGENCE (CI)

Competitive Intelligence CI as process of taking large amount of data, analyzing large amount of data, presenting high level set of reports that condense and the essence of that data into the basis of competition, enabling management to make fundamental competitive decision.

Competitive intelligence defines as “The process of collection, treatment and diffusion of information that has an objective, the reduction of uncertainty in the making of strategic decision.” By ZENG et al(2006) Expert describe competitive intelligence as a “Managing data used to describe the application and technology which are used and provide access to analyze data and information gather about an enterprise in order to help them make better informed competitive decision.

(Tvrdikova , 2007) describe the basic of competitive intelligence which is firstly collection of heterogeneous source of data for analytical method and ability to support multi user request . Zeng et. al. (2006) CI is based on method of information delivery; reporting, statically analysis, ad-hoc analysis and predicative analysis.

(Golfarelli et. Al. 2004) Define competitive intelligence including effective data warehouse and also a reactive component capable of monitoring the time critical capable operation decision makers to tune their action according to client server request strategy. (Gangadharan and Swamy, 2004) defines CI as the result in depth including potential encompassing planning, decision support system and data mining.

It also include DATA MINING technique for extraction of data from data warehouse firing query to , data base query and reporting ;which may caches a, multidimensional data, online analytical process (OLAP) data for data analysis, data mining and visualisation.

2.1 COMPONENT OF COMPETITIVE INTELLIGENCE

2.1.1 (OLAP) ONLINE ANALYTICAL PROCESSING:

It refers to the way in which client request is slice and dice their way through data using sophisticated tools , that allow for the navigation of dimension such as time or hierarchies. OLAP provides multidimensional summarised views of data and is used for reporting, analysis , modelling and planning for optimizing the Server.

OLAP Techniques and tools can be used to work with data warehouses or data mart designed for sophisticated enterprise intelligence system. These system process queries required to

discover trends and analyse critical factor in competitive intelligence. Report should be kept the data management information about the state of their competitor. It is used to store analyse data such as data mining and data warehousing, decision support system and forecasting, document warehouse and document management; knowledge management, mapping, information visualization and dash boarding ; management information system for competitive intelligence.

2.1.2 ADVANCE ANALYTICAL

It is referred to as data mining forecasting or predictive analysis , in this it takes advantage of statical analysis technique to predict or provide certain measures on facts.

2.1.3 CORPORATE PERFORMANCE MANAGEMENT (PORTAL ,SCORE CARDS,DASH BOARD)

This general category usually provides a container for several piece of data to plug into , so that it aggregate tells a story of data to take proper decision .

2.1.4 REAL TIME COMPETITIVE INTELLIGENCE:

It allow for the real time distribution of metric through email , messaging system and/ or interactive displays etc ; which helps for knowledge discovery.

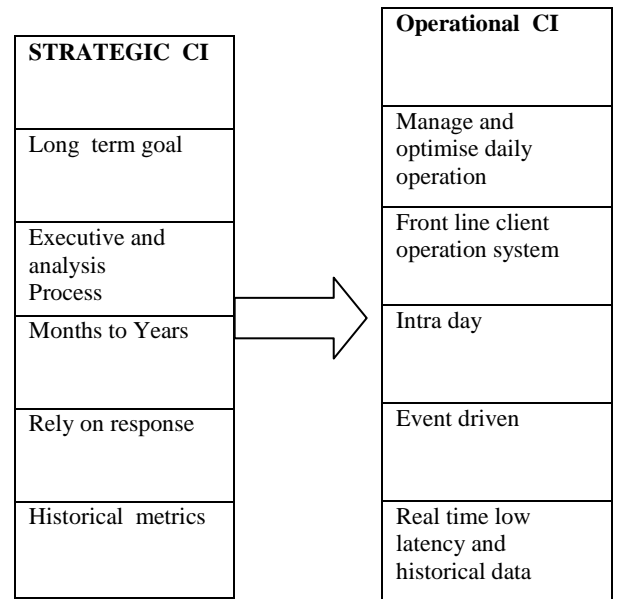
2.1.5 DATA WAREHOSE AND DATA MART

The data warehouse is the significant component of CI. It is subject oriented and integrated data supports physical propagation of data by handling the numerous client request records for integration cleansing ,aggregation and query tasks. It contain operational data which can be defined as an updateable set of integrated data used for enterprise wide tactical decision making of a particular subject area. It contains live data, not snapshot and retains minimal history . Data source can be operational database , historical data , external data or information from the already existing data warehouse environment. The data source can be relational data base or any other data , structure that support for client application. They also can reside on many different platforms and can structure information through mining. A data mart is collection of subject areas organised for decision support based on the needs of a given departments own the hardware software data & programme that constitute the data mart . Data mart should look like original data for each department data which is peculiar to and each specific to its own needs. Data warehouses data mart contain operational data that helps competitive expert strategize base on analyses of past trends & experiences. The key difference is that the creation of a data mart is predicated on a specific predefined needs for a certain grouping & configuration of selected data .A data mart can a support a particular competitive function for unit.

A data mart is the collection of subject areas organised for decision support based on the needs of given section.

Competitive Intelligence is middleware between translational application there by decoupling system tailor to an efficient handling of business transaction from system for decision. In CI we need data history for analysis which helps to take decision . This is need is full fill by data warehouse between client and server model with Strategic CI and Operation CI Figure is based on Imhoff's Model Of Data Warehouse.

2.1.6 DATA SOURCE: Data source can be operational data base historical data , external data for analysis and resulting it data history by mining it for proper decision.



3. DATA MINING TECHNIQUE FOR BROADCASTING IN MOBILE

These portable computers can also be equipped with wireless communication device s that enable users to access global data services from any location .Mobile database system area with the aim of enabling mobile computers to efficiently access a large number of shared database on stationary or mobile devices through the database servers.

The bandwidth limitation of the wireless communication medium induces high communication cost for mobile client. As servers can use a channel shared by mobile client to broadcast data. Broadcasting data of common interest is independent of the number of client receiving it. This fact made the dissemination of data by broadcasting through wireless communication medium a cost with efficient approach. On domain data service latency for client .The broadcast data enabling the client to perform predictive prefetching . Intelligent broadcast organization is done at the server side and the main idea is to place the data items on client side for frequently requests, for together close to each other.

This type of method aims to decrease the access latency for subsequently requested data items. At the client side predictive prefetching aims to improve the client cache hit ratio by predicting

the data items that might be requested in future. Predictive prefetching lower the access latency by increasing the cache hit ratio.

The Sequence of data items requested over time contains precious information about the temporal and spatial pattern of requests and this information should be exploited in broadcasting data . The broadcast request issued are time efficient in a mobile database environment can be stored in a broadcast history where a lot of useful information about the broadcast request pattern and their relative issuing times its hidden . The broadcast history is the chronological sequence of data items that have been requested by clients .There is method are based on analysing the broadcast history using data mining technique.

Data mining research deals with finding association and sequences in individual data items by analysing large collection of data .Interested in the extraction of sequence, as well as clustering the data items. The problem of finding sequential pattern in a set of items has been studied before, however to the best of our knowledge

On automated use of the resulting sequential patterns in broadcast environment . We can exploit rules for organising data broadcast for efficient data access by mobile client . The methods are based on clustering the data items through distinct data mining technique.

One of them is Hyper graph partitioning methods based on sequential patterns are used for clustering data item. In that the sequential rules obtain from sequential patterns are used for predicative prefetching at the client side. Rules are available to mobile client through broadcasting for predictive prefetching.

The broadcast history is simulated through web log and it is used for both extracting the sequential patterns and evaluating the performance impact of the resulting rules for predictive push ,cache replacement and prefetching.

3.1 COMPONENTS OF DATA BROADCASTING

3.1.1 DATA BROADCAST:

The contentious broadcast of data item from the server to a number of clients can be considered as simulating a rotating storage medium or a broadcast disk.

There are two main data dissemination through broadcast:

1.Push Based Approach:- Data broadcasting is done according to predefine user profile. This approach does not consider the current client request, it continuously deliver data through information band .

2.Pull Based Approach:- Data which is broadcasted is server to client as per request by client –server paradigm is cached by client.

Push based approach , the server sends the data as per current request where some time user may end up receiving unrequited data.

In the pull based approach on the other hand , the server load is very high . Since server has to listen to distinct client request.

As only pushing or pulling is not enough for communication with mobile devices . So use of both is necessary combine both technology loads to hybrid approach, this method is develop by (Acharya et al). This is used for both a broad cast channel and a background for the client request.

The broadcast disk , used to set the items that are is to be delivered where data is present at time of broadcast.

In broadcast disks ,the set of items that contains are broadcast request is called the broadcast set. The sending sequence of the item in the broadcast set is called the broadcast schedule. The broadcast schedule affect the waiting times of mobile clients for the item of their interest to arrive.

In mobile fetching data from disk on air is unidirectional and single dimensional since we cannot go back and forth and do random access on it . So appropriate way for client request is to call this new type of storage medium “One Way Tape in Air”.

The scheduling data as per broadcast request is determine the sequence of items in the broadcast schedule and in what sequence they are requested previously is broadcast history they should be cached in same way.

The caching is the important factor for minimizing the communication cost. Caching in mobile computing has different characteristic in client –server .In mobile computing environment data items that are not cached are not equidistant to the client since the broadcast disk is single dimensional.

So solution it is done by prefetching data for broadcast disks was proposed by Acharya. This technique uses for calculate a value for each data page by the time that will elapse before that page on broadcast is going to be replaced by one of the data pages in the mobile client cache is based on the values calculated.

3.1 TRAJECTORY BROADCAST DATA

As mobile devices and transportation means equipped by the sensor. As for proper decision they move through different trajectory and generate a large amount of data ensuing from planned observation such as data ensuing from trajectories of moving object are also called trajectory data(TrD).

As data is huge variable in space and in time and heterogeneous comes from different source . and further need to go through a phase of cleaning and integration in order to gather into repository. As dividing data mining technique with mobile source generate huge amount of data i.e spatial data in chunks to transfer the data for broadcasting on trajectory .

3.2 MOBILE MINER

Mobile miner is present in competitive intelligence to start with client relation management .It provide platform for the analytical tasks, where client profile are extracted continuously from database by moving and calling records for analysis.

The community discover task that aims to discover coherent calling . The profile based on mining platform can be constructed between server and mobile client. As in communication network community between client and server is

used to capture the data request from the server. As it contains data history for proper decision for client in competitive sector.

In this emphasis that-

- 1 How we solve the request of client through mobile communication and its technique with data mining.
 - 2 Mobile miner on real data to elaborate what can be done and how data mining can be integrated in competitive Intelligence model.
- As above fig shows the architecture of mobile miner. Client records are collected by mobile to communicate with base station and feed into mobile miner as data streams, as client is in moving trajectories and calling records.

Once records are imported in system profile mining is performed. We implemented into the system profile for the upper layer data mining tasks.

The core of this task is to mine sequential patterns on data streams. For this we have to develop a novel algorithm to mine and incrementally maintain on fast data stream sequential patterns.

For this mobile user segment data module according to client profile. The spatio-temporal pattern of clusters to allocate base station effectively for specific client group request.

4. DATA MINING

Data Mining may be used as an automated search procedure for discovering credible and actionable insights from large volumes of high-dimensional data. Data mining employs techniques from statistics, pattern recognition and machine learning.

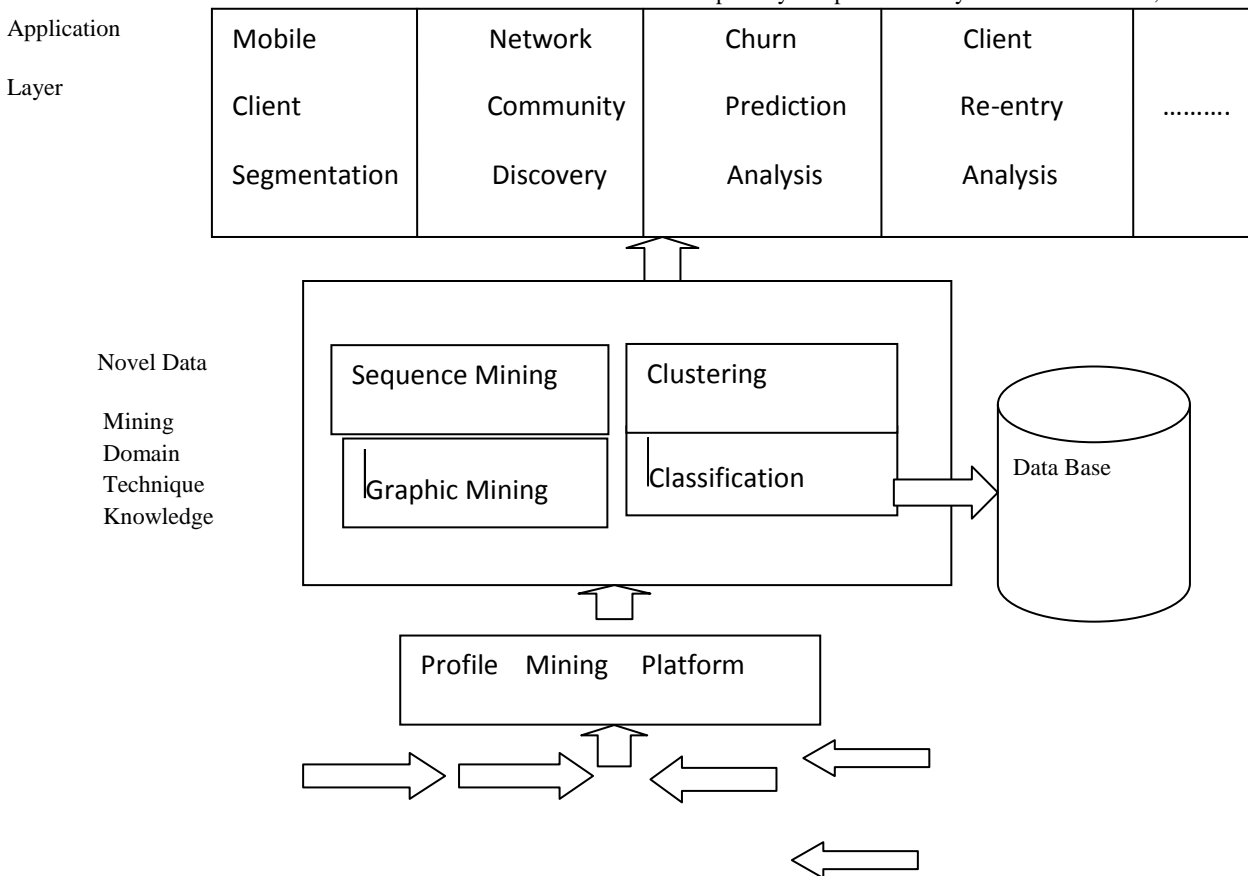
Competitive Intelligence applications of data mining include 'Risk Analysis'. As data mining is a key component in this methodology that is concerned with algorithms by which structures are extracted from data while meeting computational efficiency constraints.

4.1 COMPONENT OF DATA MINING:

4.1.1 PREDICTIVE MODELING WITH DATA MINING

Predictive modeling may be defined as the estimation of a function, that maps points from an input space, to a given mapping. Predictive modeling algorithms are designed to accurately construct an estimator 'f' of 'f' from a typical finite sample of the data known as the training set. Training set data should be appropriately handled. In CI applications the more generalized form of predictive modeling is probability modeling, which is also frequently used since a decision support system can work better with ranked predictions since they are more easily amenable to optimization and constraint satisfaction analytics.

Transformations on the input space to improve estimation capability are performed by feature extraction, construction, and



4.1.2 CLASSIFICATION MODELING IN DATA MINING FOR DATA

Classification modelling enable the prediction of the most likely state of categorical variable give the values of other variable. As Projectional method are by far the most practical for data mining , and these include linea classification, neural network, decision trees etc.

4.1.3 CLUSTERING IN DATA MINING

Clustering is data mining technique in which finite sampling of points are grouped into sets of similar points. Points with common characteristics are essentially “clustered”. While predictive modelling required that target class membership is known in the training data, in clustering ,this knowledge is not priori and is potentially discovered by segmentation process.

5. DATA MINING IN MOBILE BROAD CAST

Advance data storage and processing made possible to store huge amount of data . This data can further refered to take decision by its analysis with help of viewing it or mining it from storage. As Data mining research deals with finding relationship among data items and grouping the related items.

This data items are called on request by processing server from database server to server the client for appropriate to request . To attract more and more client in competitive intelligence . This can be provide at any place to user may be mobile by broadcasting data through signal in the range tower. This lead to get more and more client in competitors ranging.

6. CONCLUSION

This paper explorer how data is mined by mobile devices with various technique which can improve competitive intelligence. It also focuses on flaws in the technique for processing data through mobile nodes and analysed data used for decision making. That can improve with fetching algorithm . This paper also highlights on the design aspects of the mining technique along with mobile computing for decisions support by the server in competitive decision.

Decision making for completion with other server to get more client and accessing rate is vitally explain here. Various attributes affecting the performances of the various algorithms used through Data Mining in the Mobile Computing environment.

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