INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

A PATH FOR HORIZING YOUR INNOVATIVE WORK

APPROACHES OF MOBILE COMPUTING BASED ON DATA MINING

MRS. RUCHITA S. CHINCHMALATPURE[1],

DR. V. M. THAKARE[2], DR. SWATI S. SHEREKAR[2]

1.   **Bhartiya Mahavidyalaya, Amravati, India.**

2.   *Sant Gadge Baba Amravati University, Amravati, India.*

Abstract

Mobile computing describes a new class of portable computing devices which are becoming general in everyday life. Mobile computing is associated with data mining. A mobile computing system always bond with dynamic network connectivity caused by heterogeneous network. Data mining is key to develop the information technology. Data mining is used to build up applications and services to mobile users. Data mining plays significant roles in exploring, analyzing, and presenting scientific data. The components of data mining can exist in different types of systems involving different technologies, databases, and data structures. As an important branch and effective tool of data mining, cluster analysis is not a new area, which has already been applied to other disciplines. A Mobile computing is a set of programs that helps Multimedia to store, modify, and extract information or data from a database. The goal of mobile data mining is to provide advanced techniques for the analysis and monitoring of critical data from mobile devices. The objective of this paper is to investigate important issues in mobile Computing with the help of data mining.

I.INTRODUCTION

Mobile Computing is a constructive term used to describe technologies that enable people to access network services anyplace, anytime, and anywhere. Ubiquitous computing and nomadic computing are synonymous with mobile computing. Information access via a mobile device is plagued by low available bandwidth, poor connection maintenance, poor security, and addressing problems. Unlike their wired counterparts, design of software for mobile devices must consider resource limitation, battery power and display size. Consequently, new hardware and software techniques must be developed.

Data mining may be a powerful tool for extracting valuable information from plenty of data. The emerging technology combines statistical analysis, machine learning, and database management to extract information from large database systems [8].

Data mining also refer as data or knowledge discovery is the process of analysing data from different perspectives and summarizing it into useful information - information that can be used to increase revenue, cuts costs, or both [13]. Data mining technology has emerged as a means for identifying patterns and trends from large quantities of data. The Data Mining technology normally adopts data integration method to generate Data warehouse, on which to gather all data into a central site [11]. Data mining software is one of a number of analytical tools for analyzing data.

A. Data mining description

Data mining is a process to extract the contained, not known in precede and potentially useful information and data from a large number of incomplete, loud, indistinct and casual useful application data. Data mining is depending on the function. Different data mining applications may involve different data mining techniques, and the processing flow may also different, the general data mining process as Shown in figure 1 .Data mining involves capturing and gathering random data from the flow of information[9].

Figure 1 (Different Data Mining Process)

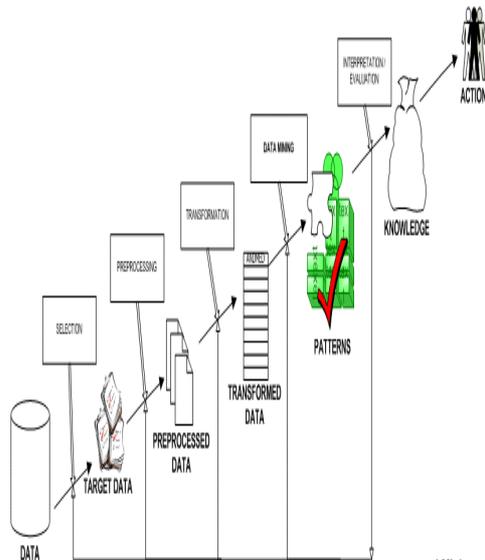Some current applications of the data mining technology are:

Image mining is concerned with the representation of images (both 2D and 3D), images can be represented in many different ways. Image mining techniques include the generation of histograms. There are many large collections of digital images that have been generated with respect to many applications.

Graph mining

Graph mining is essentially an extension of frequent pattern mining. Everything can be represented as a graph.

B. Clustering general steps

In positive clustering examination, according to whether the domain data involved in the whole process can be broken down into three links, each link has its clear task, so that the whole method of clustering analysis can be clearly understood

General steps of clustering as below,

1) Feature extraction

Its input is the original samples used by the domain experts to choose what characteristics used to deeply illustrate the nature and configuration of the sample. Its outcome is a matrix, and each row of which is a sample, each list is a characteristic indicator variable.

Text mining

Text mining is a popular data mining activity. That is a typical application is to build classifiers to categorize or cluster large document collections. Through text mining represents textual data in terms of a collection of keywords. Keywords can be defined by experts, or extracted using other data mining techniques or natural language processing (NLP) techniques.

Image Mining

2) Implementation of clustering algorithm, access to cluster genealogy diagram

Clustering is concerned with the grouping of data into categories. This is particularly desirable in the context of customer data where it is useful to group similar customers together for the purpose of targeted advertising [12]. Its input is a sample matrix, which is to think a sample to be a point in the characteristic changeable space. The output of the clustering algorithm is typically a cluster family diagram to reproduce all the classification or simply provide a specific classification system, including total categories, and each category contains what sample point.

3) Select appropriate classification threshold

After obtaining a cluster family diagram, the domain experts will decide the threshold choice according to the exact applications by knowledge and domain information. After the threshold choice the organization schemes can be directly seen from the cluster family diagram. It is also analyzing from cluster results with domain knowledge, so that to intensify the sample points and characteristic variable understanding.

C. Main algorithm for clustering analysis

A major step of the data mining is data preparation, which includes standardization, integration and pre-processing of the particular data, etc. (as shown in fig 2), which is require for data mining, also an essential for the standard operation of the clustering algorithm. There are many clustering algorithms, require to apply the type of information involved, and the reason of clustering, as well as specific application needs to choose the suitable clustering algorithm. Normally the clustering analysis algorithms can be divided into the following categories: classification methods, hierarchical methods, density-based methods, grid-based methods and model-based methods
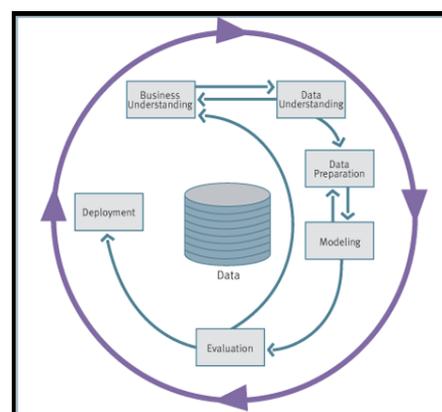

Figure 2 (Data Mining Cycle)

D. Clustering analysis overview

Clustering analysis is a data mining technology to divide the data items into more than one module or clusters, and in data mining the clustering analysis focuses on the different clustering methods, data always support for clustering complex shapes and complex types high-dimensional clustering examination techniques, as well as for the uniform values of huge databases and categorization data clustering methods [1].

II MOBILE COMPUTING AND DATA MINING

Mobile computing is related with the mobility of hardware, data and software in computer applications. Mobile computing is always associated with data mining. Quality of service upgrades mobile computing application dynamically when a resource becomes available, Mobile computing involves mobile communication, mobile hardware, and mobile software. Communication Mobile embedded systems develop into data centric and multimedia-oriented applications, storage with high performance and huge capacity has become necessary. Because of its versatile

features DBMS used in mobile multimedia for security, ease of maintenance, reliability, availability and performance. The best example of Mobile computing device is Global Positioning Systems (GPS) [15]. By which user's physical able to determine the location, current position on maps, receive traffic and weather information, and act as a car-navigation [2]. Similarly, corporate information system also require a network system for mobile computing so that employee of the organization can use data base or information to improve work efficiency, expand line of communication and enhance customer confidence and satisfaction. Mobile computing provides online real-time monitoring, as shown in figure 3 [4].
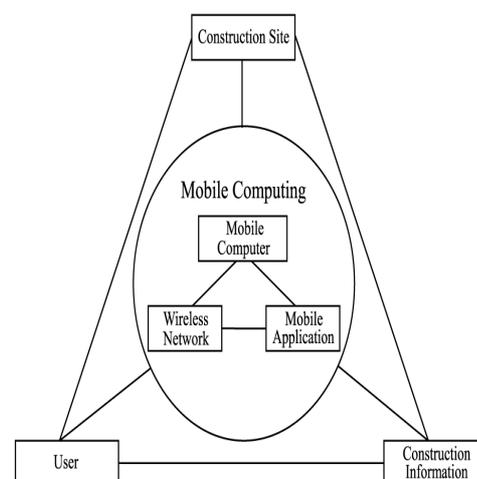

Figure 3(Online Real Time monitoring)

With the help of data mining, Mobile computing can Identifying the possibility of fingerprinting a logical location based on ambient sound, light, colour, and human movement [5]. In short, with the help of data mining process mobile computing, includes continuous recordings of a) location, b) proximity, and c) communication patterns.

III MOBILE COMPUTING AND DATA MINING TECHNIQUES

Mobile computing systems requires to hold many new issues such as mobility, low bandwidth of wireless channels, lack of stable storage on mobile nodes, disconnections, limited battery power and high failure rate of mobile nodes[6].

Mobile computing introduces new ideas and techniques with the help of data base management. Mobile computing can be access various information via wireless communication

With the help of data base system mobile computing overcome the following problems

a) High and burst losses in addition to network congestion,

b) Asymmetric effects, and

c) Unfair and poor utilization of shared links.

Thus, Mobility prediction is one of the most essential issues that need to be explored for mobility management in mobile computing systems. Mobile computing having different types of mobile application needs to handle a large number of mobile objects with different types of network bandwidths [7].

Mobile voice communication is widely established throughout the world and has had a very rapid increase in the number of subscribers to the various cellular networks over the last few years. An extension of this technology is the ability to send and receive data across these cellular networks. This is the principle of mobile computing. The Data mining is unstructured databases which combine text, image, or video [14]. Data mining uses a variety of machine-learning techniques such as neural networks, decision trees, inductive logic programming, and the *k*-nearest-neighbour algorithm to extract key information from the data. These kinds of techniques help users understand the data and get a clearer idea about which data mining techniques to apply [8].Through data mining we can deal with vast amounts

of data located at different sites that can easily exceed the terabyte limit. Data mining is one of the tasks in the process of knowledge discovery from the data. The data kept in the database is used to determine the patterns of data, which then interpreted by applying the domain information. The data mining applications can be common or domain specific [3]. Data mining techniques involving in such complex situation must encounter great dynamics due to changes in the system can affect the overall performance of the system. Data mining is very demanding process involving very large data sets. Usually, it is necessary to Partition and distribute the data for parallel processing to achieve acceptable time and space performance [11].

IV VIDEO DATA MINING

The basic idea of the video data mining is based on the content of multimedia features and the semantics related to these properties, from large multimedia data sets and analysis of the underlying discovery, effective, valuable, and understandable patterns. Wireless video information mining and trans-coding optimization algorithm have

important application values in the field of wireless video communication such as, video surveillance, mobile TV, mobile video telephony conferencing, mobile e-commerce etc. A video clip can be divided into scenes; a scene contains a sequential collection of shots. Video data mining provide entry points for visual search in videos or image databases the visual task is substantially more challenging[10].

V. ANALYSIS AND DISCUSSION

Data mining involves data analysis techniques that have been used by statisticians and machine learning community. In mobile computing data mining is the major task of discovering new patterns from large amounts of data. Through data mining user can find hidden information in a database, investigative data analysis, and deductive knowledge.

In contest of mobile computing, data mining involves an integration of techniques from multiple disciplines such as database and data warehouse technology, statistics, machine learning, high-performance computing, pattern recognition, neural networks, data visualization, information retrieval, image

and signal processing, and spatial or temporal data analysis. In case of text mining it is used to extract useful knowledge from textual data or documents. In case of Graph Mining we can extract effective features for nodes of a given graph and in mobile computing it is a key step for many data mining tasks.

VI. CONCLUSION

Mobile computing approaches typically utilize attractive method and interact with the data mining modules. So as to focus the search in this area toward motivating .Data mining system allowing the user to interact with the system by specifying a data mining query or task. Advances in data storage and processing techniques have made it possible to store and process huge amount of data. Data mining research deals with finding relationships among data items and grouping the related items together. The use of mobile computing Technology for supporting new data analysis techniques and new ways to discover knowledge from every place in which people operate small devices. A data mining system may work perfect for consistent data and perform significant inferior when a little noise is added to the transmission. Data mining still poses many challenges such as Understanding of Patterns and Knowledge, Moving Object Data, Information Network Analysis, Discovery, Usage, And Stream Data Mining, Data from Sensor Networks, Spatiotemporal and Multimedia Data Mining in research community.

REFERENCES

1. Ren Jingbiao, Yin Shaohong, "Research and Improvement of Clustering Algorithm in Data Mining" ICSPS 978-1-4244-6893-5, Pg 842-845, 2010.

2. Dan Chalmers and Morris Sloman "A Survey of Quality of Service in Mobile Computing Environments". IEEE Communications Surveys, Second Quarter, Pg 1 - 10, 1999.

3. S. P. Deshpande, V. M. Thakare, "Intelligence Ingrained Data Mining Engine Architecture "Int. J. Comp. Tech. Appl., Vol 2, No 1, Pg. 165-170, 2010.

4. Yu-Chee Tseng, You-Chiun Wang, Kai-Yang Cheng, and Yao-Yu Hsieh, "imouse: An Integrated Mobile Surveillance and Wireless Sensor System", IEEE 0018-9162/07, Pg 76-82 , 2007.

5. Martin Azizyan, Ionut Constandache, Romit Roy Choudhury, "surround sense:

Mobile Phone Localization via Ambience Fingerprinting", ACM 978-1-60558-702-8, 2009.

6. Rachit Garg, Praveen Kumar "A Nonblocking Coordinated Checkpointing Algorithm for Mobile Computing Systems" IJCSI International Journal of Computer Science Issues, Vol. 7, Issue 3, No 3,Pg. 41 – 46, May 2010.

7. Bugra Gedik, Ling Liu, "mobieyes: A Distributed Location Monitoring Service Using Moving Location Queries", IEEE Transactions on Mobile Computing, 1536-1233/06, VOL. 5, NO. 10, Pg 1384 – 1402, OCT 2006.

8. Bhavani Thuraisingham , "A Primer for Understanding and Applying Data Mining", IEEE 1520-9202, Pg 28 – 31,February 2000.

9. Y. Saygin and Ulusoy, "Exploiting data mining techniques for broadcasting data in mobile computing environments", IEEE Vol. 14, No. 6, Pg. 1 - 13 ,Dec 2002.

10. Mei-Ling Shyu , Zongxing Xie, Min Shu-Ching Chen, "Video Semantic Event/Concept Detection Using a Subspace-Based Multimedia Data Mining Framework", IEEE transactions on multimedia, 1520-9210, VOL. 10, NO. 2, Pg 252-259 February 2008.

11. Vuda sreenivasa rao, "Multi agent-based distributed data mining: An over view", International journal of reviews in computing, Issn: 2076-3328, Pg 83-92, 2009-2010.

12. Frans coenen, "Data mining: past, present and future", The Knowledge Engineering Review, doi: 10. 1017 / S0269888910000378, Vol. 26, No 1, Pg 25–29, 2011.

13. Sam Malek, Nenad Medvidovic and Marija Mikic-Rakic, "An Extensible Framework for Improving a Distributed Software System's Deployment Architecture", VOL. 38, NO. 1, Pg 73–100, January/February 2012.

14. Sathish Alampalayam Kumar, "Classification and Review of Security Schemes in Mobile Computing", doi: 10.4236/wsn. 2010.26054, Pg 419-440, June 2010.

15. Girish Welling and B.R. Badrinath "An Architecture for Exporting Environment Awareness to Mobile Computing applications" IEEE, VOL. 24, NO. 5, Vol 391-400, May 1998.