

CHAPTER: 20

**A STUDY OF DATA MINING BASED
KNOWLEDGE MANAGEMENT**

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ABSTRACT

Data mining is one of the most important steps in the process of finding information in databases. It is also an important subfield of knowledge management. Over the next few decades, business and learning organisations will do more and more research on data mining. This review paper looks at how data mining techniques have been used to help with the process of managing knowledge. "Knowledge management (KM) is an effort to improve the organization's useful knowledge. Some ways to do this are to encourage communication, give people chances to learn, and encourage the sharing of relevant knowledge artefacts. This definition focuses on how knowledge management and organisational learning work together. The knowledge management process focuses on how knowledge flows and how knowledge is made, shared, and spread. Data Mining has been used in many different fields, from public health care to the construction industry, the Food Company, retailing, and even finance. Different data mining techniques, like classification, clustering, and modelling of dependencies, can be used to help each field. Knowledge is an important asset for an organisation. Managing the resources of knowledge has become a strong need for growth. Finding out useful information is also important for management and making decisions.

Keywords: *Data Mining, Knowledge Management, Clustering, Decisions*

INTRODUCTION

In the information age, knowledge is becoming an important resource for organisations because it gives them a competitive edge. This has led to knowledge management (KM) initiatives. Many groups have gathered and stored a huge amount of information. But they can't find valuable information hidden in the data because they can't turn the data into useful and valuable knowledge. Keeping track of knowledge resources can be hard. In knowledge management, many organisations use information technology to make it easier to create, share, integrate, and spread knowledge. Using data is a part of the process of knowledge management.

Data mining is the process of using tools to get useful information from large sets of data. It is an important part of managing knowledge. Wang and Wang (2008) say that data mining can be useful for KM in two main ways: (i) to share common knowledge of business intelligence (BI) context among data miners, and (ii) to use data mining as a tool to increase human knowledge. So, organisations could use data mining tools to find the hidden knowledge in the huge amounts of data.

DATA MINING

Knowledge discovery in databases (KDD) is a process that uses data to find useful patterns or models. Data mining is an important part of this process. Both KDD and data mining have different names. KDD is the whole process of getting useful information from data. Data mining is the process of finding new patterns in large amounts of data in databases by using algorithms to pull out useful information.

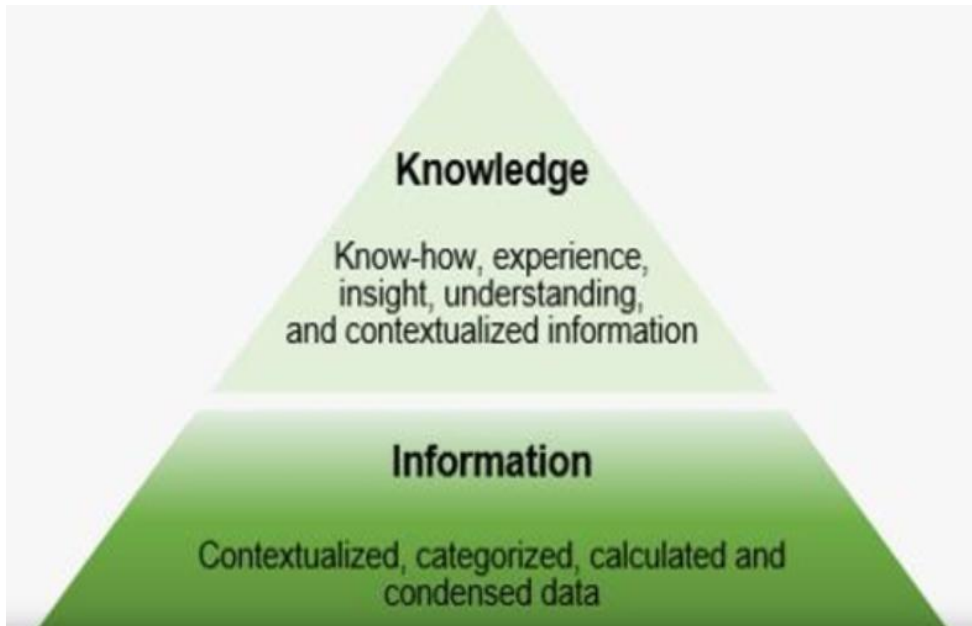
Data Mining Tasks

Fayyad et al. (1996) say that data mining has six main purposes: Classification is the process of finding models that can analyse a piece of data and put it into one of several predefined groups; Regression is the process of relating a piece of data to a prediction variable with real values; Clustering is the process of putting the data into a limited number of groups, or clusters; Dependency modelling, also called "association rule learning," is the process of finding a model that shows how important variables depend on each other; Deviation Detection, also known as Anomaly Detection, is the process of finding the biggest changes in the data; Summarization is finding a short way to explain a part of the data. Prediction and description are the two main goals of data mining. Prediction involves using some variables in a set of data to guess the values of other variables whose values are unknown (e.g. classification, regression, and anomaly detection) Description is the process of finding patterns and trends in the data that people can understand (e.g. clustering, association rule learning, and summarization).

KNOWLEDGE MANAGEMENT

Knowledge management is made up of different ideas. In this paper, we use McNerney's (2002) definition of knowledge management:

Knowledge management (KM) is a way for an organisation to get more useful information. Some ways to do this are to encourage people to talk to each other, give them chances to learn, and encourage the sharing of relevant knowledge artefacts.



This definition focuses on how knowledge management and organisational learning work together. The knowledge management process focuses on how knowledge flows and how knowledge is made, shared, and spread. Information technology can help with capturing and making new knowledge, sharing and spreading it, and getting new knowledge and using it.

As technologies are an important part of KM, they are likely to be a tool that can't be done without. So, KM needs technologies to help with communication, collaboration, and content so that knowledge can be better captured, shared, spread, and used.

THE APPLICATIONS OF DATA MINING IN KNOWLEDGE MANAGEMENT

Previous article reviews have talked about how data mining can be used to improve organisational knowledge management by making it easier to capture, store, retrieve, and share knowledge. We put the articles we looked at into four main groups: I the knowledge resource; (ii) the knowledge types and/or knowledge datasets; (iii) the data mining tasks; and (iv) the data mining techniques and applications used in KM.

Knowledge Resources

- In the study, we put knowledge resources into eight groups based on how they are stored and used in knowledge management (KM) and how data mining helps.
- Health Care Organization: This was an area where the hospital case study's disease knowledge management system (KMS) was used. A data mining tool was used to look into the connections between diseases, operations, and tumours. This tool was used to make KMS to help clinical medicine and improve the quality of care.
- Retailing: This was customer knowledge from household customers about how to extend product lines and brands. Data mining can help the company and offer suggestions and solutions for how to extend product lines and brands. This is done by getting information about customers, brands, products, and purchases from the market to meet customers' needs.
- Financial/Banking: The domain knowledge included financial and economic data; data mining can help banks make decisions and share information to classify enterprise bonds.
- Small and middle-sized businesses (food companies and food supply chains) had two ways to get knowledge resources: knowledge seeding and knowledge cultivating. Knowledge seeding was the process of finding the key knowledge from knowledge seeding, and knowledge cultivating was the process of finding the key knowledge from knowledge seeding. Putting together data mining and knowledge management can help people make better decisions. Li et al. (2010) wanted to build Early Warning and Proactive Control (EW&PC) systems to solve the Death-On-Arrival (DOA) problem in food supply chain networks (FSCN). A big part of EW&PC systems was the Knowledge Base. It had managers' analyses of the data and was set up in a way that was useful for other managers. The EW&PC systems were helped by the way data mining was done.
- In Entrepreneurial Science, the knowledge resource was research assets in a knowledge institution. There were three types of research assets: research products, intellectual capital, and research programmes. Data mining made it easier to extract knowledge and helped managers figure out how to compete with other knowledge-based organisations.

- Business: data from a questionnaire, a thorough review of the literature, and talks with four KM experts. Data mining can find hidden patterns between KM and how well it works so that KM can be used better.
- Collaboration and teamwork: Each worker's referencing behaviour was looked at in their logs and documents to figure out how their knowledge flowed. Using data mining techniques, a prototype for a group-based knowledge flow (GKF) can be found and built for a task-based group.
- In the construction industry, a lot of this business data was available in textual data formats. This is why text mining techniques are used to deal with textual sources of information for industrial knowledge discovery and management solutions.

Knowledge management techniques and programmes that use data mining

According to the articles we looked at, data mining has been used in many different fields, from public health care to the construction industry, the Food Company, retailing, and even finance. Different data mining techniques, like classification, clustering, and modelling of dependencies, can be used to help each field. We gave a short description of the four most common data mining techniques, along with some common tools and references:

Classification: One of the most common things to learn in data mining is how to put things into groups. This task is about putting a piece of data into one of several classes that have already been set up. As part of knowledge management, classification methods are used to sort patients from primary care centres to specialists, to combine data mining and decision support approaches in planning the regional health-care system, and to use the visualisation method to help with KM and decision making [11]. Cheng, Lu, and Sheu (2009) put in place an ontology-based approach to knowledge management (KM) and knowledge sharing in the financial knowledge management system (FKMS) and used the hybrid SOFM/LVQ classifier of clustering and classification data mining techniques to put corporate bonds into groups [4]. For small and medium-sized businesses in the food business, data mining can help make better decisions through a method called Extenics and Extension data mining (EDM) [12]. This method combined data mining and knowledge management to make a platform for a decision support system that would help people make better choices [12]. To solve the problem of death-on-arrival (DOA) in food supply chain networks, a corporate manager used a data mining method called "decision tree" to choose variables that might have an effect on DOA and then used a "neural network" to keep an eye on potential DOA and

make predictions [13]. Since knowledge assets were an important part of knowledge economies, Cantu and Ceballos (2010) used data mining agents to find useful patterns to help decision makers get the most out of the knowledge assets and a knowledge information network (KIN) platform to manage the knowledge assets. Companies with a lot of work wanted to learn more about the hidden patterns between KM and its performance. They did this by using a combination of data mining techniques: Bayesian Network (BN) classifier and Rough Set Theory (RST) in their business could help companies that make KM to do it well and get better results [27]. Decision trees, neural networks, Bayesian networks, and rough set theory are all tools that are often used for classifying.

Clustering is the process of trying to find a limited number of categories and grouping things that are similar to each other but different from things in other clusters. This method has been used in many different areas, such as:

- **Health care:** clustering categories and characteristics used to look at how community health centres are alike.
- **Retailing:** clustering the segmentation for possible product line and brand extension to find market to customer clusters;
- **Finance and banking:** finding groups of corporate bond clusters based on the industry and a specific segment within an industry. Then, tuning cluster data for each industry as a template for predicting rating changes.
- **Construction Industry:** grouping together textual data to find groups of access patterns that are similar.
- **Collaboration and teamwork:** figuring out which groups of workers have similar needs for task-related information based on how their knowledge flows are similar.

Dependency modelling is the process of finding a model that shows the important connections between sets of attributes. For instance, it is often used in healthcare to make clinical pathway guidelines and provide a platform for evidence-based medicine. It is helpful for making clinical decisions in the field of medical records management. Using this technique on a dataset from the construction industry could help improve knowledge refinement. This technique was used to mine customer knowledge from household customers. Apriori association rules and sequential pattern analysis are both tools that are often used for modelling dependencies.

CONCLUSIONS

Knowledge is an important asset for an organisation. Managing the resources of knowledge has become a strong need for growth. Finding out useful information is also important for management and making decisions. Since data mining is a big part of KM, this paper looks at ten articles written between 2007 and 2012 about how data mining can be used in KM. The goal of this is to give a summary of research on how data mining is used in the KM technologies domain.

In this paper, we've shown that data mining can be added to the KM framework and make the KM process better by giving people more information. It's clear that the techniques for data mining will have a big effect on the way KM is done and will pose important challenges for future research into knowledge and information systems.

REFERENCES

1. Neal, A., & Griffin, M. A. (1999). *Developing a model of individual performance for human resource management*. *Asia Pacific Journal of Human Resources*, 37, 44-59.
2. Perl Tutorial Website (2000), *Working with files in Perl*, [Online], Available at:
3. <http://www.tjhsst.edu/~dhyatt/perl/ex3.h tml>
4. Seidmann, A. and Sundararajan, A. (1997) 'The effects of task and information
5. *Asymmetry on business process redesign'* *International Journal of Production Economics*, Vol 50, No. 213; pp 117-128.
6. Selma, L. M., Farhi, M. and Hago A. R. (2003) 'Case-Based Reasoning as a
7. *Technique for knowledge Management in Business Process Redesign*, *Electronic journal of knowledge Management*, volume 1, issue 2 113- 124
8. Smith, S. (1996) *Rules of Engagement*, *Computer Weekly*, 14 Mar pp 36-7
9. Strassmann, P. (1995), *the Politics of Information Management*, *Information Economics Press*.
10. Wendy R. (1997), 'Strategic Management and information Systems'. *An Integrated Approach: Second Edition*. *Financial Times Professional Limited*.
11. Wiig, K. M. (September 1997) 'Knowledge management: An introduction and Perspective' *The Journal of knowledge management*, Vol 1, No 1 pp 6-14.