



Intelligent Mining Algorithm of Macroeconomic Information for Social Network

Ying Liu^(✉)

School of Business, Jinggangshan University, Ji'an 343009, China

liuyingzhende@126.com

Abstract. In the operation process of macroeconomic information intelligent mining algorithm, in the face of different data set types, there is the problem of long running time. In order to solve the above phenomenon, an intelligent macroeconomic information mining algorithm for social network is designed. Extract environmental factors, adjust the diversification of service content, describe the length of economic cycle, identify the performance characteristics of macroeconomic cycle, obtain the degree of distance between nodes, use social network to build mathematical model and design intelligent mining algorithm. Experimental results: the running time of the macroeconomic information intelligent mining algorithm in this paper and the other two algorithms are 22.210 s, 33.433 s and 33.082 s respectively, which proves that the designed macroeconomic information intelligent mining algorithm has better performance after making full use of social networks.

Keywords: Social network · Macroeconomic · Economic information · Intelligent mining · Economic model · Information data

1 Introduction

From the perspective of business domain division, economic information business can be attributed to information mining industry. As an intelligence intensive knowledge service industry, it takes professional knowledge, data information and industry experience as resources to provide solutions or decision-making suggestions to solve specific problems according to the needs of different users. No matter how the macroeconomic situation changes, the market will immediately respond to new market information through price adjustment. According to the openness of market information, the efficient market hypothesis divides the market into three forms: weak efficient market, semi strong efficient market and strong efficient market. At the initial stage of putting into use, the society as a whole lacks sufficient understanding of the function and function of information intelligent mining, and many enterprises and managers are skeptical about information intelligent mining. Enterprises rely on experience and managers' ability to make decisions, and have low demand for information mining. These three forms of markets are based on the assumption that the market can operate effectively and make corrections

immediately, so the possibility of market prediction model is excluded. In addition, the overall industry volume is small, there is a lack of industry norms and supervision, the quality of personnel is uneven, and few people in the professional field participate.

Based on the theory of EMH, it is different from the short-term market. The randomness of this market movement makes the stock price unpredictable and there is no effective trading strategy to continuously beat the market. The market capacity of domestic information mining is small, and there is a big gap compared with the same industry abroad. Therefore, intelligent information mining technology once developed slowly and was in an embarrassing situation. Due to the uncertainty of characterization parameters and continuous transformation, it is difficult to achieve the ideal mining effect. Financial related market information is an important reference basis for stock market prediction, which includes all kinds of information sources, from financial related forums to financial media portals and then to the portals of relevant government departments, which provide a large amount of information supply for market investors. With the acceleration of economic globalization and the development of market economy and competition, the government and enterprises gradually realize the role of information mining in decision-making, especially the mining of economic information business has an important impact on the future economic development of the country and enterprises. The dependence of the government and enterprises on it has gradually deepened, and the domestic information mining market has gradually developed.

These different types of information represent the market sentiment from different aspects. Especially with the development of the information age, information data has a more and more profound impact on human society, especially in the field with high sensitivity to information such as macroeconomic market. Information will not only cause market fluctuations, but also affect the subsequent trend of stock price. In reference [1], in order to reduce the risk of economic management benefit loss and improve the risk early warning ability, an automatic early warning system of economic management benefit loss risk based on data mining is proposed. The panel data statistical regression analysis technology is used to detect the characteristic information of economic management benefit loss risk. According to the detection results, the big data information sampling and fusion processing of the economic management benefit loss risk early warning system are carried out. The characteristic information of large data related to economic management benefit loss risk is mined. The maximum likelihood estimation method is used to automatically evaluate the risk of economic management benefit loss. The association rule set and frequent item set of economic management benefit loss risk big data are extracted, and the robustness test and automatic prediction of economic management benefit loss risk assessment are carried out in combination with the piecewise regression analysis method, so as to realize the automatic early warning of economic management benefit loss risk. The software development and design of economic management benefit loss risk early warning system is carried out under the embedded Linux environment. Reference [2] discusses the application advantages of data mining technology in economic statistical surveys, analyzes the application of data mining technology in economic statistical surveys, and puts forward suggestions to promote the in-depth application of data mining technology in economic statistical surveys for reference. However, because macroeconomic information is greatly affected

by the environment, its performance in mining macroeconomic information needs to be further optimized.

This paper proposes an intelligent mining algorithm for macroeconomic information based on social network. On the basis of extracting environmental impact factors, macroeconomic information is mined to further optimize the mining performance.

2 Intelligent Mining Algorithm of Macroeconomic Information for Social Network

2.1 Extraction of Environmental Factors

As an external environment, market economy is the basis for the survival and development of consulting industry. With the economic globalization and the rapid development of information and communication technology, the scope and methods of information mining research have been further expanded and upgraded. The development of the Internet is one of the factors affecting economic growth, and economic growth is also the result of the joint action of many factors. The analysis of economic growth naturally needs to consider the influence of many factors. Information mining is the product of the development of market economy. With the continuous improvement of the requirements for enterprise management level, based on the theories, methods, experience and consulting tools of the same industry abroad, China's consulting industry has gradually developed. With the change of economic environment and the deepening of economic cognition, and then to the research process of total factor productivity - especially in recent years, many studies use the method of total factor productivity to analyze economic growth.

As an emerging industry, information mining has attracted the attention of all countries and developed rapidly. After the end of the "cold war", with the strengthening of the trend of global economic and trade integration, the center of national strength competition has shifted from the political and military fields to the scientific, technological and economic fields. It is generally believed that the improvement of total factor productivity mainly depends on two ways. One is micro technological progress, which mainly depends on strengthening technology R & D investment and high-end technology introduction, so as to improve production efficiency. Second, rely on various ways to improve the efficiency of resource allocation. Macroeconomic needs developed information mining to provide information guarantee, and needs the full development and utilization of information resources [3, 4]. China's economic model has changed from planned economy to market economy. Fierce market competition has promoted the close combination of information and economy. The main environmental impact factors of macro economy are shown in Fig. 1:

As can be seen from Fig. 1, the main environmental factors affecting macro-economy are: political factors, private economic factors, social factors and technical factors. Throughout many economic information theories and related literature, material capital, labor force and technological progress are recognized as the driving forces of economic growth. At the same time, studies on the contribution of other factors to economic growth are also emerging. The amount of various information data is huge, and the demanders often have no way to start. The way of sorting, processing, refining, refining and deep

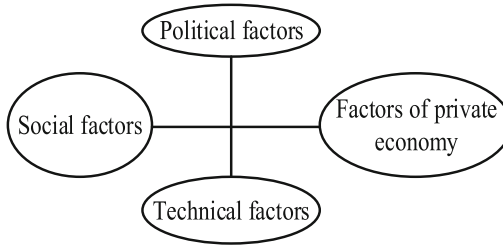


Fig. 1. Main environmental factors affecting macro economy

excavation of information can meet the demands of customers. Practice has proved that the results of information mining can effectively avoid decision-making mistakes and economic losses caused by poor information. The so-called expansion of scale mainly refers to the expansion of Internet related infrastructure, the increase of influence scope, the accumulation of resources, the diversification of service content and so on. Market economy is inseparable from scientific decision-making and information mining.

In economically developed countries and regions, the demand for information is distributed in various fields and industries, including politics, economy, military, culture, science and technology. Specifically, infrastructure expansion includes the laying of necessary equipment for fixed Internet access such as telephone lines, cable TV optical cables and optical fiber lines, as well as the coverage of mobile internet signal range. This is a basic work in the development of the Internet. If these works are not improved and implemented, the development of the Internet will not be possible. The huge market demand promotes the rapid development of information mining. Information mining methods help customers improve management and operation methods, improve operation efficiency and promote scientific decision-making. The Chinese market has a huge demand for information mining, and the potential demand is even greater. The expansion of the scope of influence mainly refers to the increase in the number of Internet users, including the increase in the popularity of Internet users. Of course, it also refers to the improvement of the impact of the Internet in some specific groups, such as the expansion of the scale of rural Internet users and the growth of the number of mobile Internet users. The growth of the number of all kinds of Internet users is the key to the deepening impact of the Internet. For example, in the past, many economic development in China relied on the consumption of natural resources to stimulate economic growth. Resource consumption and waste are very common. Although the economic level has been improved, the problems of resource waste and environmental degradation also follow.

At present, the Chinese government has taken relevant measures to alleviate the problems of development and environment, such as controlling haze and water pollution. These are not short-term actions, but long-term comprehensive treatment. In addition, the Internet access price can also affect the number of Internet users. Reducing the Internet access price is to reduce the entry threshold of the Internet and reduce the network access cost, which is conducive to the promotion of the Internet. How to ensure economic development without damaging the ecological environment, how to deal with the imbalance of economic development, and how to solve the gap between the rich and the poor in the process of urbanization, so as to ensure the steady development of China's

economy. This requires think tanks to put forward feasible strategies and solutions from the perspective of information mining, pay attention to social and environmental benefits while emphasizing economic benefits, and take the road of sustainable development.

2.2 Identify the Performance Characteristics of Macroeconomic Cycle

The economic cycle consists of four stages: expansion in most economic activities almost at the same time, followed by the same general recession, contraction and recovery connected with the expansion stage of the next cycle. The effectiveness of economic information mining is also an important symbol of overall comprehensive strength. Economic information is the business pillar and strategic focus of business. The goal of economic information business development strategy is to serve the national economic and social development in the field of economic information and occupy the leading position in the field of economic information. The order of this change occurs repeatedly, but the time is not fixed. Its duration ranges from 1 to 10 or 20 years, and it is no longer divided into shorter periods with similar characteristics close to its own amplitude. The overall business strength has been improved. The voice and influence in the field of macroeconomic information match China's comprehensive national strength and international status, meet the needs of national strategy and serve the national economic information security.

In economic analysis, the economic cycle is often divided into two periods of contraction and expansion, four stages of prosperity, recession, depression and recovery, and two turning points of peak and valley. In the boom stage, investment demand rose, money and credit increased, production and employment increased, corporate profits increased and expanded to the peak. After the peak of the economic cycle passed, the economy began to decline gradually, which is the recession stage. Focus on building the core business platform, change the development mode, optimize the product structure, and improve the information service level, ability, strength and influence. According to the situation of the United States, gross domestic product (GDP) fell for two consecutive quarters, that is, it entered a recession. In the recession stage, effective demand decreases and production investment decreases, resulting in an increase in unemployment. The increase of unemployment will reduce the income of residents, which will further lead to the contraction of demand, the further decline of enterprise profits and the deterioration of enterprise operation. Concentrate resources and efforts to promote the tackling of the four key economic information business products of Xinhua Finance and economics, Xinhua Silk Road, Xinhua credit and Xinhua index, continuously improve the business quality and service level, drive the overall business development with the four pillar economic information business platforms, and improve the market competitiveness and market share.

When the recession is serious, there is a large amount of idle production capacity, and if the machinery and equipment that are worn and repaired are not supplemented and replaced temporarily, it can also meet the needs of production. The part of the economic cycle close to the trough belongs to the depression stage. Its characteristics are: high unemployment rate, lower consumption level of residents, a large number of idle enterprise production capacity, serious inventory backlog, low profit or even loss, and enterprises are unwilling to add new investment. The business implements high-quality

projects, innovation projects, demonstration projects and rooting projects, transforms the growth momentum, innovates the models of product development, market promotion and user service, promotes the marketization and specialization of business, pays equal attention to both inside and outside, and promotes the international development of economic information business. Many banks and industrial and commercial enterprises have declared bankruptcy due to poor turnover. When the economic cycle is at its lowest point, recovery means the beginning of the recovery stage. The factors driving the recovery are diverse. For example, a large number of machines need to be replaced after years of wear and tear, inventories need to be replenished, and enterprise orders increase. The employment rate is gradually rising, and the income and consumption expenditure are increasing. With the increase of production and sales, the profits of enterprises are also increasing. Enterprises are optimistic about the investment prospect.

The types of economic cycles are usually divided according to the standard of cycle length. In terms of macroeconomic background, it has the advantages of strategic positioning and global vision that other information mining methods do not have, so that the station height and goal significance of economic information business development strategy are different. In the process of mining business, we can coordinate multiple departments to work together and obtain first-hand data and materials from relevant departments and institutions in the economic field for basic research and analysis of macroeconomic information business [5, 6]. Although the length of the economic cycle is not described in detail in the definition of the economic cycle, scholars finally made a formal division of the economic cycle according to the standard of cycle length in combination with the phenomenon of the economic cycle. According to this division method, there are generally four types of economic cycles shown in Fig. 2:

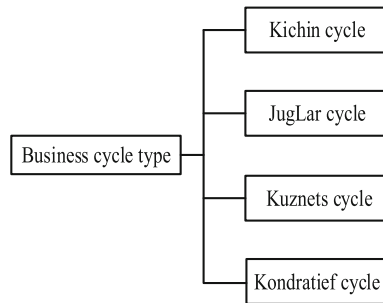


Fig. 2. Types of business cycle

As can be seen from Fig. 2, the economic cycle mainly includes four types: kichin cycle, Jugra cycle and Kuznets cycle. Kichin cycle is summarized by American economist kichin when inspecting bank clearing and wholesale price data in Britain and the United States. The length of this type of economic cycle is about 2–4 years. Generally speaking, it is mainly believed that the cycle of enterprise inventory investment leads to the production of kichin cycle. Therefore, this economic cycle is also called inventory cycle, which is a short cycle. Transfer the backbone of the collection and editing business, reorganize the integrated information collection and editing center, realize the

overall collection, editing and distribution of macroeconomic information, and ensure the overall supply of self collected original information of key business products [7, 8].

Based on the statistics of bank loans, interest rates and prices, this type of economic cycle is found in the process of studying the changes of industrial equipment investment in developed countries such as Britain, the United States and France. The duration of this cycle is 7–11 years, and the cycle fluctuation corresponds to a life cycle of investment products that cause fluctuations in GDP, inflation rate and employment. According to the actual needs of business development, complete and strengthen full-time information collectors step by step and with emphasis, and strengthen the overall command and unified dispatching of information collection. In addition, the Jugra cycle belongs to the economic cycle in commercial and trade activities, so it is also regarded as a “real business cycle”. At present, most foreign scholars have reached the following conclusions through research: it is precisely because of the fluctuation of unemployment and price with the investment in machinery and equipment that the zugra cycle is produced, which leads to the periodic fluctuation of about 10 years. Now this conclusion has been widely accepted, so the zugra cycle is also known as the “equipment investment cycle”. Develop information collectors outside the society in key regions and industries, and expand information collection sources by means of market-oriented remuneration. Strengthen the selection and employment of chief economic analysts in subdivided fields, establish an effective assessment and incentive mechanism, and give full play to the advantages of information analysis. The duration of Kuznets cycle is about 15–20 years. If the average duration of Kuznets cycle is 20 years, this situation is usually considered to be caused by the cyclic change of construction activities. Therefore, Kuznets cycle is also known as “construction cycle”. Strengthen the collection and compilation of original information, exclusive information and authoritative information, and improve the quality of economic information collection and compilation. Build an intelligent technical data system for economic information business. Establish a technical committee to coordinate technology construction and projects. In the process of studying the iron consumption of Britain and Germany, Kantraev found that this type of economic cycle grows for about 40–60 years. Actively participate in the construction of the company’s big data center, accelerate the implementation of the data Lake project, realize the interconnection and sharing of data resources, and improve the efficiency of resource use. Build an integrated information collection, compilation and distribution system to provide technical platform support for the overall collection, compilation, distribution and sharing of information. There are many reasons for Kant raev cycle, but it is generally believed that the main reason is the change of economic structure caused by technological change. After investigating the economic development process of nearly 200 years, Kantraev concluded that three epoch-making technological revolutions led to three long cycles.

2.3 Mathematical Model of Social Network Construction

The research of social network began from anthropology. Anthropology is a discipline that makes a comprehensive study of human beings. As individual members of society, each human gradually forms a relatively stable relationship system through various ways of communication and interaction. These relationship systems are social networks. Social

networks provide users with various services. Users can enjoy various services brought by social networks, such as making friends, obtaining information, games, instant messaging and so on. The basic fact of social network is that each member has more or less relationship with other members.

A social network is actually a collection of multiple nodes and connections between nodes. Each node represents a member, and each connection represents the relationship between the two members connected. In the era of Web 2.0, the value of users has been gradually released. Users will generate a large amount of data through the network, especially social networks, every day, such as microblogging, commenting, scoring goods, praising articles or news, checking in at places of interest, clicking/browsing favorite goods or news, collecting and purchasing products of interest Upload pictures on the journey to social networks, upload videos taken by yourself to video websites, etc. By calculating the shortest distance between nodes, the degree of distance between nodes is obtained. The higher the compactness and centrality of a node, the shorter the distance between the node and other nodes. The calculation method of the compactness centrality of a node is to calculate the sum of the distances between a node and other nodes, and then take the reciprocal of the calculation result, which is the compactness centrality score of the node. The specific calculation process is shown in formula (1):

$$T(\varepsilon) = \frac{\sum_{i=1}^n p + \varepsilon_i}{L} \quad (1)$$

In formula (1), p represents the total number of nodes, ε represents any node, and L represents the shortest distance. With the rapid development of the Internet, contacting and sending information on the network has become an important way for people to communicate. Social network has been widely used in various fields, such as mining network social relations, exploring key factors and tracking information flow. There are also many practices to judge, speculate and explain information behavior and attitude through network analysis. The concept of user-centered has been continuously penetrated in various industries and fields. Enterprises and governments have realized the importance of analyzing and grasping user behavior and preferences. Social network analysis involves various industries and fields. As an interdisciplinary method, it has become an important research paradigm in practical application. In the social network diagram, nodes are used to represent the disseminator and receiver of information, the direction of information transmission is indicated by the direction of arrows, and the thickness of arrows is used to represent the frequency and amount of information transmission. The intermediary centrality of a node is judged by measuring the number of shortest paths passing through the node. The more shortest paths a node passes through, the higher the mediation centrality of the node. Specific calculation process (such as formula 2):

$$G = \sum_{i=1}^n \frac{t \times \varepsilon_i}{\sqrt{t+1}} \quad (2)$$

In formula (2), t represents the number of shortest paths. At present, the network has become a feature of the information age. The distributed storage of data on the network is a common way of data storage. There are generally two methods for data crawling.

One is to obtain data directly according to the API interface provided by the platform, and the other is to develop crawler programs according to the crawling objects, simulate user behavior, analyze web pages, and finally get the required information. Although there are a large number of existing methods based on rough set theory, most of them always assume that the analyzed data is stored centrally, and can not directly deal with the distributed stored data. In most cases, websites do not want data to be obtained by third parties, so most websites do not provide open interfaces. Therefore, crawler programs need to be developed to crawl data.

In the distributed data environment, it is generally necessary to store the distributed data in a unified format through the data integration process, so as to make use of the existing rough set methods. Raw data integration requires a lot of space overhead. At the same time, considering the possible heterogeneity of distributed data and the need to maintain and process data changes to maintain data consistency, raw data integration is an expensive work. Crawler scheduler is the main control program of the whole crawler. This program is mainly responsible for scheduling each module in the whole crawler program and controlling the execution and data flow of each module. In addition, it also needs to simulate the behavior of the browser and control the access frequency in the crawling process.

As the preprocessing part of these existing methods, data integration and data maintenance affect the performance of these methods. The URL manager is responsible for managing the URL information in the whole crawling process, including the crawled URL and the URL information to be crawled. When a new URL is found, the manager needs to first judge whether the URL has been crawled. If it has been crawled, it will be discarded, otherwise it will be added to the crawling queue. Moreover, this integration and maintenance of raw data is only a simple integration and maintenance, and does not provide more direct and effective help for rough set methods, such as improving performance. The social network will be divided into modules, and the distinction between each module is very high. The specific calculation process is shown in formula (3):

$$W = \frac{\left[\frac{1}{\eta} - \frac{2}{\varphi} \right]}{2} \times R \quad (3)$$

In formula (3), η represents the adjacency matrix of the network, φ represents the total number of connections, and R represents the total number of degrees. Therefore, it is necessary to study the less expensive distributed data processing mechanism. The page loader is mainly responsible for requesting the page in the crawling process. The module needs to request according to the request information assigned by the crawler scheduler and the URL given by the URL manager, and obtain the request result. HTML parser mainly realizes the parsing of web pages and parses them into objects convenient for program operation.

2.4 Design Intelligent Mining Algorithm

This section focuses on the main steps of designing macroeconomic information intelligent mining algorithm. Step (1) problem definition: first analyze the needs of the project,

clarify the problems to be solved, whether they belong to classification problems, regression problems or other problems, determine the goal of information intelligent mining, and formulate information intelligent mining plan. Attribute reduction and kernel are the two most important concepts in rough set theory. Attribute reduction is a set of conditional attributes obtained by deleting unnecessary and redundant attributes while maintaining the classification ability of the system. It can simplify information and form knowledge without losing the basic information of the system. Step (2–3): data collection and data preprocessing: collect the data to be collected through the information collection tool and save it to the system. Information mining assumes that the data has been mined and stored in the relational database, and information mining mainly focuses on the mining of natural language documents rather than structured data [9]. The comparison results of two attributes are defined by similarity. However, this paper defines two types of attribute values, unique value attribute and list value attribute. The calculation methods of attribute value similarity of these two types are different. The calculation formula of attribute similarity of unique value is:

$$Y(i, j) = \frac{|i, j|}{D_{\max}} \times \frac{1}{D_{i, j}} \quad (4)$$

In formula (4), D represents the number of the same characters between i and j . . Because there are often many errors in real data, such as the loss of some key data, the collection of wrong data, or the different display of data corresponding to specific problems in different places, these data may cause the distortion of the results. According to whether to distinguish between decision attributes and conditional attributes, attribute reduction can be divided into absolute attribute reduction (not distinguishing between conditional attributes and decision attributes) and relative attribute reduction (distinguishing between conditional attributes and decision attributes). Therefore, the questionable data will be cleaned, the meaningless or valuable data will be filtered out, the missing information will be filled, and the data will be processed into the data form in information intelligent mining, that is, data preprocessing. Step (4) data modeling: select the appropriate model from the clustering model, regression model, classification model, etc., and use specific tools such as statistics, swarm intelligence algorithm, connection model, prediction model and rule-based reasoning to process the data and find the information of interest to users. For the attribute similarity calculation of list value, if the calculation method of table value attribute similarity, such as formula (4) i and j , is the value of list value attribute, the attribute similarity of list value is defined as:

$$S(i, j) = \frac{1}{Q_{\max}} \sum_{i=1}^n \max \frac{D}{\delta_{i, j}} \quad (5)$$

In formula (5), δ represents the maximum list length and Q represents the minimum list length. According to these problems, this paper puts forward the basic architecture of text information mining system. The text information mining system architecture proposed in this paper, in which the bottom layer is the information extraction layer, which is the main data source of the whole macroeconomic information mining algorithm. Step (5) interpretation and evaluation: analyze and evaluate the quality of the results

obtained by information intelligent mining, and explain the reasons for such results by analyzing the models and tools used. The top layer is the data processing layer, which mainly cleans the data obtained from information extraction, calculates the cleaned data using the data processing model, and finally obtains the information needed in this paper. Step (6) implement and deploy the model: use computer graphics or image processing technology to transform the results of intelligent information mining into a model that is easy to accept or understand by users. The middle layer is the data storage layer. Due to crawling a lot of data, the data needs to be reasonably stored for subsequent data processing. The structured data in this paper is mainly stored in mysql, and the data is added, deleted, modified and queried through a unified interface.

To sum up, the algorithm flow of intelligent mining of macroeconomic information in this paper is summarized as follows:

Step 1: problem definition

Step 2: data collection

Step 3: Data Preprocessing

Step 4: Data Modeling

Step 5: Interpretation and evaluation

Step 6: implement and deploy the model

Intelligent information mining can infer the general direction of the development of some things or situations in the future, so that enterprises can actively make judgments. Using intelligent information mining to find patterns and relationships in data can help enterprises make better business decisions. Therefore, mining useful information from unstructured and semi-structured text data is an important task in text mining.

3 Experimental Study

3.1 Setting up Experimental Environment

Experimental running environment: 4-core 3.20 ghz CPU, 4 GB memory computer, operating system is Ubuntu 14.04 64bit, IDE is eclipse, programming language is java, CPU: Intel Core i5 CPU (2-core, 2.70 ghz), memory: DDR3 8 GB, hard disk: 100 GB. The termination condition is set to 10000 iterations and the population size is set to 20. Under this condition, the experimental test is carried out.

3.2 Experimental Process

In the above environment, the macroeconomic information in a website is mined. The mining results can not be directly used for subsequent analysis and processing, which is mainly caused by the difference in the quality of the original data of each data source, specifically: 1) the electronic data is subject to the management level and execution, which makes it difficult to unify the format and standard; 2) It is inevitable to make mistakes in data entry, which is prone to the problem of missing or inconsistent information. Therefore, it is necessary to clean the integrated data so as to eliminate noise and facilitate pattern recognition in the later stage. For the preprocessed data, the method in this

paper, the macro-economic information intelligent mining algorithm based on big data and the macro-economic information intelligent mining algorithm based on association rules are used to mine and test.

3.3 Experimental Results

Select the macroeconomic information intelligent mining algorithm based on big data and the macroeconomic information intelligent mining algorithm based on association rules to compare with the macroeconomic information intelligent mining algorithm in this paper. According to part 3.2, after data cleaning, the disk related attributes are recorded in the data. The disk information of each virtual tape library can be recorded by name and target in the information table_ The values of the three attributes ID and entity are merged to build a new attribute. The running time of the three algorithms is shown in Tables 1, 2 and 3.

Table 1. Data set chess running time (s)

| Number of experiments | Big data | Macroeconomic information mining | In this paper |
|-----------------------|----------|----------------------------------|---------------|
| 1 | 23.146 | 22.088 | 15.602 |
| 2 | 22.581 | 23.646 | 14.313 |
| 3 | 21.622 | 22.584 | 15.611 |
| 4 | 23.602 | 21.336 | 14.902 |
| 5 | 24.158 | 22.502 | 13.722 |
| 6 | 23.645 | 23.691 | 13.844 |
| 7 | 22.135 | 24.188 | 14.601 |
| 8 | 20.018 | 25.316 | 15.007 |
| 9 | 22.607 | 24.101 | 14.355 |
| 10 | 21.313 | 22.133 | 15.206 |

It can be seen from Table 1 that the running time of the macroeconomic information intelligent mining algorithm in this paper and the other two algorithms are 14.716 s, 22.483 s and 23.159 s respectively; It can be seen from Table 2 that the running time of the macroeconomic information intelligent mining algorithm in this paper and the other two algorithms are 24.909 s, 41.082 s and 41.413 s respectively; It can be seen from Table 3 that the running time of the macroeconomic information intelligent mining algorithm in this paper and the other two algorithms are 27.006 s, 36.733 s and 34.673 s respectively. According to the above data, the running time of the proposed algorithm is shorter. The main reason is that the proposed algorithm extracts environmental factors and processes incremental data, which improves the data mining effect.

Table 2. Running time of dataset mushroom (s)

| Number of experiments | Big data | Macroeconomic information mining | In this paper |
|-----------------------|----------|----------------------------------|---------------|
| 1 | 42.615 | 43.612 | 26.485 |
| 2 | 39.348 | 42.154 | 27.111 |
| 3 | 41.202 | 41.202 | 25.199 |
| 4 | 40.165 | 39.774 | 24.612 |
| 5 | 41.302 | 41.225 | 25.747 |
| 6 | 40.225 | 38.633 | 26.551 |
| 7 | 39.688 | 41.203 | 25.442 |
| 8 | 41.206 | 42.371 | 23.669 |
| 9 | 43.522 | 41.648 | 22.501 |
| 10 | 41.549 | 42.309 | 21.774 |

Table 3. Data set connect running time (s)

| Number of experiments | Big data | Macroeconomic information mining | In this paper |
|-----------------------|----------|----------------------------------|---------------|
| 1 | 35.211 | 35.481 | 25.613 |
| 2 | 36.821 | 32.164 | 26.548 |
| 3 | 37.125 | 33.588 | 27.136 |
| 4 | 38.914 | 35.156 | 28.414 |
| 5 | 37.205 | 32.011 | 27.120 |
| 6 | 36.442 | 34.642 | 25.842 |
| 7 | 35.194 | 36.158 | 26.311 |
| 8 | 36.253 | 38.146 | 27.166 |
| 9 | 38.015 | 35.161 | 28.545 |
| 10 | 36.146 | 34.225 | 27.363 |

4 Conclusion

The macro-economic information intelligent mining algorithm designed this time subdivides the types of incremental data according to the characteristics of incremental data and some information saved in the original calculation process. Data cleaning is divided into two parts: attribute value cleaning and duplicate record cleaning. At the same time, the impact of incremental data on the original maximum distribution reduction and rule set is effectively reduced. In the future, further research will be carried out on incremental learning in the algorithm.

References

1. Wang, Y., Wang, N.: Automatic early warning system of economic management benefit loss risk based on data mining. *Autom. Instrum.* (4), 133–136 (2020)
2. Hu, J.: Analysis on the application of data mining technology in economic statistical investigation. *China Sci. Technol. Overv.* (16), 20–21 (2021)
3. Gao, M.: National accounts in view of macroeconomic supply side. *Stat. Res.* **37**(2), 15–25 (2020)
4. Yin, D., Zhang, W.: A review of current macroeconomic nowcasting research. *Stat. Inf. Forum* **35**(1), 121–128 (2020)
5. Ma, Y., Zhang, Z.: Fixed assets information and macroeconomic growth forecasting. *Account. Res.* (10), 50–65 (2020)
6. Xiao, Q., Chen, H., Zhang, Y., et al.: The impacts of carbon tax on China's macro-economy and the development of renewable energy power generation technology: based on CGE model with disaggregation in the electric power sector. *China Environ. Sci.* **40**(8), 3672–3682 (2020)
7. Li, W., Jiao, J.: From the vacant, should-be to the reality: on the formation of macroeconomic regulation and control in China. *J. Xiamen Univ. (Arts Soc. Sci.)* (4), 22–38 (2020)
8. Wang, S., Fan, C.: Heterogeneity analysis of the impact of financial cycle on macroeconomic stability. *Econ. Theory Bus. Manag.* (10), 4–20 (2020)
9. Lu, J., Fan, Z., Liu, C.: Supply chain information oriented mining model based on TF-IDF algorithm. *Comput. Simul.* **38**(7), 153–156, 349 (2021)