Application of Large Data Analysis Based on the Evaluation of Jewelry

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Abstract. With the development of the jewelry industry, the requirements for jewelry evaluation in the market are getting higher and higher. The development of jewelry evaluation in our country has just started, and there are still a large number of legal, theoretical, and technical flaws. Therefore, it is necessary to improve the evaluation theory to promote the development of the jewelry evaluation market. Therefore, this article proposes a research on the application of jewelry evaluation and analysis based on big data, aiming to highlight the combination of big data and innovative methods of jewelry evaluation, making jewelry evaluation more scientific and maneuverable. This article first uses the literature method to study the traditional jewelry evaluation methods, including cost method, market method and expert evaluation method, and then proposes a jewelry evaluation method based on big data. Then design the jewelry evaluation experiment and jewelry evaluation process, and finally analyze and research the jewelry evaluation standards, jewelry evaluation factors, and the purpose of jewelry evaluation applications. It can be seen from the conclusion that the top three factors affecting jewelry evaluation are authenticity, the age of manufacture, and the level of craftsmanship of manufacture, accounting for 100%, 38%, and 36% respectively; the purpose of jewelry evaluation is mainly to carry out Resale or auction, accounting for 45%.

Keywords: Big Data, Jewelry Evaluation, Replacement Cost Method, Market Comparison Method

1. Introduction

The development of jewelry evaluation is inseparable from the maturity of the jewelry market, and it also depends on the development and improvement of evaluation theory, as well as the accumulation of many years of evaluation practical experience [1]. Not long after the establishment of domestic jewelry evaluation and consulting services, the internal system is not perfect enough, jewelry transactions are still blind, and there are still major technical problems in jewelry evaluation [2]. Therefore, this article proposes a research on jewelry evaluation and analysis based on big data.

Big data can be understood as a huge database and extracting targeted information elements. This is a large-scale data collection that far exceeds the functions, management and analysis of traditional database software tools in terms of collection, storage and analysis [3-4]. It has the characteristics of large-scale database, high-speed data flow, various data types and low density values[5]. In the application of jewelry evaluation, the traditional market evaluation method can be changed. Through the large database, the market conditions and
economic fluctuations can be understood, and the impact of market uncertainties can be minimized [6-7].

The innovations of this article are: (1) The combination of qualitative analysis and quantitative analysis, and qualitative analysis based on fully analyzing the data; (2) The combination of theoretical research and empirical research, based on in-depth study of jewelry evaluation theory, Empirical research is carried out in combination with actual conditions.

2. Application Research Methods of Jewelry Evaluation and Analysis Based on Big Data

2.1. Jewelry Value Assessment Method

Jewelry is a special asset with two characteristics of tangible assets and intangible assets [8]. The evaluation of jewelry requires very professional and technical skills. The evaluation of jewelry requires not only understanding the theory and methods of jewelry, but also knowledge of jewelry recognition [9]. Jewelry evaluation objects are divided into three categories: 1) precious metal products, 2) single jewelry and jade jewelry, and 3) decorative jewelry. Jewelry analysis methods can be divided into three types: cost calculation method, market comparison method, and income method [10].

The basic principles of jewelry evaluation have the following points: 1) Technical principles. Jewelry evaluation must be professional and feasible; 2) Practice principles. It must have the principles of authenticity, scientificity and fairness. 3) Principles of quality identification and classification. Assessing quality recognition refers to physical objects with specific recognizable characteristics, characteristics or marks. Similar varieties have the same identifiable characteristics, which are based on subjective classification of quality and objective classification of quality. 4) Value principle. It is necessary to consider the principles of substitution, supply and demand, adaptability, and prediction possibilities. And, the value principle of possessing characteristics and market productivity.

(1) Replacement cost method

Replacement cost is the cost of the enterprise to regain the asset or the cost of re-casting. When performing replacement accounting, it is to use accounting rules to calculate all the cost items and expenses one by one.

Replacement cost = direct cost + indirect cost

The cost of jewelry includes precious metal cost, gem cost, design cost and processing fee.

The main steps to assess the cost of jewelry: identify the type of jewelry, measure the size and weight, calculate the cost of jewelry, add taxes and profits, extract appropriate data, exclude the influence of under-evaluation factors, collect and evaluate the rationality, and evaluate the report. The drawback is that these jewels must be realizable, copies or equivalent substitutes can be found, and they must be assets that have depreciation characteristics over time. If it is not, then costing cannot be used for evaluation.

The cost method can be used to calculate the market value:

\[ P = p_1 \times (1 + r_1) = p_2 \times (1 + r_2) \]  

(1)

That is: market retail price = wholesale price \times (1 + market profit rate) = cost price \times (1 + markup rate)

(2) Market law

The market comparison method is to estimate the value of assets by comparing with other similar or identical products in the market, and to determine the appraised value of assets by adjusting the purchase prices of these assets. This method is suitable for any jewelry, especially antique jewelry, jewelry of a specific era, famous designers, intellectual property and special types of jewelry evaluation. The lower the total cost, the greater the impact. The above cost method is not applicable, only the market comparison method can be used.

The operation steps are as follows. First of all, clarify the evaluation object and determine the types of gems and metals. Secondly, classify and evaluate gems, analyze their metal composition and fineness. Analyze the manufacturing process of jewelry. Specify the source and time of the jewelry. Look for suitable markets where similar products are frequently sold, look for reference products and comparison products, compare the evaluated gems with the comparison objects, analyze the differences between the evaluation objects and the comparison objects and the impact on their value. Analyze the differences and make adjustments to draw conclusions of the evaluation. The disadvantage of the market comparison method is that it is difficult to obtain information about the actual price of jewelry sales, and it takes a lot of time and energy.

(3) Income method

The scope of the income method is relatively small, and it is generally used to evaluate the total assets of an enterprise and personally evaluate the predictable future income assets. When evaluating jewellery that may have an estimated profit, the income method is usually used.
The basic principles of the income method are:

\[ V = \sum R_i / (1 + r)^i \]  

Among them, \( V \) is the appraised value, \( R \) is the expected rate of return, \( r \) is the discount rate, and \( i \) is the period of return.

There are many steps in using the income method to evaluate jewelry. First, collect and verify data on relevant business and economic conditions, then calculate and compare relevant indicators, including the trend of potential total income and net income, and then specify the three parameters of income period, expected income and discount rate. Capitalize the expected return and determine the estimated value of the estimated asset.

2.2. Big Data Technology

Big data technology masters huge data information. It cannot be processed by a single computer. It must rely on the distributed processing of cloud computing, distributed database and cloud storage, and virtualization technology in order to realize the correctness based on the storage of massive data. The data is processed professionally.

Distributed database technology is a product that combines past database technology and network technology. The distributed database is scattered across the nodes of the computer network in the physical space, but logically can belong to the same system for data collection. Decentralized memory database technology has local spatial self-discipline, global reasonable sharing and use, data-rich security functions, data independence and system transparency. Distributed database management systems need to support global centralized control and distributed global control methods.

In this system, the following requirements must be met: (1) The database in the memory of each network node maintains its autonomy. (2) The memory database needs to be compiled, read and recorded in a separate way. To solve the vertical and horizontal segmentation strategy of large-scale data storage. (3) Various data division methods based on the overall vertical division function of horizontal division. Different applications and data need to be handled in different ways. (4) The in-memory databases of each node are adjusted mutually, and all the databases in the memory can be used as servers of other nodes.

3. Application Research Experiment on Jewelry Evaluation and Analysis Based on Big Data

(1) Determine the assessment question

First, determine the relevant issues for evaluation. 1) Determine the object of evaluation and the purpose of evaluation. 2) Determine the type of evaluation value according to the purpose of evaluation. 3) Clarify the expectations, uses and types of evaluation reports. 4) List of unexpected conditions and restrictions

Take samples and make preliminary instructions. The color, size, shape and quality of the inlaid jewelry should be recorded. If it is a jewelry inlay, please pay attention to the style of the setting, the number and size of the gems, the matching gems, the color and marking of the metal, etc. Regarding jade carving, pay attention to the color, size, specification, and shape of the carving.

(2) Identification and evaluation of jewelry

First, confirm the condition of the jewelry, determine the cleaning method, take a photo, and clean it. Secondly, in order to take pictures of jewelry clearly, use machines to evaluate jewelry. Calculate the quality and weight of the jewelry, classify the jewelry, score the ring benchmark and use the system. Records of metal signs, metal identification, determination of metal types and purity, measurement and measurement of metal substrates, records of inspection marks, trademarks and intellectual property trademarks.

Explain and evaluate the jewellery of the evaluation object. 1) Apply the principles of evaluation, contribution, and evaluation, explain the object of evaluation, and determine the characteristics of its composition. 2) The true description is to explain the size, color, material, etc. 3) Interpretation description is to explain the physical characteristics and value characteristics of the evaluation object, adjust similar elements related to the evaluation object, and adjust the difference between the evaluation object and the comparison object.

In the description of the evaluation object, the following content needs to be specifically included. A. The precious metal gems, gem raw materials, gem products, gem sets, etc. that are evaluated. B. Evaluation object life (mainly refers to the construction year) C. Manufacturers and designers D. Signs and marks E. Design (refer to cutting style, cutting and pasting) F. Material composition (refer to the composition of the evaluation item) G. Quantity H. Quality characteristics I. Status (refer to young age), age, damage, etc.) J. Reliability K. Source L. Image value addition function (deficiency, business volume, practicality, etc.)
(3) Market research and analysis
Collect relevant information and data: 1) Factors that should be considered when collecting relevant information and data: investigate international, domestic, regional or regional market conditions, and collect relevant information such as economic trends and consumer attitudes. 2) To find a suitable market, it is necessary to adjust the jewelry evaluation, collect various sales and lease information and income data generated by the jewelry in the past, that is, adapt to the corresponding market level.

4. Application Research Analysis of Jewelry Evaluation and Analysis Based on Big Data

4.1. Analysis of Jewelry Evaluation Standards Based on Big Data

| Bead thickness level | Quality requirements (nacre thickness) |
|----------------------|---------------------------------------|
| Extra thick          | A                                     |
| thick                | B                                     |
| middle               | C                                     |
| thin                 | D                                     |
| Extremely thin       | E                                     |

Table 1. Pearl thickness grade of Pearl

In the evaluation and analysis of jewelry, the factors that should be considered for pearl quality classification should be fully considered. In terms of appearance, it includes the size, shape, and color of the pearl. From a professional point of view, it is necessary to observe the layer thickness of the pearl and whether the surface is smooth. The thickness of the pearl bead layer is divided into five grades: A, B, C, D, E, and its quality requirements are shown in Table 1. It can be seen from the table that the pearl thickness level > 0.6 is A, etc., which belongs to the extra-thick level, which means that the quality of the pearl is better, meets the standard, and the evaluation value will be higher.

This article surveys a number of professional jewelry appraisers, and obtains a ranking result table of the importance of the jewelry appraisal content through a questionnaire survey on the following evaluation content.

Table 2. The importance of jewelry evaluation content

| Evaluation project | Proportion /% |
|--------------------|---------------|
| Types of items to be evaluated | 30 |
| years               | 38 |
| Manufacturers and designers | 12 |
| Imprint             | 15 |
| Manual design technology | 36 |
| Material composition | 25 |
| number              | 12 |
| quality             | 35 |
| Authenticity        | 100 |
It can be seen from Table 2 and Figure 1 that the most important first thing in jewelry evaluation is the authenticity of the jewelry, which accounts for 100%, that is, there must be no problems in the jewelry appraisal link; and then the age and year of manufacture. Craftsmanship and quality accounted for 38%, 36%, and 35% respectively. These are the most direct factors affecting jewelry valuation, and the most influential factors.

4.2. Objective Evaluation of Jewelry Based on Large Data

Table 3. Purpose analysis of jewelry evaluation based on big data

| Purpose of assessment                  | Proportion /% |
|----------------------------------------|---------------|
| Insurance                              | 38            |
| Mortgage or guarantee                   | 35            |
| Resale or auction                       | 45            |
| Division of property                    | 26            |
| Heritage inspection                     | 23            |
| Donation                               | 15            |
| Evaluation of patented products         | 12            |
Figure 2. Purpose analysis of jewelry evaluation based on big data

It can be seen from Table 3 and Figure 2 that the purpose of jewelry evaluation includes insurance, mortgage or guarantee, resale or auction, property division, inheritance inspection, donation, and evaluation of patented products. From the perspective of the proportion, 45% of the people Choose to conduct jewelry evaluation for resale or auction, 38% of people are for insurance, 35% of people are for mortgage or guarantee, to obtain more funds with jewelry, to solve urgent needs. Only 12% are evaluated for patented products.

5. Conclusion
This article is mainly based on the application research of big data on jewelry evaluation. This article analyzes the advantages and disadvantages of traditional evaluation methods, and then proposes the evaluation method of this article. Using big data to evaluate jewelry can effectively avoid uncertainties caused by market volatility and maximize the value of jewelry. The research innovation of this article is to make full use of the combination of qualitative research and quantitative research. Under the quantitative evaluation criteria, qualitative analysis of the experimental objects in this article fully demonstrates the value of jewelry evaluation.

This article still has shortcomings: First, it is technically difficult. The first is the limited identification equipment, and the second is the lack of comparable reference materials; the second is the high risk of value evaluation. Because of the particularity of jewelry and the complexity of economic behavior, the value assessment is generally a range, and the price fluctuations are large, so the accuracy of the value assessment is also difficult to assess. 3. The appraiser is required to have rich experience and professional experience, and the appraisal principles should be objective and independent.

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