Optimization Scheme of Accurate Calculation Algorithm of Electric Charge Based on Machine Learning

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Abstract: With the development of society and continuous scientific and technological innovation, accurate accounting technology has become an indispensable part of current economic life. The accurate calculation of electricity charge is very important and practical in accurate management and statistical analysis. Based on the machine learning method, this paper studies the optimization of electricity charges, and proposes a new idea that is based on the characteristics of time series to achieve efficient and accurate pricing of electricity. At the same time, in view of the following problems of traditional large sample algorithm, such as insufficient accuracy, low stability, poor real-time and other shortcomings, an improved in-depth combination of neural network technology and accounting machine data fusion scheme is proposed. After that, the optimization effect of the machine learning based accurate electricity charge calculation algorithm is tested. The test results show that the method has high accuracy, stability and scalability.

1. Introduction

In the accurate accounting, the traditional accurate payment algorithm of electricity bills can no longer meet the current actual needs, so it is necessary to find a more efficient, simple and effective method [1-2]. At present, it is commonly used to propose a lot of targeted and low cost electric charge accurate accounting schemes based on machine learning, including multiple design ideas such as the combination of multi-dimensional coding method and moment allocation strategy[3-4]. Two new development tools, artificial neural network technology and deep learning algorithm, are introduced in the implementation process, and MATLAB software is used for simulation experiment analysis and verification[5].

The performance of two non-parametric machine learning technologies (See5 and rough set) is compared. JF Hernández compared a group of financial ratios and applied the two methods to predict the bankruptcy of Spanish non-life insurance companies. We also compare these methods with three classical and well-known technologies: one belongs to the field of machine learning (multi-layer perceptron) and the other belongs to the field of statistics (linear discriminant analysis and logistic regression). The results show that machine learning technology has higher performance. In addition, See5 and Rough Set provide a decision model that is easy to understand and explain, which shows that these methods can be used as a useful tool to evaluate the bankruptcy of insurance [6].With the rapid growth of information on the Internet, Wu X may find it more difficult and time-consuming to find what he really wants, especially in e-commerce. Systems and methods based on machine learning[7].Various trends and patterns of Indian states/UT units and MHFW data sources (as of November 16, 2020) were analyzed. Using various machine learning algorithms, such as linear regression, KNN regression, LASSO regression, Elasticnet regression and decision tree regression, Mandru D B analyzed the number of novel coronavirus (COVID-19) cases reported by the top 10 states/UT in India. However, for the number of cured cases, LASSO and linear regression model gave the best accuracy results. Unfortunately, due to some changes in the original data set, Elastic net produced poor accuracy results. In particular, this work analyzes the calculation of accuracy based on the test data set[8].

This paper takes accurate accounting as a breakthrough, and proposes an improved algorithm based on machine learning method to solve the problems in the traditional accurate electricity bill invoice. The algorithm establishes a corresponding model by combining the relationship between the user group and the sensor nodes in the system to automatically identify the information of merchants (or consumers) and price tag. In this process, it is found that the data is changing regularly, so artificial neural network technology can be used to achieve this goal.

2. Discussion on the Optimization Scheme of Accurate Calculation Algorithm of Electric Charge Based on Machine Learning

2.1. Accurate Calculation of Electric Charge

The accurate calculation of electricity charges is mainly aimed at analyzing and processing the data provided by different users in different time periods through machine learning algorithms [7-8]. In the traditional algorithm, it is usually necessary to determine the specific amount corresponding to each data item, and then calculate the corresponding amount of each end deposit under the data item according to the proportion of each item in the total fund. The keyword weight is determined according to the number of power consumption information acquisition nodes, and each characteristic quantity is obtained by multiplying each node as the center as the input variable and the output index by the known value. When a certain index is greater than the standard value, different results will appear, for example, the power consumption of a unit is at the maximum or minimum value. This method is a real-time optimal control strategy by establishing a mathematical model of the relationship between input parameters and output variables to predict the trend of data changes. Based on computers, it uses digital signals for real-time monitoring, acquisition and processing, and combines other relevant technical means (such as neural networks) to analyze the process and results of problem pattern recognition [9-10]. Through the collection, analysis and processing of electricity bill data; we can judge and predict the regularity of consumer behavior. In real life, due to various factors, many commercial costs are high and their real values cannot be accurately calculated. When they are directly charged manually or price difference pricing is used

for accounting, but also because consumers' demand preferences are not accurately grasped, there is a certain error in the accurate budgeting method. This part mainly focuses on the standardization and data mining of variables. Since the user's input and output information need to obtain the corresponding attribute values through the calculation matrix, and then input them into the FTL program to perform the corresponding specific calculation process, it is necessary to convert all data into a vector to represent these values, and then use the function method to obtain the accurate electricity bill amount [11-12]. Figure 1 shows the process of accurate electricity charge accounting.
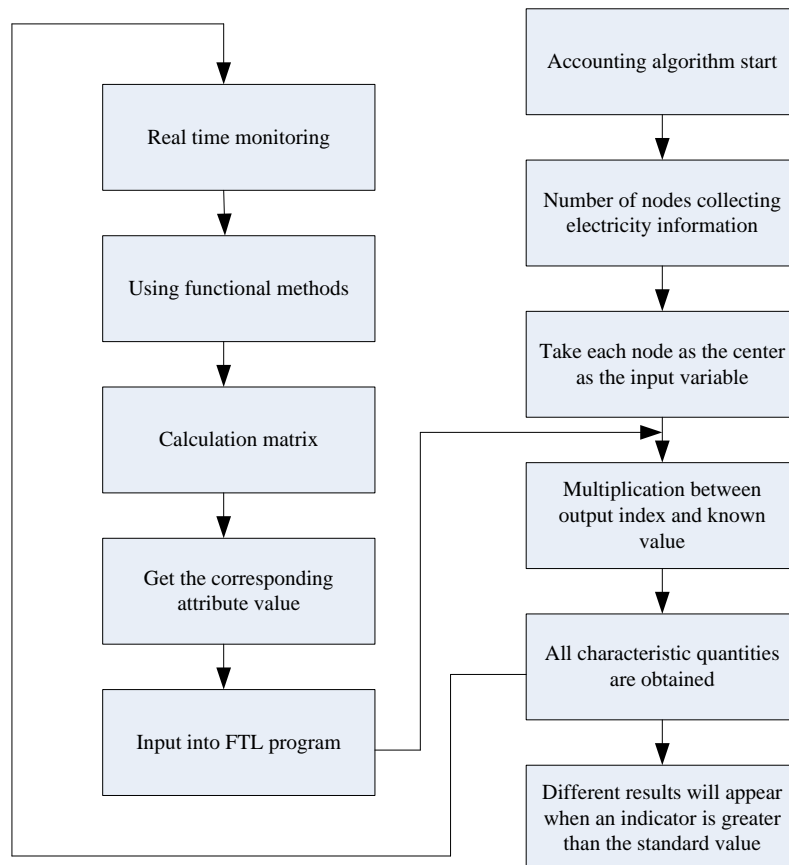

Figure 1. Electricity bill accurate accounting process

2.2. Factors Affecting Electricity Charge

In the accurate calculation of electricity charges, the influencing factors mainly include the following aspects: the accuracy of user information. Accurate data is to calculate accurate and reasonable product and service costs. Therefore, it is crucial for businesses to choose whether to use the company to provide accurate and reliable financial analysis data. At present, most enterprises will judge whether consumers are satisfied with a certain product or service quality and expected income by the quantity of goods they buy [13-14]. In accurate accounting, we need to consider the main influencing factors, such as user name, login password and other personal sensitive words. All of these will cause some interference to the calculation results of electricity bills. Therefore, it is necessary to accurately determine which are the key data. At the same time, it should be noted that there are differences between different categories and different age groups. For example, student groups and teacher groups belong to lower grades, while high-level institutions such as enterprises

may belong to high-level personnel or high-level technicians [15-16]. The factors that affect the accurate calculation of electricity charges mainly include the following aspects: quantity and quality of goods. When accurately calculating the electricity charge, ensure that the collected data is true and reliable. Otherwise, errors or missed measurements will occur, leading to large calculation errors or even failure to achieve the intended purpose. If the quantity is not enough, it may lead to miscalculation or the estimated value is far from the actual value, which wastes a lot of human, material and financial resources. If the commodity price fluctuates greatly or the price changes violently, it is easy to have problems such as miscalculation, which will affect the improvement of accuracy and economic benefits. In our targeted poverty alleviation work, due to the uncertainty of poor households' use of electricity bills, an accurate, real-time and efficient data processing system is needed to help them get rid of poverty better. But at present, many remote areas and mountain areas in China use manual operation or human eye recognition technology. Machine learning technology can use computers to automatically analyze large amounts of data, and combine with artificial intelligence algorithms to achieve accurate accounting and statistical process control and other functions, so as to improve the efficiency and accuracy of poverty alleviation. In the accurate calculation of electricity bills, if it is a special commodity, such as mobile phones, computers and other large data, it needs to be marked. However, for general products, there is no good distinction between such goods and other types of costs. For example, articles for daily use, food, and printed materials are all expense items within the category of such types of goods[17-18]. However, there is a mistake in the accurate calculation of electricity charges for knitted fabrics. The cost and price of such materials cannot be accurately calculated due to the user's wrong identification or incorrect input into the computer.

2.3. Machine Learning

In the age of big data, the development of the Internet makes it easier for us to obtain information and learn knowledge, but at the same time, it also brings many problems. For example, due to the fast updating speed of the machine, users' demands for new content cannot be met. In addition, some people think that the algorithm is too simple and prone to errors. To solve these problems, the following solutions are proposed. First, improve system performance indicators (such as running time, calculation efficiency, etc.), reduce program complexity and improve reliability. Then, improve learning methods and model design to reduce the amount of data to optimize the algorithm process, so as to increase the accuracy of calculation. The purpose of machine learning is to solve some complex problems by using the powerful computing power of the computer itself, so as to achieve better and more accurate data analysis applications. In real life, we can find similar algorithms and machine learning algorithms in many fields. For example, intelligent bracelets, clustering and other related technologies, robot systems, artificial intelligence control and processing and other aspects are one of the theoretical bases for operating research based on the automatic process of human mental labor.
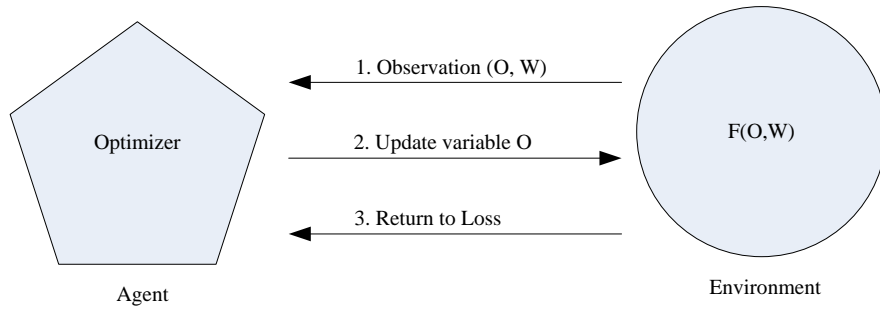
Figure 2. Accurate accounting of machine learning

When conducting accurate accounting (as shown in Figure 2), we need to establish corresponding algorithms based on the model and apply them to real life. Therefore, machine learning is a typical, efficient, stable, simple, convenient and easy to implement advantage and is widely used. Based on the statistical mathematical method, a representative characteristic marker function is designed to represent that there is a certain relationship between all sample points on the sample data set. At the same time, the specific number of each sample can be obtained by calculating these characteristic marker functions, and to some extent, its distribution and regularity can be reflected. The distribution rule of samples meets the following formula:

$$A_1 \cup A_2 \cup A_3 \ldots .. \cup A_n = A \tag{1}$$

$$A_i \cap A_j = \phi (\forall i \neq j) \tag{2}$$

The classification results obtained by clustering can clearly distinguish the samples, but the final confirmation of each category must be re evaluated according to certain standards.

3. Trial Discussion on the Experimental Process of Optimization Scheme of Accurate Calculation Algorithm of Electric Charge Based on Machine Learning

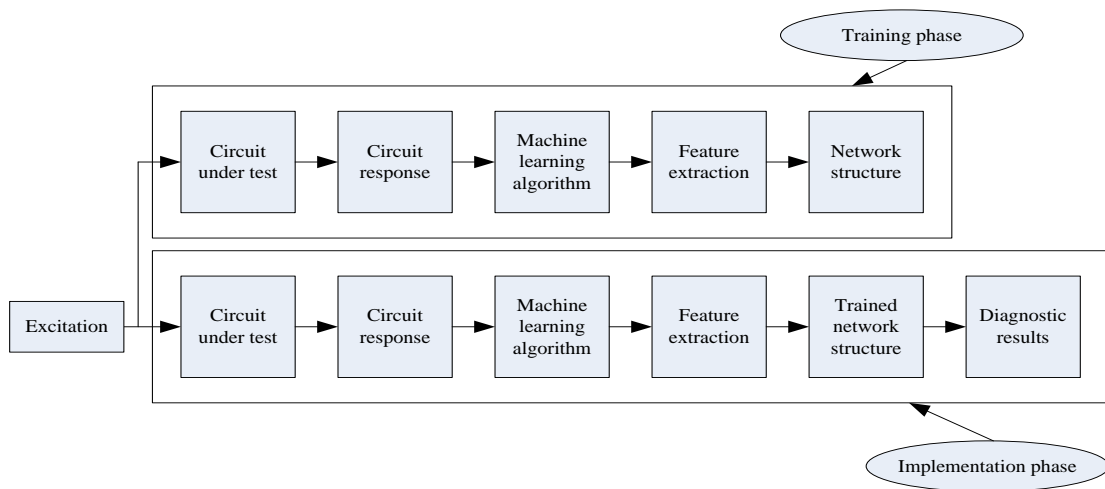### 3.1. Machine Learning Based Accurate Electricity Cost Accounting Process

Figure 3. An accurate electricity bill accounting process based on machine learning

In the accurate calculation of electricity bills, it is necessary to first analyze the basic information of users in detail, and then establish a model based on the target data to be achieved (as shown in Figure 3). Based on machine learning algorithm and neural network theory, this paper proposes an improved optimization scheme which is adaptive to the original system and has strong real-time, high accuracy and easy operation and maintenance. Combining traditional manual computing technology and computer aided software, we use traditional methods to process massive unstructured information, model in a small area of sea area, establish a model based on the data, assign the required accounting tasks to each node, obtain the number of nodes through clustering analysis, classify the attributes, and finally generate 16 different types of electricity charge categories and cost item databases, Pretreatment work and result output and verification. First, identify and judge whether the relevant parameters of all input eigenvalues and expense items meet the requirements, and then issue the corresponding test instructions. Then, establish the corresponding relationship matrix according to the data types contained in the task list to determine the degree of correlation between tasks and the computational time complexity. Sum the unit price and unit price of electricity charge to get a relational number. The second is data processing. The value is calculated after a certain period of time. Once again, the database algorithm in machine learning is used to complete the comprehensive analysis and accounting tasks of multiple indicators. Finally, MATLAB software is used to achieve the comparison between the output results of the parameterized model and the actual evaluation results. If the error is relatively large and there is a deviation, it is reasonable and accurate to adjust to the minimum value, which can ensure the accuracy and improve the work efficiency at the same time.

3.2. Machine Learning Based Optimization Effect Test of Accurate Electricity Bill Calculation Algorithm

In the accurate accounting based on machine learning, firstly, the artificial neural network algorithm is used for accurate pricing of electricity bills. Using neural network algorithm to calculate the formula of user input data, the result is obtained. This method can accurately predict the unit of electricity charge and the degree of electricity consumption select the appropriate algorithm and determine the corresponding parameters according to the characteristics of different types of user demand. What is more successful, stable and reliable for the accurate calculation of electricity bills is that the experimental research results are also more accurate, such as artificial neural network, genetic algorithm and other methods. For the refined management of electricity bills, it is necessary to combine multiple optimization strategies on the existing basis to achieve more accurate fine control. Therefore, cluster analysis technology is used to classify data and improve differential pricing. Compared with the existing automatic meter reading system for goods, we found its problems, and improved the model for these problems, and applied it to the precision accounting based on machine learning, so as to achieve the precision accounting based on machine learning based on different user needs.

4. Experimental analysis on Optimization Scheme of Accurate Calculation Algorithm of Electric Charge Based on Machine Learning

4.1. Test and Analysis of Optimization Scheme of Accurate Calculation Algorithm of Electric Charge Based on Machine Learning

Table 1 shows the optimization effect data of the accurate calculation algorithm of electricity

bills.

Table 1. Optimization effect of electricity bill precision accounting algorithm

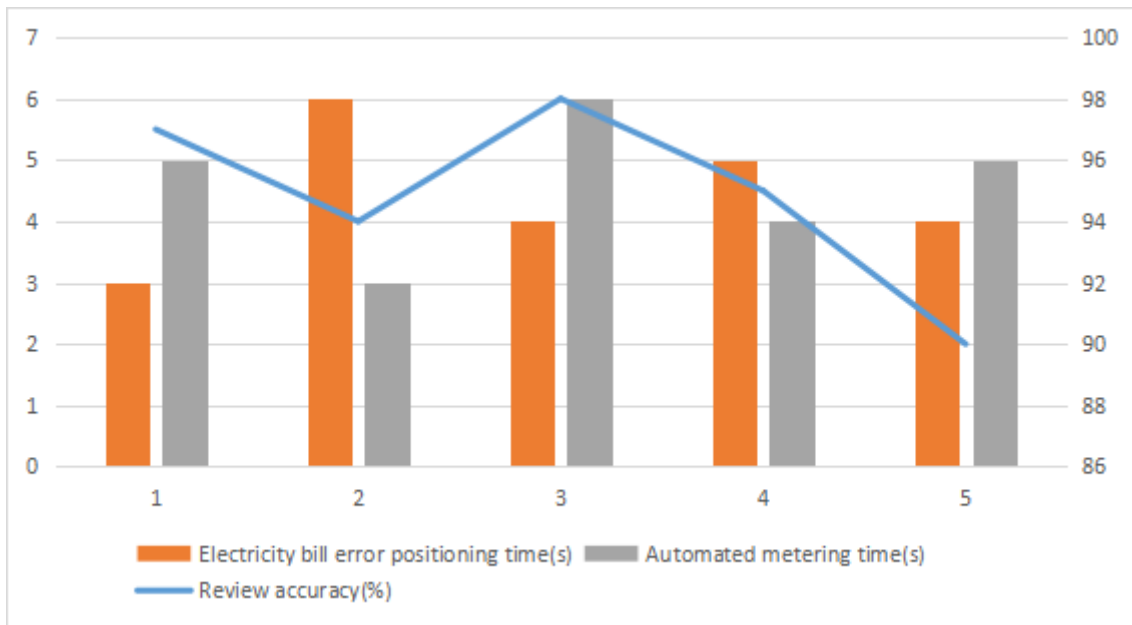| Test times	Review accuracy(%)	Electricity bill error positioning time(s)	Automated metering time(s)
1	97	3	5
2	94	6	3
3	98	4	6
4	95	5	4
5	90	4	5

Figure 4. Optimization effect of the accurate electricity bill accounting algorithm based on machine learning

Through comparative experiments on the machine learning based accurate electricity charge accounting algorithm in different user groups, the results are shown in Figure 4. It can be seen from the figure that this method has high accuracy, stability and scalability. From the perspective of data collection, it can be seen from the test that this mode is more suitable for ordinary individual users, while it is more suitable for wage earners (companies). The advantages of fast charging of electricity bills are obvious and the accuracy has also been improved to some extent, and the accuracy is relatively higher.

5. Conclusion

In the work of targeted poverty alleviation, the accurate calculation of electricity bills is an important content, and also a key link to achieve poverty alleviation for poor households. In this paper, based on machine learning theory and existing technical achievements, the optimal design of accurate electricity cost accounting scheme is carried out. First, it introduces the current situation and trend of research in this field in China, and then analyzes the current research results and practical application of this kind of problems at home and abroad. Then, it proposes a new method

to solve the above problems after improving the traditional mathematical algorithm, and gives its effect through the experimental results to verify that this research has a certain value.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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