Application of artificial intelligence in data processing

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Abstract. Aiming at the problems of large scale, variety and difficulty in data analysis, a fuzzy neural network algorithm based on artificial intelligence technology is proposed to analyze and process data. This algorithm combines the learning characteristics of the neural network and the fault-tolerant advantages of the fuzzy system, uses k-man's algorithm to cluster the sample input space, generates the membership matrix, and uses the neural network algorithm to train the data, and finally completes the target output. The analysis results can meet the existing engineering application requirements. The research content of this paper is of great significance to improve the utilization level of power engineering data and engineering management ability.

1. Introduction

With the continuous innovation and development of computer science and Internet technology, artificial intelligence is no longer a novelty. It has been applied in many fields and has a very important impact on people's production and life [1]. The development and improvement of artificial intelligence has effectively improved people's daily work efficiency and promoted the development and progress of social civilization. When applying artificial intelligence technology, traditional data processing technology is difficult to meet its development needs [2].

With more and more subdivided scenes of artificial intelligence technology, the fourth wave of industrial revolution brought by artificial intelligence has become a surging trend. Many traditional industries rely on ARTIFICIAL INTELLIGENCE to empower the industrial structure [3]. In the constant emergence, ARTIFICIAL INTELLIGENCE is also subtly changing all aspects of life, such as biometrics, video recognition, content review, and intelligent security [4].

In view of the problems of large amount of data, many types of power engineering, and difficult processing, this paper proposes a fuzzy neural network algorithm based on artificial intelligence technology to process and analyse power engineering data [5, 6]. The fuzzy neural network algorithm is a kind of artificial intelligence technology algorithm, which can analyze and process a large number of random historical data, and extract useful information and data laws from it, so as to complete the prediction of engineering cost and guide engineering project management [7-9]. The research content of this article is of great significance for improving the level of power engineering management in my country [10, 11].
2. Data mining algorithm

The data mining method based on artificial intelligence technology refers to the process of extracting useful information from a large amount of engineering data. Since its role is a large number of actual recorded data, it is faced with problems such as large data volume, large data noise, and difficulty in rule extraction. Generally, in order to better extract useful information, a complete data mining technology usually includes: selection sampling, data processing, data conversion, mining model, and data evaluation process.

In actual power engineering, in order to solve the data processing and information extraction work, the commonly used data mining techniques are: statistical analysis method, decision tree method, neural network method, fuzzy logic algorithm and genetic algorithm. Because the fuzzy neural network algorithm combines the learning advantages of the neural network and the logic fault tolerance of the fuzzy system, it has important applications in power engineering data processing and engineering cost prediction.

When applying neural networks to process and predict power engineering data, the first issues to be addressed are the acquisition of fuzzy system parameters and the identification of fuzzy rule parameters. Among them, the acquisition of fuzzy system parameters includes the determination of the number of fuzzy rules and the calculation of membership. Due to the complexity and diversity of the actual situation, when the fuzzy neural network algorithm is used, the data space needs to be divided into several fuzzy data sets by clustering method, and then the membership function can be obtained by training and the required output. Figure 1 shows a schematic diagram of a simple fuzzy neural network model.

![Figure 1. Schematic diagram of fuzzy neural network model](image)

3. Data preprocessing

When analyzing power engineering data, a large amount of data involved in the project needs to be screened purposefully, and the largest possible is to find a data set representing the attributes of the engineering data on the basis of maintaining the original data information.

Power engineering data is usually stored in numerical form, so this paper uses Bayesian classifier as the evaluation function. Bayesian method is a conventional method for classifying large amounts of data based on mathematical statistical theory. Assuming that the data set is S, the sample attributes are represented by X1, X2, ..., Xn, and at the same time, the existing data types are represented by C1, C2, ..., Ck, then for a new sample data, it belongs to a certain category Cj, The probability is:

\[
P(X|C_j) = \frac{n_{c_j}}{N} \sum_{x:C(x)=c_j} K\left(\frac{X-\mu_j}{h}\right)
\]
In the above formula, $h = \sigma$ is the bandwidth, $n_{cj}$ is the number of samples, and $K = g (X, 0, 1)$ is the Gaussian distribution function. The posterior calculation probability calculation formula of the improved Bayesian classification algorithm is:

$$P(X|C_j) = \frac{1}{n_{cj}} \sum_i g(X, 0, 1)$$

$$g(X, 0, 1) = \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}}$$

$G$ is a Gaussian density function used to represent the probability of data distribution. The mean is 0 and the variance is 1. Taking a certain power engineering data as an example, 100 data nodes are evaluated, and the data attributes corresponding to the nodes are regularized. The input data and output data attributes of the power engineering are finally obtained as follows:

Input set: Voltage level, line number, transport distance, terrain coefficient, line length;
Output set: Transportation engineering, basic engineering, wiring engineering, attachment engineering.

4. Data model establishment
According to the analysis results of power engineering data in the previous section, due to the diversity of engineering data, the input and output of data are multiple, so the nature of data analysis is a nonlinear mapping problem, so when choosing an artificial intelligence algorithm The fuzzy neural network algorithm can be used as the core algorithm of engineering data processing, so as to establish the estimated model of power engineering cost.

The combination of fuzzy neural network algorithm and conventional neural network algorithm for data learning mechanism and fuzzy system inference ability, not only has the ability to obtain data rules, but also has a strong network fault tolerance ability, unique in dealing with complex nonlinear data Advantage.

5. Model simulation
The processing of power engineering data. The original data is 200 pieces of historical data after data preprocessing, the input data contains 5 attributes, and the output data contains 4 attributes. Then use the Kmeans method to classify the power engineering data. After the data classification is completed, the fuzzy neural network needs to be used to adjust the membership function. During the calculation, the sample is divided into 4 parts

All samples are divided into 3 parts, of which the number of samples in the training set, test set and verification set are 120, 40 and 4, respectively, and the operation is stopped after 500 iterations. At the same time, in order to verify the correlation of the results, the linear relationship between the output of the fuzzy neural network algorithm and the actual network output is obtained. The fuzzy neural network algorithm can be used to analyze and process power engineering data, and to a certain extent, the data rules obtained by the fuzzy neural network can be used to predict the power engineering cost level. The fuzzy neural network is used to extract data rules for 200 sets of historical data, and then the project cost prediction is made for a specific project.

6. Conclusion
This paper presents a fuzzy neural network algorithm based on artificial intelligence technology to analyze and process power engineering data. The K-man’s algorithm is first used to perform cluster analysis on the sample input space and produce the corresponding membership matrix, and then the
neural network algorithm is used to train the data and perform regression analysis on the sample data. The artificial neural network-based fuzzy neural network algorithm proposed in this paper has important application value and guiding significance for the analysis and processing of power engineering data.

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