Application of hybrid model of big data and BP network on strategy prediction

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Abstract. Big data refers to the data set that cannot be captured, managed and processed by conventional software tools within a certain period of time. It is a massive, high growth rate and diversified information asset that needs new processing mode to have stronger decision-making power, insight and process optimization ability. BP neural network can be applied to the prediction of models and the study of the relationship between different models. Therefore, the combination of big data technology and BP neural network can deal with large and complex nonlinear structural problems from a statistical point of view, and with high stability and accuracy. This paper collects a cloud computing revenue from 2015 to 2019, and analyzes the impact of strategy mode value by using the combination of big data and BP neural network. The conclusion is that the correlation coefficient is 0.99762, which proves that big data combined with BP neural network can make accurate and effective decision prediction.

1. Introduction

Big data finance refers to the collection of large amounts of unstructured data, through real-time analysis and mining of customer transactions and consumer information to grasp customer's consumption habits, and accurately predict customer behavior, enhance the capabilities of financial institutions in service, marketing and risk control. The key to big data is the ability to quickly obtain useful information from a large number of data, or the ability to quickly cash in big data assets. Therefore, the information processing of big data is often based on cloud computing. Cloud computing is the product of the new era. Taking cloud computing as a development strategy can further expand the market [1]. And Alibaba on the basis of cloud computing, applies big data to cloud computing and obtains a series of data that can be used for business, thus forming a big data financial model.

Alibaba was founded at the end of 1998, headquartered in Hangzhou, set up overseas branches in Silicon Valley and London. Alibaba is a famous brand of e-commerce in the world and the largest online trade market in the world. With good positioning, stable structure and excellent service, Alibaba has become the first e-commerce website with 2.11 million merchants in the world, and the preferred website for global merchants' network promotion, and is rated as "the most popular website" by businessmen [3]. These achievements of Alibaba are inseparable from the operation of big data financial model. According to the statistics of China Internet Network Information Center (CNNIC), by June 2019, the number of online shopping users in China had reached 639 million, an increase of 28.71 million over the end of 2018, accounting for 74.8% of the total Internet users. Since the trial operation of Taobao live broadcast in March 2016, more than 10 million mobile users and more than 1000 hosts have watched the live broadcast content. As of May, the platform has nearly 500 live
broadcasting sessions per day, of which more than half of the audience are post-90s. Big data cloud computing is positioned on the "Consumer Live" hand Taobao platform. As of June 2016, female audience accounted for the absolute majority, with a female proportion of about 80%. However, from 20:00 to 22:00 every night is not only the most active time to watch live broadcast, but also the time when users are most willing to place an order [3]. These specific data are obtained by big data of cloud computing. Using these data can not only meet the needs of customers, but also create new enterprise output value.

Fang Guo and others analyzed the total operating revenue of Alibaba group from 2015 to 2019, and concluded that overseas M & A will play a positive role in the sustainable growth of Alibaba Group in the future [4], and others analyzed the total operating revenue of Alibaba group from 2015 to 2019, and concluded that overseas M & A will play a positive role in the sustainable growth of Alibaba Group in the future [4]. Jing Sun pointed out that under the guidance of Internet thinking, Alibaba through scope economy and positive feedback mechanism expands profit model, it has diversified the income sources of the group [5].

To sum up, they did not use specific mathematical models or algorithms to explore the changes of enterprise market value under the big data financial model. Therefore, taking Alibaba as an example, this paper explores the trend change of enterprise market value under the big data financial model with mathematical model, and mainly analyzes the effect of cloud computing on enterprise output value, and draws relevant conclusions.

2. Algorithm

2.1. Principles of cloud computing

Cloud computing (Cloud Computing) is a new way of resource utilization on the Internet. It can provide users with on-demand computing based on heterogeneous and autonomous services on the Internet. Because resources are on the Internet, and in the computer flow chart, the Internet is often represented by a cloud pattern, so it can be vividly compared to cloud computing, and "cloud" is also an abstract concept of underlying infrastructure.

The resources of cloud computing are dynamic, easy to expand and virtualized, which are provided through the Internet. End users do not need to know the details of the infrastructure in the "cloud", do not need to have the corresponding professional knowledge, and do not need to directly control. They only focus on what kind of resources they really need and how to get the corresponding services through the network.

Cloud computing can be considered to include the following levels of services: infrastructure as a service (IAAs), platform as a service (PAAS) and software as a service (SaaS). Cloud computing services usually provide general online business applications accessed through browsers, and software and data can be stored in the data center.

2.2. Pearson principle

The overall correlation coefficients of X and Y:

$$\rho = \frac{\text{Cov}(x, y)}{\sqrt{\text{Var}(x)\text{Var}(Y)}}$$  \hspace{1cm} (1)

The expected values are $$E(X) = \mu$$ and $$E(Y) = \nu$$,

$$\text{cov}(X, Y) = E[(X-\mu)(Y-\nu)]$$  \hspace{1cm} (2)

$$\text{cov}(X, Y) = E(X, Y) - \mu \nu$$ \hspace{1cm} (3)

In the equation, E is the expected values. It can be seen from the formula (2)(3) that the covariance is the mean value of the product of the deviation between the random variable and its mean; if we take the difference between the random variable and its mean as the "mean" random variable, then the two averaged random variables should have the same mean value, which is 0; at the same time, if the two
are independent, then when \( x \) is greater than its mean value, \( y \) should be possible. In other words, if \( x \) and \( y \) are independent of each other, their covariance is zero. Similarly, if \( x \) and \( y \) are linearly correlated, then one of them will be greater than the mean value (because the mean value is also linear correlation). So we can see that covariance is a good physical quantity to judge whether two random variables are linearly related.

3. Experimental design
This paper takes the data in Alibaba's financial report as the analysis object, and analyses Alibaba's cloud computing revenue. In 2008, the concept of cloud computing was first proposed by Google, and its core concept spread and developed rapidly around the world in a short time. In 2010, it formed a trend in China. Up to 2013, cloud computing has gradually begun to mature in China. In order to better analyse the enterprise output value of Alibaba company, this paper collects the cloud computing revenue of Alibaba company and the total revenue of Alibaba from 2015 to 2019. The data are shown in Table 1.

| Year | The cloud computing revenue (Billion Yuan) | The total revenue (Billion Yuan) |
|------|------------------------------------------|--------------------------------|
| 2013 | 4.26                                     | 320.84                         |
| 2014 | 8.65                                     | 568.26                         |
| 2015 | 12.71                                    | 762.04                         |
| 2016 | 30.19                                    | 1011.43                        |
| 2017 | 66.63                                    | 1582.73                        |
| 2018 | 133.90                                   | 2503.00                        |
| 2019 | 247.02                                   | 3768.44                        |

Data source: Alibaba financial report

After getting the cloud computing revenue and the total revenue, the correlation coefficient between the cloud computing revenue and the total revenue can be obtained through the Pearson correlation coefficient analysis, that is to say, the effect of cloud computing on the total revenue of the enterprise can be obtained.

4. Discussion and analysis
Take 2015 as the first year of 2015-2019 cloud computing revenue, and calculate the growth percentage of 2016-2019. The results are shown in Table 2.

| Year | The cloud computing revenue (Billion Yuan) | Increased percentage (%) |
|------|------------------------------------------|--------------------------|
| 2013 | 3.26                                     | 100                      |
| 2014 | 8.65                                     | 145                      |
| 2015 | 12.71                                    | 138.94                   |
| 2016 | 30.19                                    | 137.5                    |
| 2017 | 66.63                                    | 120.7                    |
| 2018 | 133.90                                   | 101.0                    |
| 2019 | 247.02                                   | 84.5                     |
It can be seen from the histogram that the revenue of cloud computing is increasing year by year, and the increased percentage is decreasing. The main reasons are as follows:

(1) Network dependence. Power failure or server interruption will hinder the access to cloud facilities. With the growth of years, people's data is more and more, and cloud computing is more and more dependent on the network, so cloud computing also has certain restrictions.

(2) System dependence. An organization is highly dependent on the availability and reliability of the system provided by the cloud provider. But if the provider does not provide the appropriate disaster recovery mechanism, then the organization will have very serious consequences.

(3) Lack of control. The object data of cloud computing is very large. If there is no appropriate control organization to control and keep it secret, once the data collapses or leaks, it will do great harm to both the enterprise and the leaked party.

Although the growth percentage of cloud computing revenue is decreasing due to these constraints, it does not affect the global influence of Alibaba's cloud computing business. The global top 5 cloud computing market share from 2015 to 2019 is shown in Figure 2.

Historical data show that in the past five years, Alibaba cloud's global market share has grown rapidly, becoming the third largest cloud computing service provider in the world. During this period, the market share of Amazon, Microsoft and Alibaba cloud continued to rise, while IBM declined year
by year. Google gradually rose to the fifth place after it was listed in 2016. Alibaba cloud computing market share gradually rose to the third from the fourth in 2015, and maintained this performance. This ranking shows that Alibaba's cloud computing ability is quite good in all companies in the world, and indirectly proves that Alibaba's enterprise market value is so strong is inseparable from the cloud computing based on big data finance.

According to the data in Table 1, the percentage of cloud computing revenue in total revenue can be calculated. Through the analysis of the proportion and the comparison of the correlation coefficient, the influence of cloud computing revenue on total revenue can be obtained. The calculation results are shown in Table 3.

Table 3. 2015-2019 the ratio of cloud computing revenue to total revenue.

| Year | The total revenue (Billion Yuan) | Ratio |
|------|---------------------------------|-------|
| 2013 | 320.84                          | 1.247 |
| 2014 | 568.26                          | 1.522 |
| 2015 | 762.04                          | 1.668 |
| 2016 | 1011.4                          | 2.985 |
| 2017 | 1582.7                          | 4.210 |
| 2018 | 2503.0                          | 5.350 |
| 2019 | 3768.4                          | 6.555 |

Figure 3. (a) 2015-2019 total revenue (b) 2015-2019 the ratio of cloud computing receivables to total revenue.

From the ratio of Alibaba cloud computing revenue in the total revenue, we can see that the percentage of cloud computing revenue in total revenue is almost linear growth. The correlation coefficient between cloud computing revenue and total revenue is 0.99762, which is very strong. This shows that Alibaba's cloud computing revenue has a very strong influence on the company's total revenue.

5. Conclusions

After collecting the data of Alibaba's cloud computing revenue and total revenue from 2015 to 2019, it can know that the use of cloud computing has greatly increased the market value of Alibaba company, thus promoting the development of Alibaba company. Among them, the correlation coefficient between cloud computing revenue and total revenue is 0.99762, which scientifically proves that cloud computing improves the revenue of the whole company. Moreover, Alibaba cloud computing ranks among the top in the world, which proves that the operation of big data financial model plays a very significant role in improving the market value of enterprises. The analyzing model is not only suitable for the prediction of other models, but also suitable for studying the relationship between different
models. In this paper, it proves the impact of big data financial model on the market value of enterprises. And it can guess that big data financial model is also applicable to other enterprises.

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