

Analysis of Big Data Application in Real Estate Investment

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Abstract. As an important project of national economic growth, real estate plays an important role in education, scientific research and production industries. Despite the slower pace of urbanization, However, the development of real estate has started to slow down currently, and there have been problems such as market differentiation and changes in consumer demand. At the same time, many investors' investments are blindly aimed at adapting to the market, which can easily lead to losses. With the development of the information age, big data can process massive amounts of information and provide investors with effective reference when investing in real estate, thereby improving the efficiency and gold content of real estate investment. This study will describe the application of big data in real estate investment from four aspects: information mining system, housing price evaluation, risk profile and marketing. The information mining system is mainly used in the initial stage of development to provide decision-makers with the preferences of the target customer group. House price prediction and risk prediction are mainly based on BP neural networks. Marketing mainly describes the application of big data in real estate sales. These results demonstrate how big data can help investors better choose investment objects, save investment costs and better meet market demand in the current market environment.

Keywords: Information mining system; price evaluation; marketing; big data; real estate.

1. Introduction

The real estate industry provides the basic Means of production for China's economic construction and is an important part of many economic construction in China. Looking at the history of real estate development, it can be found that the development of real estate at different times can reflect the development of China's economy at the same time. The average annual growth rate of the Chinese real estate market between 1998 and 2002 reached 20%, far exceeding the country's then-current rate of economic development. The government had adopted many preferential policies to stimulate the development of real estate, so as to offset the impact of the 1997 Asian financial crisis, such as purchasing mortgages and lowering loan interest rates. In this context, the real estate industry had reached a high degree of popularity, but also led to the development of the national macro-economy. However, the output of real estate also exceeded the sales volume, and the number of real estates for sale in the market began to increase and house prices were soaring. In order to control housing prices, the government had also adopted credit policies and tax policies [1]. At present, with the gradual advancement of urbanization, the development of the real estate industry is no longer as rapid as in the 1990s. Even though it remains a pillar of the national economy, the real estate sector started to advance in the direction of quality and rationality as the national economy changed. At the same time, there are also two major problems, one of which is due to the unreasonable age structure of the country and the aging trend of the population. The demand for housing suitable for the elderly in the real estate industry has increased. Another problem is the serious market differentiation in different regions in the real estate industry [2]. Therefore, the traditional real estate industry cannot meet the current market changes. Investors can no longer invest in real estate without thinking, as they did in the 1990s. They are in urgent need of emerging technologies to assist in investment decisions.

Big data has a variety of applications in the real world, include massive data messages, effective data information transmission, standardized data information type, Low-density data value. By processing text, charts and other different information sources, big data not only meets the actual needs, but also improves the overall work efficiency [3]. The development of cloud computing and cloud storage technology provides guarantee for the information storage of big data. This allows big

data not only to absorb new data, but also to permanently store old data. The combination of old and new data analysis and mining makes the conclusions drawn when dealing with big data more comprehensive. It can classify hierarchical information and do in-depth mining [4].

Therefore, the amazing data processing ability and work efficiency of big data perfectly meet the current needs of the real estate industry: through efficient information collection, analysis and processing, to understand and meet the market demand [5]. At the same time, on the basis of seizing market opportunities, it can also reduce costs through effective risk prediction and budget planning. This article focuses on the role that big data can play in the process of real estate planning, construction and sales. It is hoped to provide effective suggestions for corporate investors' decision-making by showing the application of big data in four fields. This paper mainly introduces the application of information mining in project planning, price evaluation in cost budgeting stage, risk assessment at the project progress stage and marketing after real estate construction. At the same time, the limitations of big data application in real estate will also be analyzed.

2. House Price Forecasting

With the development of first tier cities and the growth of China's economy, China's real estate has developed very rapidly, but there has also been a phenomenon that shows high demand for housing in first tier cities and prosperous areas and high housing prices. Many times, real estate developers cannot accurately assess the expected investment income in the budget stage, because the market price of house prices is constantly changing with the policy and economic development.

It is worth mentioning that what needs to be estimated here is the market price rather than the exchange price. The exchange price refers to the price that the buyer can bear and the seller can accept through negotiation between the buyer and the buyer. It has certain human factors and uncontrollable factors such as financial resources, preferential power and bargaining between the buyer and the seller; The market price is the average price of real estate, as a commodity after a large number of transactions, which is the general result of transaction price. Therefore, the market price is more rigorous as the evaluation object of big data [6]. The research model that this paper focuses on is the prediction of real estate prices by BP neural network technology.

Table 1. Predicted values of various indicators of commercial residential buildings in Changsha from 2020 to 2021.

The Year	GDP	Total permanent population at the end of the year	Cost of completed houses for real estate development enterprises	Per Capita Disposable Income	Per capita consumption expenditure
2020	12531	865	3011	59630	42118
2021	13312	894	3143	64049	44720
The year	Completed residential area of real estate development enterprises	Average transaction price of residential land	Urbanization rate	Investment in housing development and housing	Transaction area of residential land
2020	919	8594	80%	973	251
2021	912	9191	80.44%	1010	376

In the price prediction of Changsha housing price based on BP neural network, a total of 11 indicators are selected, including GDP, the total permanent population, the transaction area of residential land, the sales area of residential commercial housing, the average transaction price of residential land, the cost of completed houses of real estate development enterprises, the per capita disposable income of cities and towns, the per capita consumption expenditure of cities and towns,

the area of completed houses of real estate development enterprises, and the investment amount of real estate development houses. One takes the index data of seven years from 2010 to 2016 as the training input set and uses the average sales price data of residential commercial housing for seven years as the training output set (the number is 1). According to the formula, the invisible nerve layer is 9. The dynamic error of the network will continue to decline with the increase of training times, and the final error will reach the initial target range. After obtaining the appropriate model, the enterprise has calculated the expected values of 11 input layers, as shown in Table 1. Finally, all the above input layers are brought in to obtain the expected house price, which is within the error range, as shown in Table 2.

Table 2. Forecast value of sales price of commercial residential buildings in Changsha from 2020 to 2021

Year	2020	2021
Predicted average sales price of residential commercial housing	8965	9740

As the most mature and widely used artificial neural network. The operation of BP neural network is very similar to human neural information transmission. It can send information forward and feedback back at the same time. Different neurons carry different information, and the same information can also be carried in different neurons. Neurons are connected with each other, and their information can also be fed back to each other. Finally, a knowledge network is compiled. At the same time, BP neural system has a strong ability to learn from each other. They can adjust according to different environments, so they are suitable for analyzing the influencing factors of different environments. Finally, BP neural system can carry information and calculate at the same time, which means that their use can greatly improve the efficiency of information analysis [7].

3. Risk Assessment

Enterprises will inevitably face risks when investing. If one can analyze the influencing factors of relevant risks through big data, one can avoid unnecessary risks. In the risk prediction of Xi'an, 17 samples were selected in the input layer. According to the risk size, the sample is set to five levels: large, large, medium, small and small, corresponding to 0.9, 0.7, 0.5, 0.3 and 0.1, respectively. The results are presented in Table. 3 and Table. 4. Then one averages the final data, and the final result is the comprehensive score, which is used as the output layer. Databases 1-6 in this paper are obtained through comprehensive evaluation by experts, as shown in tables 3 and 4. 7 and 8 groups of data are the basis of testing the model. Finally, within the allowable range of error, after obtaining the model and inputting the experimental data of 7 and 8, the results are obtained as given in Fig. 1. From the output results, 0.4 is between 0.3 and 0.5, indicating that the investment project has low risk and good risk prevention and control effect. 0.5452 is between 0.5 and 0.7, indicating that the risk of the project is moderate, and some measures can be taken to prevent and control the risk [7].

Table 3. Scoring results of risk indicator systems for each project

index number	Natural risks			Technology risks			Economic risks					Policy risks				Other risks	
1	4	24	43	33	36	3	5	5	4	3	4	3	4	4	4	28	31
2	35	21	43	38	29	3	5	5	5	4	6	5	4	4	4	34	36
3	37	24	3	29	31	18	4	4	3	3	3	4	3	4	3	3	31
4	38	22	33	3	37	3	6	5	6	4	6	5	5	4	4	31	32

5	27	19	4	31	31	3	5 2	4 9	4 4	3 7	4 2	3 8	4	4 6	3 6	38	4
6	28	19	46	37	36	26	6 2	6 5	6 4	4 7	6	5 2	4 8	4 6	4 2	51	41
7	3	16	3	3	34	26	5 2	5 1	4 8	3 9	4 6	4 5	4 3	4 7	4 4	36	39
8	31	17	44	29	36	25	5 5	5 4	5 4	4 2	5 8	5 4	4 2	3 8	4	32	36

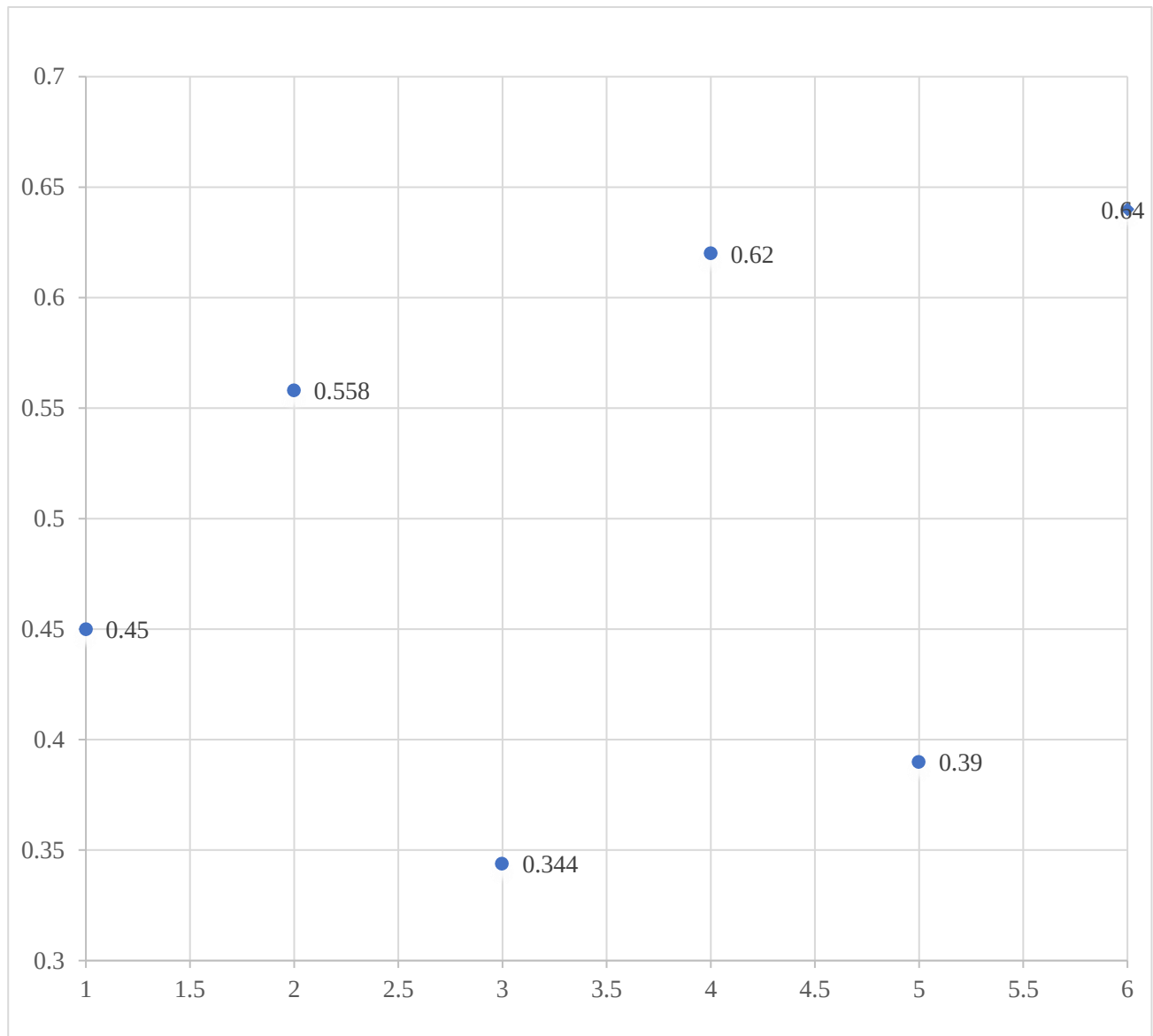


Fig. 1 Output results.

Table 4. Final comprehensive evaluation results of each project

number	1	2	3	4	5	6	7	8
target result	45	58	34	62	39	64	41	54

4. Marketing

Information data, especially real estate competitive product information data and customer information data, is the core of real estate enterprises' competition with the industry. The previous information mining technology ensures the customer information data. However, owing to the opaque

and asymmetric market information, it is difficult to share the information of customers and enterprises at the same frequency. For those customers who may be interested, especially those who have purchase demand but cannot understand the enterprise, if the enterprise only uses the traditional marketing method, it may not be able to break through the limitations to transmit the information of real estate competitive products to customers [4]. Therefore, enterprises can use big data for data precision marketing.

Firstly, in the information mining system, the enterprise has confirmed the customer data information and determined the target customer types. This group of customers is the enterprise's own customer database. This information can come from customers' online visits to real estate enterprises, data registration of offline customers, public local area networks of enterprises, and so on. The second step is user awareness. Enterprises can analyze some common points of certain types of customers through big data, e.g., their daily habits, social media use preferences, or high-frequency keywords for daily searches, and their daily browsing time of social media. After understanding user preferences, enterprise can customize corresponding marketing strategies [9, 10]. Combined with the above customer preferences, enterprises can cater to customers' daily habits when delivering real estate information online. For example, if most customers prefer to browse twitter and WeChat public accounts at night, then combining with big data push technology, enterprises can spend more budget on the push strength of Twitter and public accounts. Moreover, the delivery method of real estate information is not only in the form of text and video, but also through online live broadcast to lead customers to real-time interaction. Otherwise, through the virtual reality technology, the 3D stereoscopic scene can be displayed on the web page, so that customers can enjoy the panoramic features of the model house 360 degrees without dead angle through the mobile phone. This marketing method improves the customer's sense of experience. Compared with the traditional marketing of peers, it can greatly save the time of both parties. Meanwhile, it can also screen out a number of swing customers online, which also saves the human resource cost of offline marketing of enterprises [10].

5. Limitations

Big data can greatly improve the work efficiency of enterprises through its efficient information collection, analysis and dissemination ability. Nevertheless, establishing a big data system with few precise errors will also cost a lot of manpower, material and financial resources, and enterprises need to maintain and update it regularly. In addition, if the enterprise's supervision of the big data system is unfavorable, it is easy for hackers to invade or people inside the enterprise to fraud. Additionally, the main analysis object of big data is the data with high frequency. If decision makers rely too much on the analysis results of big data and do not combine current policies and market conditions, they are likely to become overwhelmed in the face of unusual risks.

6. Conclusion

In combination with China's current economic development trend, as a pillar industry, although real estate will still show an upward trend in the future, if the enterprise still adheres to the traditional real estate strategy, it will be easily eliminated by the market and unable to make profits. Combined with the discussion of this paper, From the selection of target groups before real estate investment, to the price prediction and cost estimation during real estate construction, to the marketing strategy after construction, and finally to the risk assessment, big data can complete data analysis within the allowable range of error, and the results can cover most of China's markets. To a certain extent, big data does provide relevant theoretical basis for investors' real estate investment and improve the operation efficiency of investors, especially to those who do not know relevant knowledge. However, it is worth noting that enterprises should also keep in mind the limitations of big data and regularly maintain the system. They cannot rely entirely on big data, and they should also have their own

judgment on key decisions. After realizing the above situation, big data must have more advantages than disadvantages for the development of the real estate industry.

The future development of the real estate industry must tend to use big data. Therefore, enterprises that can reasonably apply big data to real estate investment are bound to have more advantages. The purpose of this paper is to introduce the rational use of big data from four aspects of customer mining, profit forecasting, risk forecasting and marketing, and to Provide reference direction for blind investment enterprises. Enterprises can use data analysis to reasonably and legally avoid unnecessary risks. A variety of investment plans and expected results will be presented by big data. Finally, with the help of big data analysis capabilities, enterprises can better fit in with China's market-oriented development.

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