Design of Project Cost Information Management System Based on Intelligent Construction

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Abstract. With the rapid development of computer science and technology, artificial intelligence technology has penetrated into all disciplines and fields. In this paper, the application of artificial intelligence in the field of valuation is systematically studied. Taking the land price of a residential land sample as an example, the digital land price model based on Surfer is established, and further research ideas are put forward.

Keywords: Artificial intelligence technology, the field of valuation, Surfer

1. Introduction
Artificial intelligence is a comprehensive discipline that aims to study how to use modern tools such as computers to design systems that simulate the behavior of human intelligence. With the development of computer science and technology, artificial intelligence technology has also infiltrated into various disciplines and fields. Scholars at home and abroad have done a lot of research on valuation methods. Traditional methods generally have the disadvantages of long period, slow speed and large error, etc., and modern methods and techniques such as fuzzy mathematics, neural network and genetic algorithm have emerged to estimate prices. Engineering projects and real estate systems are characterized by concealment, fuzziness, multilevel and complexity. So far, there is still no set of mature and effective estimation methods, and there is no literature to systematically study the application of artificial intelligence methods in the field of valuation.

At present, many domestic scholars use geostatistics data information processing methods and various spatial interpolation methods for research. Shi Jiangang, Li Ling, Yang Haijuan and other domestic scholars put forward the application of digital land price model, using a small number of land price sample points, using geostatistics method for spatial interpolation, to form a visual figure. In the later period, many scholars enriched the research and played a certain role in the visualization and visualization of land price management. However, most of the researches on the digital land price model in China focus on the analysis and discussion of sample data and the comparison of various interpolation methods, but there are few researches on the descriptive concept of land price characteristics. It focuses on the study of spatial characteristics and neglects the application of land price model in time series.

This paper mainly studies the comprehensive application of Surfer artificial intelligence method in the field of engineering valuation, and the expected results have relatively general guiding significance and extensive application prospects.
2. Digital Land Price Model for Residential Land

2.1 Research Idea

In the process of updating the benchmark land price, grid method is adopted in most areas to divide evaluation units, and the establishment of digital land price model should be carried out on such a basis. Therefore, this paper uses discrete points (land price sample points) to establish a digital land price model based on planning network.

Taking the land price of a residential land monitoring point as an example, the Surfer geographic information processing software was used to interpolate a few monitoring sample points to form a continuous land price surface. The advantages and disadvantages of the digital land price model were analyzed from the spatial feature concepts such as contour line.

Table 1. Land Price of Residential Land Monitoring Point in A Certain City

| Monitoring point number | Coordinates X | Coordinates Y | Land price per Floor area ($) |
|-------------------------|---------------|---------------|------------------------------|
| J01001                  | 619076        | 2707237       | 6704                         |
| J01002                  | 609744        | 2704494       | 6837                         |
| J01003                  | 609151        | 2705215       | 7025                         |
| J01004                  | 609957        | 2708260       | 11349                        |
| J01005                  | 611763        | 2709530       | 5817                         |
| J02001                  | 608608        | 2706468       | 6282                         |
| J02002                  | 612154        | 2708231       | 5682                         |
| J02003                  | 609433        | 2709165       | 5857                         |
| J02004                  | 617395        | 2708846       | 4571                         |
| J02005                  | 610008        | 2707432       | 5597                         |
| J02006                  | 611065        | 2707236       | 5756                         |
| J02007                  | 610108        | 2704501       | 6795                         |
| J02008                  | 614353        | 2710563       | 5071                         |
| J02009                  | 613599        | 2710399       | 5035                         |
| J02010                  | 612968        | 2708460       | 5236                         |
| J03001                  | 613186        | 2708272       | 4652                         |
| J03002                  | 611871        | 2712692       | 3116                         |
| J03003                  | 614962        | 2710769       | 4656                         |
| J03004                  | 608749        | 2709688       | 5086                         |
| J03005                  | 615829        | 2710632       | 3839                         |
| J03006                  | 610869        | 2713292       | 3662                         |
| J03007                  | 611764        | 2713455       | 2639                         |
| J04001                  | 615971        | 2713026       | 2470                         |
| J04002                  | 616300        | 2711488       | 2799                         |
| J04003                  | 616013        | 2711075       | 3230                         |
| J04004                  | 611222        | 2713813       | 2419                         |
| J04005                  | 614722        | 2714958       | 2234                         |

Table 1 shows the land price of a residential land monitoring point, and Figure 1 shows the distribution map of the monitoring points. The basic data comes from the updated document of the benchmark land price, and the graded units are divided by the grid method. The size of the units is 30 meters × 30 meters, and the total number of monitoring points and residential land is 60.
2.2 Model Establishment Based on Surfer

Considering the inherent characteristics of urban space land price, namely the distribution of land price sample points, it is more influenced by location. In general, in the same or similar section, the price level is the same or similar. Inverse distance weighted average interpolation method and Kriking interpolation method have exactly such characteristics. Kriking interpolation can use known sample points with few and scattered distribution for interpolation calculation, and study different interpolation results with randomly selected verification points. The results show that residential land is more suitable for Kriking interpolation, its interpolation results are closer to the actual land price distribution, and the operation is simple. Using the land price of known monitoring points, Excel file is converted into Surfer software to accept GRD format data files. In the process of GRD file generation, Kriking interpolation is conducted on a few known sample points to form a continuous land price surface with grid spacing of 100. On the basis of the interpolation results, the land price contours spaced at 500 yuan are made, as shown in figure 2.

Comparing figure 1 with figure 2, we can see the trend of land price change. The land price decreases from the highest value of 8000 yuan along the contour line ring, and the land price in the central region changes frequently and the contour line is dense, thus illustrating the location distribution of residential land in the island. Moreover, the sample points are shaded by Surfer software to improve Relief Map, which Shaded areas with obvious difference in land price by contrast of black and white, as shown in figure 3. The black-and-white crisscrossed area indicates the area with a large range of land price change. The two northern land price change areas that are not obvious are
shown in figure 2, and are reflected by the black-and-white crisscrossed area in figure 3, which is more intuitive than the land price feature shown by the contour line. Wireframe Map is made by the software to obtain 3D images with strong three-dimensional sense. The lines in this Map are grids of coordinates (x, y). The intersection point of each grid represents z value, where z value is land price on the floor, as shown in figure 4. Surface Map showing the trend of land price change by lines and colors can also be obtained, as shown in figure 5. Figure 4 and figure 5 are drawn from a three-dimensional perspective to simulate the change of land price. Compared with the plan, they are more vivid and easy to express and analyze the change trend of land price.

3. The Research Idea

3.1 Expand the Application Level of Digital Land Price Model
At present, the establishment of digital land price model is limited to provide scholars with more intuitive tools for analyzing land price changes, so the application and development of digital land price model in other fields should be expanded. With the development of computer technology, artificial intelligence has developed rapidly and has been applied in many fields. Artificial intelligence technology has great application potential in geographical research and can provide strong technical
Support for complex geographical problems. It is an important way to realize informatization, automation and intelligence of geographic science. The artificial intelligence technology as a framework to solve the problem of complex, in based on the mature analysis function of spatial data, and to help the GIS will be the original cloud data into data available, analysis, value, and to discover and solve problems, to provide updates to the geographic information system, more intelligent digital land price model, have greater application value, it is need to discuss research in our country at present stage.

3.2 The Improved Spatial Interpolation Method is Studied

There are two kinds of spatial interpolation methods: one is deterministic method, the other is geostatistical method. Deterministic interpolation method is based on the similarity between information points or the smoothness of the whole surface to create a fitting surface, such as inverse distance weighted average interpolation method, trend surface method, spline function method; Geostatistical interpolation method is to select the statistical law of sample points, quantify the spatial autocorrelation between sample points, and thus establish the spatial structure model of sample points around the predicted points, such as Kriging interpolation method. There are many spatial interpolation methods, and there are corresponding interpolation methods for different original data distribution characteristics. The digital land price models established by different interpolation methods are different. In dealing with practical problems, there will be some geographical features such as river course, mountain slope and swamp that make the land price zero. Further research can use statistical thinking to improve the spatial interpolation method to make the land price interpolation result more reasonable.

3.3 Enhance the Application Value of Digital Land Price Model

By using the digital land price model, virtual 3D display analysis can be realized, but what the model shows is only the digital characteristics of land price at a certain static point, which cannot reflect the dynamic change characteristics of each period. The current research focuses on spatial analysis, but has not carried out dynamic evolution analysis in time, so it cannot be updated in time.

Further research can build the system program based on computer language, set most fixed parameters and a few variable parameters, use the visual operation window, input update variable parameters, can get the corresponding real-time digital land price model and reduce the workload and time of digital modeling. At the same time, the real-time digital land price model has been constructed, and the land price of a certain point in a certain region can be obtained by inputting the coordinates of known points, so as to implement the dynamic management of land price.

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