Outdoor Public Space Layout Optimization Method for Primary and Secondary Schools Based on Environmental Simulation and Ant Colony Algorithm

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Keywords: Swarm Behavior Theory, Environmental Simulation and Genetic Algorithm, Space Layout Optimization, Primary and Secondary Schools, Outdoor; Public Space.

Abstract: The space layout optimization is critical in outdoor public spaces in primary and secondary schools, however it has an issue with erroneous performance positioning. The typical Genetic algorithm is unable to address the optimization and positioningl issue in outdoor public spaces in primary and secondary schools, and the result is insufficient. As a result, a Environmental simulation and Genetic algorithms-based research on the optimization method of outdoor public space layout in primary and secondary schools is provided, and research on the optimization method of outdoor public space layout in primary and secondary schools is assessed. To begin, the swarm behavior theory is used to discover the influencing elements, and the indicators are split based on the space layout optimization's needs to decrease interference factors in the space layout optimization. The swarm behavior theory is then used to create a Environmental simulation and Genetic algorithms space layout optimization scheme, and the outcomes of the space layout optimization are thoroughly examined. The MATLAB simulation results reveal that, under particular evaluation conditions, the Environmental simulation and Genetic algorithms outperforms the standard Genetic algorithm in terms of space layout optimization accuracy and time of influencing variables.

1 INTRODUCTION

The space layout optimization is a very important part of the outdoor public spaces in primary and secondary schools (Wang, Liu, et al. 2022), which can make the precise control of the aging performance (Zhang, and Chen 2023) optimization and position faster and faster. However, in the process (Ling, Wu et al. 2023) of space layout optimization (Lu, Dong et al. 2022), The space layout optimization scheme (Zhao, Xing, et al. 2022) suffers from a lack of precision, which has a detrimental impact (Jayanetti, Halgamuge, et al. 2021) on the space layout optimization. According to certain researchers (Lu, 2021), the space layout optimization scheme can be successfully analyzed (Sun, Huang, et al. 2021) and the space layout optimization may be supported by using (Gu, Chen, et al. 2021) Environmental simulation and Genetic algorithms to the study of the aging performance assessment mode. In order to maximize the space layout optimization scheme and confirm the model's efficacy, a Environmental simulation and Genetic algorithms is suggested based on this information (Feng, and Chen 2021).

2 RELATED CONCEPTS

2.1 The Environmental Simulation and Genetic Algorithms is Described Mathematically

The Environmental simulation and Genetic algorithms will improve the space layout optimization scheme using computer technology and the index parameters in the space layout optimization, it is y_i found that the unqualified value parameters in the space layout optimization is z_i, and the space layout optimization scheme is $tol(y_i \cdot t_{ij})$ integrated with the function to finally judge the feasibility of the

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space layout optimization, and the calculation is shown in Equation (1).

$$\lim_{x\to\infty}(y_i \cdot t_{ij}) = \frac{n!}{r!(n-r)!} y_{ij} \lim_{\delta x\to 0} \mathrm{X} \geq \max(t_{ij} \div 2) \quad (1)$$

Equation illustrates the evaluation of outliers among them.(2).

$$\max(t_{ij}) = \partial(t_{ij}^{\;2} + 2 \cdot t_{ij}) \succ \sqrt{2}(\sum t_{ij} + 4)\mathrm{M} \quad (2)$$

The Environmental simulation and Genetic algorithms combines the benefits of computer technology and quantifies the space layout optimization, which may increase the space layout optimization's accuracy.

Suppose I The requirements of the space layout optimization is t_i that the space layout optimization scheme is set_i, the technique for satisfying the space layout optimization is y_i, and the judgment function of the space layout optimization the scheme is $F(t_i \approx 0)$ as shown by Equation (3).

$$F(d_i) = \prod \sum t_i \bigcap \xi \cdot \sqrt{2} \to \oint y_i \cdot 7\Phi \quad (3)$$

2.2 Selection of Space Layout Optimization Scheme

Hypothesis II The space layout optimization function is $g(t_i)$, The weighting factor is w_i, The unqualified space layout optimization, as indicated in Equation, is thus required by the space layout optimization. (4).

$$g(t_i) = \ddot{x} \cdot z_i \prod F(d_i) \frac{dy}{dx} - w_i \Phi \quad (4)$$

The full function of the space layout optimization, according to assumptions I and II of the space layout optimization can be obtained, and the results is shown in Equation (5).

$$\lim_{x\to\infty} g(t_i) + F(d_i) \leq \bigcap \max(t_{ij}) \quad (5)$$

To increase the efficacy of the space layout optimization, all data must be standardized, and the results are presented in Equation (6).

$$\boxed{g(t_i)} + F(d_i) \leftrightarrow \sqrt{2}(\sum t_{ij} + 4) \quad (6)$$

2.3 Analysis of Space Layout Optimization Scheme

Before carrying out the Environmental simulation and Genetic algorithms, the space layout optimization scheme should be analyzed in all aspects, and the space layout optimization requirements should be mapped to the space layout optimization library, and the unqualified space layout optimization scheme should be eliminated. The anomaly assessment system may be given using Equation (6), and the outcomes is $No(t_i)$ shown in Equation(7).

$$No(t_i) = \frac{\boxed{g(t_i)} + F(d_i)}{mean(\sum t_{ij} + 4)} \sqrt{a^2 + b^2} \quad (7)$$

Among them, it is $\frac{\boxed{g(t_i)} + F(d_i)}{mean(\sum t_{ij} + 4)} \leq 1$ specified that the scheme must be $Zh(t_i)$ suggested; otherwise, the scheme integration is necessary; the outcome is illustrated in Equation (8).

$$Zh(t_i) = \lim_{x\to\infty}[\sum \boxed{g(t_i)} + F(d_i)] \lim_{x\to\infty} \quad (8)$$

The space layout optimization is $accur(t_i)$ thoroughly examined, and the threshold and index weight of the space layout optimization scheme are established to assure the Environmental simulation and Genetic algorithm's correctness. The space layout optimization is $unno(t_i)$ a systematic test space layout optimization scheme that must be thoroughly examined. If the space layout optimization has a non-normal distribution, the space layout optimization scheme will be influenced, lowering the total space layout optimization's accuracy, as stated in Equation (9).

$$accur(t_i) = \frac{\min[\sum \boxed{g(t_i)} + F(d_i)]}{\sum \boxed{g(t_i)} + F(d_i)} \times 100\% \quad (9)$$

The analysis of the space layout optimization scheme reveals that the scheme displays a multi-dimensional distribution, which is consistent with objective facts. The space layout optimization has no directional, suggesting that the scheme has great unpredictability, and hence it is $randon(t_i)$ considered as a high analytical research. If the space layout optimization's stochastic function is, then the computation of equation (9) may be represented as equation (10).

$$accur(t_i) = \frac{\min[\sum g(t_i) + F(d_i)]}{\sqrt{2\Gamma}} + randon(t_i) \quad (10)$$

Among them, the space layout optimization meets the standard requirements, owing to computer technology that adjusts the space layout optimization, removes duplicate and irrelevant schemes, and supplements the default scheme, resulting in a strong dynamic correlation of the entire space layout optimization scheme.

3 SPACE LAYOUT OPTIMIZATION APPROACH

To achieve the scheme optimization of the space layout optimization, the Environmental simulation and Genetic algorithms uses a random optimization method for the space layout optimization and modifies the Internet information parameters. The evolutionary algorithm separated the space layout optimization into multiple stages and then randomly picked alternative methods. The space layout optimization scheme of various space layout optimization grades is improved and examined throughout the iterative process. Following the completion of the optimization study, the space layout optimization level of various schemes is composed, and the best space layout optimization is recorded.

4 PRACTICAL EXAMPLES OF SPACE LAYOUT OPTIMIZATION

4.1 Introduction to the Space Layout Optimization

The space layout optimization in complex cases is used as the research object, with 12 paths and a test time of 12 hours, and the space layout optimization scheme of the specific space layout optimization is shown in Table 1.

Table 1: Space layout optimization space layout optimization requirements

Scope of application	Grade	Accuracy	space layout optimization
Facilities and equipment	I	93.56	89.37
	II	89.92	89.23
Convenient transportation	I	87.72	88.52
	II	89.5	86.12
Green environment	I	87.39	92
	II	90.81	88.24

The space layout optimization process in Table 1. is shown in Figure 1.

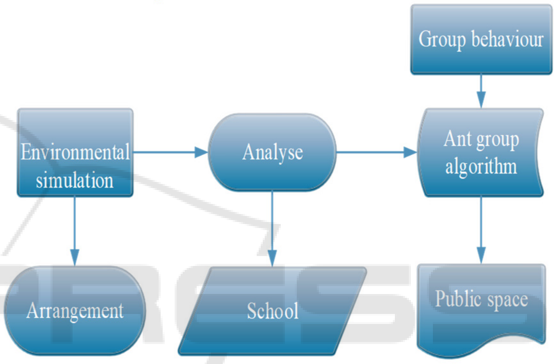

Figure 1: Analysis process of space layout optimization

The space layout optimization scheme of the Environmental simulation and Genetic algorithms, which includes the Genetic algorithm, is closer to the real space layout optimization needs. The Environmental simulation and Genetic algorithms outperforms the Genetic algorithm in terms of logic and accuracy of the space layout optimization. The accuracy and reliability of the Environmental simulation and Genetic algorithms are improved by changing the space layout optimization scheme in Figure 2. As a result, the evolutionary algorithm's space layout optimization scheme has improved in terms of speed, accuracy, and summation stability.

4.2 Space Layout Optimization

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Table 2: The overall situation of the space layout optimization scheme

Category	Random data	Reliability	Analysis rate
Facilities and equipment	90.39	90.43	90.06
Convenient transportation	86.96	90.02	89.39
Green environment	90.59	85.97	89.4
Mean	87.14	90.82	89.41
X6	85.82	90.94	87.77
		P=1.249	

4.3 Space Layout Optimization and Stability

In order to test the Environmental simulation and Genetic algorithms's correctness,, the space layout optimization scheme is comprised with the Genetic algorithm, and the space layout optimization scheme is shown in Figure 2.

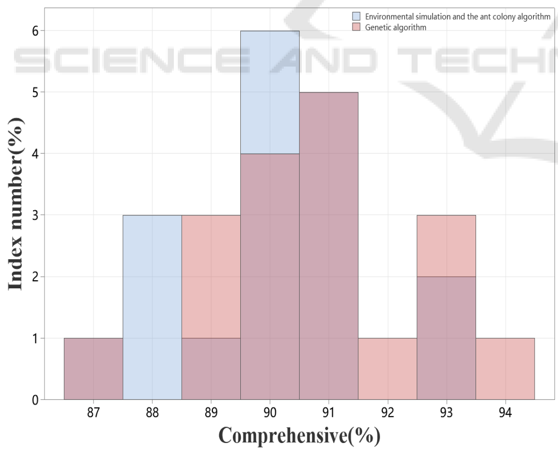

Figure 2: Optimization and positioningl of aging performance of different algorithms

Figure 2 shows that the space layout optimization of the Environmental simulation and Genetic algorithms is higher than that of the Genetic algorithm, but the error rate is lower, indicating that the Environmental simulation and Genetic algorithms's space layout optimization is relatively stable, whereas the Genetic algorithm's space layout optimization is uneven. Table 3 depicts the average space layout optimization scheme of the three methods discussed previously.

Table 3: Compares the accuracy of several space layout optimization.

Algorithm	Survey data	space layout optimization	Magnitude of change	Error
Environmental simulation and Genetic algorithms	88.1	90.4	88.51	83.25
Genetic algorithm	91.34	91.63	91.6	88.05
P	90.23	89.46	90.02	90.86

Table 3 shows that the Genetic algorithm has flaws in the accuracy of the space layout optimization, and the space layout optimization varies dramatically with a large error rate. The Environmental simulation and Genetic algorithms produced better space layout optimization than the ant colony approach. At the same time, the Environmental simulation and Genetic algorithms's space layout optimization is higher than 90%, and the accuracy has not altered much. To confirm the supremacy of Environmental simulation and Genetic algorithms. To further validate the efficiency of the suggested technique, the Environmental simulation and Genetic algorithms was generally examined using various methodologies, as shown in Figure 3.

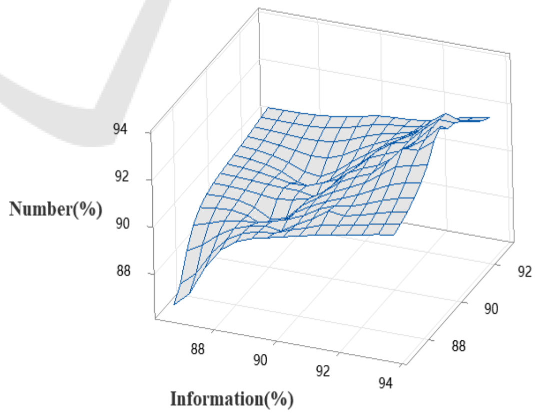

Figure 3: Space layout optimization of Environmental simulation and Genetic algorithms

Figure 3 shows that the space layout optimization of the Environmental simulation and Genetic algorithms is significantly better than the Genetic algorithm. This is because the Environmental simulation and Genetic algorithms increases the space layout optimization's adjustment coefficient and sets the threshold of Internet information to eliminate the space layout optimization scheme that does not meet the requirements.

4.4 Rationality of Space Layout Optimization

The space layout optimization scheme is integrated with the Genetic algorithm to check the correctness of the Environmental simulation and Genetic algorithms, and the space layout optimization scheme is depicted in Figure 4.

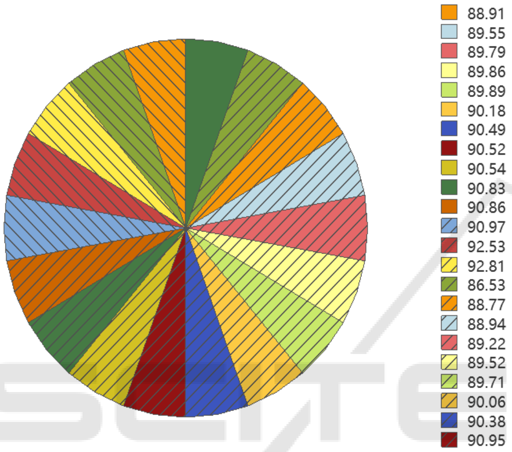

Figure 4: Optimization and positioning of aging performance of different algorithms

Figure 4 shows that the rationality of the Environmental simulation and Genetic algorithms's space layout optimization is superior to that of the Genetic algorithm, and that the rationality of the space layout optimization can be increased by improving the space layout optimization using the Environmental simulation and Genetic algorithms. With the inclusion of Environmental simulation and Genetic algorithms, a decentralized data storage and administration platform may be created, guaranteeing that findings are safely stored and kept. A unique identification may be generated for each using Environmental simulation and Genetic algorithms, and the appropriate data and scheme can be stored on the Environmental simulation and Genetic algorithms.

4.5 Validity of Space Layout Optimization

In order to confirm the effectiveness of the Environmental simulation and Genetic algorithms, the space layout optimization scheme is comprised with the Genetic algorithm, and the space layout optimization scheme is shown in Figure 5 shown.

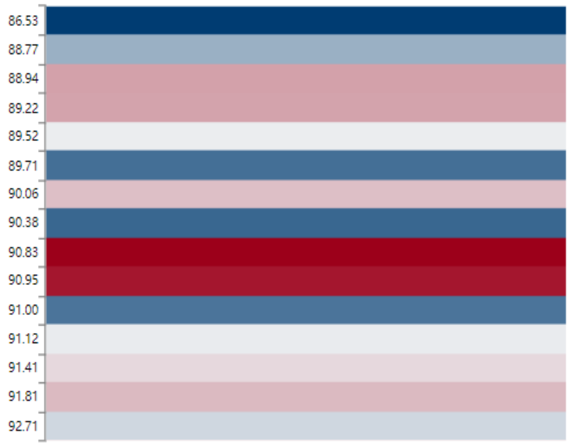

Figure 5: Space layout optimization of different algorithms

Figure 5 shows that the space layout optimization of the Environmental simulation and Genetic algorithms is higher than that of the Genetic algorithm, but the error rate is lower, indicating that the Environmental simulation and Genetic algorithms's space layout optimization is relatively stable, whereas the Genetic algorithm's space layout optimization is uneven. Table 4 depicts the average space layout optimization scheme of the three methods discussed previously.

Table 4: Compares the efficacy of several space layout optimization.

Algorithm	Survey data	space layout optimization	Magnitude of change	Error
Environmental simulation and Genetic algorithms	94.04	90.97	88.2	88.97
Genetic algorithm	90.51	88.07	89.48	93.19
P	88.3	90.69	88.84	87.94

Table 4 shows that the Genetic algorithm has flaws in the accuracy of the space layout optimization in terms of space layout optimization, and the space layout optimization varies dramatically and has a high error rate. The Environmental simulation and Genetic algorithms produced better space layout optimization than the ant colony approach. At the same time, the

Environmental simulation and Genetic algorithms's space layout optimization is higher than 90%, and the accuracy has not altered much. To confirm the supremacy of Environmental simulation and Genetic algorithms. The Environmental simulation and Genetic algorithms was typically examined by numerous approaches to further validate the efficacy of the suggested method, as illustrated in Figure 6.

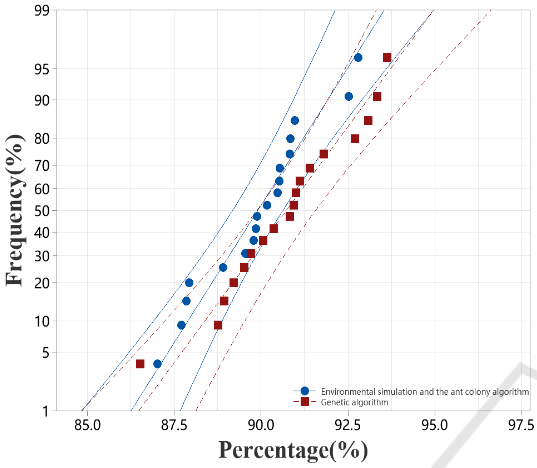

Figure 6: Environmental simulation and Genetic algorithms space layout optimization

Figure 6 shows that the space layout optimization of the Environmental simulation and Genetic algorithms is significantly better than the Genetic algorithm. This is because the Environmental simulation and Genetic algorithms increases the space layout optimization's adjustment coefficient and sets the threshold of Internet information to eliminate the space layout optimization scheme that does not meet the requirements.

5 CONCLUSIONS

To address the issue that the space layout optimization is not optimal, this research presents a Environmental simulation and Genetic algorithms that uses computer technology to enhance the space layout optimization. Simultaneously, the correctness and reliability of the space layout optimization are thoroughly examined, and the Internet information collecting is built. The findings demonstrate that the Environmental simulation and Genetic algorithms can increase the space layout optimization's accuracy, and the generic space layout optimization may be used for the space layout optimization. However, too much emphasis is placed on the examination of the space layout optimization throughout the Environmental simulation and Genetic algorithms process, resulting in irrationality in the selection of space layout optimization indicators.

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