Research on Human Performance Evaluation Model Based on Neural Network and Data Mining Algorithm

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Research

Keywords: Analytic Hierarchy Process, Government Administrators, Performance Evaluation, Regression Analysis, BP neural network, wireless network

Posted Date: June 1st, 2020

DOI: https://doi.org/10.21203/rs.3.rs-19197/v2

Version of Record: A version of this preprint was published on September 10th, 2020. See the published version at https://doi.org/10.1186/s13638-020-01776-4.

Abstract

In order to effectively evaluate personnel performance, a distributed data mining algorithm for spatial networks based on BP neural wireless network is proposed. In the cloud computing environment, an excavator is used to construct multiple input multiple output spatial network data, analyze the data structure, and perform redundant data compression of massive data through time-frequency feature extraction. Combined with adaptive matching filtering method, the characteristics of the data are matched. The spatial frequency feature extraction method is used to locate the features of the multiple-input multiple-output spatial network data. In order to improve the accuracy of data mining, the BP neural network is used to classify and identify the extracted data features to achieve the optimization of data mining. A wireless sensor network is a wireless network composed of a large number of stationary or moving sensors in a self-organizing and multi-hop manner. It cooperatively senses, collects, processes, and transmits the information of the perceived objects in the geographical area covered by the network, and finally puts these The information is sent to the owner of the network. This algorithm improves the accuracy of personnel performance evaluation, and simultaneously establishes a hierarchical analysis and quantitative evaluation model for the performance of government managers, and adjusts the results of hierarchical statistical analysis on government administrators as needed. The performance evaluation and optimization of government administrators were introduced. The empirical analysis results show that the method has higher accuracy for government managers' performance evaluation, higher efficiency of big data processing and better integration.

Introduction

The number of administrative departments of the government continues to merge with the reform of the government system and the development of the economy. No matter whether the scale of government administration is large or small, it is necessary to manage the performance of administrative staff. There are some difficulties in this part of the management. The administrative department of government is a non-profit organization. Under the situation of the reform of government system and mechanism, its business scale is expanding constantly. The staff in the administration include office, financial and other aspects. Administrators, like staff in other departments, put the goals and interests of the executive branch at the top of their work. The performance management of administrative staff plays an important role in the development of administrative staff as well as the whole government administration[1]. Fuzzy normal form neural network partly covers the basic knowledge of neural computation and fuzzy neural computation, and the realization of the algorithm can identify the essence of the relationship between fuzzy system and neural network.The work of administrative staff is complicated, flexible and difficult to quantify. Administrative staff provide more temporary services to other departments, such as manpower, finance and so on. These temporary services are not easy to judge in quantitative management. The work of administrative personnel is complex, and often receive other tasks in the work[2]. Fuzzy normal form system can provide big data support for medical health and reliable data source for decision-makers. In this paper, prov-s, safety data origin model based on W3CPROV, is proposed to study various labeled

objects in the safety origin relation graph and define the range of related objects.Compared with the task of the production department, the work of the administrative staff is not restricted and directed by the production plan, and there is often sudden work in the daily work. This kind of sudden work can account for a large part of the total work of administrative personnel. The administrative personnel's work is too dynamic, the examination will encounter problems of one kind or another[3].

The administrative staff's work content is more complex, mainly for the other departments of the government administrative department to provide services and help, and it also has the function of supervision and coordination[4]. The performance assessment of the administrative staff is not enough, the quantitative process and the quantitative results are not clear and accurate. In the performance assessment of the administrative staff, the evaluation index is not flexible and does not take into account the differences between the administrative staff. Although the use of the unified assessment can save the cost for the government administration, it will strike the enthusiasm of the administrative staff[5]. Therefore, it needs to be studied. This paper proposes an effective performance evaluation model for government administrators. This paper puts forward the performance evaluation model of government administrators based on an analytic hierarchy process, and combines the results of descriptive statistical average analysis to test the sample regression of the large data of the performance evaluation of the government administrators and adopt the adaptive fuzzy scheduler. The law carries out the classification and recognition of the performance data of the government administrators[6]. According to the results of the performance information fusion of the government administrative personnel, the hierarchical analysis is carried out, the quantitative evaluation model of the performance of the administrative personnel of the government is established, and the regression analysis and adaptation of the administrative personnel management of the government are carried out by the F statistics analysis method. The adjustment, based on the hierarchical statistical analysis results of adaptive adjustment of government administrative personnel, combined with the AHP method, to achieve the performance evaluation of government administrative personnel optimization. Finally, the empirical analysis of the performance test is taken, it shows the superiority of this model in improving the ability of the performance evaluation of administrative personnel of the government[7,8].

The rest of this paper is organized as follows. Section 2 discusses statistical analysis model and constraint parameter analysis of the performance evaluation of government administrators, followed by optimization of performance evaluation model for government administrators in Section 3. Empirical analysis and test is discussed in Section 4. Section 5 concludes the paper with summary and future research directions.

Statistical Analysis Model And Constraint Parameter Analysis Of The Performance Evaluation Of Government Administrators

Due to technical limitations, the statistical analysis section is only available as a download in the supplementary files.

Methods

Due to technical limitations, the Methods section is only available as a download in the supplementary files.

Experiment

The experiment adopts Matlab 7, the method of sampling the data of government administrative personnel's performance evaluation modeling adopts the method of social investigation and descriptive statistical analysis. The software of data analysis is SPSS 19.0. the basic statistical results of the personnel are shown in Table 4. Figure 2 is the distribution diagram of network nodes.

According to the results of the regression analysis of performance evaluation in Table 5, the performance evaluation of government administrators is carried out. The distribution of the evaluation curve is shown in Figure 4, taking the satisfaction degree of the masses and administrative behavior as the parameter.

The analysis shows that the performance evaluation of government administrators by using this model is accurate and confidence level is better.

In order to further verify the effectiveness of the performance evaluation model of this paper, compared with the quantitative evaluation method, the relative evaluation method and the scale evaluation method, as shown in Figure 5.

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Results And Discussion

In this paper, a performance evaluation model of government administrators based on AHP is proposed. Combined with the results of descriptive statistical average analysis, the sample regression test of big data performance evaluation of government administrators is carried out, and the adaptive fuzzy scheduling method is used to classify and identify the performance big data of government administrators. According to the results of the performance information fusion of government administrators, the hierarchical analysis and the quantitative evaluation model of the performance of government administrators are established. The *F* statistic analysis method is used for the regression analysis and adaptive adjustment of the government administrative personnel management, and the adaptive adjustment for the government administrative personnel is carried out according to the results of the hierarchical statistical analysis, and combined with the AHP method, the performance evaluation and optimization of government administrators is realized. The results of empirical analysis show that the performance evaluation of government administrators by using this method has higher accuracy, higher efficiency of big data processing and better integration. This method has a good application value in the performance evaluation of government managers.

Declarations

Availability of data and material

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

declares that he has no conflict of interest.

* Research involving human participants and/or animals

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

* Informed consent

All authors agree to submit this version and claim that no part of this manuscript has been published or submitted elsewhere.

Funding

None

Authors' contributions

Wei Liang wrote the entire article.Tingyi Li is responsible for the experimental simulation

Acknowledgements

None

Abbreviations

(AHP) Analytic Hierarchy Process

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Tables

Table 1 Performance evaluation indicators for government managers

	Primary indicator	Secondary index
Performance evaluation indicators for government managers	Ability	Working attitude Conscientiousness Event handling capability Innovation ability Other capabilities Organizational management capacity Capacity for policy analysis
	Moral character	Political morality Professional ethics Ethics and morality Psychological morality Autonomy
	performance	Achievements in scientific research Daily performance Winning rate
	Diligence	Attendance situation Load Work efficiency Degree of diligence

Table 2 Judgment matrix -

—					
1.0000	1.0321	1.4555	1.2365	1.0000	0.2365
0.6321	1.2236	1.0000	1.0000	1.2568	0.3214
0.6540	1.0000	1.2635	1.3654	1.0000	1.0000
0.8565	0.4526	0.4569	0.7569	1.9635	0.1652
1.0000	0.3251	0.1358	0.5236	1.2365	0.1356

The of the weight coefficient of the judgment matrix is less than 0.1, which satisfies the consistency detection.

Table 3 Judgment matrix -

—					
1.0000	1.0355	1.1351	1.1656	1.0000	0.2235
0.3651	1.2236	1.0000	1.0000	1.0356	0.3261
0.6666	1.0000	1.2635	1.3546	1.0000	1.0000
1.23565	0.4657	0.4566	0.6526	1.1386	0.1352
1.0103	0.3246	0.1324	0.3103	1.1356	1.5686

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Table 4 Basic information of government administrators

Statistical characteristics		Quantity	Effective percentage	Cumulative percentage
Career	Administration	123	42.76	48.45
	Technology	43	14.87	61.56
	Rear services	57	38.75	53.23
Working time	Less 1 year	86	29.44	26.22
	1-3 years	83	41.53	65.34
	More than 3 years	55	30.54	42.21
Sex	Male	123	71.31	71.21
	Female	55	28.54	32.21
Educational background	College and below	32	19.65	19.23
	Undergraduate course	82	70.92	70.43
	Master's degree or above	43	18.21	43.33
Age	Under 30	54	72.24	72.45
	30-40	43	23.35	92.45
	Over 40 years of age	58	4.65	54.33

Table 5. Regression model coefficient table for performance evaluation

Factors	Standardization coefficient		Collinear statistics	
	Coefficient	Standard error	Tolerance	Variance inflation factor
Constant	3.432	0.054	-	-
F3($x1$)	0.354	0.043	0.545	1.543
F4($x2$)	0.532	0.021	0.656	1.212
F6(x 3)	0.345	0.023	0.653	1.554
F7(x 4)	0.233	0.045	0.932	1.432

Figures

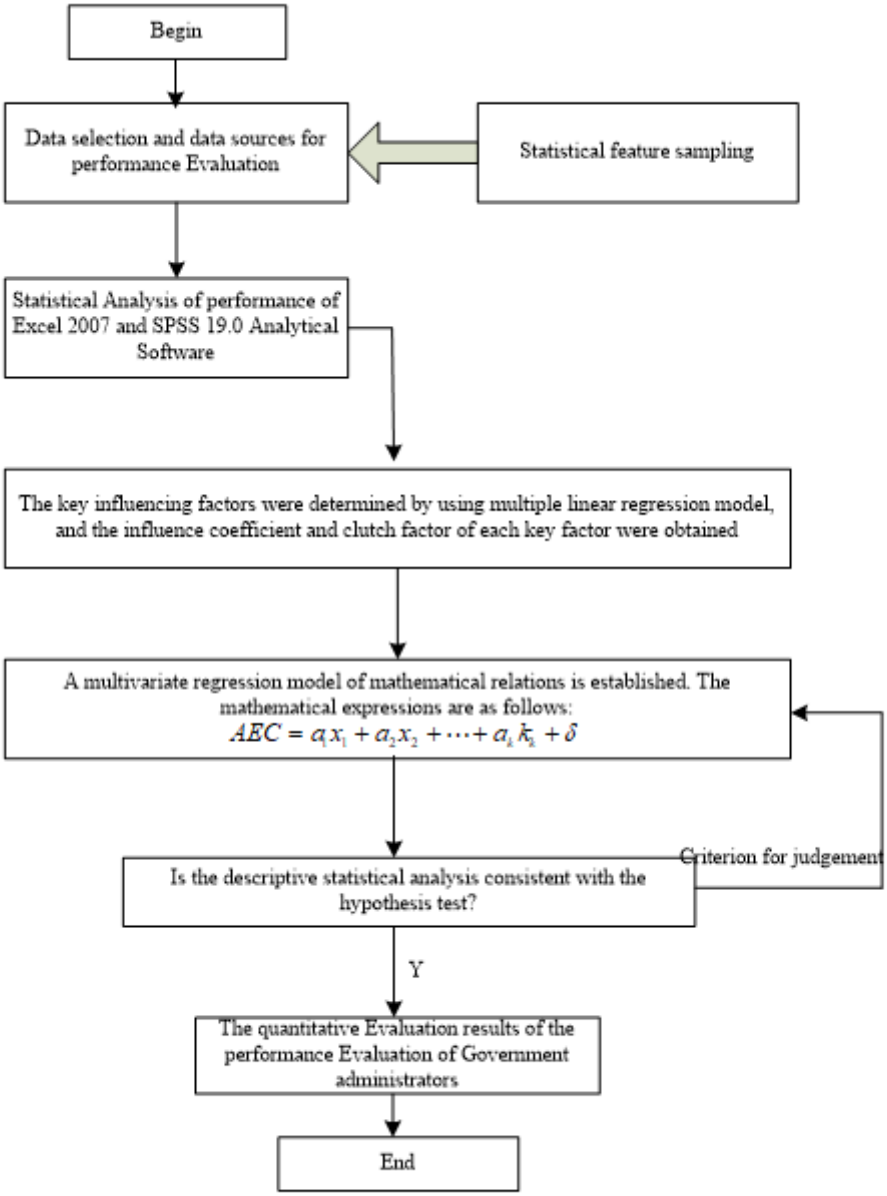

Figure 1

Overall implementation process of performance evaluation modeling for government administrators based on AHP

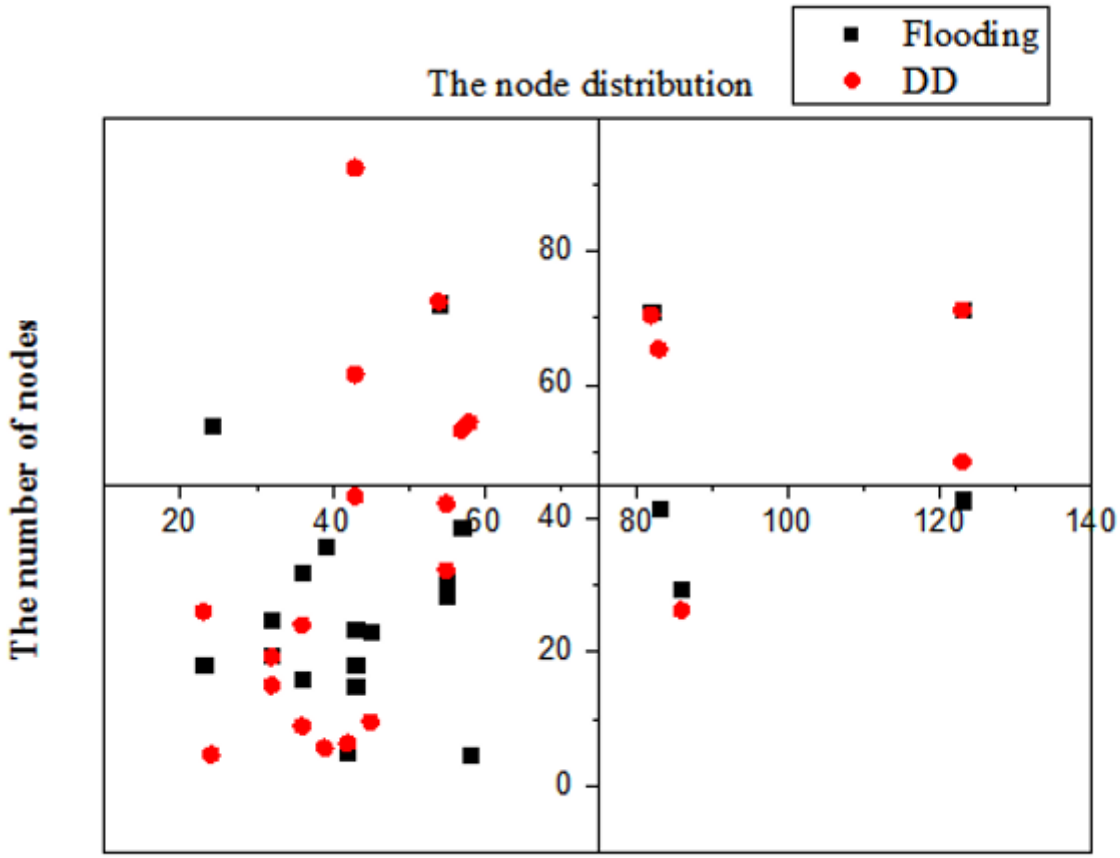

Figure 2

Network node distribution diagram

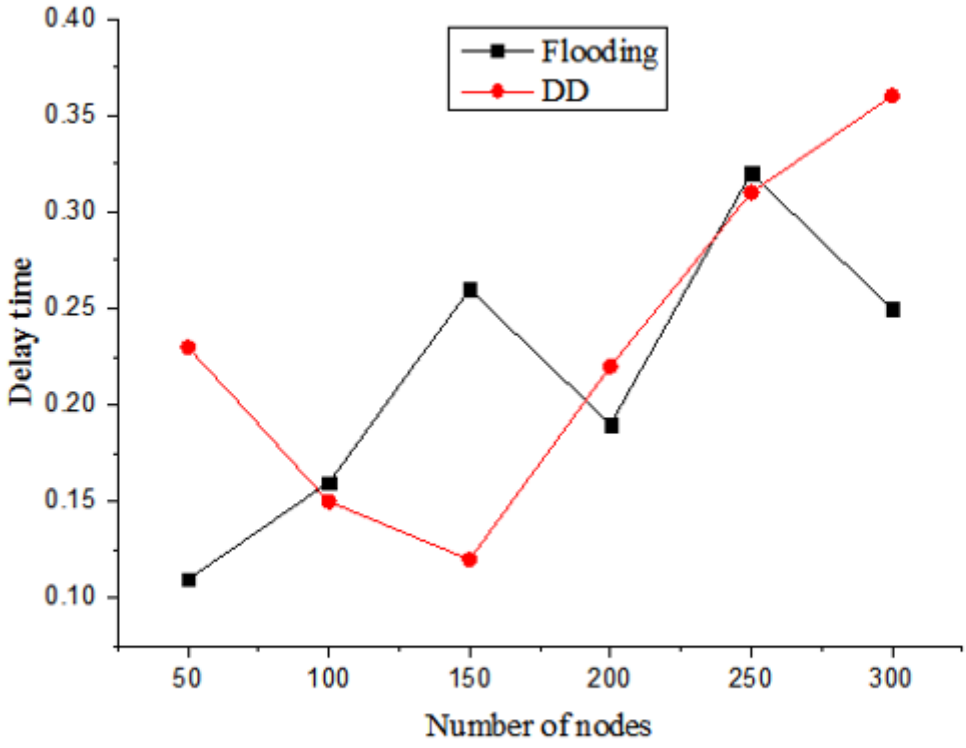

Figure 3

Time-varying graph of network size

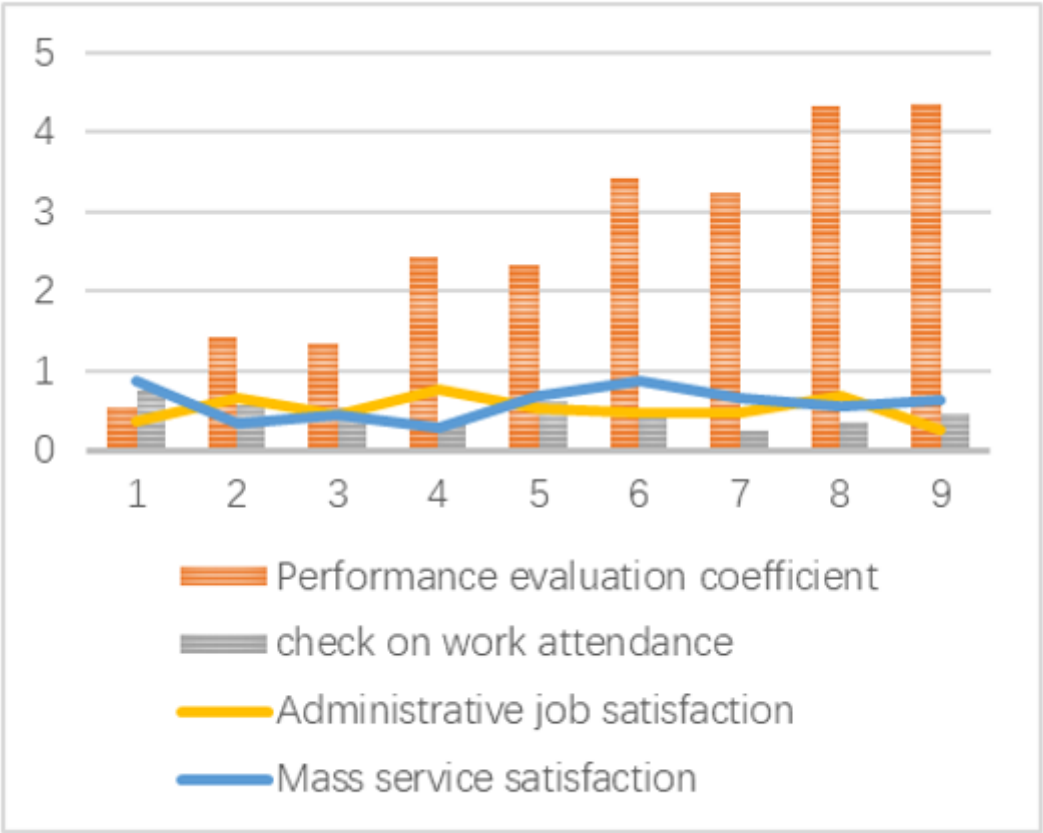

Figure 4

Results of statistical analysis of performance evaluation of government administrators

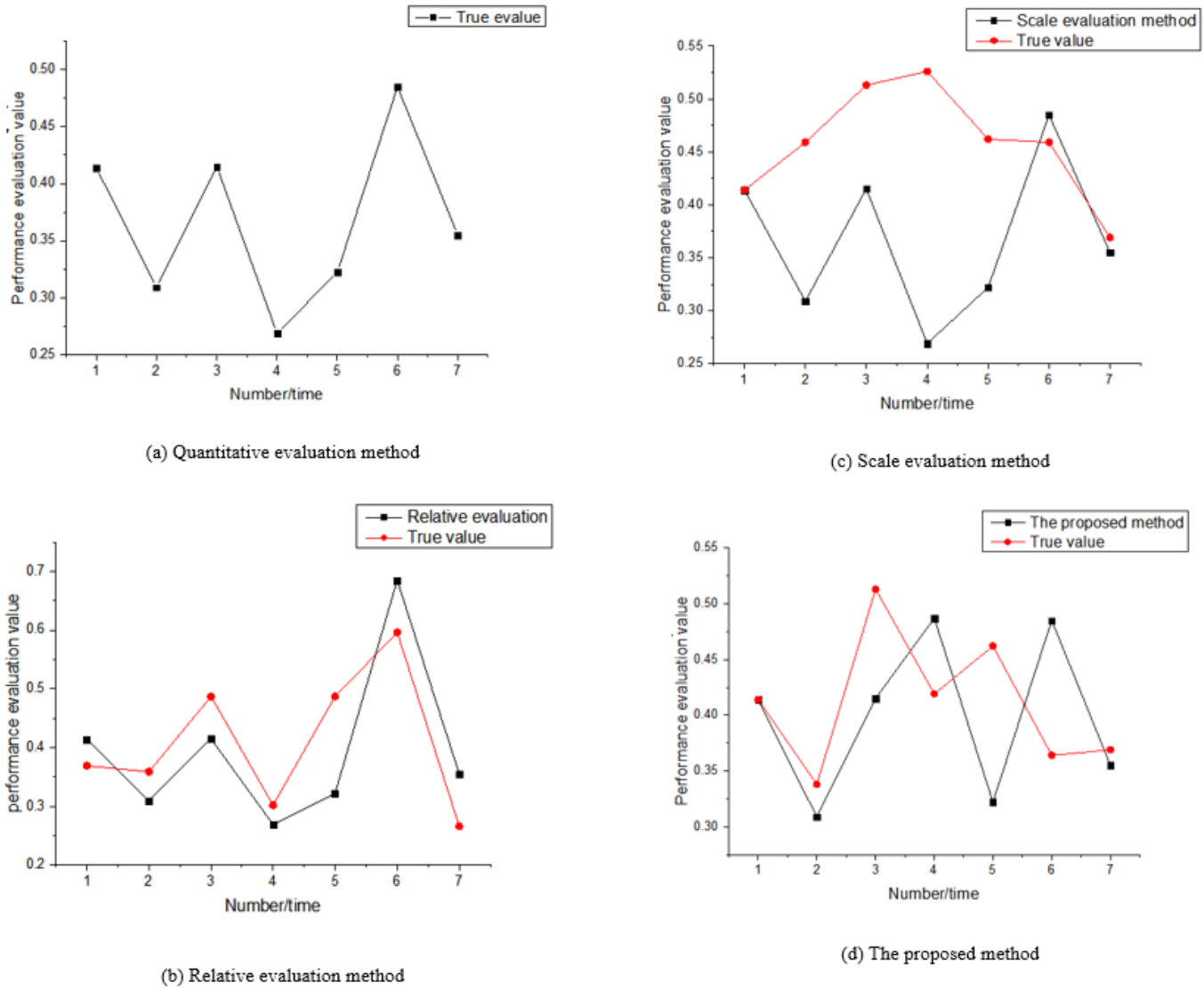

Figure 5

Performance measurement comparison of different methods

Supplementary Files

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- Methods.docx
- statisticalanalysis.docx