

Retraction

Retracted: Realization Path of the Social Development of Meteorological Services Based on Intelligent Data Analysis

Wireless Communications and Mobile Computing

Received 25 July 2023; Accepted 25 July 2023; Published 26 July 2023

Copyright © 2023 Wireless Communications and Mobile Computing. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

- [1] F. Guo, Y. Feng, and H. Xiao, "Realization Path of the Social Development of Meteorological Services Based on Intelligent Data Analysis," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 8904136, 8 pages, 2022.

Research Article

Realization Path of the Social Development of Meteorological Services Based on Intelligent Data Analysis

Fang Guo ¹, Yufang Feng,² and Han Xiao³

¹Meteorological Bureau of Liaocheng, Shandong University, Liaocheng, 252000 Shandong, China

²Computer Science and Technology, Suzhou University, 215006 Shandong, China

³Computer Graphics, Shandong University of Technology, 255049 Shandong, China

Correspondence should be addressed to Fang Guo; 1417421428@st.usst.edu.cn

Received 19 January 2022; Revised 19 April 2022; Accepted 22 April 2022; Published 10 May 2022

Academic Editor: Shalli Rani

Copyright © 2022 Fang Guo et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

In recent years, with the development of social economy, the working efficiency of meteorological system has been gradually improved. The socialization of meteorological service refers to the use of intelligent data analysis technology to achieve accurate forecast and real-time monitoring of weather forecast and provide personalized services for users based on this information. This paper studies the realization path of meteorological service socialization in order to bring convenience to people's life. This paper mainly uses a simulation experiment method, investigation method, and statistical method to conduct in-depth research on the social development of meteorological services. Experimental data show that more than 70 percent of people get weather information from their smartphones. The system designed in this paper can basically meet the requirements.

1. Introduction

In recent years, weather service has become a new hot topic. This paper will focus on data mining and social analysis and conduct intelligent integration and visual management of meteorological information resources based on intelligent multisource and social network platforms. The socialized development of weather service refers to the comprehensive management of weather forecast by using intelligent data analysis technology, including weather warning, automatic broadcast, information push, and other functions.

There are many theoretical achievements on the realization path of the socialized development of meteorological service based on intelligent data analysis. For example, in order to further improve the timeliness of weather warning, some scholars have made great efforts to improve the level of refined meteorological service [1, 2]. Some scholars use UNIT's speech recognition and natural interaction technologies to create intelligent interactive weather services [3, 4]. Some scholars believe that in the context of international service system reform, socialization of meteorological service is an important direction for future development and reform

[5, 6]. Therefore, this paper makes an in-depth study on the realization path of meteorological service socialization development by using an intelligent data analysis method.

This paper first studies the development of meteorological service and sharing and expounds the basic concepts and theories of meteorological service and sharing. Secondly, the intelligent forecasting method based on a neural network is analyzed, and the meteorological service system is designed by using this algorithm. Then, it expounds the selection of meteorological service socialization index. Then, the overall design of meteorological information service system is made. Finally, the feasibility of the system is verified by experiments.

2. The Realization Path of the Social Development of Meteorological Services Based on Intelligent Data Analysis

2.1. Meteorological Services and Shared Development. Meteorological service is a big concept. In the era of traditional planned economy, meteorological service is completely invested by the government and provided to users for free.

This unique investment model is obviously difficult to meet the needs of meteorological services in all aspects of society and economy. Our country's meteorological services (products) can be divided into three categories: one is nonprofit meteorological services (public products), including decision-making meteorological services and public meteorological services. The second is paid weather service. The third is commercial weather services [7, 8]. The status of various services is as follows:

Decision-making services refer to the meteorological services provided by major party and government departments at all levels to guide social development and national economic construction. It is a special weather service with Chinese characteristics, and the operating cost comes from national funds. From the perspective of service content, decision-making weather services are mainly for weather forecasting services for major disasters, transitional periods, and important social activities and provide accurate and timely meteorological scientific basis for decision-making [9, 10].

Although the weather telephone service started earlier, its progress has been slower. Based on the convenience of the masses, the promotion is rapid and social benefits are paramount. Many places popped up suddenly, and the general public responded well. They think this kind of service is practical, fast, and close to people's lives. The weather telephone service not only improves people's living standards but also serves as a good assistant and consultant for citizens. The service content has been continuously enriched and extended from a single air pollution weather forecast service, somatosensory, temperature, weekend commuting, etc. This largely meets the needs of society and the public [11, 12].

Newspaper weather service is also one of the most important forms of public weather service.

Since the founding of New China, the state has directly provided full funding to meteorological agencies, and meteorological stations at all levels have provided unique nonprofit meteorological services. After the Third Plenary Session of the Eleventh Central Committee of the Communist Party of China, with the change of the main direction of the party's work and the continuous deepening of reform and opening up, various economic fields and some users have many new special needs for meteorological services [13].

The concept of common development has four main connotations. The first is shared by all; that is to say, that common development is appreciated by everyone; everyone has something. The second is global sharing, that is, sharing development means sharing the achievements of the country's economic, political, cultural, social, and ecological civilization construction and fully guaranteeing the rights and legitimate interests of the people in all aspects. The third is to build and share together. Only by coconstruction can we share, and the process of coconstruction is also a process of sharing. The fourth is progressive division. Joint development must have a bottom-up, unbalanced to balanced process; even if it reaches a very high level, there will be differences. This definition emphasizes the universality and

content of joint development issues. The completeness of the development phase, the participation process, and the gradual advancement provide effective guidance for scientists and experts enable them to fully understand and understand the importance of joint development. However, if you want to implement coconstruction, you need to further deconstruct and refine the concept of coconstruction, so that every specific goal and goal can be achieved and enforced and promote the realization and evaluation of results [14].

The meaning of public service is often linked with the concept of public goods. Public goods are material goods, while public services emphasize an intangible service. To fully understand the concept of public services, we need to start with the analysis of the connotation of public products. From the introduction of public services to the present, public services have become an important issue affecting government functions, social development, and people's happiness. Equalization of public services means that the state can provide public products or services to different economic components, different social classes, or different interest groups without discrimination, including roughly similar financial investment, income and cost sharing. The balance of public utilities includes a large number of realizable, targeted, and planned value judgments. The pursuit of "balance" reflects the fair value orientation of public utilities [15].

2.2. Intelligent Prediction Method Based on Neural Network.

Artificial neural network is called neural network for short. This data model is extracted from a biological network containing many interconnected neurons to build a more complex network. One of the most important characteristics of neural networks is its topological structure, which is generally divided into direct neural networks and return neural networks. Feedforward neural network is the most common and simplest model in artificial neural network. According to different information processing methods, neurons can be divided into input layer neurons, hidden layer neurons, and output layer neurons. The signal from the input layer to the output layer flows in one direction.

Generally speaking, the learning methods of artificial neural networks (ANN) can be divided into two types: learning with tutors and learning without tutors. The artificial neural network model is a simplified mathematical model that simulates the function of the biological nervous system. Its properties are summarized as follows:

- (1) It has a very parallel structure and information processing capabilities
- (2) It has strong self-learning ability and information storage ability
- (3) It has strong fault tolerance
- (4) It has strong nonlinear approximation ability

In the BP neural network algorithm, if the actual output of the output layer matches the expected output, it becomes the actual output. That is, if the actual output of the output

layer does not match the expected output, you must enter another process of the algorithm.

Because BP neural network has self-organization, self-learning, and self-adaptive capabilities and better fault tolerance, it can be used for prediction, but BP neural network is easy to fall into its loopholes. The initial weights and thresholds are initialized randomly, so it is difficult to get the overall optimal initial value, which further reduces the accuracy of prediction. The PSO algorithm is used to optimize the weights and thresholds of the BP neural network, and an intelligent prediction model based on PSO-BPNN is established. The basic process is as follows:

- (1) Initialize the particle swarm randomly
- (2) Calculate the fitness value of each particle
- (3) Compare the fitness value of the current particle with the previous best fitness value, compare the two, and take the larger value as the best fitness value of the current particle
- (4) Choose the best of all particle fitness values as the overall optimal solution
- (5) Use formula (1) to calculate the forward speed of each particle, namely,

$$w_m(s+1) = \psi w_m(s) + d_1 q_1 (o_m - a_m(s)) + d_2 q_2 (o_h - a_m(s)) \quad (1)$$

- (6) Calculate the position of each particle after advancing, namely,

$$a_m(s+1) = a_m(s) + w_m(s+1) \quad (2)$$

- (7) Reduce the inertia weight W according to

$$W = W_{\max} - \frac{W_{\max} - W_{\min}}{m_{\text{termax}} m_{\text{ter}}} \quad (3)$$

- (8) Change the acceleration coefficient d_1 and d_2 according to

$$d_1 = d_{1 \max} \frac{W_{1 \max} - W_{1 \min}}{m_{\text{termax}} m_{\text{ter}}}, \quad (4)$$

TABLE 1: Proportion of channels through which the public obtains weather warning information.

	TV	Smart phone	Internet	Other
2016	21.1%	65%	9%	5.9%
2017	18.6%	67.9%	8.5%	5.1%
2018	17.5%	69%	9.5%	5%
2019	16.6%	72.4%	7.1%	3.9%
2020	15.3%	75.9%	6.4%	2.4%

$$d_2 = d_{2 \max} \frac{W_{2 \max} - W_{2 \min}}{m_{\text{termax}} m_{\text{ter}}} \quad (5)$$

- (9) Until the algorithm reaches the maximum number of iterations or until the convergence criterion is met, do not leave the PSO algorithm
- (10) Continue to train the neural network, compare the results of the two, if it is better than the training result of the PSO algorithm, generate a BP neural network; otherwise, generate a neural network for PSO training

2.3. Selection of Socialization Indicators for Meteorological Services

2.3.1. Weather Warning Coverage. The scope of meteorological warning information is mainly the range of meteorological warning information transmitted to the public and users through secondary warning communication means such as mobile phones, television, radio, and the Internet. The assessment of the coverage area of meteorological disaster warning information is a scientific benchmark for the development of effective tools, high-quality, and equal meteorological disaster prevention and control. Our country's meteorological disaster warning coverage rate should reach more than 90%, and the goal is to achieve full coverage and meet the different needs of the national public for meteorological information services, so as to achieve meteorological science and technology achievements, the people, and disaster reduction services for economic and social development. This indicator is measured by the percentage of the population covered by weather warning information, also known as the coverage rate of weather warning information per capita.

Table 1 shows the results of the national public weather service survey from 2016 to 2020 show that the three main methods for obtaining weather warning information from the public, television, telephone, laptop computer, and the Internet are still relatively weak.

As shown in Figure 1, we can see that smartphones are the most reliable channel for obtaining weather information. Therefore, this article divides the broadcast methods of weather warning information into four categories: TV, mobile phone, and Internet. The coverage of weather warning information includes four coverage factors: TV broadcast weather warning information coverage, mobile phone

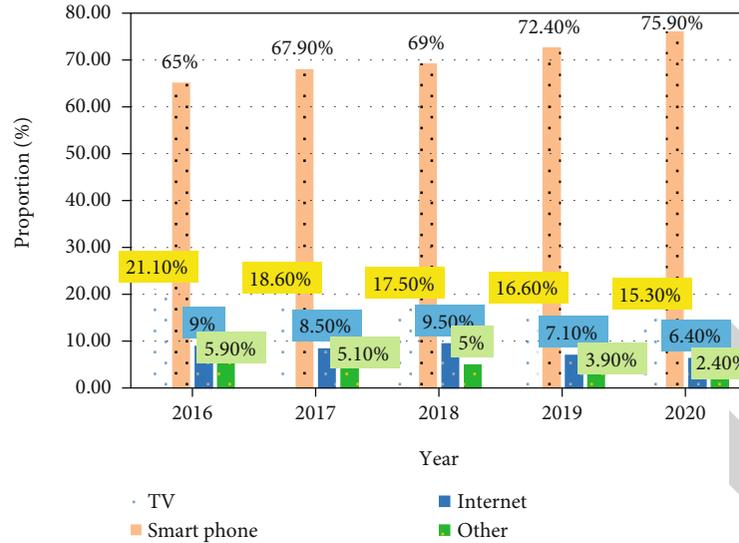


FIGURE 1: Proportion of channels through which the public obtains weather warning information.

coverage, network warning information coverage, and weather information coverage. Form other means.

2.3.2. Benefits of Weather Disaster Risk Management and Mitigation. The direct role of weather services is to seek strengths and avoid weaknesses. The benefits of meteorological disaster prevention and reduction are mainly reflected in two aspects. The first is to reduce the impact of meteorological disasters on GDP, and the second is to improve economic and social benefits. Since the benefits of weather disaster prevention and mitigation are different from the economic and social benefits of weather services, they are essentially the same. Therefore, this article uses the benefits of weather services to express the benefits of weather disaster prevention and mitigation. Meteorological service profit refers to the comparison between labor costs and the profit generated by meteorological services. The meteorological service income of branches is the sum of the income obtained by all commercial organizations of various departments of the economy from the application of meteorological service products or services. The cost of meteorological service is the sum of the financial investment of various levels of government to the meteorological department and the income-generating resources of departmental science and technology services.

2.3.3. Public Satisfaction. The highest measure of weather service is whether the public is satisfied or dissatisfied. Meteorological services must always follow the development direction, adhere to the people-oriented approach, serve life, and fully meet the growing service needs of the people. Satisfaction is a measure of satisfaction. In order to provide the public with a comprehensive and in-depth understanding of the objectives and overall evaluation of our country's meteorological services, overall satisfaction with public weather services also examined the four most important rating indicators considered by the public, without the global service

TABLE 2: Hardware environment configuration parameter information.

Name	Set
Internal storage	2G DDR
CPU	Pentium IV
Video card	GeForceMx 440
Indicator	19-inch pure screen
Hard drive	320G

impact assessment index survey. It includes timely availability, convenience, accuracy, and functionality.

2.3.4. Meteorological Equipment. Weather forecast and early warning services are based on meteorological observation, while meteorological observation services depend on the development of meteorological equipment. This shows that the development and progress of meteorological services cannot be separated from the support of advanced technical equipment. The level of meteorological equipment not only is a direct manifestation of the basic level of meteorological modernization but also affects the overall level of meteorological modernization. The evaluation indicators for the further development of meteorological equipment can be divided into two levels. The first layer is the complete index, including the device configuration layer and the device management and application layer.

2.4. Overall Design of Meteorological Information Service System. With the advent of Java technology, component technology quickly became popular. These components are transactional, extensible, and portable. The use of Java technology infrastructure allows repeated calls to business components. From the perspective of business function design and implementation, the framework can be used as a benchmark. It is perfectly able to abstract and analyze the context

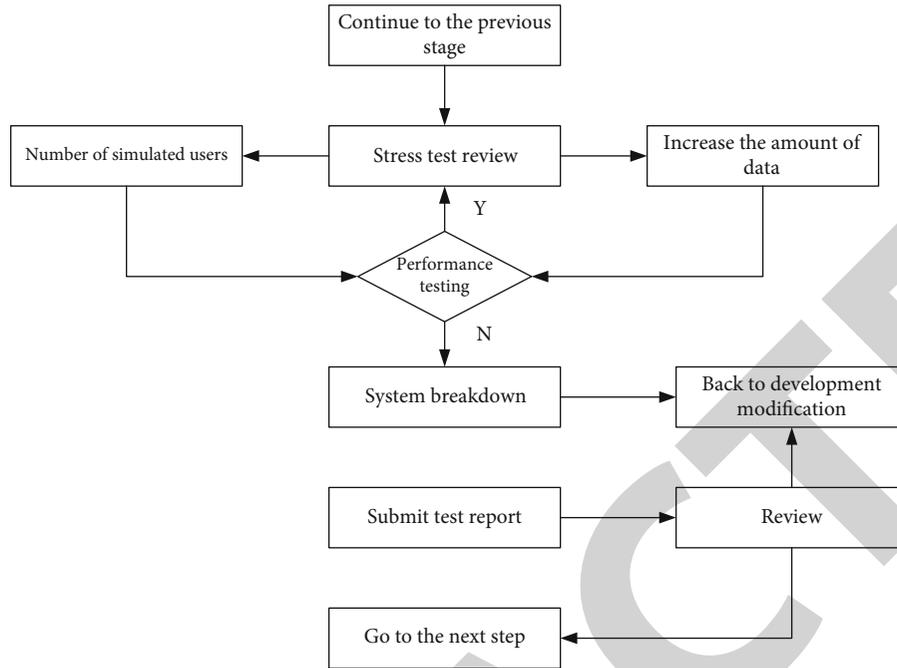


FIGURE 2: System performance test process.

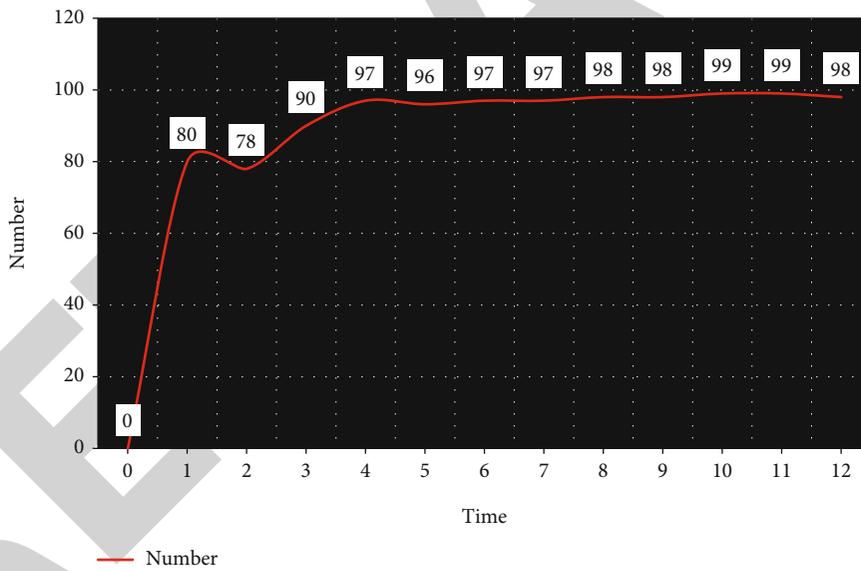


FIGURE 3: Changes in system throughput as load increases.

of industrial applications and industry requirements, so that the available components not only have the technical characteristics of transactional, scalability, and portability but also are closer to the real world, system-specific application industries, and meteorological service company specialty. Once such a business framework is in place, building top-level services will be faster, easier to manage and maintain.

The weather information service system weather website structure is as follows: application layer, middle layer, and data layer. And it is divided into several modules such as sys-

tem login interface, system homepage, platform data maintenance, information statistics, user operation authority, keyword management, platform, weather service information, and sending SMS. Based on the B/S model, design the functional structure of the weather information service system and construct the weather information service system. The functions of the basic structure of the meteorological information service system are as follows:

- (1) The database is used to store the data structure of weather service processing information

- (2) The data access layer provides interfaces or functions for efficient data access. When entering the database through this layer, other operations such as adding, selecting, deleting, and updating other databases are designed
- (3) System access layer, system login interface, system homepage, platform data maintenance, information statistics, user operation authority, platform keyword management, weather service information, and short message transmission module realize this design model based on B/S

System security design mainly includes three aspects: equipment and physical security, network and data security, and server security. Due to the phenomena of memory card damage, falling, power failure, and touch failure in the terminal, all devices are interchangeable, the power-on state is the same, and the operation is consistent. According to the security strategy of hierarchical protection, combined with the characteristics of management services, the security of information exchange between security domains, boundary protection, and the security of the local IT environment of the security domain should take into account each security domain and external networks. The platform domain and the intranet platform domain share the weather management system.

3. Meteorological Information Service System Test

3.1. Test Environment. In order to ensure the quality of the software development of the weather information service system, specific and standardized testing and analysis of the weather information service system designed and implemented by the weather service organization should be carried out. Software testing is aimed at reflecting the stable operation of the system and complete functions. The weather service system tests the use cases of the system weather service functions and summarizes and analyzes whether the system meets the system design requirements. In addition, in order to reflect the results of the system design, test and analyze the functional operating status of the meteorological information service, as well as the response and access parameters of the software.

3.2. Test Objectives. If the test object is considered to be an open box, it represents a white box test, and the weather information service system test uses the white box test procedure.

- (1) According to the use case test of the weather information service system software system, conduct the main function use case test, analyze the weather data query, add functions, and test the user verification module
- (2) As part of the designed network architecture, run software modules in various scenarios and examine the impact on them

TABLE 3: The CPU usage of the system obtained in the flat test changes over time.

Time	CPU
0	31
1	32
2	23
3	24
4	26
5	24
6	42
7	40
8	22
9	26
10	36
11	43
12	25
13	29
14	24
15	27
16	45
17	32
18	28
19	22
20	23
21	25
22	28
23	26
24	22

- (3) Interface testing is a relatively simple and intuitive testing method in the testing process, provided that the testing process is carefully checked according to the requirements of the interface. In the process of interface testing, we need to focus on testing interface typos, vague content, content titles, and other issues that do not conform to the harmony of the overall system

3.3. Environment Configuration. The required software environment and hardware environment generally include the system test. The weather information service system test environment refers to the server environment. The details are shown in Table 2.

3.4. System Performance Test. Through capacity test, strength test, and load test, the performance of meteorological information service system is reflected. The system performance test process is shown in Figure 2.

- (i) Capacity test: verify the maximum number of users of the system online at the same time to ensure the stability of the system.

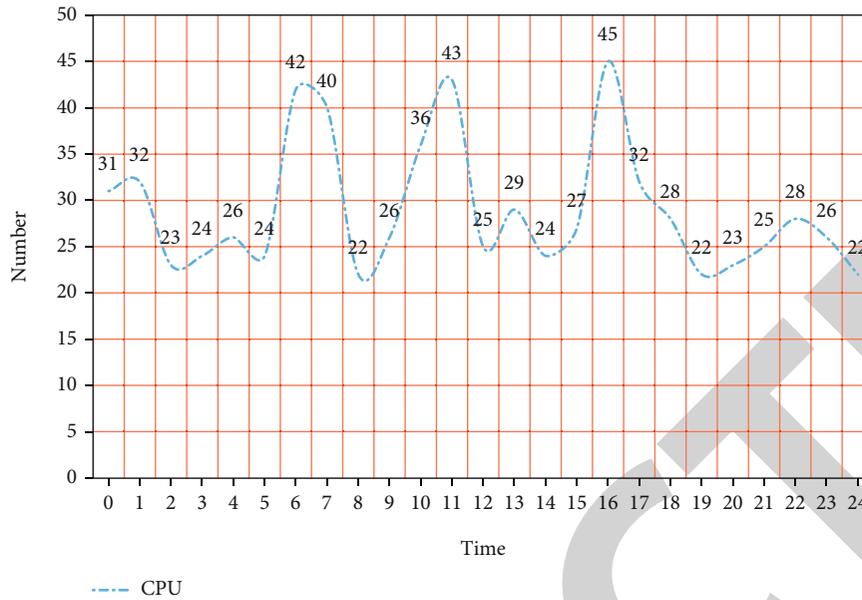


FIGURE 4: The CPU usage of the system obtained in the flat test changes over time.

- (ii) Strength test: strength test is a performance test. The specific situation of the test system occupying computer resources.
- (iii) Stress test: Since the program can be run and executed in a crowded environment, stress test is an analysis of performance test parameters. In observational indicators, test various system performance indicators, simulate various normal, peak and abnormal load conditions, and use automated testing tools for observational testing.

4. Analysis of Test Results

4.1. Changes in System Throughput as Load Increases. The flow rate increases steadily and stabilizes at a certain point. Since all threads on the server are already occupied, they will be processed when they are idle.

As shown in Figure 3, we can see that although the throughput remains stable, the response time of the weather information service system has also increased. Thereafter, when the weather information service system reaches a saturation point, the throughput of the server remains stable. This is because the request cannot be processed in time and the response time increases.

4.2. The CPU Usage of the System Obtained in the Flat Test Changes over Time. As the load of the system increases or decreases, the execution queue also grows or shrinks. The execution queue also suffers from unstable load, peak waveforms appear from time to time, and the CPU usage rate is not smooth. The details are shown in Table 3:

As shown in Figure 4, we can see that the transaction response time in the system is similar to this fluctuating pattern. The execution queue curve is very similar to the graph of CPU usage, and a waveform appears every once in a while. Through the process of these performance tests, the

performance parameters obtained show that the meteorological information service system meets actual needs.

5. Conclusion

The socialized demand of meteorological service can be obtained from data analysis. The goal of the socialized meteorological service system designed in this paper is to realize the real-time dynamic collection of weather information, temperature, and other parameters through the analysis of meteorological data and to make decisions and judgments and manage according to the obtained information. Users can collect, sort out and analyze the data of meteorological information on the platform. Data collation and analysis of collected meteorological information. Simulation experiments show that the system designed in this paper can meet the requirements of most people.

Data Availability

The data underlying the results presented in the study are available within the manuscript.

Conflicts of Interest

There is no potential conflict of interest in our paper, and all authors have seen the manuscript and approved to submit to your journal. We confirm that the content of the manuscript has not been published or submitted for publication elsewhere.

References

- [1] L. Ming, X. Yafen, and L. Jun, "Research on the socialization of grassroots meteorological services in agricultural supply-side structural reform," *Meteorological and Environmental Research*, vol. 10, no. 4, pp. 35–40, 2019.

- [2] L. Jialin and W. Xiaojun, "Analysis on the relationship between ecological protection red line and red lines of other elements," *Meteorological and Environmental Research*, vol. 10, no. 5, pp. 70–77, 2019.
- [3] J. Zhao, J. Xu, L. Cheng et al., "The evolvement mechanism of hydro-meteorological elements under climate change and the interaction impacts in Xin'anjiang basin, China," *Stochastic Environmental Research and Risk Assessment*, vol. 33, no. 4–6, pp. 1159–1173, 2019.
- [4] R. Ma, "Research on the cultivation of college students' ideology based on the practice of education," *International Journal of Social Science and Education Research*, vol. 3, no. 2, pp. 186–191, 2020.
- [5] C. Zheng, "Research on the development strategy of Camellia Oleifera Industry in Hengyang based on SWOT analysis," *Journal of Hunan Industry Vocational and Technical College*, vol. 19, no. 3, pp. 44–61, 2019.
- [6] K. Karimlou, N. Hassani, A. Rashidi Mehrabadi, and M. R. Nazari, "Calculating price elasticity of water demand using gene expression programming based on economic, social and meteorological variables," *Water Resources Management*, vol. 33, no. 12, pp. 4171–4188, 2019.
- [7] L. Tan, "Study on effectiveness of government governance in the cities with serious air pollution: a case study of Zhengzhou City," *Meteorological and Environmental Research*, vol. 10, no. 6, pp. 20–30, 2019.
- [8] F. Kong, "Spatial pattern difference of contribution between short and long-duration heavy rainfall to Total heavy rainfall in China from 1961 to 2015," *Meteorological and Environmental Research*, vol. 10, no. 4, pp. 55–64, 2019.
- [9] G. Fragkiadaki, M. Fleer, and K. Ravanis, "A cultural-historical study of the development of children's scientific thinking about clouds in everyday life," *Research in Science Education*, vol. 49, no. 6, pp. 1523–1545, 2019.
- [10] W. Liu, G. Guo, F. Chen, and Y. Chen, "Meteorological pattern analysis assisted daily PM_{2.5} grades prediction using SVM optimized by PSO algorithm," *Pollution Research*, vol. 10, no. 5, pp. 1482–1491, 2019.
- [11] Q. Zeng and W. Zhang, "Research on the development of "Ghost City" based on night light data: taking Sichuan Province as an example," *Open Journal of Social Sciences*, vol. 7, no. 12, pp. 176–188, 2019.
- [12] Y. Y. Jin, "Research on the influence of defensive impression management on employee innovation behavior—based on the perspective of compulsory citizenship behavior," *Advances in Psychology*, vol. 11, no. 6, pp. 1513–1522, 2021.
- [13] A. G. Pañeda, S. Garcia, A. Casanova et al., "System for the realization of advanced mobility studies based on driver, cabin and vehicle monitoring," *IEEE Latin America Transactions*, vol. 18, no. 11, pp. 1853–1861, 2020.
- [14] J. Dey, A. Bhowmik, A. Sarkar, S. Karforma, and B. Chowdhury, "Cryptographic engineering on COVID-19 telemedicine: an intelligent transmission through recurrent relation based session key," *Wireless Personal Communications*, vol. 122, no. 4, pp. 3167–3204, 2022.
- [15] H. K. Hoai, S. C. Chen, and H. Than, "Realization of the sensorless permanent magnet synchronous motor drive control system with an intelligent controller," *Electronics*, vol. 9, no. 2, p. 365, 2020.