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Retraction

Retracted: Power Metering Automation System Based on Internet of Things

Wireless Communications and Mobile Computing

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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] X. Dai, "Power Metering Automation System Based on Internet of Things," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 6380079, 6 pages, 2022.

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Research Article

Power Metering Automation System Based on Internet of Things

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In order to solve the problems of poor stability and low operation efficiency of the traditional power marketing metering production automatic scheduling system, this paper proposes a power metering automation system based on the Internet of Things. In this paper, the hardware and software of the system are designed under the environment of the Internet of Things. The hardware part is mainly divided into three platforms: basic resource layer, platform business layer, and interface presentation layer. The normal operation is realized through the network topology, and the load balancing server and business subsystem are emphatically designed. The software is completed in four steps: coding, scheduling, backup, and display. The experimental results show that the integrity rate of the electric quantity data collected by this system in the experiment with the traditional system is as high as 99%. Compared with the traditional dispatching system, the power information dispatching system designed under the Internet of Things has better stability and higher operation efficiency.

1. Introduction

The Internet of Things integrates sensing, network communication, cloud computing, and other technologies to realize terminal information collection, network transmission, automatic data processing, intelligent decision-making, and other functions [1]. As an upgrade and leap from traditional power grid to efficient, economic, clean, and interactive modern power grid, smart grid has become a key technology for development [2]. There are many common technologies between the Internet of Things and smart grid, both of which need to collect, transmit, and process information from large-scale and highly decentralized equipment. Therefore, the integration of the two in the development process has produced the power Internet of Things [3].

As an important part of smart grid, metering system is also changing and developing with the advancement of power Internet of Things. The measurement system based on the power Internet of Things has the characteristics of distribution, networking, and digitalization. The degree of automation and networking of the system has been greatly improved, which greatly improves the performance of the measurement system and the efficiency of measurement work. In power enterprises, the marketing metering and dispatching system plays an important role. The power marketing metering and production automatic dispatching system is mainly divided into three parts: automatic master station control system, channel system, and metering terminal. A good automatic dispatching system can make power products more simple, lean, and efficient. At present, the society emphasizes resource friendliness and encourages resource conservation. The automatic metering system plays a key role in the power marketing industry. The traditional power metering and marketing production scheduling system needs manual operation. The scheduling efficiency is very low, and the stability is poor, which is difficult to meet the energy-saving requirements put forward by the state. In recent years, the explosive growth of power information has brought great challenges to the stable operation of dispatching system.

2. Literature Review

At present, the application of Internet of Things technology in smart grid has become a hot topic of scholars' research, but the research on Internet of Things technology and smart power metering in HowNet is very few. Liu et al. designed and implemented a remote electric energy meter reading

system based on wireless sensor network and GPRS on the basis of in-depth understanding of remote meter reading technology, GPRS technology, WIA-PA wireless sensor network technology, and other related Internet of Things technologies, realizing real-time electric energy measurement and display and network management [4]. In the research published by Hidayah and Kusama, electrotechnics focuses on the scheme of using the emerging LP-WAN technology to help build the wireless access of smart meters and shows the system implementation for the end-to-end Lora connection of smart meters [5]. Xi et al. proposed a platform design scheme to realize intelligent power metering based on Wireless Embedded Internet of Things technology and proved the feasibility of the scheme through practical experiments. In foreign countries, we mainly use various technologies to build a high-level measurement system as the starting point for research. The advanced metering system consists of smart meters installed at the user end, metering data management system located in the power company and their communication systems [6]. Therefore, there is still a large research space at home and abroad on the application of Internet of Things technology in intelligent power metering, which has a certain research value.

Kabir et al. proposed and designed the electric energy automatic meter reading system in power marketing measurement. In power marketing measurement, the application of this system plays a role in data analysis, helping marketing management, remote control of users' electricity consumption, etc.; from the perspective of practical application, the electric energy automatic meter reading system realizes the functions of authority management and bypass information reception, providing support for its role [7]. However, the stability of the dispatching process is poor when the system schedules the power data; Job and Mustafa proposed and designed a web-based power marketing system. Through mobile application software development technology and ZigBee communication network, they discussed the design of using an efficient power marketing system. In order to achieve a compact and flexible IOS mobile client, they used Model-View-Viewmodel mode, Client/Server style, integrated message digest algorithm, and other encryption technologies to ensure the information security of system data [8]. However, the integrity rate of the collected data is low, which leads to the poor operation efficiency of the system. To solve the above problems, this paper designs a new power marketing metering automatic dispatching system in the environment of Internet of Things. According to the design requirements, the system designs the hardware and software of the automatic scheduling system for power marketing measurement and production. The system hardware is mainly composed of three layers: basic resource layer, platform business layer, and interface presentation layer. On this basis, the software design is completed in four steps: coding, scheduling, backup, and display. The system can effectively coordinate the warehouse scheduling, ensure the automation of transmission, and make the management production line run orderly, and the industrial management can be better regulated. At present, China's power operation measurement system is in the construction stage. Experts in this field have invested a lot of energy in order to realize the real advanced measurement system. This research has certain significance for the development of power enterprises.

3. Method

3.1. Hardware Design of Power Marketing Metering Production Automatic Dispatching System. The Internet of Things can make use of most of the network resources and also have the functions of computing, storage, programming, and application. The Internet of Things transmits the virtualization resources to users in the form of services, so that the power resources can be dispatched to the user terminal through the IP address. The dispatching system designed in this paper controls the separation of services through NGN to complete the bearing and access of each system. The hardware structure of the dispatching system is shown in Figure 1.

It can be seen from Figure 1 that the business application layer of the dispatching system has a variety of expanded businesses and automatically schedules the power marketing and measurement production results through video, monitoring, meetings, and other means. The mobilization platform established by the Internet of Things applies the most advanced intelligent technology, which can centrally complete the unified dispatching and management of information and realize the sharing and dispatching of power system data. The client is used as the presentation interface of the scheduling platform, so that users can understand the scheduling results and operate more conveniently. The cloud scheduling platform used in this paper supports not only c/s networking structure, but also b/s networking structure. There are multiple dispatching terminals in the display platform of the dispatching system to realize large-scale dispatching by hierarchical operation. Each dispatching platform server will correspond to multiple dispatching terminals to ensure that users in the dispatching process can connect each terminal with the service bus. The Internet of Things environment is dynamic, and many resources can be allocated uniformly. The power marketing metering production automatic dispatching system designed under this environment needs to combine the dispatching software of each location to ensure the reliability and overall performance of the system.

The power marketing measurement and production automatic dispatching system designed in this paper adopts topology structure control, and the composition level includes three levels: basic resource level, platform business level, and interface presentation level [9].

In the automatic production dispatching system, the basic resource layer is at the bottom, which lays the foundation for the dispatching work of the whole system. The recorded power resources include physical resources and virtual resources. The working process of the dispatching system is monitored through the positioning of monitoring equipment. With the help of ISSA services, the rapid access and management of hardware to the business subsystem are improved [10]. Due to the rapid development of the Internet, the data resources of the basic resource layer need

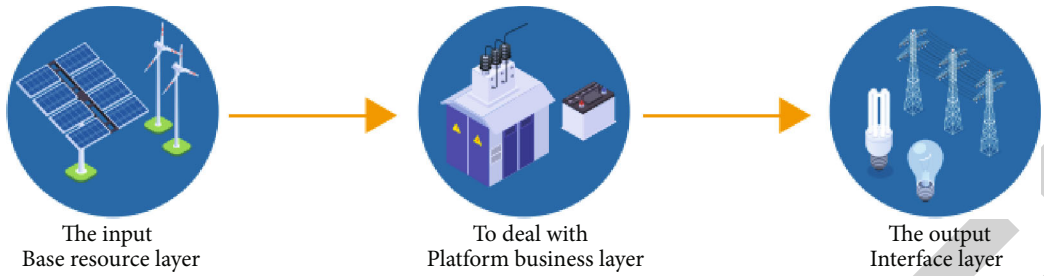

Figure 1: Hardware structure of dispatching system.

to be updated regularly, and the latest external data resources should be introduced to ensure sufficient information in the database.

After designing the basic resource layer, this paper designs the platform service layer [11]. The basic resource layer is mainly responsible for theoretical research. The platform resource layer is implemented on the theoretical basis. The platform service layer has strong practicability and scalability and is very convenient for management. It is the core part of the hardware of the entire automatic production scheduling system. A large number of system service buses are designed in the platform service layer to build a large-scale network, which makes cross regional scheduling possible.

The production scheduling system is a large-scale network structure, which must be added to the network topology to ensure the stable and effective operation of the system. The types of network topology are diverse, and it needs to be set according to the needs of the system. Some scheduling systems support tree network topology, and some scheduling systems support mesh network topology. Dynamic adjustment should be made during use to make the scheduling application multipolarized [12].

The system service bus design is shown in Figure 2.

It can be seen from Figure 2 that the system service bus is responsible for controlling the power information and data of the system. During the control process, it encodes and processes the power data to realize the reordering of resources and can synchronously migrate to the fault-tolerant mechanism to organically integrate all kinds of power system data. The system service bus has multiple nodes. When integrating each node, resources and businesses are continuously shared, making the cloud scheduling system more unified [13].

The hardware system is automatically equipped with a load balancing server, and the Internet of Things contains a large number of data, so it plays different roles in scheduling network resources, and its stability is difficult to guarantee [14]. Adding a load balancing server can effectively balance the resource scheduling and make the system stable and orderly in large-scale scheduling. When deploying the load balancing server, it is necessary to conduct a comprehensive investigation on the operation status of the system and analyze the collected information and the operation status of power resources. Due to the huge information contained in the power marketing automatic dispatching system, each node and the regional network are also under great pressure. If some nodes have problems, it is difficult to place the load balancing server to achieve the desired effect. The load balancing server can separate each network area to prevent the fault problem from expanding, and the failure of some nodes will not affect the operation of the whole system.

The communication layer and interface module of the automatic dispatching system are equipped with servers, so that the third party and the platform have a better information interaction environment [15]. All the data of the automatic production scheduling system are extracted from the database. The data scheduled by users and equipment during associated storage are extracted from the database. The rich data information makes the data management easier. In order to improve the operation quality of the system, the dispatching system is also equipped with a service module, which can complete the maintenance management, data configuration, work records, strategy analysis, and other work of the system at any time.

The interface presentation layer is responsible for presenting the scheduling results to the network platform. In order to make the display effect look better, the interface presentation layer service interface of the automatic scheduling system should be completely unified and the service standards used should be consistent. In the interface presentation layer, the staff schedules uniformly so that the displayed results are transmitted to the user through the midintelligent mobile terminal. Each user has different permissions, so the permission allocation resources are also different. Each terminal corresponds to its own interface, and multichannel transmission data is placed at the same time to avoid too much data affecting each other. When the signal is transmitted, the external magnetic field signal will also cause interference to the channel, so the antimagnetic device shall be set inside the channel. The interface presentation layer is shown in Figure 3.

The power dispatching system has a large workload, and a problem in a small link may affect the normal operation of the whole system. The monitoring system is added to analyze the operation of the system in real time and make records to find out the important links and key records of the dispatching system. The Internet of Things has an independent cloud scheduling platform and storage nodes. Even if no new equipment is introduced, the system can operate stably to avoid the occurrence of redundant data.

The search engine for dispatching is a parallel search engine. Parallel computing and integrated computing greatly

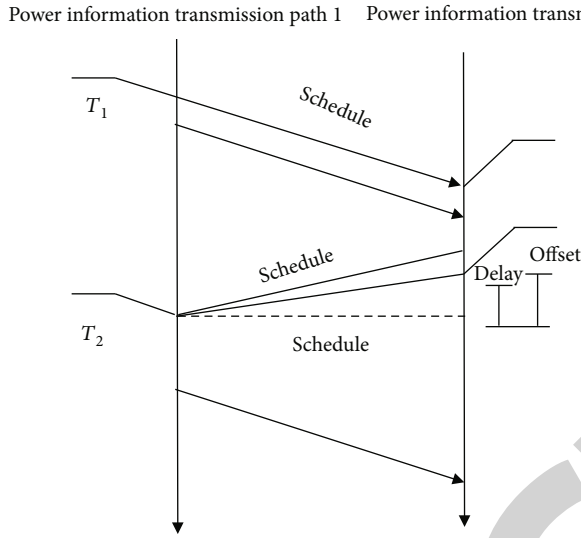

Figure 2: System service bus.

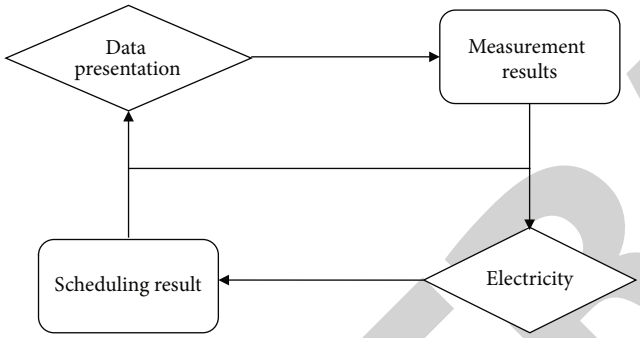

Figure 3: Interface presentation layer.

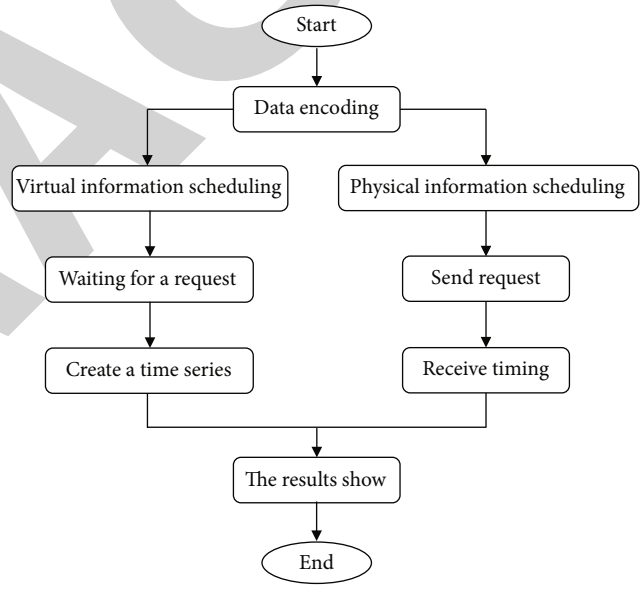

Figure 4: Software flow of power marketing metering production automatic dispatching system.

accelerate the dispatching speed and can jointly process large-scale power data [16]. In case of an emergency, the parallel search engine will automatically start permission authentication to prevent external signals from entering the system and reserve sufficient time and space for staff to deal with the problems. The parallel search engine processes power data in a distributed way, reduces the broadband pressure during network operation, and makes every scheduling work more convenient and effective. The system will automatically back up the collected data to prevent the loss of important contents in case of an emergency.

3.2. Software Design of Power Marketing Metering Production Automatic Dispatching System. According to the hardware structure of the designed automatic dispatching system for power marketing measurement and production in the Internet of Things environment, the system software is designed, and the workflow is shown in Figure 4.

It can be seen from Figure 4 that before dispatching the power marketing metering production system, first use the DTMF module to encode the power signal, convert the network signal information into digital signal information, and then convert the digital signal information into analog signal. Then, the host scheduling module of the system judges the running state of power and schedules the system. Then, use the safety supervision module to verify the user information and back up the obtained data. Only the recorded staff are allowed to operate the system to ensure the security of the system. Finally, the obtained power data information and operation status are displayed through the display platform, and the obtained files are imported into the number, so that users can understand the operation status of the system more clearly [17].

In order to improve the stability of the dispatching system, the software system will automatically add Excel files, which can record all the data information obtained into the database, so that the staff can dispatch the software from the database at any time [18]. The baud rate, data bit, stop bit, and other parameters of the dispatching interface shall

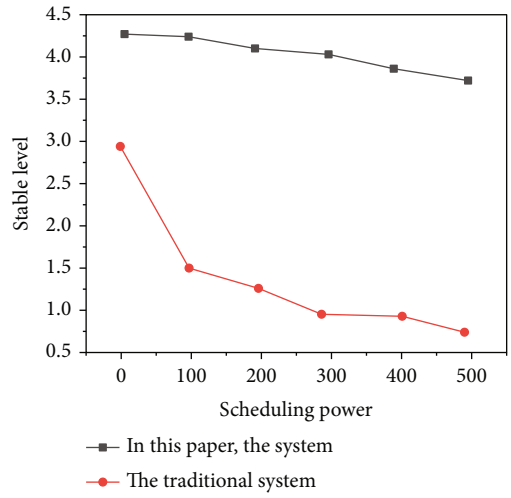

Figure 5: Power system experiment environment.

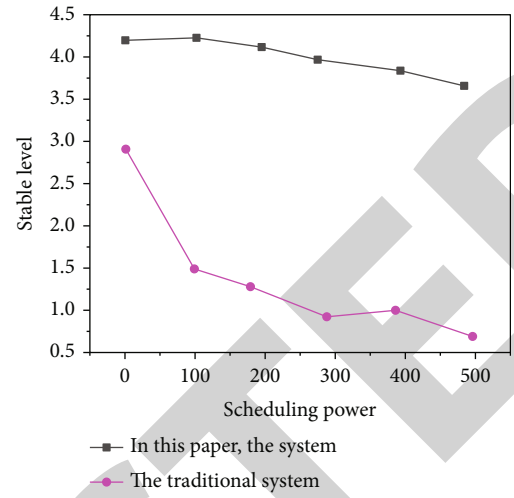

Figure 6: Stability comparison test.

Table 1: Experimental parameters.

Project	Parameter
Scheduling environment	MVA
Working voltage	500 V
Operating current	250 A~350 A
Working frequency	100 Hz~500 Hz
Dispatch time	15 min~30 min
Monitoring status	Hardware monitoring
Server connection mode	Series connection

be designed according to unified standards. Such a scheduling standard can not only improve the operation efficiency of the system but also effectively avoid the system failure and difficult maintenance when the scheduling methods are not unified.

In the Internet of Things environment, software work is more convenient. Power grid operation is different from other operation networks. It has extremely high uncertainty. Software work needs to balance the complex relationship between the nodes in the power grid network, find the relationship between the nodes, and analyze their change function [19]. The change mode of power system is random, and it is easy to fail during dispatching. Therefore, it is necessary to accurately grasp each power equipment. Automatic scheduling can improve decision-making effect and reduce uncertainty [20].

3.3. Experimental Study. In order to test the actual working effect of the power marketing metering production automatic dispatching system designed based on the Internet of Things, a comparison experiment is designed with the traditional dispatching system [21]. The experimental environment is shown in Figure 5.

The simulation environment is as follows: VS2010 +OpenCV2.4.13, Windows10 operating system Intel (R) Xeon (R) CPUE5-2603v4@2.20 GHz; the memory is 32 GB, and the database is MATLAB.

In the test phase, corresponding tests are carried out, and the test results are counted and substituted into formula (1). In formula (1), ΔA represents the maximum absolute error allowed in the measurement range, and Y represents the measurement range.

$$\mathrm{ACC}(\text{accuracy class}) = \left(\frac{\Delta A}{X}\right) \times 100\%. \quad (1)$$

3.4. Experimental Parameters. The experimental parameters are shown in Table 1 below:

4. Results and Discussion

In the power system experiment environment, according to the above parameters, the traditional dispatching system and the dispatching system studied in this paper are selected to dispatch the power data and record the stability of the dispatching process. The experimental results are shown in Figure 6.

It can be seen from the above figure that when dispatching the same electricity, the stability of the traditional dispatching system is very poor. With the increase of the number of dispatching, the stability of the traditional system becomes worse and worse. In the later stage, it is easy to fail, and the stability is even lower than 1. The stability of power marketing metering production automatic scheduling based on the Internet of Things is much better than the traditional system. Although the number of late scheduling increases, the stability of the scheduling system in this paper also decreases, but the degree of decline is very small, which can basically maintain the stability above 4. The power grid dispatching system designed in this paper adopts the principles of automatic dispatching and hierarchical dispatching and can dispatch the data without investing too much cost. At the same time, the terminal designed by the automatic scheduling system for measurement and production has a complete detection mechanism.

Once the data is abnormal, the system will start the alarm function, and the whole network will cover the new operation mode to improve the stability of the system. To sum up, the power marketing measurement production automatic transfer system designed in this paper can effectively improve the scheduling efficiency, and the stability of the system is good, so that the scheduling results can achieve the expected effect of the enterprise.

5. Conclusion

This paper presents a power metering automation system based on the Internet of Things. When dispatching power data, it is easy to be affected by external information. The stability of the system is poor and prone to fluctuations, and the integrity rate of power data collection is low, resulting in poor operation efficiency of the system. In the long run, the scheduling results are difficult to be guaranteed, which is not conducive to the development of enterprises. The Internet of Things environment provides a better environment for power dispatching. Based on the Internet of Things environment, a new power marketing metering production automatic dispatching system is designed. The system is equipped with an automatic monitoring module, which can monitor the entire operation status of the system, prevent external data intrusion, effectively ensure the stability of the system, and improve the operation efficiency of the system, and is more worthy of promotion and development.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The author declares no conflicts of interest.

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