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Retraction

Retracted: Application of Internet of Things Technology in Mechanical Automation Control

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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.

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[1] Y. Xie, H. Li, Q. Jia, and X. Nie, "Application of Internet of Things Technology in Mechanical Automation Control," *Journal of Sensors*, vol. 2022, Article ID 9388942, 7 pages, 2022.

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Research Article

Application of Internet of Things Technology in Mechanical Automation Control

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In order to solve the problem of low production efficiency of the mechanical electromechanical automatic control system, this paper proposes a manufacturing mechanical automatic detection system based on Internet of things technology. Automatic detection of manufacturing machinery is realized by setting data module monitoring, which includes the data monitoring module and signal detection module. The experimental results show that compared with the traditional computer vision system, the detection system designed in this paper has a higher level of basic data and better detection accuracy. The detection accuracy can be improved by about 10% in different detection times. *Conclusion*. The mechanical and electrical automation control system based on the Internet of things can effectively improve the production efficiency and control accuracy of the mechanical and electrical automation control system.

1. Introduction

With the continuous development of the Internet of things technology, the Internet of things has been gradually applied in various fields as an emerging industry in the new era, changing the face of world economic development. The numerical control technology of the Internet of things can solve many problems in mechanical control, bring opportunities and challenges to mechanical and electrical automation control, and create a good numerical control foundation for the mechanical and electrical automation control system to adapt to modern development [1].

With the development of the Internet, many Internet-related technologies have also been innovated and developed. All emerging Internet technologies are affecting people's real life [2]. People begin to try to set up an ID card for all objects in real life, so that they can connect all objects to the network, and use the convenience of the Internet to control all objects in real life. The purpose of the Internet of things is to connect all objects in real life. Gradually, the industrial sector has begun to introduce and apply the Internet of things technology, which is based on the characteristics that the Internet of things can accurately control production, which is beyond the reach of human beings, especially the actual production of precision mechanical automation engineering projects [3].

Due to the high demand for initial data in the design process of the manufacturing machinery automatic detection system, it is necessary to collect machinery automatic data with high accuracy in the preliminary stage of design, so as to improve the design of the overall detection system [4]. The traditional automatic inspection system for manufacturing machinery based on computer vision is designed to query the image of the internal part structure of the machinery, adjust the internal operation structure of the inspection system, and obtain accurate inspection results [5]. The traditional manufacturing machinery automatic detection system based on node detection is designed to analyze the detection network of the detection system, build a detection platform, and strengthen the control of the detection platform according to the network analysis content, so as to achieve better detection results [6]. However, the traditional system design has a small grasp of the mechanical automation data of the manufacturing industry, which does not meet the requirements of the sustainable development of the system, and the detection accuracy is low [7].

2. Literature Review

The application of the mechanical electromechanical automatic control system is mostly realized in complex and harsh environment. Therefore, it is necessary for the staff to remotely control the equipment and operation procedures on the automatic production site and monitor the parameters of the equipment operation status and system production status on the site. The staff at the monitoring point under the Internet of things numerical control technology can generally skillfully control the software and hardware resources in the system, so as to achieve the purpose of system fault elimination and maintenance and reduce the human resources of the system on site. At the same time, Internet of things numerical control can also be used to analyze and process on-site data, with preventive troubleshooting of potential faults in the system. It can also provide a more reliable data execution basis for mechanical and electrical automation technology through Internet of things numerical control technology and improve the efficiency of mechanical and electrical automation [8]. The following requirements must be met in the overall framework design of the CNC mechanical and electrical automation control system based on the Internet of things:

(1) IOT CNC can fully control and manage the mechanical and electromechanical automatic machining program [9]. The production program data in the mechanical electromechanical automation system can be systematized through the Internet of things numerical control technology, and relevant management personnel can retrieve the mechanical electromechanical automation production program parameters at any time, which is conducive to timely maintenance of hardware equipment and improvement of automation level [10]

(2) The Internet of things numerical control technology is applied to ensure the safety of mechanical electromechanical automation parameters. During the implementation of the system, the operating parameters of the machine tool will change due to the operator's control error, increasing the material loss of mechanical electromechanical automation. Therefore, it is necessary to monitor the parameters in the system in real time through the Internet of things numerical control technology to avoid parameter changes [11]

(3) Mechanical and electrical automatic production equipment pays more attention to the production quantity of equipment, and operators often ignore the maintenance of production equipment. Therefore, it is necessary to apply the Internet of things NC to monitor the automatic machine tools, reduce the faults of automatic production equipment, and extend the service life of the machine tools

(4) In the process of mechanical, electromechanical, and automatic production, no artificial mechanical control is involved, but professional personnel are required to monitor the production data in real time to meet the safety and manufacturing stability in the production process, and then, the Internet of things numerical control technology is applied to maintain or expand the wireless communication function of the machine tool, so as to increase the efficiency of mechanical [12], electromechanical, and automatic production

(5) The key technology of Internet of things numerical control is wireless sensor communication technology, which can be applied to the production communication of mechanical and electrical automation [13]. The potential resources in the network topology development system such as Ethernet gateway and data format frame number are designed in the numerical control mechanical and electrical automation equipment. With the increase of the flexibility of Internet of things, the monitoring, data acquisition, and analysis in the mechanical and electrical automation control system are reflected

Therefore, in view of the above problems, this paper proposes a new design of the manufacturing machinery automatic detection system based on Internet of things technology to analyze and solve the above problems [14].

3. Research Methods

3.1. Hardware Design of Manufacturing Machinery Automatic Detection System Based on Internet of Things Technology. As a convenient and intuitive intelligent operation technology, Internet of things can communicate and exchange goods and networks in an open environment, providing a corresponding shortcut for the development of different industries [15]. This paper uses the sensing node information of the Internet of things to adjust the system hardware, track the data operation space in the system hardware component structure, and construct the network node sensing diagram, as shown in Figure 1. Different operation modules are set for data processing to improve the effectiveness of the overall hardware design. Automatic detection of manufacturing machinery is realized by setting data module monitoring, which includes data monitoring module and signal detection module [16].

3.1.1. Data Monitoring Module. The data monitoring module selects the industrial digital camera and connects the camera status. The module has high receiving sensitivity and strong anti-interference performance and can be easily embedded into the system. It has half duplex communication function, is ism multiband, does not need to apply for frequency free use, and has multiple frequency options. It has a variety of transmission rates and ISSI channel

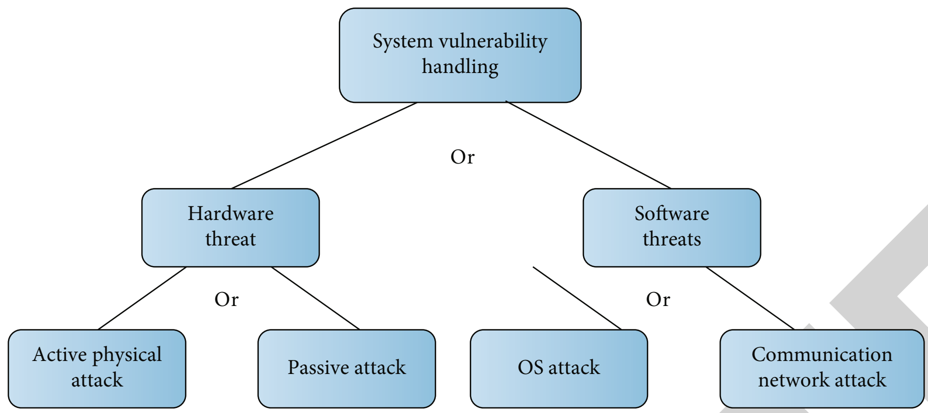

Figure 1: Network node perception diagram.

detection functions and can provide a relatively good monitoring environment for the system with strong monitoring performance [17].

3.1.2. Signal Detection Module. The signal detection module selects the TL signal transmission cable to enhance the transmission system theoretically and selects pro-w10gx broadband digital RF detector to optimize the system detection mode and increase the dominant ability of the system [18]. The detector has unparalleled sensitivity in the RF frequency range of 0~10 GHz. It can display most digital frequencies and unprecedented analog signals up to 6 GHz to ensure the accuracy of signal detection. When used in the secret mode, the detector can monitor the signal strength in beep mode or silent mode to fully display the different states of the signal [19]. Equipped with semirigid multiband whip antenna and directional high gain antenna, the input frequency range is 1 MHz~10000 MHz, and the audio frequency response is 400 Hz~5 kHz ± 2 db, with high data processing capacity, built-in 3.7v1500 Ma rechargeable lithium battery, which can work for eight hours under full power, facilitating system research and realizing overall signal inspection operation. There is a detector in the detection module, which is responsible for the modular detection of automatic data and the analysis of the detection structure of different detection spaces. Due to the complexity of the internal detection circuit of the detection module, it is necessary to set up multiple MCU for microcontrol of the detection circuit while performing the detection, assist the detection circuit to execute the detection instructions, protect the circuit, improve the security of the detection, set the image of the detection circuit, adjust the detection strength of the module detection, optimize the internal detection switch of the detector, and connect the detection switch with the detection data interface. Realize accurate detection of data. Thus, the overall system hardware design is completed.

3.2. Software Design of Manufacturing Machinery Automatic Detection System Based on Internet of Things Technology. The system software is designed based on the designed hardware detection data, and the data transmission network of Internet of things technology is used for the rapid transmission of mechanical automation data, and the system

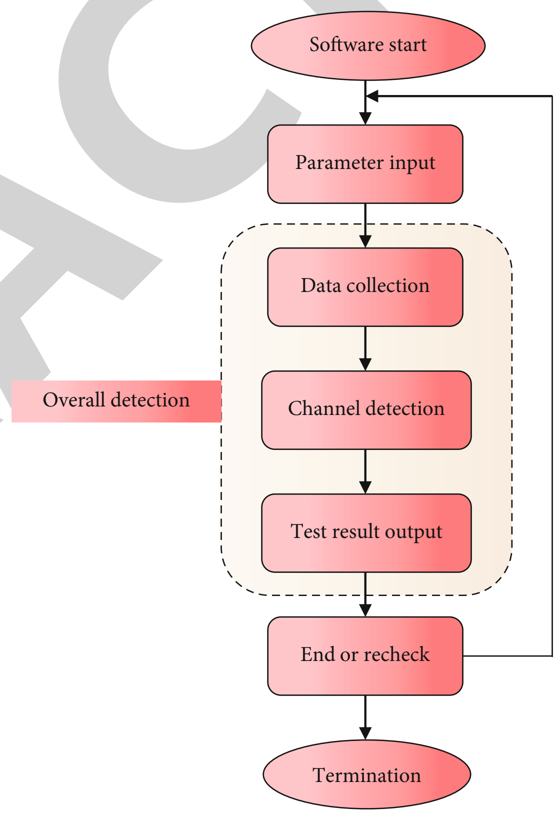

Figure 2: Software detection flow chart.

detection software platform is built [20]. The set internal detection flow chart is shown in Figure 2.

Input the data to be tested into the software platform, integrate the mechanical automation images in the working process of the manufacturing industry according to the relevant platform software execution instructions, strengthen the marking of the automation data, and conduct basic management on the marked data. The management formula is as follows:

$$N = \sqrt{A - P^3}. \tag{1}$$

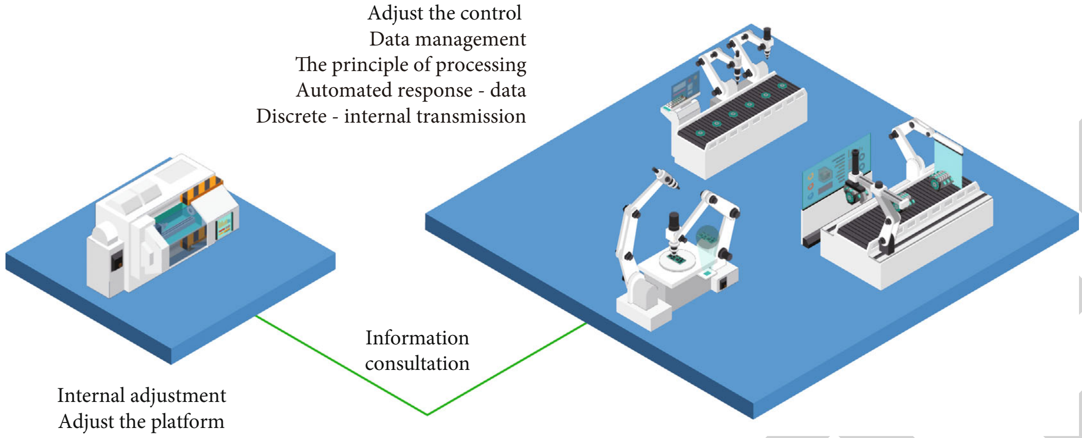

FIGURE 3: Information adjustment diagram.

In equation (1), N represents management data, A represents automatic data marking information, and P represents relevant collation principle parameters. After completing the above management operations, adjust the automation information. The build information adjustment diagram is shown in Figure 3.

The image display device is selected to display the detection data image in real time, adjust the automatic data content in different spaces, allocate the storage location of the automatic data, and store the automatic data belonging to the same storage mechanism for centralized management. Relieve the internal pressure of the detection platform and set the software platform detection formula as follows:

$$T = \frac{s + \sqrt{k}}{n} - q. \quad (2)$$

T is the detection result parameter, s is the internal storage mechanism data, k is the corresponding storage location parameter, n is the number of data detected, and q is the internal automatic data transmission direction data. According to the above detection operations, enhance the detection accuracy of the overall software, and take protection measures for the software platform at the same time of detection, so as to prevent data leakage within the software platform, thereby affecting the detection result data. Match the protection mechanism of the software platform, manage the basic contents of different protection mechanisms, connect the protection mechanism with the detection data transmission channel, execute protection instructions during data transmission, ensure data transmission security, and set the data protection instruction formula:

$$P = \int A \cdot h + c^2. \quad (3)$$

In the above formula, P represents the protection instruction data, A represents the internal data of the transmission channel, h represents the corresponding transmission rule, and c represents the transmission parameters generated in the transmission process. Thus, the design of the overall detection system software is realized [21].

4. Result Analysis

After the above system design is realized, the data results of the designed system are compared, and the corresponding comparison experiments are set up. The comparison indicators are as follows:

(1) Master degree of mechanical automation data in manufacturing industry

(2) Detection accuracy of the detection system. According to the above two indicators, the setting of comparative experiment is carried out, and the experimental parameter table is designed

In Table 1, different operating parameters are used to analyze the degree of mastering the mechanical automation data of the initial manufacturing industry of the detection system, so as to strengthen the internal management of the detection system and improve the efficiency of the overall detection. Put the manufacturing machinery automation data in the initial storage space of the detection system and analyze whether there is data missing in the automation data in the space. Timely supplement missing data and strengthen the data filtering mechanism of the detection system to prevent detection errors caused by the intrusion of external data. Monitor the data flow direction of the system for detection and analysis at all times, adjust the direction appropriately, and combine the automatic parameters with the detection algorithm. Carry out automatic data inspection of the system according to the inspection process [22]. Strengthen the internal control over the detection information of the detection system to prevent the degradation of the detection function of the detection system due to data leakage. Match the information of the system experiment platform and the software detection platform at this time, compare the different platform information with the internal detection data, enter the comparison result data into the

Table 1: Experimental parameters.

Project	Parameter
Number of sensors	5
Number of detection mechanism systems	6
Fixed value setting	k
Experiment data operation	Information entry
Algorithmic mechanism	System detection algorithm
Software platform	Network platform
System state	Normal

platform detection algorithm to wait for the system algorithm detection, and realize the overall detection operation. Execute the detection management instructions to avoid the detection commands being intercepted by the system during the issuing process. At the same time, cooperate with the independent data cleaning operation of the detection software platform to clean up the data consistent with the cleaning principle as a whole, so as to ensure the smooth development of the experimental research. Sort out the obtained result data, and set the data comparison diagram as shown in Figure 4.

As can be seen in Figure 4, the degree of mastering manufacturing machinery automation data designed by the manufacturing machinery automation detection system based on Internet of things technology in this paper is higher than that designed by the other two traditional manufacturing machinery automation detection systems [23]. After the first experimental study is realized, the secondary experimental research operation is carried out by using the research data, the experimental indicators are analyzed, and the experimental parameter table is constructed as shown in Table 2.

In Table 2, connect the internal management platform with the monitoring elements of the detection system, classify and process the detection data of different structures, divide the relevant module space, and compare and store the divided data. Select the internal monitoring device to conduct real-time monitoring operation on the stored information, and strengthen the detection strength of the detection system. Based on the collected data, perform the data detection task under the standard mode [24]. In the process of detection, the amount of detection data is allocated, so as to avoid the redundancy of detection data caused by excessive concentration of detection data, which affects the detection effect of the detection system. Input all the results detected by different detection systems into the result comparison space for data comparison, and set the result comparison table as shown in Tables 3 and 4.

The detection accuracy of the automatic manufacturing machinery detection system designed in this paper based on the Internet of things technology is higher than that of the other two traditional automatic manufacturing machinery detection systems. The main reason for this difference is that the detection system in this paper uses the internal detection criteria for data detection, executes internal

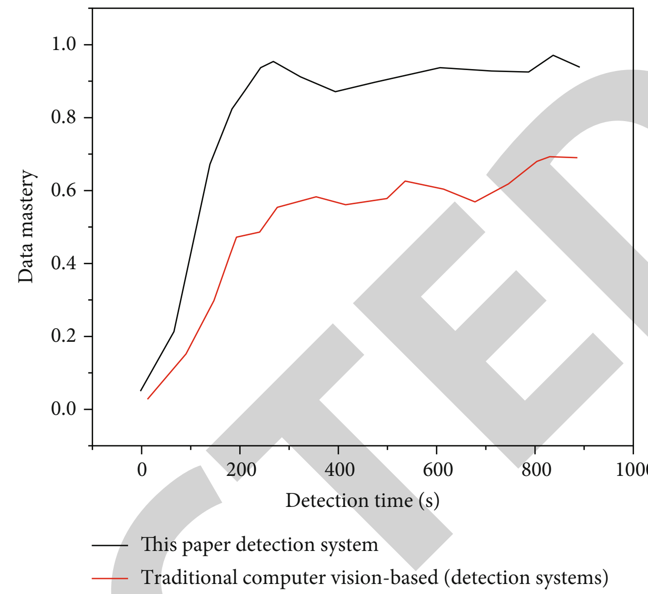

Figure 4: Comparison of data mastery.

Table 2: Experimental parameters.

Project	Parameter
System architecture	C/S
Processing module	Data processing module
Detection mechanism	Data detection mechanism
Mode adjustment	Detection monitoring mode
System protocol	TCP protocol
Number of hosts	2
Number of sensing nodes	50

Table 3: Test accuracy results of this system design.

Test time (d)	Detection accuracy (%)
10	89
20	92
30	94
40	96
50	97
60	99

Table 4: Test accuracy results of traditional computer vision-based system design.

Test time (d)	Detection accuracy (%)
10	76
20	78
30	82
40	84
50	87
60	91

control instructions in the initial stage of detection, and configures a monitoring system with high monitoring integrity to ensure the integrity of data monitoring [25]. To sum up, the manufacturing machinery automatic detection system based on the Internet of things technology in this paper has a high level of basic data and better detection accuracy. It can conduct experimental operations in different scenarios, meets the needs of system detection, better provides relevant services for users, and has a broader space for development.

5. Conclusion

Based on the design of the traditional manufacturing machinery automatic detection system, this paper presents a design of the manufacturing machinery automatic detection system based on Internet of things technology. In this paper, the internal mechanical operation structure of mechanical automation in the manufacturing industry is used to adjust the overall detection system, strengthen the integration and management of the system, realize the accurate analysis and information search of the detection data, obtain more accurate mechanical automation data, and achieve the purpose of data collection of the detection system. At the same time, this paper executes the detection instructions on the basis of data collection, constructs the software platform under the premise of hardware component transformation, obtains a more reliable detection information source, and then improves the detection accuracy and efficiency of the overall detection system. The experimental results show that the testing effect of the automatic testing system for manufacturing machinery based on the Internet of things technology is significantly better than that of the traditional automatic testing system for manufacturing machinery and can better provide solid testing services for the development of manufacturing machinery automation. Apply the Internet of things numerical control technology to improve the stability and accuracy of the mechanical electromechanical automatic control system, and effectively integrate the advantages of the Internet of things numerical control into the mechanical electromechanical automatic control system.

Data Availability

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

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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