Research on PCB Cost Data System Based on Cloud Platform

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Abstract: With the rapid development of electronic manufacturing industry in China, defect detection of printed circuit board (PCB) is particularly important in order to improve its quality and reduce its production cost. The cost of PCB has always been discussed in depth by practitioners, but there are few fixed models for replication, although confidentiality is the key reason. However, due to the long process of PCB and the variety of products, it is really difficult to be comprehensive. Therefore, based on the cloud platform, the author studies the PCB cost data system. Research shows that the cloud-based PCB cost data system allows management to master energy consumption data more effectively and in real time, effectively grasp the monitoring reports of production costs and energy consumption, and control the production equipment in a safe state in real time. Improve management capabilities.

1. Introduction
In the operation process, printed circuit board (PCB) enterprises consume a large amount of energy (equivalent to CO2 emissions), resulting in increased operating costs and environmental pollution [1]. However, due to factors such as limited funds, scattered resources, and irregular management, the development of informatization construction has been slow [2]. Systems that have been in operation for more than a decade generally face a problem: system access is getting slower and slower, and it is time to upgrade. At the same time, the PCB module is a necessary signal channel for intelligent instruments. That is to say, any instrument must have a PCB link [3]. Real-time, efficient and non-contact detection requirements require new detection techniques, and PCB applications have emerged in this context [4]. It is a new detection technology based on computer vision, which integrates electronic and image processing. It has wide application prospects in industrial development [5]. In the research and production of our country, with the development of science and technology, the occupancy rate of machine is higher and higher, and the function of digital signal processor is stronger and stronger. This provides an effective means for people to use modern digital signal technology to process information at high speed and in large quantities, while PCB technology plays an important role in information acquisition and processing [6]. Conceptually, we know that the cost composition of PCB products is nothing more than the total cost of materials, labor, hydro power and equipment depreciation. In order to build a more scientific and reasonable cost model of PCB, we carry out relevant research [7].

In the PCB industry, if you are a technician, you have to face every PCB product and cost management problems brought by every technology method in addition to various technical problems every day. Most of the time, the upgrade methods mainly include: purchasing more powerful servers, improving the service capability of the system [8]. Purchase new applications and upgrade hardware at the same time. Software users must have certain preconditions when enjoying traditional information services. Users need to bear certain investment risks in information services when the benefits of information services are uncertain [9]. Comprehensive planning, through the control of the main energy-consuming equipment in PCB enterprises, to reduce energy consumption and improve energy...
efficiency, establish an energy management system with high efficiency, advanced technology, stable and safe supply [10]. Therefore, optimizing the cost to maximize social and economic benefits is the function of the all-wireless energy management and control system. In the PCB circuit, there are two important indicators of data sampling rate and data conversion resolution. Especially for the number of points, small components and large batches of plates, it is more difficult to check with the naked eye. It is easy to miss the time for a long time, so the PCB has great advantages. Therefore, the development of a PCB with certain versatility reduces the duplication of hardware. Sexual development, reducing R&D costs and improving the efficiency of product design are necessary.

2. Classification and Characteristics of PCB Cost Data System

At present, there are five types of defect detection used in the production process of circuit boards: manual visual inspection; electrical testing; automatic optical inspection; radiographic inspection; manual inspection of laser inspection PCB is the quality of burnt tin printing by workers using eyes or with a magnifying glass, the quality of the board and the quality of the patch are judged and tested. Modern PCBs have the following main features: Modern PCBs are generally controlled by computers, which greatly improve the quality and efficiency of PCBs and save hardware resources. The role of software in PCBs is growing, which increases the flexibility of system design. PCB and data processing technologies are increasingly integrated, forming a PCB and processing system that can do everything from PCB, processing to control. PCB processes generally have "real-time" characteristics. The real-time standard is to meet the actual needs. For general PCB, it is generally expected to have as high speed as possible to meet more application environments. With the development of microelectronics technology and the improvement of circuit integration, PCB becomes smaller and smaller, and its reliability is higher and higher, even a single PCB appears. Bus is widely used in PCB. Bus technology plays an important role in the development of PCB structure.

The automatic optical detection system is composed of hardware and software. The hardware system includes illumination module, image acquisition module, motion control module and main control computer. The software system is a program to control each hardware module. The overall system structure block diagram is shown in Figure 1.

![Figure 1 Block diagram of PCB defect detection system](image)

In order to achieve real-time cost generation and real-time monitoring, it is necessary for the system to automatically generate the cost of PCB products in the process of transferring work to account. According to the characteristics of students' management in general and vocational colleges, it closely combines with the resources of the existing educational administration management information system. It mainly provides functional modules including freshman registration
management, student information management, student employment management, student dormitory management, student comprehensive evaluation management and so on. Even if the information service meets the initial needs of users, when the demand changes or when other enterprises in the same industry need to share information services in accordance with their own situation, the cost of transformation and redeployment of traditional information service mode is higher. Each physical factory will set up a separate computer room for the management system. Due to the large number of PCB production processes, some process workshops have high requirements for air cleanliness. The normal production workshops will no longer allow the construction process to generate large amounts of dust such as wall-cutting and thread-buried pipes. Therefore, the wireless energy management system is wireless. The quick installation method has an irreplaceable advantage. Therefore, considering its long-term cost, with the rapid development of modern manufacturing industry, the quality and speed of inspection of manual visual inspection is difficult to meet industrial requirements, and it has gradually faded out of the vision of electronics manufacturers.

A series of achievements in microelectronics and the wide application of microcomputers have not only opened up a broad prospect for the application of PCB cost data systems, but also have a profound impact on the development of PCB technology. “PCB,” refers to the process of collecting, converting, and converting various analog quantities into digital quantities for storage, processing, display, or printing. The corresponding system is called the PCB cost data system. The sample sequence is expressed as a sequence of impulse functions. These impulse functions appear exactly at the sampling instant. The integral amplitude is exactly equal to the amplitude of the input signal at the sampling instant, that is, the ideal sampling can be regarded as the amplitude modulation process of the impulse carrier. Artificial visual inspection can quickly detect errors, which is of great significance to some small processing factories. Operators, for example, can't judge with too much precision whether there are defects in individual circuit boards. Subjectively, the defect detection results of the operators are different, and the failure smoke point caused by the metal layer falling off inside the pin glow end can not be checked. With the continuous improvement of processing technology and the development of miniaturization of components, operator's visual fatigue will inevitably lead to missed detection. Laser detection technology has been verified on the optical board with satisfactory results, but it also exposes many problems such as high equipment and maintenance costs. At present, laser detection technology is gradually developing in the process quality detection system. I believe that in the near future, with the progress of laser technology will be more perfect.

3. Cost Composition of PCB Products

Conceptually, we know that the cost composition of PCB products is nothing more than the total cost of materials, labor, hydropower and equipment depreciation. In order to build a more scientific and reasonable cost model for PCB, we analyze the concepts of material cost and resource cost. The expectation of the blueprint of the new cost model is that it will change from simple end-of-month cost statistical calculation to planned beginning of the month, real-time process accounting, end-of-month analysis and summary, and form a management model for improving opinions. Real-time response to the current state of each product cost consumption. PCB is a basic framework for building distributed systems for large-scale data processing and analysis. It is easy to use, users can easily develop distributed applications without fully paying attention to the distributed underlying details, and make full use of clusters for collaborative computing and collaborative storage to achieve the goal of horizontal expansion. In the PCB manufacturing process, the cost of materials is the most important cost and an important part of the cost management work. In the production process of the product, each PCB product will consume different materials because of the characteristics of its products. The consumption of the same material will also be different due to the different types of processes, such as the difference in plating copper thickness. The copper balls are different; the characteristics of the product are also plate thickness, size, copper plating thickness, electric gold thickness, process type and so on.

We know that in the PCB manufacturing process, several main materials are shown in Table 1. We
can edit the consumption calculation formula according to the “cost driver” of these materials, and then let the system perform automatic cost convolution.

| Serial number | Material name             | Company               |
|---------------|---------------------------|-----------------------|
| 1             | CCL                       | Sheet                 |
| 2             | Prepreg                   | M                     |
| 3             | Potassium auride cyanide  | G                     |
| 4             | Phosphor copper ball      | Kg                    |
| 5             | Electrolytic copper foil  | Kg                    |
| 6             | Outer layer dry film      | M                     |
| 7             | Solder resist ink         | Kg                    |

China's PCB industry will be built into an energy-saving, emission-reducing, environmentally friendly and sustainable development industry, while ensuring efficient management and control of energy, costs and benefits, ensuring reliable supply of energy and efficient and clean use of energy. For PCB cost convolution, its main function is to decompose the material consumption components of a product, and then to establish a standard calculation method for each material component. And in the process of product circulation, the amount of the material is generated through the process, so that the total material consumption and cost of the product can be automatically counted. At the same time, it can check the average consumption converted from the monthly consumption of the same process to the average consumption per unit product, and provide the basis for analysis of abnormal material consumption. After the establishment of the PCB and the accuracy of its calculations, the quotation system can be truly guided, so that the quotation system can obtain the corresponding cost of the quotation according to the characteristics of the product; it also provides the basis for the cost of the independent unit accounting. PCB and data processing technologies are increasingly integrated, forming a PCB and processing system that can do everything from PCB, processing to control. The new cost model is BCB material, and the cost of materialless can be updated in real time, which can better reflect the impact of market changes in material prices on product cost.

Needless to say, cost management is very necessary. In recent years, with the increase in the cost of raw materials, the price of PCBs has been continuously reduced, and the cost management in PCBs is particularly prominent. From the charts in Figures 2 and 3, we can have a deep understanding.

![Figure 2 Trend Chart of Copper Price Rising](image-url)
In the process of deployment of traditional cost management system application, the application of downward unit or database server of group company basically exists independently. Small-scale data centers exclusive to a single company will be eliminated, replaced by large-scale data centers with full consideration of the rational allocation of resources. This change has changed from a decentralized, energy-intensive model to a centralized, resource-friendly model, which conforms to the trend of the development of the software industry. PCB equipment has the functions of real-time control and management, PCB, data analysis and report forms, abnormal energy consumption warning, disastrous energy consumption warning and so on. By comparing the cost with the sales price, it is not difficult to find the products that are actually losing money in the new system, so as to facilitate the sales management of the products. The physical quantities in nature are mostly analog quantities that vary continuously in time and amplitude, or as continuous time functions, and need to be expressed in the form of analog quantities. The information processing is mostly realized by digital computers, and the results of the processing are often "feedback" to the external physical system. In contrast, in the cloud computing platform, the business systems of several group-denominated units share the group's large resource pool, and the size of the resource pool can be adjusted in a timely manner. Resources can also be allocated in real time through dynamic resource scheduling mechanisms. Through some means, the utilization rate of cloud computing platform resources can be greatly improved.

4. Conclusion
This paper describes the related research of PCB cost data system based on cloud platform. PCB defect detection is an important means of PCB quality control. Early detection of defects will prevent the bad board from being sent to the subsequent assembly stage to reduce the economic loss caused by defective products. It is convenient for managers to find the factors that manage product costs and play a role in better managing product costs. As the latest application mode of the Internet era, the cloud platform has continuously promoted the industry from the existing self-sufficiency model to the industrialized operation with scale effect. The contradiction between the shrinking energy stocks and the increasing energy demand is becoming more and more prominent. Enterprises are also seeking solutions between energy use and economic benefits. How to win the future energy war is a big deal. The multi-user database based on cloud platform mode is designed, the function modules of cloud platform and the communication mode with external system are designed, and the system code based on cloud platform mode is designed. The design and development process of the system are described, and the advantages and disadvantages of the system are analyzed. It effectively solves the problem that database access affects the performance of the whole system due to the accumulation of large amounts of data. With the continuous development and updating of various technologies, the real-time and advanced implementation of PCB cost data system, stability, openness and universality of software
will be greatly improved, which can better meet the actual needs and play a greater role in people's production and life.

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