Lecture Notes in Electrical Engineering 1214

Yan Pei
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Lecture Notes in Electrical Engineering 1214

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Contents

Layout Control Algorithm of Interior Lighting Design Based on ATMEGA16

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Abstract. Aiming at the shortage of traditional lighting system, an improved design scheme of indoor lighting system based on intelligent detection technology is proposed. The brightness of the room and environment is sufficient to meet people's needs. ATMEGA16 MCU is used for signal processing, analysis and decision-making. Therefore, the control of lighting equipment is more accurate, convenient and user-friendly. The test results show that the system performance is stable and reliable. This paper introduces an intelligent indoor lighting control system based on ATMEGA16 microcontroller. The system collects ambient light parameters through traditional photoresist and color sensor, and transmits the current light intensity and color to multiple parts of Zigbeed. ZigBee wireless communication technology is used to transmit data to the shared ZigBee node, and then to the processor. Then the corresponding CPU control unit intelligently sets the headlights.

Keywords: ATMEGA16 · Control Algorithm · Design · Interior Lighting · Layout

1 Introduction

The lighting system plays an important role in people's production and life, but at present, most people use ordinary switches to control the on/off of the lighting system, while the lighting and dark modulator are just ordinary buttons or modulators, which control street lighting. Most of them are double switches, and users can work independently. Hotels or pensions usually require many counters. Compared with the comfort people bring through these lights, there are many areas that need to be improved. For a long time, the combination of natural light and intelligent indoor lighting system has been ignored by designers. Most rooms still use the traditional lighting mode. In some public places, excessive lighting time will not only lead to energy loss, but also accelerate the aging of equipment.

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2 System Structure and Working Principle

With the development of science and technology and the acceleration of social informatization process, the relationship between people's work, life and intelligence is getting closer and closer. Informatization has changed people's way of life, but also challenges people's living conditions. People in different environments need different lighting. At present, most living spaces use non compensated light sources, which can easily lead to visual fatigue and even eye damage. The system collects optical data through multiple branch nodes, transmits it to the cpu wirelessly, and then responds to lighting settings through a group of devices to design a closed-loop feedback connection to make the system more stable and intelligent. The system completes the infrared spectrum of human, stops the activities of UAV, and saves energy [1].

2.1 System Structure

The indoor lighting control system mainly uses ATMEGA16 single chip microcomputer as an independent controller, and combines LED display technology, light detection technology, key detection processing technology, infrared detection technology, delay technology and other technologies to intelligently control the indoor lighting equipment. The system structure is shown in Fig. 1 [2, 3].

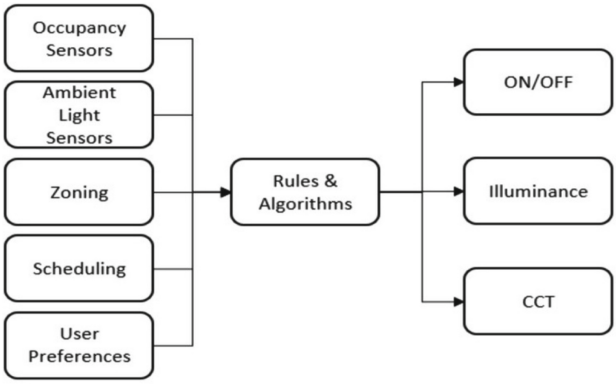

Fig. 1. Indoor Lighting Control Scheme

2.2 Light Data Acquisition

At present, the widely used optical data acquisition technologies mainly include photocell detection and electronic sensor detection. Photocell is a photocell that directly converts light into electrical energy. When the light reaches the surface of the selenium photoelectric element, the incident light reaches the interface between the selenium semiconductor layer and the metal film through the metal film. The photoelectric effect occurs at the voltage difference between the interface and the two ends. The resulting potential

difference is proportional to the illumination of the receiving surface of the photoelectric element, and the current measured in the circuit reflects the illumination data. The latter mainly uses high-precision electronic sensors to change the resistance and voltage of components by changing the light; Light intensity depends on the functional relationship between voltage and illumination. The system uses optical resistance and color sensor to collect information. The sensitivity of general photoresistors (spectral characteristics) is very close to the response of human eyes to visible light (0.40–0.76 μm). As long as the human eye can perceive light, the resistance value of the photoresistor will change, so we can use the photoresistor to detect effective light intensity information; The TCS3200 color sensor is used to identify the three main colors. The circuit converts the three color illumination intensity information into electric pulse signal, and realizes color recognition effect through certain information processing [4–6].

2.3 Working Principle

(1) Single chip microcomputer controls the switch of indoor lighting equipment through relay. (2) The light detection circuit around the lighting device detects the brightness around the device. The signal reaches the microcontroller through the ambient brightness sensor module. If the brightness can meet the needs of life, the microcontroller keeps the lighting device off through a relay. If the brightness is not enough, the microcontroller relays.

Continue to detect whether the pyroelectric inductance signal of human body is collected. (3) If the passive pyroelectric infrared sensor detects the human body signal, the microcontroller will immediately control the lighting device and turn it on; If no human body signal is detected, the microcontroller will keep the lighting device off. (4) When the lighting device is turned on, if the microcontroller does not detect the human body signal at a certain time, the lighting device will be turned off after a period of time. If the human body signal is detected during the delay period, the delay will end and the lighting device will continue to turn on. (5) The PA0–PA3 pins of the single chip microcomputer can be set to different delay time values according to the different lighting application occasions and different users. (6) When the lighting circuit works normally, the lighting equipment can be forced to control as long as the forced button is pressed, and the circuit can also be switched to the automatic control state through the button [7, 8].

The machine controls the indoor lighting switch through the relay. The lighting controls around the lighting fixture determine the external brightness of the fixture. The signal reaches the microcontroller through the ambient brightness detection module. If the brightness meets the needs of life, the microcontroller supports turning off the lighting device through a relay. If the brightness is not enough, the automatic relay continues to check whether someone is sending a thermal signal. When the passive infrared heat dissipation sensor detects an artificial signal, the microcontroller immediately monitors the lighting device and turns on the lighting device; If no human signal is detected, the entire machine will remain off. If the lighting device is turned on and the monitor does not detect the human body signal for a certain time, the lighting device will turn off after a long time. If a manual signal is detected during the delay, the delay ends and the lighting continues to turn on. PA0-PA3 connector can set different delay values according to

lighting fixtures and quantity. If the lighting circuit works normally, just press the button to violently control the lighting equipment, and turn the circuit into automatic control state through the button. As shown in Fig. 2, indoor lighting design effect.

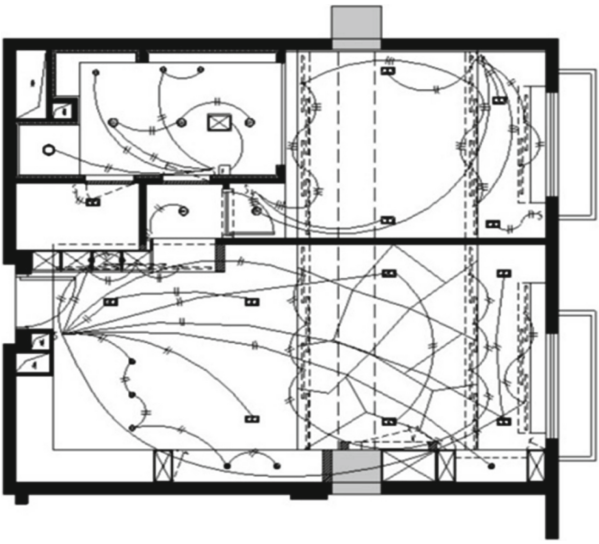

Fig. 2. Interior Lighting Design Rendering

2.4 Light Control Procedure

In the design process of the lighting control system, a single-chip microcomputer is used to control the two-way switch between transistors to adjust the brightness and darkness of the lamp. The working effect of the ON/OFF light is that when the remote controller presses the button, the SCM sends out the crystal control signal light ON/OFF, and then presses the button, the SCM sends out the crystal control signal light OFF, that is, after receiving the infrared signal, the indicator light signal turns. If the indicator light is 0, the indicator light will light up, and then press the button again, and the indicator light will go out at the same time. In the whole design, the light and dark adjustment of the lighting level, that is, the lamp with dimming function, is the key. At present, many residential and office buildings are installed with rotary dimmers. These light modulator switches are implemented by hardware. However, the infrared remote controller should use an intelligent lighting system to adjust the brightness and darkness of the lamp through the infrared signal of the remote controller. Therefore, it is necessary to find a way to achieve light modulation. In order to understand this method, starting from the principle of the bulb itself, you can adjust the light and shade of the bulb by changing the voltage on the bulb. On the hardware handle, adjust the resistance to change the voltage at both ends of the lamp. In the intelligent lighting system developed by us, we use SCM to change the function of bidirectional transistors and the line angle voltage of lamps. The principle of changing the shutter voltage by changing the shutter angle is shown in Fig. 3 [9–11].

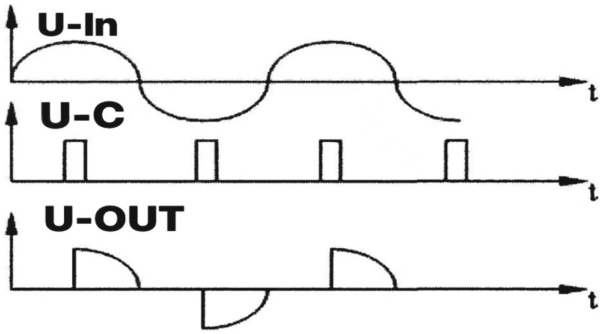

Fig. 3. Change of power supply voltage by crystal tube control

3 Sensor Design

3.1 Design of Environmental Brightness Sensor Module

The main component of the ambient light sensor module is photoresist. The peak spectral response of photoresist is close to the visual sensitive area of the human eye, and the wavelength is 555mm. On the other hand, photoresist uses the principle of photoelectric semiconductor effect, and its resistance varies with the intensity of incident light. The lower the incident light intensity is, the lower the resistance value is; The lower the incident light intensity is, the longer the reaction time is, and the resistance value increases. The detection module is encapsulated with epoxy resin, featuring small size, high sensitivity, fast response and high reliability. If the ambient brightness is detected when the detected light intensity exceeds the set value, the output level is low, otherwise the output level is high. The function of photoresist is to convert the brightness of ambient light into analog voltage, and then use a computer amplifier to transmit accurate digital signals to the microcontroller. In order to avoid the disadvantage of small light area, the detector must be reasonably placed around the building to accurately determine the intensity of natural light [12].

The design of passive thermal infrared sensor. The infrared heat dissipation sensor sends out electrical signals to detect infrared radiation from humans or animals. This.is an infrared energy sensor, which can detect the radiation of objects. The sensor of this circuit is a P2288 passive infrared heat release sensor, which is mainly composed of three parts: (1) Fresnel filter chip, as a bandpass filter, can match human radiation with a wavelength of 9 to 10 microns μ M infrared axis, which distinguishes people from animals. Fresnell lens can decompose thermal infrared signal into thermal infrared sensor, and divide alarm into several bright areas and dark areas. When the object moves within the warning range, the electrical signal of the infrared heat sink sensor can be changed by changing the temperature, thus changing the electrical signal of the infrared heat sink. The experiment shows that if there is no Fresnel lens, the infrared heat dissipation sensor can detect a distance of about two meters. With Fresnel lens, the detection distance can be increased to more than ten meters. Thermoelectric ceramic materials and pyrothermic infrared sensors convert changes in infrared radiation energy into electrical signals, that is, thermoelectric conversion is carried out through filter chips.

In the design, the human body can transmit about 10mV infrared ray by filtering and amplifying M with Fresnel filter chip. The infrared signal is detected by the Fresnel lens on the thermal infrared sensor. Then, the thermal infrared sensor converts the infrared energy into electrical signals through the thermoelectric conversion of the filter chip. Finally, the signal processor and logic circuit of the infrared detector are used for processing. If the value of output logic is 1, it indicates that someone is present; Otherwise, it means no one [13].

3.2 Control Part Design

(1) Delay time selection circuit

The time of the delay chain is determined by the timer in the microcontroller. The delay is selected to be set in the PA output of the microcontroller, mainly because the lighting must be delayed when the ambient light is dark. Set PA0–PA3 outputs with different delays. When it is detected that PA0–PA3 switches are not closed, the system monitors the lighting delay according to the set initial value. When PA0–PA3 switches are closed, the program starts to check the status of each port in the order of PA0–PA2, and the system sets different port delays according to different signal inputs [14].

(2) Single wing control unit

ATMEGA 16 uses RISC architecture as the main controller. This series of chips has the advantages of high efficiency, low power consumption, strong RISC processing capacity, large storage capacity, high cost performance, etc. The chip has 32 programmable I/O ports, 1KB SRAM and 8-way 10 bit ADC, meeting the system requirements. The photoelectric sensor converts the light intensity into electrical signal through a/d converter, and then converts it into digital signal. The system controller calculates the control variable according to the detected light intensity and the system input command to meet the light control requirements. The minimum schematic diagram is shown in Fig. 4.

(3) Display circuit

The system adopts external display configuration to display the operation status and changes of operation parameters of each device in real time. In order to save system cost, this design uses LED as external display to display the current state of the system. Based on the principle of photoelectric effect, the semiconductor photoresist was prepared. General materials include selenium, cadmium sulfide, sulfide pencil, sulfide secretion, cadmium selenide, zinc selenide, gallium arsenide, silicon, etc., among which the most important is the photosensitive resistance of photosensitive cadmium sulfide. Cured CDS photoresist, GL5516 series, 5–10 Ω photoresist and 0 Ω black resistor are used in the design [15]. The design consists of 5.1 Ω resistance, and the voltage fluctuation range is shown in Fig. 5 below:

The specific scope is shown in the following formula:

$$V1 = 5 * (5/(5 + 5.1)) = 2.47\ V \tag{1}$$

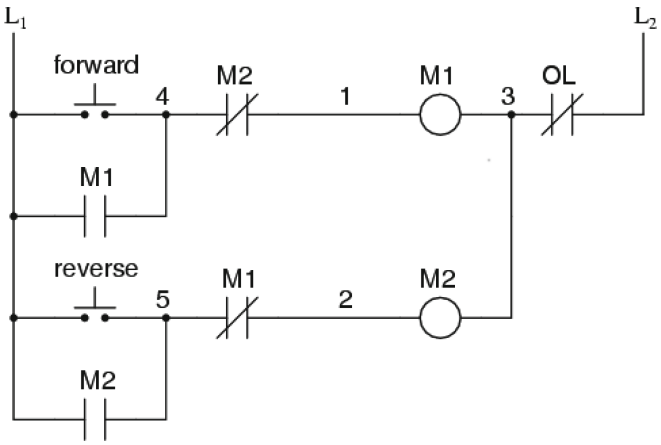

Fig. 4. Minimum circuit system

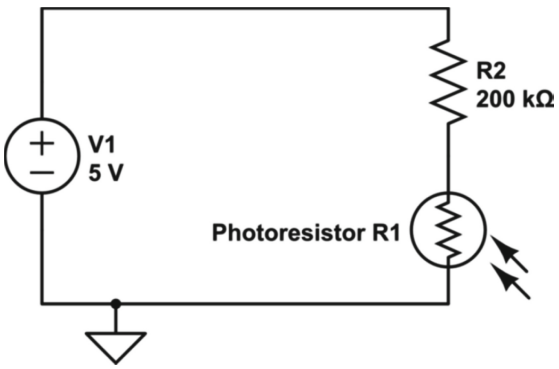

Fig. 5. Photoresistor control circuit

$$V2 = 5 * (10/(10 + 5.1)) = 3.31\,V \tag{2}$$

$$V3 = 5 * (100/(100 + 5.1)) = 4.87\,V \tag{3}$$

The working principle of the output control circuit is that a machine recognizes the output signals of the light detection circuit and the sensor processing circuit. PC0 microcontroller outputs control signal. If there is strong light or weak light in the room, and no one is in the room, the PC0 microcontroller output is high, and the relay does not work. The light is off. When the indoor light is dim and there is someone in the room, the PC0 pin output is low, the relay works and the lighting is normal.

3.3 Shape of Interior Lighting

The basic form of lighting is the design of points, lines and surfaces, and the point light source is the reference of the phase. For relatively small single tube lighting, such as

coil, ceiling light, light bulb, etc. D. In the middle of lighting design. Light source is the most common, but the target is very clear. Stable and orderly, centralized lighting, clear alarm effect; Light source mainly refers to:

Appropriate combination of linear light sources, including linear and curved light sources, can produce straight lines. The feeling of seriousness and tranquility has the effect of expansion and guidance, and the curve gives a feeling of flowing beauty. It has a strong decorative effect; Surface light source refers to the light flowing through the surface of the large surface cladding.

Linear light source can make lighting more uniform, softer and transparent, creating more artistic effects for people. Intelligent use is not required for indoor lighting, depending on the shape of the room. Lamps of the same shape make the atmosphere of the room an ideal place for people to be comfortable.

3.4 Ambient Lighting, Decorative Effect of 4-Lamps

The artistic treatment of lighting has produced a decorative effect that no decorative tool can match. Suggestion. But an excellent lighting effect is not easy to achieve, but through everything related to it. Analyze the means sensibly and use them correctly. With the development of social productivity. Also the appearance changes. Reflecting its exquisite style and decoration.

The beauty and fashion of modern society. In modern society people live and work, As physical objects in the interior, the existence of lamps plays an important role. It's a decorative element. As a lighting designer, in addition to the requirements for interior lighting, Environmental conditions, decoration style and other factors affect the choice of lamps, and attention should also be paid to the decorative effect of lamps. The decorative personality of lamps and lanterns is represented by their shape, size, material, color and other components.

4 Conclusion

With the development of science and technology, people's lives have changed, and the requirements for buildings and housing are becoming higher and higher. This system is suitable for building intelligent lighting. Modular design, simple and feasible; It can be used in accommodation, jewelry, clothing stores and other places with high lighting requirements. The integrated circuit module is small in size, does not affect the appearance, and has a wide range of applications. The optical matching system developed by the system uses multi-sensor light collection, ZigBee transmission frame, external light source and equipment to supplement and slow down light in the system. Compared with the previous intelligent control system, the system uses multiple sensors to collect complete information. The system passes the physical test, and each circuit module has low power consumption, high optical accuracy, simple detection circuit and fast information acquisition speed. Aiming at the shortcomings of traditional lighting system, an improved design of indoor lighting system based on intelligent detection technology is proposed. Using infrared and pyrolytic human body temperature control systems, combined with the two conditions of human body and environmental brightness adequacy

evaluation, signal processing, analysis and decision-making of a single ATMEGA16 machine can control lighting equipment more accurately. Strong humanization. The system is designed to control the lighting of large indoor spaces such as schools and shopping centers.

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Pricing Basis System Planning of New Electric Power System

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Abstract. Based on SWOT analysis of the current power engineering pricing basis system, SWOT analysis method is used to objectively analyze the current power engineering pricing basis system, and analyze the impact of new technology and new forms of development in the power field on the power engineering pricing basis and the opportunities. The construction of the pricing system framework for the electric power construction project of the new electric power system led by electric power enterprises not only takes into account the inheritance of the original system, guarantees the universality and pertinence of the pricing basis, but also combines the current dual-track system of list pricing and quota pricing in China. The valuation system framework based on the three level model of "foundation - rule - application", comprehensive quota and bill of quantities, and through the estimation of the preliminary settlement is established, and the working method is proposed to improve the system framework in the future.

Keywords: New Electric Power System · Electric Power Engineering · Pricing Basis System · Accurate Control · Project Valuation

1 Introduction

The new electric power system is based on the premise of carrying the internal requirements of achieving carbon peak carbon neutrality, implementing the new development concept, building a new development pattern and promoting high-quality development, ensuring the safety of energy and electricity as the basic premise, meeting the power demand of economic and social development as the primary goal, maximizing the consumption of new energy as the main task, and taking the strong smart grid as the hub platform.

Supported by the interaction of source and network, charge and storage and multi-energy complementarity, it has the basic characteristics of clean and low-carbon, safe and controllable, flexible and efficient, intelligent and friendly, open and interactive power system. However, due to the rapid technological development of the new electric power system, the pricing basis system of electric power engineering has some problems, such as small coverage, incomplete specialties, inconsistent preparation methods and actual conditions, disconnection between price and market, excessive dependence on industry quota, and inability to realize market pricing mechanism.

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In the face of the new demands of marketization, refinement, informatization and internationalization of cost management in the power industry, it is necessary to further innovate and improve the pricing basis system of power engineering, better guide the whole life cycle investment and cost control of power projects, and provide the basic basis for the optimal allocation of resources and value management of power enterprises [1–3].

2 SWOT Analysis of Current Power Engineering Pricing Basis System

2.1 Analysis on the Advantage of Current Power Engineering Pricing System

According to the content of the project pricing, the quota pricing system is relatively perfect, thermal power and power grid engineering categories are complete, and renewable energy is gradually improving; The list pricing basis system has been developed successively since 2003. Thermal power and power grid projects basically meet the demand, but there is a temporary lack of list pricing basis for wind power, photovoltaic and other types. In terms of the compilation method of engineering valuation basis and the measurement of resource consumption, a relatively mature theoretical method system has been formed at present, and there is a relatively clear price formation and price adjustment mechanism. In terms of engineering valuation basis application, the electric power industry has basically formed a relatively standardized pricing basis application behavior, so that the investment control, project cost management and engineering audit of electric power enterprises can rely on the basis of evidence.

2.2 Analysis of Disadvantages of Current Power Engineering Valuation Basis System

In terms of the content of the engineering valuation basis, the quota valuation system of the whole life cycle has not been established, and the engineering types covered by the electric power engineering valuation basis are not comprehensive. The mode of bill of quantities valuation has shortcomings in short execution time, whole life cycle, whole project type, new technology and new process in electric power industry. In terms of the compilation method of engineering valuation basis, the reform of electric power system makes the traditional resource consumption measurement method not applicable, and the current expert experience method has some problems such as quota content, consumption and actual mismatch. Factor price formation and adjustment mechanism are not in line with the market. In terms of the application of engineering valuation basis, engineering bidding and engineering settlement audit over-rely on industry quota, and cannot realize the mechanism of market pricing.

2.3 Opportunity of Current Pricing Basis System for Power Engineering

Energy transformation and innovative development will gradually realize green, low-carbon and efficient clean energy in the future. The development of energy and electricity provides soil and opportunities for the development of engineering pricing basis.

Whole process engineering consulting, whole life cycle cost management and other management technologies, big data, artificial intelligence. Blockchain and other new technologies provide methods and means for the innovation of pricing basis for power engineering. The successful experience of international cooperation projects of electric power enterprises lays a foundation for improving the wide applicability of the pricing basis of electric power engineering and helps the multi-angle development of the cost management standard of electric power engineering in the international electric power field [4].

2.4 The Challenge of Current Pricing Basis System for Power Engineering

The pricing basis of power engineering needs to be further improved in order to adapt to the control of investment cost of various types and stages of energy and power engineering. On the one hand, the pricing basis of electric power engineering should meet the requirements of the new management mode, on the other hand, the compilation method of the pricing basis of engineering is different from the advanced technical means. At present, the pricing basis of electric power engineering in China's electric power industry is not well adapted to the differences between the management of international engineering and overseas investment projects and the foreign pricing basis, and no adjustment method has been proposed to adapt to the foreign pricing basis.

3 The Influence of the Development of New Power Technology and New Business Form on the Basis of Project Valuation

The technological innovation and application in the field of electric power promote the constant adjustment of the pricing basis of electric power engineering to adapt to the development trend of new technologies in the electric power industry and timely enrich the element types of the pricing basis system of electric power engineering. The rapid development of new business forms provides an opportunity for the expansion of the application scope of the pricing basis system of electric power engineering and the optimization of the overall structure. The pricing basis of electric power engineering needs to be supplemented and perfected to effectively meet the pricing demand of new business forms of electric power.

3.1 Electric Power Technology Innovation

The power industry has made continuous breakthroughs in science and technology and promoted the improvement of the technical level of the industry. In the field of hydropower, it has mastered the world's leading manufacturing technology of giant hydro-generator sets with a capacity of one million kilowatts. In the field of thermal power, major breakthroughs have been made in the technology of secondary reheating boilers and heavy-duty gas turbines. In the field of nuclear power, third-generation nuclear power technology continues to advance; In the field of new energy, China's first large-scale offshore wind farm was built, and the demonstration and application of solar photovoltaic thermal power generation technology were carried out. Important

progress was made in research on new efficient solar cell technology. In the field of power grid, the company has comprehensively conquered key core technologies such as ±1100 kV UHVDC transmission, successfully developed the world's first set of UHV GIL equipment and achieved mass production [5, 6].

3.2 Optimization of Power Structure

To optimize the power structure and promote the clean development of power is the trend of global energy transformation and development. In the power sector, efforts have been made to explore and practice diversified energy and power investment, giving birth to new forms of energy and power business aimed at improving the quality and efficiency of energy development and enhancing the capacity to use clean energy. New forms of electric power development, such as integrated energy, electric energy storage, distributed energy, micro-grid, and electric vehicle charging, are developing rapidly in terms of technology and commercial application [7].

3.3 Application of Electric Digital Information Technology

With the continuous development of Internet, Internet of Things, blockchain, big data, artificial intelligence, edge computing and other technologies, as well as breakthroughs in quantum computer and 5G/6G technologies, modern information technology is applied in the field of power engineering construction to build smart construction sites, smart grids and smart power plants, and gradually realize remote monitoring, real-time recording and data sharing for construction and operation of engineering projects. We will promote the digitalization, intellectualization and intelligentization of the power industry. The rise and comprehensive promotion of big data, cloud computing and blockchain technologies will effectively realize the sharing and exchange of industrial cost data. BIM, as a platform carrier, can realize the information sharing of the whole life cycle of buildings, connect data, processes and resources at different stages of the whole life cycle, and support the integration of the industrial chain of the construction industry. It provides the basis for the establishment of the valuation basis system of the whole life cycle of the project [8–10].

4 New Electric Power System Valuation Based on System Model Top-Level Design

Based on the development of the above new electric technology and new business forms and the improvement of the pricing basis system of electric power engineering, this paper, on the basis of the original pricing basis, takes solving the existing pricing problems as the fundamental starting point and establishing the pricing system in accordance with law and compliance as the ultimate goal, and sets up a three-level framework model of "base layer - rule layer - application layer". A new system of pricing basis for power grid construction projects conforming to the characteristics of power grid cost management and convenient for application is formed.

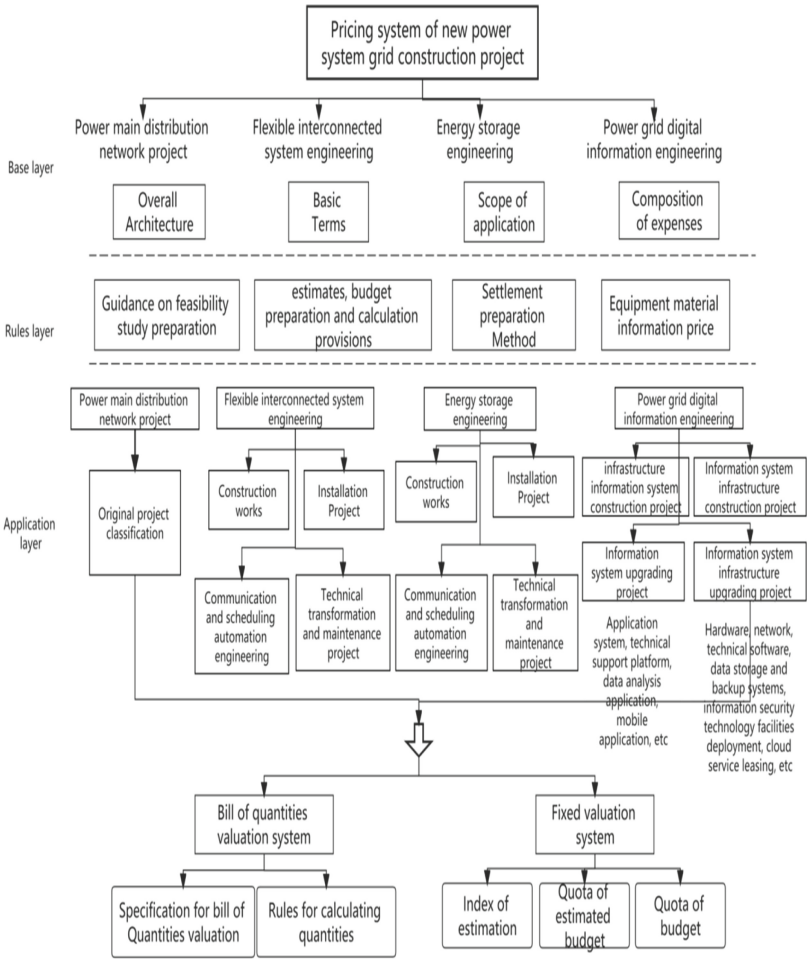

Fig. 1. Pricing system of new power system grid construction project

As show in Fig. 1, the base layer pricing basis is at the top of the pricing system framework of the new electric power system grid construction project, and it coordinates the standardization and supports the basic standardization of the pricing of the new electric power system grid construction project. It mainly includes the overall structure of the pricing system, basic terms, scope of application, cost structure and other basic instructions.

The pricing basis of the rule layer is located in the middle layer of the pricing system framework of the new electric power system grid construction project, connecting the pricing basis of the base layer and the application layer, and standardizing and supporting the estimation, budget estimate and budgeting of the new electric power system grid construction project. It mainly includes general standards such as research

and development guidelines, budgeting and calculation provisions, information prices of equipment and materials, and settlement preparation methods.

The valuation basis of the application layer is at the bottom of the valuation system framework of the grid construction project of the new electric power system. It is divided into the main distribution network project, the flexible interconnection project, the energy storage project and the grid digital information project according to the engineering types. The corresponding valuation basis is set respectively according to the list and quota. Including bill of quantities valuation specification, engineering quantity calculation specification and estimation index, estimate quota and budget quota. Based on the content setting of the model and application layer, this paper puts forward suggestions on the application layer of the pricing system of the construction project of the new power system, as shown in the following Table 1.

The valuation basis at different levels of the valuation system framework of new electric power system grid construction project should be standardized and formulated in accordance with the principle of mutual support and coordination, and applied to the valuation work of new electric power system grid construction project.

According to the above content, a relatively complete and clear hierarchy of the pricing system framework of the new power system has been built, but the framework should be gradually filled according to the technical development of power engineering. It is suggested that in recent 1–2 years, based on the existing pricing basis in the power industry, the corresponding supplementary quota or supplementary cost standard can be prepared according to the characteristics of various electric power construction projects of new power systems, so as to solve the prominent pricing problems at the present stage. In the long-term 3–5 years, the valuation basis fully applicable to the power construction project of the new power system shall be gradually formulated and formed, that is, the valuation basis covering all stages of the estimate of the power construction project of the new power system shall be formed to form a complete set of independent pricing basis.

The electric power construction project of the new power system involves many industries such as power, water conservancy, chemistry, heat and so on. It is suggested that the country or related industries should take the lead, and all industries should jointly promote the establishment of the pricing system. In particular, it is necessary to establish unified project pricing rules from the national level: including improving the construction cost item composition, to meet the construction project cost control and general project contracting needs; Perfect bill of quantities format, project composition, cost composition, compilation method, unified national bill of quantities valuation method and valuation rules; To unify the compilation rules of consumption quota, the comprehensive index index of project cost and the release standards of labor and material price information, and promote the formation of a unified and open construction market.

Table 1. Application layer of pricing system of new power system grid construction project

No.	Type of project	Valuation basis name
	Main and distribution network engineering	Specification for valuation of bill of quantities for main and distribution network engineering
		Specification for calculation of quantities of main and distribution network engineering
		Estimation index of main and distribution network engineering
		Estimated quota of main and distribution network projects
		Budget quota for main and distribution network projects
		Technical reform and maintenance quota of main and distribution network engineering
	Flexible interconnection system engineering	Specification for valuation of bill of quantities for flexible interconnected systems engineering
		Specification for engineering quantity calculation of flexible interconnected system engineering
		Flexible interconnected system engineering estimation index
		The budget estimate quota of flexible interconnected system engineering
		Flexible interconnected system engineering budget quota
		The technical reform and maintenance quota of flexible interconnected system engineering
	Energy storage engineering	Specification for valuation of bill of quantities for energy storage engineering
		Specification for engineering quantity calculation of energy storage engineering
		Energy storage engineering estimation index
		The estimate quota for energy storage projects
		Budget quota for energy storage projects

(*continued*)

Table 1. (*continued*)

No.	Type of project	Valuation basis name
		Technical reform and maintenance quota of energy storage engineering
	Power grid digital information engineering	Specification for valuation of bill of quantities of power grid digital information engineering
		Specification for the quantity calculation of power grid digital information engineering
		Estimation index of power grid digital information engineering
		The estimate quota of power grid digital information engineering
		The budget quota of power grid digital information engineering
		The technical reform and maintenance quota of power grid digital information engineering

5 Conclusion

This paper uses SWOT analysis to analyze the advantages, disadvantages, opportunities and challenges of the current power engineering pricing basis system. It is urgent to establish a unified and standardized pricing basis system for the new electric power system. Combined with the current situation of electric power engineering construction, the influence of new technology and new business forms on the electric power engineering pricing basis system is analyzed, and the top-level design framework of the new electric power system pricing basis system model is studied and formulated, which provides a reference and reference for the accurate control of engineering cost in the future power field and the improvement and development of more applicable electric power engineering pricing standard by enterprises.

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Application of Intellectualization in Medical Beauty Space

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Abstract. With the advent of information technology, intelligent medical treatment will be the general trend. At present, there are still many defects in the integration of medical beauty center and intelligent technology, which is reflected in the lack of intelligent and humanized design of medical beauty space. This paper focused on the intelligent design and research of medical beauty space from the perspective of building a digital intelligent medical beauty center. Through intelligent technology, innovative and experiential design of medical beauty space is carried out, and the safety and service of the space are improved, so that the intelligent technology in the medical beauty space can be fully utilized, so as to rationally allocate medical resources and improve efficiency, reduce the medical burden and other aspects to provide a more healthy, safe, intelligent and comfortable diagnosis and treatment environment.

Keywords: Medical Beauty · Intelligence · VR Technology · Sense of Experience

1 Introduction

In recent years, with the mature development of intelligent technology, residential intelligence, medical intelligence, information technology and other new ideas have emerged, some medical devices have introduced intelligence into them, which has a certain reference value for the intelligent design of medical beauty salons [1]. Due to the constraints of the conditions, there are still some shortcomings, intelligence in the overall design of the medical space is still a very small part, only for medical equipment functions and medical technology, with the advent of information technology, the intelligent technology into the design of medical beauty interior space, medical beauty institutions and intelligent technology integration still have many defects, intelligent in the design of human nature is still inadequate performance, improve the intelligent technology. Based on intelligent technology, the design and research of medical beauty space is the focus of this paper [2].

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2 Project Overview

This design project is for the Lido Medical Aesthetic Centre, which is located on the first floor of Block D of Rock Times, 103 Huizhongli, Chaoyang District, Beijing, adjacent to the Bird's Nest and the Water Cube, the main venues of the Beijing Olympic Games, with easy access to the surrounding area and convenient parking. The reception area is the first area that patients come into contact with when they enter the Lido Medical Beauty Centre, and includes a reception desk, a discussion room, a VIP room, a rest area and a pharmacy, providing patients with services such as product introduction and answering questions. It includes a waiting room, consultation room, skin management room, VR technology experience area, laser treatment room, patient recovery observation room and operation room; finally, there is the medical staff office area, which is an area for discussion and research on surgical solutions and medical technology among medical staff, including offices and research rooms (as shown in Figure) This area includes offices, research rooms, etc. (as shown in Fig. 1). Indoor flow analysis: Indoor pedestrian flow lines include customer walking routes and central medical staff walking routes (as shown in Fig. 2). The space can be navigated according to the user's location by means of human and infrared sensors in the intelligent system, based on the intensity of light.

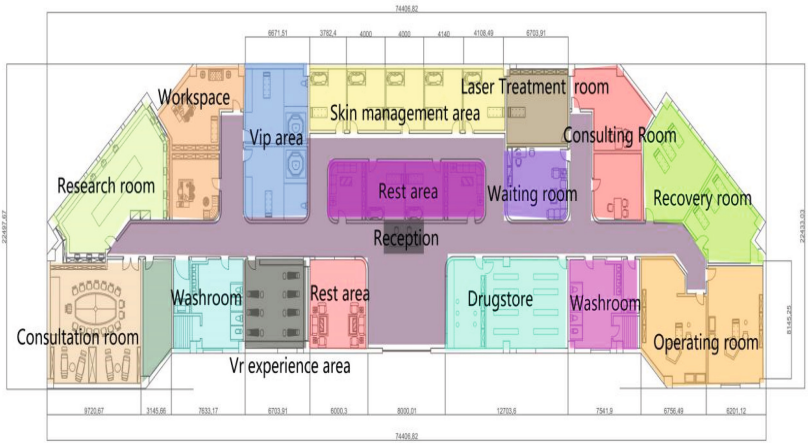

Fig. 1. Functional zoning map