Research on hospital intelligent construction based on weak current network system

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Abstract. The era of information technology has spawned the rise of intelligent buildings, and as the basic module of intelligent buildings, weak electricity technology, computer technology, communication technology, and control technology have jointly built an intelligent platform, especially in modern hospital buildings. A wider range of applications. Based on this, the paper combines practical engineering cases to explore the application of weak current systems in modern intelligent hospital buildings.

1. Introduction
With the continuous development of intelligent buildings, intelligent systems have become more specialized and mature, and various functional buildings have applied intelligent systems with different functions, so that the functions of buildings can be maximized to realize designers and buildings. The owners of the original concept of the building, such as government agencies, courts, financial institutions, museums, hospitals and other intelligent buildings have different special requirements, have different special requirements, and need different intelligent systems. The weak current intelligent system specifically includes: building equipment monitoring system (monitoring building) and monitoring security protection system, comprehensive wiring system, outpatient calling system and medical staff intercom system and hospital computer room construction. In this case, the author discusses the application of weak current systems in the intelligent construction of modern hospitals through the analysis of specific cases.

2. Introduction to weak current system
2.1. Composition of weak current system
Weak current system is a new, comprehensive and complex system engineering for building intelligent system. It is modern computer technology, modern communication technology, modern automatic control technology, modern image display technology, integrated wiring technology, system integration technology. Such as modern information technology and other modern high-tech and building technology organic combination [1]. The weak current system mainly includes the following characteristics according to the characteristics of the hospital and the development trend of the current intelligent technology. First, building equipment management system: building automation system (BAS), fire automatic alarm and fire linkage system (AFS), background music and emergency broadcasting system, security monitoring and anti-theft system (SAS), access control card system; second, hospital Specialized system: design of surgical demonstration teaching system, outpatient
queuing system design, operating room monitoring system; third, comprehensive medical management system: UPS power supply protection system design, information room.

2.2. Integrated wiring system design
For the signal transmission lines of intelligent systems (computers and networks, voice equipment) in the building, it can connect voice equipment, data equipment, switching equipment and various control equipment’s with the information management system, and also make this equipment communicate with the outside. Network connected. Therefore, on the basis of this, voice communication, data image processing, control and other functions are realized. The principle of distribution points generally sets one voice point and one intranet data point in each work area (office, nurse station). The medical technology department (B-ultrasound, CT) sets 1 voice point, 2 intranet data points, 1 external network data point and 1 set of fiber information points. The laboratory and biochemical room should reserve enough information points [2].

![Fig. 1 Hospital intelligent building weak current system integrated wiring](image)

3. Building equipment management system

3.1. Building Automation System (BAS)
The purpose of building self-control is to provide hospitals with efficient, safe, convenient and comfortable working environment, reduce hospital energy consumption, save hospital expenses, improve operational management level, and meet the hospital's work with the continuous improvement and development of hospital construction. Environmental requirements and management requirements. The system consists of seven parts: cold and heat source system, new air blower unit, air supply and exhaust, water supply and drainage, power distribution, lighting, and elevator. The building automation system adopts a set of advanced, reliable and complete equipment, which consists of a central operation station, a network controller (NCU) direct digital controller (DDC), etc. [3]. Real-time monitoring, recording and alarming of fresh air conditioners, water supply and drainage equipment, refrigeration systems and lighting systems, signal collection and monitoring of power and elevator systems, timely understanding of the operation of various equipment, and effective management. Through various management software and energy-saving software, the equipment can be automatically controlled and started regularly, which can save the number of personnel and reduce energy consumption, and ensure the safe and reliable operation of the hospital electromechanical system, thus achieving the best management effect. The entire building automation control system is highly intelligent.
3.2. Automatic fire alarm and fire linkage system (AFS)
According to the requirements of the fire protection regulations, the intelligent smoke detector, the temperature sensing probe, the manual alarm button with telephone plug and the fire hydrant linkage control SI button are set, and transmitted to the fire automatic alarm control host of the DI control room through the computer special network. When the fire occurs, the linkage of the anti-pump and the spray pump is controlled by the linkage system, and the publication of the fire curtain of the Zhengtian blower and the smoke exhaust mechanism is started, and the emergency broadcast system is activated to notify the personnel to evacuate.

3.3. Background music and emergency broadcasting system
As the background music system of the hospital, it provides leisure music of <30db, which provides a relaxed, comfortable and comfortable environment (such as waiting room, clinic, reception area, sun room, garden), which can adjust the emotions of both doctors and patients. Provide music that matches the time and season [4]. Using a system to achieve both daily play and emergency broadcast, that is, playing background music and daily broadcasts. When an abnormal situation such as a fire occurs, according to the signal transmitted from the fire protection system, the corresponding floor or S-domain broadcast is forcibly switched to the emergency broadcast by the switching controller, and the organization personnel evacuate in time, while other floors are still broadcasting normally. It can be divided into different floors to play different music, and medical broadcasts can also be issued only to designated areas, such as doctors' offices and nursing offices.

3.4. Security Monitoring and Anti-theft System (SAS)
The security monitoring system consists of closed-circuit television, anti-theft alarm, visual intercom equipment in the ward area, channel (forbidden) management equipment and parking lot monitoring equipment. The security system consists of front-end image acquisition, signal transmission, and main control. The front-end system has cameras, pan/tilt machines, etc., depending on the site conditions. The camera mainly adopts a color hemisphere type, and its appearance is semi-circular. It is similar to a lighting lamp and is installed in a public place such as a corridor, and does not affect the appearance of the floor. The special color dome camera is used in the elevator car. The appearance is beautiful and concealed, and the activity of the passengers in the elevator can be photographed in time. In addition to monitoring important areas, infrared dual-weight mobile alarm devices are installed in areas such as tolls, drugs (poisons, hemp) and medical equipment libraries. An emergency call alert button is installed at the toll booth and at each level of the nurse station to ensure that the nurse station, which is the hospital ward floor supervision center, is under the supervision of the security center [5]. When the on-duty nurse encounters an emergency or an emergency, the help-seeking signal is sent to the security center through the emergency call alert button, and the monitored screen is displayed on the main monitor.
3.5. Access Control Card System
In order to make hospital management more scientific, we have adopted a one-card integrated system. Medical staff can enjoy all kinds of conveniences simply by carrying a smart card. Safe and comfortable service. Incorporate the smart card system into the scope of security management system, real-time control of the location of the fortification zone, through objects, transit time, etc., and integrate the isolated systems into an associated system by means of technologies such as computer networks and databases. The sharing of information, materials and tasks has a great impact on improving the ability to respond to emergencies and management capabilities. The establishment of a comprehensive security system can improve the management level, improve the quality of window service, and guarantee the property and personal safety. People who work and live in hospitals always feel the convenience brought by modern technology.

4. Hospital-specific system

4.1. Surgical Demonstration Teaching System
Using the camera to shoot the scene of the operation through the Internet real-time and digital DVR for live broadcast, and can save the entire surgical process, the preservation of post-data, the preservation of the CD, the integration of surgical video on demand and analog transmission. The image adopts MPEG-2 codec to meet the high image quality requirements of hospitals.

4.2. Outpatient Queuing Calling System
The system consists of a ticket issuing machine, a voice report device, a comprehensive display screen, a queue management center and software. By setting the call number system in the waiting area of the outpatient hall and connecting with the HIS, the doctor calls the number through the virtual keyboard, and the system automatically collects the patient name from the registration system of the HIS system, and displays the relevant information through the voice report device. The hospital can set up multiple sets of calling systems in different areas as needed [6].

![Security System Diagram](image-url)
4.3. Operating room monitoring system
The clean surgery department has a number of operating rooms, and the surgical scene is monitored by setting a dome camera in each operating room. The color display is located at the nurse station. The head nurse in the operating room can monitor the operating room most intuitively according to the needs, understand the use of the operation room, and arrange various preoperative preparations to improve the operating efficiency of the operating room. The operation coordination of the medical staff in the operating room communicates with the indoor staff in time through the hands-free telephone indoors and outdoors. The operating room clean air conditioning system is equipped with an independent automatic control device, and is disconnected from the building automation system, avoiding repeated settings and maloperations. This can monitor indoor temperature and humidity conditions and various gas operating conditions, as well as lighting. The opening and closing of the necessary operations.

5. Integrated medical management system

5.1. UPS power supply protection system design
UPS is not only a discontinuous power supply, but also provides power supply for uninterruptible power supply to weak current system equipment, so as to achieve 7*24 hours of uninterrupted operation, which is a necessary condition for ensuring the normal operation of the weak current system. The UPS power supply has two types of backup and online. The backup features are cheap, the conversion time is long (4ms), and the equipment requirements are not high. The online features are more expensive, the conversion time is extremely short (0ms), and the equipment requirements are high. The choice of battery pack generally considers a 1-hour backup time.

5.2. Information room
The information room is the core of the entire weak electrical intelligent system. The electronic information room construction environment must meet the technical requirements of computer equipment for temperature, humidity and air cleanliness, power quality, grounding, electromagnetic field and vibration. In addition, it must be Meet the requirements of lighting, air freshness, flow speed, and noise for people working in the equipment room. Computers, switches, servers, storage, etc. are valuable precision equipment, and the equipment room is a key and important data center. Once data...
loss occurs, the loss cannot be estimated. Therefore, it is often the focus of security. At the same time, the information room has high requirements for fire protection and security. The construction of electronic information room mainly includes machine room decoration, grounding system, power distribution system, integrated wiring, fire protection system, security and access control system, air conditioning and ventilation system, and centralized monitoring system [7]. Due to their location in the weak intelligence, each system is relatively independent of other systems in the building. The materials used for decoration must meet the standards of dustproof, antistatic, flame retardant, flame retardant, shielding, water leakage prevention, heat insulation, heat preservation and noise reduction.

6. Conclusion
In recent years, the application of weak current system design in hospital intelligent construction has developed rapidly. There are many mature weak current system design and construction units in our province, and more than 10 provincials, municipal and county-level hospitals have been newly built and rebuilt and expanded. The weak current system design and intelligent construction are adopted. The newly built and rebuilt intelligent hospitals have played an important role in the management of modern hospitals, improved the service process, improved the medical environment, facilitated the patient's medical treatment, greatly improved the work efficiency, and made the hospital's functions and services qualitative. Leap, an application platform that provides better services for patients, truly reflects information, automation, and intelligence. With the continuous development of the intelligent level of domestic hospitals, more and more intelligent systems will be applied to all aspects of the hospital. This requires combining the current situation and long-term planning of hospital intelligent construction as a whole, not only to meet the needs of the current stage, but also to maintain appropriate interfaces and space for subsequent expansion, so as to create a first-class environment, first-class management. First-class talents and first-class services lay a solid foundation.

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