Suitable for chicken house,duck house,pig factory,cattle factory and other breeding environment.

Smart Breeding Environment Monitoring System

System Background

1

CHANPTER ONE

System Background

During the development of modern livestock breeding industry, it faces problems such as low level of enterprise production management, weak government supervision, serious environmental pollution, scattered industry data resources, animal product quality management, epidemic prevention and control.With the rapid development of the livestock industry, the scale and specialization of livestock breeding is increasing, and it has become an increasingly important factor in the development of the livestock industry to transform and upgrade the traditional livestock industry, develop and innovate the modern intelligent livestock industry, and accelerate the modernization and informationization of the livestock industry.

To build automation and informatization of livestock breeding and realize smart livestock breeding, we must establish data transmission channels for on-site automation equipment as well as monitoring equipment and breeding management platfom first.

System Background

To this end, Jianda Renke provides smart breeding environment monitoring system for industry characteristics.The system combines IoT intelligent sensing, transmission and control technology with the farming industry according to the characteristics of the livestock and poultry farming environment.Using advanced network transmission technology, it is designed around intensive livestock and poultry farming production and management links, which can reduce labor management costs, energy consumption costs and improve farming efficiency for farmers.

2

CHANPTER TWO

System Overview

◆ System Overview

    Jianda Renke Smart Farming Environment Monitoring System consists of **environmental information monitoring , video monitoring , automatic control and information management platform**.It mainly includes **temperature monitoring, humidity monitoring, O2 concentration monitoring,H2S concentration monitoring, NH3 concentration monitoring, CO2 concentration monitoring, and illumination monitoring** in the environment of chicken house, duck house, pig breeding factory, and cattle breeding factory, etc.

    The collected data and video monitoring images can be uploaded to the information management platform (environmental monitoring cloud platform) via the environmental monitoring host, realizing the data viewed by computers, PAD and mobile phones in multiple terminals.At the same time, the background can set the upper and lower data limits, once the data exceeds the standard, the sound and light alarm connected to the host will alarm, and each platform will also receive the alarm push, which is convenient for managers to control the environment in the plant in time. Through a set of temperature and humidity and harmful gas monitoring program to ensure that the environment in the house is suitable for animal growth and development and improve economic efficiency.

Topology Diagram of Smart Breeding Environment Monitoring System

System Composition

3

CHANPTER THERE
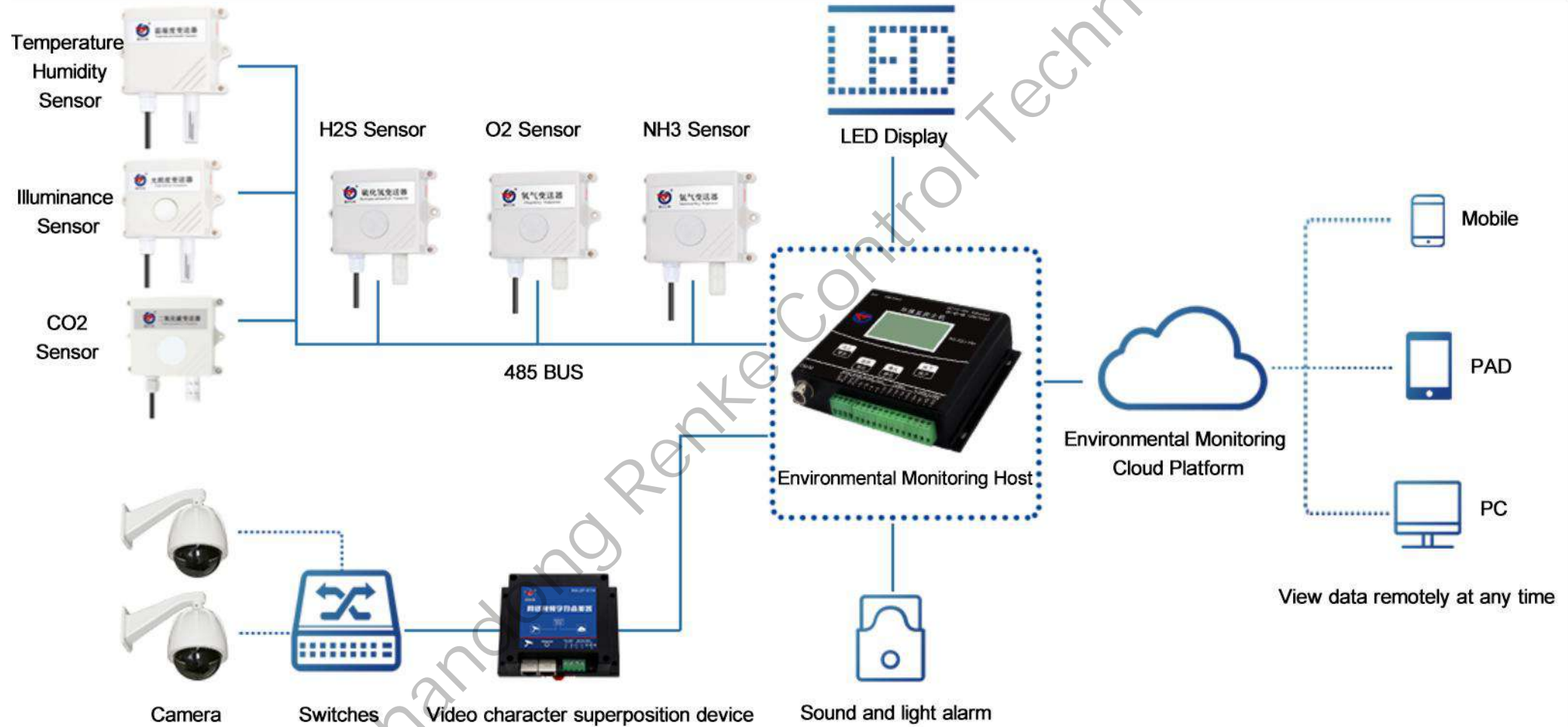
✓ Information Management Platform

✓ Environmental Information Monitoring

✓ Automatic Control

✓ Video Monitoring

System Composition

Environmental information monitoring

Temperature and humidity sensor, illuminance sensor, CO2 sensor,NH3 sensor, H2S sensor, O2 sensor

Video monitoring

Installing cameras in the breeding plant,and access to the environmental monitoring cloud platform.

Information management platform

Environmental monitoring cloud platform, which can realize the display, storage, analysis and management of information collected from breeding plants.

Automatic control

Realize the control of light, temperature and humidity, feed addition and other functions.

Jianda Renke smart breeding environment monitoring system consists of environmental information monitoring , video monitoring , automatic control and information management platform.

◆ System Composition

Environmental information monitoring

Installing **temperature and humidity sensors,illuminance sensors, CO2 sensors, NH3 sensors, H2S sensors, and O2 sensors** in the breeding plant.Each sensor collects data via 485 and displays it on the LED display in the breeding plant or uploads it to the environmental monitoring cloud platform in real time through the **environmental monitoring host** to achieve automatic detection and transmission of environmental information in the breeding plant.

Temp & RH   Illumination   Gas

◆ System Composition

Environmental information monitoring - Temperature and humidity sensor

RS-WS-N01-2-* is a wall-mounted temperature and humidity sensor with high protection level shell, IP65 protection level, rain and snow proof and good ventilation.The circuit adopts American imported industrial-grade microprocessor chip and imported high-precision temperature sensor to ensure excellent reliability, high precision and interchangeability of the product. This product adopts particle sintered probe sheath, the probe is directly connected to the shell with beautiful and elegant appearance. The output signal is RS485, the farthest communication can be 2000 m. It is standard modbus protocol and supports secondary development.

DC power supply (default)	10~30V DC
Max. power consumption	0.4W
Temperature range	-40℃~+120℃，-40℃~+80℃(default)
Humidity range	0%RH~100%RH
Operating temperature and humidity	-40℃~+60℃，0%RH~80%RH
Signal Output	RS485 output (standard Modbus-RTU protocol)

◆ System Composition

Environmental Information Monitoring - Illuminance Sensor

RS-GZ*-*-2 is a wall-mounted, high-precision light-sensitive touch illuminance sensor, the output value measurement unit is Lux, the device is waterproof shell, high protection level.The device adopts 485 communication, standard ModBus-RTU communication protocol, communication address and baud rate can be set, the farthest communication distance is 2000 m. The product power supply is 10-30V wide voltage power supply, mainly used in agricultural greenhouses, flower cultivation greenhouses, agricultural fields, electronic equipment production lines and other occasions that require illumination monitoring.

DC power supply (default)	10~30V DC
Max. power consumption	0.4W
Temperature accuracy	±0.5℃ (25℃)
Humidity accuracy	±3%RH(60%RH,25℃)
Light intensity accuracy	±7%(25℃)
Light intensity range	0~65535Lux；0~20万Lux
Temperature & humidity range	-40℃~+60℃，0%RH~80%RH

❖ System Composition

Environmental Information Monitoring - Carbon Dioxide Sensor

CO2 sensor RS-CO2*-*-2 adopts the new infrared calibration technology for CO2 concentration measurement, with rapid and sensitive response, avoiding the life span and long time drift problems of traditional electrochemical sensors. CO2 sensor is widely used in agricultural greenhouses, flower cultivation, edible fungus cultivation and other occasions requiring CO2 and temperature and humidity monitoring.The equipment has a wide voltage supply of 10-30V and high protection level of the shell, which can adapt to various harsh conditions on site.

DC power supply (default)	10~30V DC
Power consumption	0.3W（24VDC）
Measurement Range	0~5000ppm（default）
Accuracy	±(40ppm+ 3%F·S) (25℃)
Operating temperature	-10℃~+50℃
Operating humidity	0%RH~80%RH
Response time	Generally less than 90S at 90% step change

◆ System Composition

Environmental Information Monitoring - Oxygen Sensor

Oxygen sensor RS-O2*-*-*-25Vol adopts imported first-tier brand electrochemical oxygen sensor, which has the characteristics of rapid and sensitive response, strong anti-interference ability, after our unique compensation algorithm, multi-segment standard gas calibration, also has the characteristics of long life, high precision, high repeatability and high stability. It is suitable for warehouses, workshops, chemical plants, greenhouses, enclosed living places and other occasions that require real-time monitoring of oxygen concentration. The device adopts 485 signal output, standard Modbus-RTU communication protocol.ModBus address can be set, baud rate can be changed, the communication distance is up to 2000 m.

DC power supply (default)	10~30V DC
Power consumption	0.12W
Measurement Range	0~25%Vol
Accuracy	0~25%Vol
Operating temperature	-20~50℃
Operating humidity	5~95%RH No condensation
Resolution	0.1%VOL

◆ System Composition

Environmental Information Monitoring - Ammonia Sensor

The ammonia sensor RS-NH3-*-2-* adopts imported first-tier brand ammonia sensor, which has the characteristics of rapid and sensitive response, strong anti-interference ability, and through our unique compensation algorithm, multi-segment standard gas calibration, also has the characteristics of long life, high accuracy, high repeatability and high stability. It is suitable for agricultural greenhouses, farms, pesticide manufacturing plants, chemical plants and other applications that require real-time monitoring and control of ammonia gas. The device adopts 485 signal output, standard Modbus-RTU communication protocol, ModBus address can be set, baud rate can be changed, the communication distance is up to 2000 m.

DC power supply (default)	10~30V DC
Power consumption	0~50/100ppm：0.12W 0~500ppm：0.9W
Measurement Range	0~50ppm/0~100ppm/0~500ppm
Accuracy	0~50/100ppm：±2%FS 0~500ppm：20%FS
Operating temperature	-20~50℃
Operating humidity	15~90%RH No condensation
Resolution	0-50ppm：0.1ppm/0-100、0-500：1ppm

◆ System Composition

Environmental Information Monitoring - Hydrogen Sulfide Sensor

Hydrogen sulfide sensor RS-H2S-*-2-100P adopts the imported first-line brand electrochemical hydrogen sulfide sensor, which has the characteristics of rapid and sensitive response and strong anti-interference ability. It is suitable for underground corridors, underground parking lots, garages, workshops, chemical plants, greenhouses, enclosed living places, etc. where the concentration of hydrogen sulfide needs to be monitored in real time. The device adopts 485 signal output, standard Modbus-RTU communication protocol.ModBus address can be set, baud rate can be changed, the communication distance is up to 2000 m.

DC power supply (default)	10~30V DC
Power consumption	0.12W
Measurement Range	0~100ppm
Accuracy	±3%FS
Operating temperature	-20~50℃
Operating humidity	15~90%RH No condensation
Resolution	1ppm

◆ System Composition

Environmental Information Monitoring - Environmental Monitoring Host

RS-XZJ-100-Y-* is a multi-functional monitoring host developed by our company for environment monitoring places such as server rooms and warehouses, which can connect all our RS485 sensors (temperature and humidity, water leakage, smoke detection, etc.) to the environment monitoring host through RS 485 interface and upload the data to our cloud platform (www.0531yun.cn or iot.0531yun. cn) or the customer's own server in real time. or iot.0531yun. cn) or the customer's own server.

The device supports GPRS (optional 4G), Ethernet, RS485 wired to upload data, users can choose the corresponding sub-models according to the actual use of demand. The device has a built-in large LCD screen with easy-to-operate interface, and the host can be connected to a maximum 1024*256 dot matrix LED screen. When the equipment exceeds the limit, the screen will display the alarm channel and the alarm real-time data in turn, and the built-in real-time clock can display real-time data and system time.
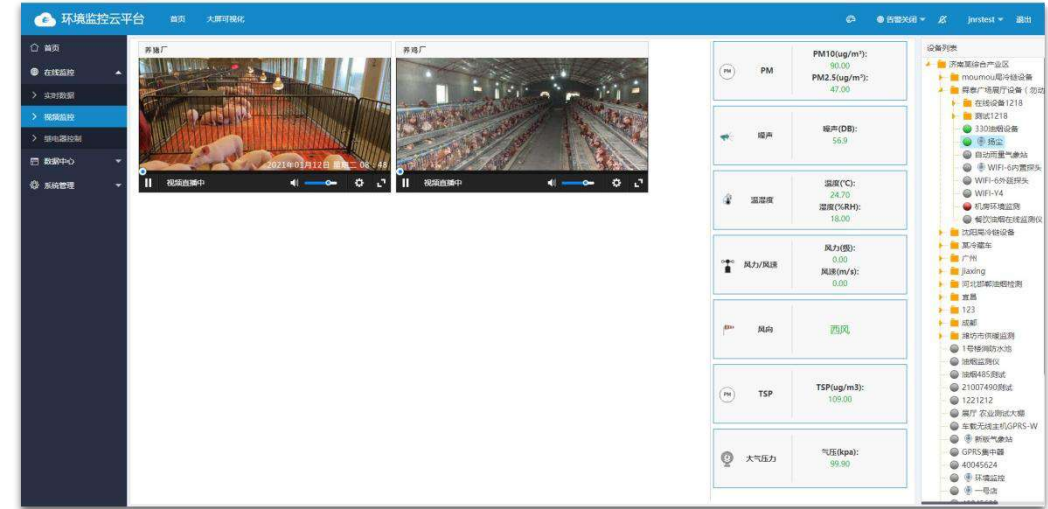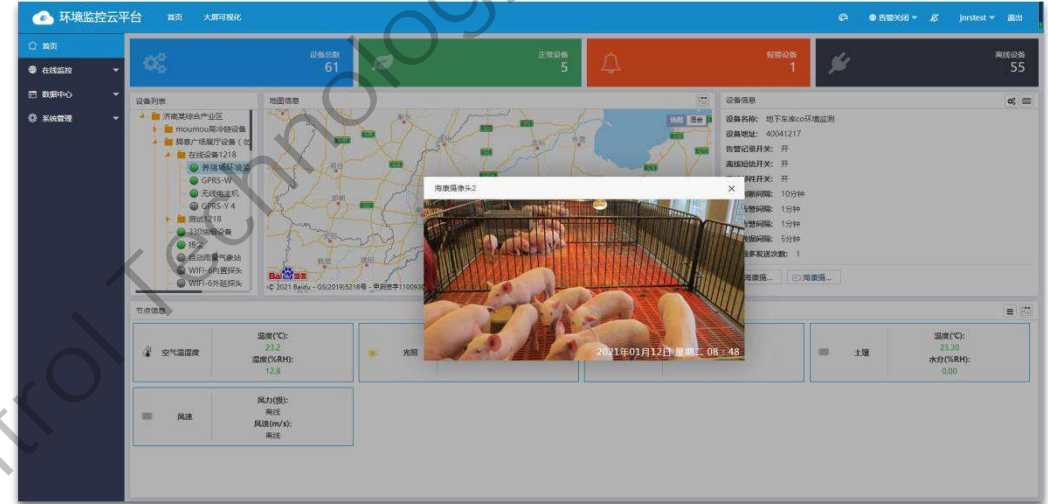
System Composition

Video Monitoring

Installing cameras in the breeding plant and accessing to the environmental monitoring cloud platform, the real-time monitoring data is displayed on the monitoring screen through the **video character superposition device**, which can realize the activity of the animals at any time, reducing the number of manual on-site inspections and improving the management efficiency. In addition, you can also monitor the security of the surrounding environment of the farm.

Real-time view

Improve efficiency

Reduce labor

◆ System Composition

Video Monitoring- Video Character Superposition Device

Network Video Character Superposition Device RS-ZF-ETH is a device developed by our company for high-definition network cameras with the common standard Modbus-RTU communication mode 485 devices in the market. Users can connect this product to 485 devices according to the actual needs, and after simple configuration of the superimposer, the corresponding character information will be superimposed on the HD network camera video screen.

The device adopts standard Modbus-RTU communication mode, matching all standard Modbus-RTU devices on the market, and can be used for sensor superposition character information, server room monitoring, smart agriculture, meteorological monitoring and other so on. RS-ZF-ETH character superposition device can support the superposition of multiple cameras at the same time. Each character superposition device can simultaneously support up to 4 cameras processing, 16 standard Modbus-RTU communication mode 485 devices. The configuration software is simple and convenient, supporting a variety of data type settings, register address can be offset read. Camera underlying protocol docking, does not affect the original video signal, superimposed information position can be adjusted. The device is small and beautiful, occupies little space, easy and convenient installation.

◆ System Composition

Information Management Platform

Jianda Renke Smart Breeding Environment Monitoring System is an environmental monitoring cloud platform that can realize the display, storage, analysis and management of information collected from breeding plants and provides threshold settings and alarm functions. Users can remotely log in to the management platform through computers and mobile phones to control the status of each farm and implement supervision and management of the farm's production and operation. The supervision departments (Animal Husbandry Bureau, Animal Health Supervision Bureau, Animal Disease Prevention and Control Center, etc.) can view the production, quarantine, immunization and sales of livestock and poultry in each township through the platform, plan the introduction, cultivation and promotion of good breeds, and maintain good market order.

System Composition

Dehumidification Heating

Open Window for Ventilation

Lightening and Refilling

Automatic Control

The environmental monitoring cloud platform supports web terminal, mobile APP, WeChat public number and other login methods that are not restricted by time and location, and supports users to add sub-accounts, view equipment status, query data records, select alarm methods, etc. Users can remotely and centrally control and linkage control the relevant equipment (dehumidifier, heater, window opener, infrared light, fan, etc.) in the breeding plant through the environment monitoring cloud platform, APP or WeChat public number. It realizes the control of light, temperature and humidity, feed addition and other functions in livestock and poultry houses.

4

CHANPTER FOUR

System

Advantages

System Advantages

Jianda Renke Smart Breeding Environment Monitoring System can help realize resource integration, data sharing and business collaboration in the livestock industry, improve management efficiency and reduce management costs by using information technology, and enhance scientific, efficient and standardized management of production and operation enterprises.

24-hour monitoring of the breeding environment

Staff can remotely monitor the environmental data transmitted by each equipment sensor and control it as needed or suggested by the system。

Remote maintenance, Automatic fault diagnosis

It implements remote parameter configuration, upgrade and maintenance management for terminal devices through the device management platform, realizes remote fault diagnosis, accurate alarm and remote repair of communication faults, and saves network management and terminal maintenance costs.

Mobile Remote Control

Platform remote control provides including: PC terminal, mobile terminal, tablet client and other remote control equipment, data transmission is safe and reliable. The devices all adopt industrial-grade design to achieve reliable, safe and stable data transmission links for unattended sites.

Complete Network Package Software

Formulating and modifying complex multi-level management system becomes simple and convenient. Managers of each layer can query various breeding information simply and quickly through the network. Intelligent data backup function ensures that the data is stable and not lost and kept for a long time.