

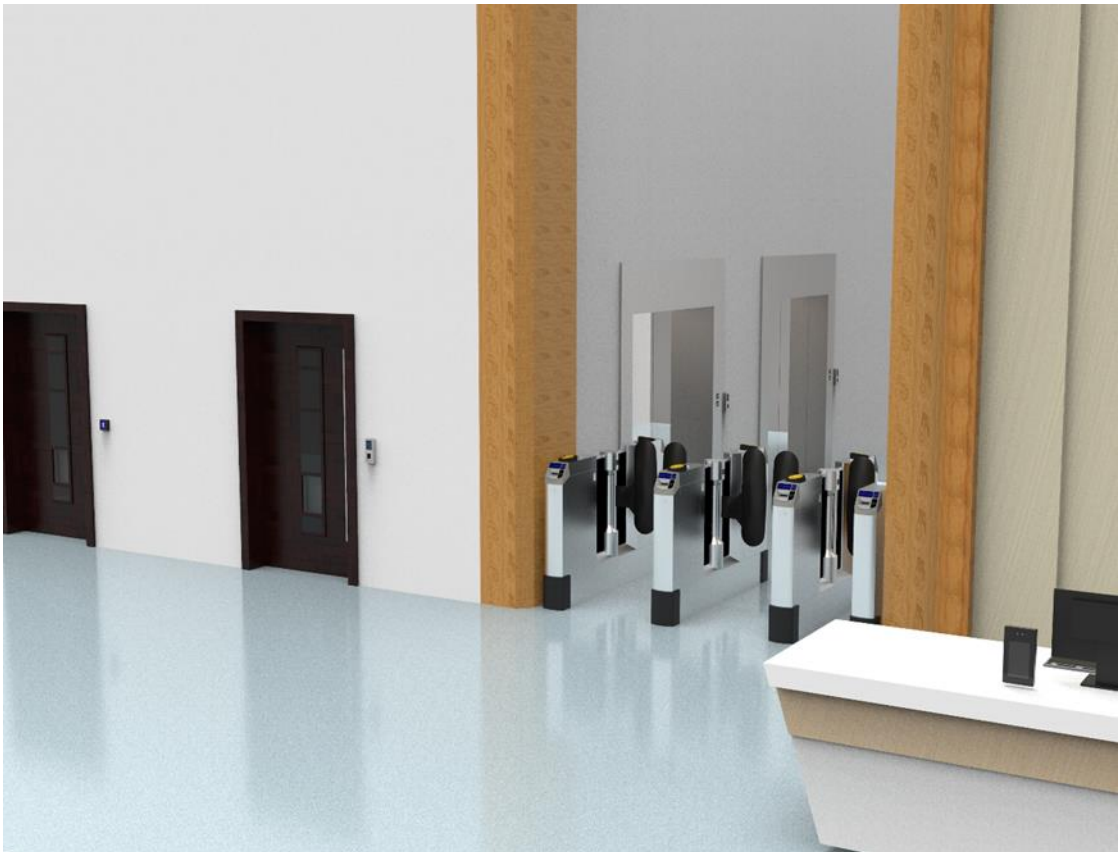
ELITEUN Lightweight IoT Access Control System

LIACS

# System Introduction

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ELITEUN INTELLIGENCE TECHNOLOGY LTD



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# 1 System Overview

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## 1.1 Background

Rapid development of technology and economy has brought information technology into almost every part of people's lives, while accompanied with new security challenges. Now the awareness of assets protection and security control begins to gain more focus, there is a broader need for access control systems to be more comprehensive and user friendly. Therefore, plenty smart access control systems have emerged and are widely adopted in various buildings. However, the variety and complexity of current access control systems on the market does not make it easier for users, especially enterprise users. Thus ELITEUN launched Lightweight IoT Access Control System (LIACS), to offer customers a simple, lightweight, quickly deployed access control solution.

The access control systems have the following problems:

- Many lightweight assets in both industrial and commercial IoT need centralized management, such as telecom equipment boxes, outdoor control boxes, utility protection equipment, hotel doors, etc.
- Traditional access control methods, such as cards or mechanical keys, conceal potential risks in the process of distribution, management and security maintenance, and are costly.
- To blindly apply existing heavyweight access control system could lead to many problems, such as complex management process, high cost, and poor management of large number of IoT nodes.
- The inefficiency to securely transmit or centrally manage data from large quantity of nodes results in loss of value of these data and of IoT ecosystem.

## 1.2 Positioning

LIACS grants access by recognizing Bluetooth ID, one-click(remote) authorization, and face recognition, to avoid troubles such as forgetting keys and losing door cards. For business office buildings, visitors' access can be managed in the cloud to simplify cumbersome supervision and save human resources. Smart access control brings unprecedented convenience, safety and efficiency to people's life, work, entertainment and learning. In the future, the application scenarios of smart access control systems will become more diverse.

## 1.3 Highlights

ELITEUN LIACS has the following characteristics:

- The system is designed specifically for industrial IoT scenarios with mass nodes. Its compatibility with traditional access control systems helps to reduce deployment cost.
- Lightweight distributed access control system on cloud and encryption mechanism can simplify and secure the distribution and management process.
- Multi-factor authentications including Bluetooth ID, face recognition, fingerprint recognition, code keyboard, and card reader are applied to guarantee safety. Customers can choose authentication methods for different scenarios.
- Both public and private deployment are available to support a cross-regional, integrated system. This centralized management streamlines data extraction from access logs and delivers value to decision making.

## 1.4 Benefits

ELITEUN LIACS brings the following benefits to customers:

- Based on the industrial IoT framework, the traditional distributed access control system is reconstructed to pave the way between mechanical, isolated access control devices and central management platform.
- This solution offers a genuine, reliable and low-cost IoT access management system with lightweight deployment and decentralized security strategy.
- Rather than simply connecting the devices, the system aims to greatly enhance business management by coordinating IT/OT and leveraging data value.

## 2 Network Architecture

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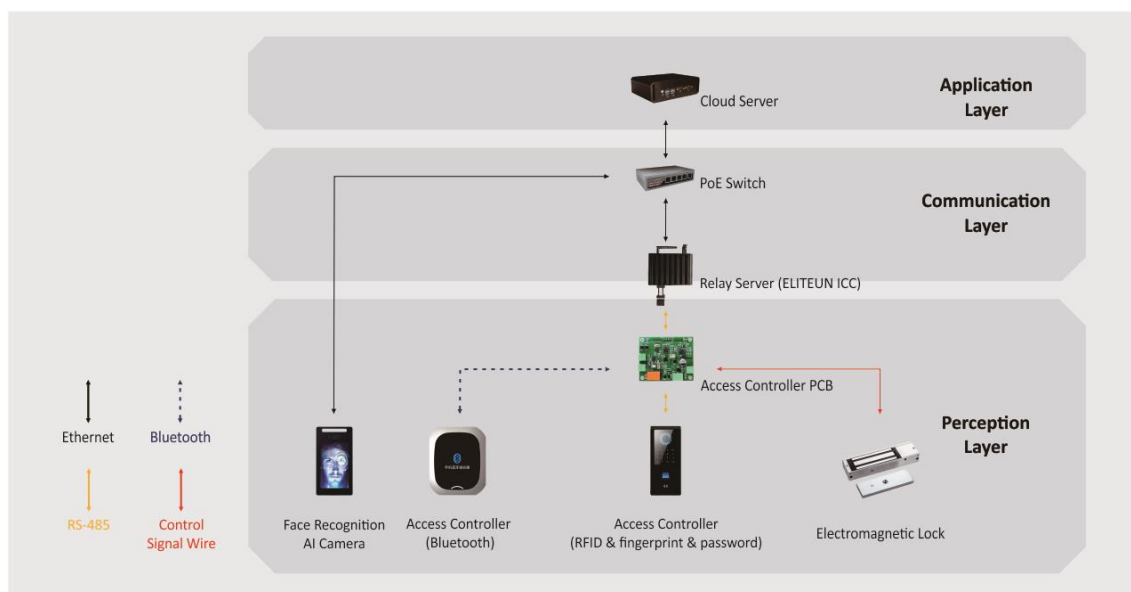
### 2.1 Networking Overview

LIACS adopts an integrated and open network architecture with three layers, application layer, data transmission layer, and data perception layer.

Components:

- Application layer: manages terminals and implements LIACS services. This layer contains LIACS service platform, database and application software.
  - LIACS Service Platform:
    - manages LIACS relay system, creates device control tasks, assigns and delivers tasks to LIACS relay system for processing.

- The cloud carries out data analysis, comparison and other operations on the acquired data from terminal devices, providing references for users to manage devices remotely.
- Database:
  - The cloud stores and manages the acquired data from terminal devices.
- Application software:
  - Both web and mobile applications are designed with user-friendly interfaces.
- Data transmission layer: the communication network between application layer and data perception layer.
- Data perception layer: contains LIACS relay system, Smart Access Control Host, Access Controller, and other equipment for coordinated control.
  - LIACS relay system-Relay Server:
    - manages Data Acquisition Unit cluster and terminals, and executes commands, assigns and delivers tasks to Data Acquisition Units or terminals.
    - implements data transmission between the data perception layer and application system.
  - Smart Access Control Host: executes data acquisition commands, uploads acquired device data to LIACS relay system through protocol conversion.
  - Access Controller: executes commands from LIACS relay system.



## 3 Basic Functions of the LIACS

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### 3.1 Device control

LIACS manages all connected terminal devices, whether online or offline. Real-time maps in application system display location, connection status and other information of all devices. At the same time, the application system remotely controls devices in real time, and updates access records synchronously to help users manage the terminal hosts and other connected devices anytime and anywhere.

### 3.2 Remote authorization

LIACS distributes access authorization commands from the cloud, adding and deleting users in the cloud system, or assigning access authorization.

### 3.3 Multi-mode access

LIACS offers most popular access control methods, such as Bluetooth, face recognition, fingerprint recognition, RFID, password, QR code and so on.

## 4 Functions of Components

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### 4.1 LIACS

Based on Bee Force™ IoT cloud platform, LIACS acquires, processes data and controls on-site devices intelligently, which helps enterprises to achieve flexible deployment and easy maintenance of access control systems. The system consists of Remote Control, Profile Management, Device Management, and Log Management.

- Remote Control: controls remote access control devices, supports unconventional operations such as temporary authorization, single-pass authorization, etc. (This function is only authorized to super administrators)
- Profile Management: allows administrator to add, modify, delete, query and export files of users or of terminal devices.
- Device Management: manages Data Acquisition Units and terminals, including online management, topology management, parameter configuration management, software information query, remote device upgrade, remote maintenance and device installation, replacement, and removal.

- Log Management: acquires log information in real time, enabling users to timely monitor the running status of the system, access records and status of all access control devices.

## 4.2 Relay Server

LIACS Relay Server with strong computation can provide ultra-fast data processing and access.

- Dual ethernet ports perfectly fit for flexible configuration.
- High performance processing achieves fast and smooth data experience.
- Small size design takes up less space, making it light and easy to install.
- Synchronous / asynchronous dual-display and supports VGA and HDMI.

## 4.3 Bluetooth Access Controller

ELITEUN Bluetooth Access Controller is self-developed high-end device which supports entrance access with mobile Bluetooth, remote unlock, and remote management. It is suitable for access security management in smart communities and office buildings.

- Authorization through cloud makes the system convenient and fast.
- Access records are actively uploaded to the cloud for remote monitoring.
- Instead of installing an APP, users can open the door by simply turning on Bluetooth.
- The system separates management devices from controlling devices, leaving the cloud in charge of management while Bluetooth in charge of control.
- The system is simple to install, flexible to deploy and easy to maintain.

## 4.4 Face Recognition Machine

ELITEUN face recognition machine is embedded HD camera. Its high performance allows it to capture faces in real time and compare the photo with face database. It can quickly capture, compare, and execute control command.

- Support liveness detection
- Face recognition algorithm to accurately recognize faces in less than 1s
- Support tracking of personnel movements under strong backlight conditions
- High stability
- Mean time between failures (MTBF) exceeds 50,000 hours

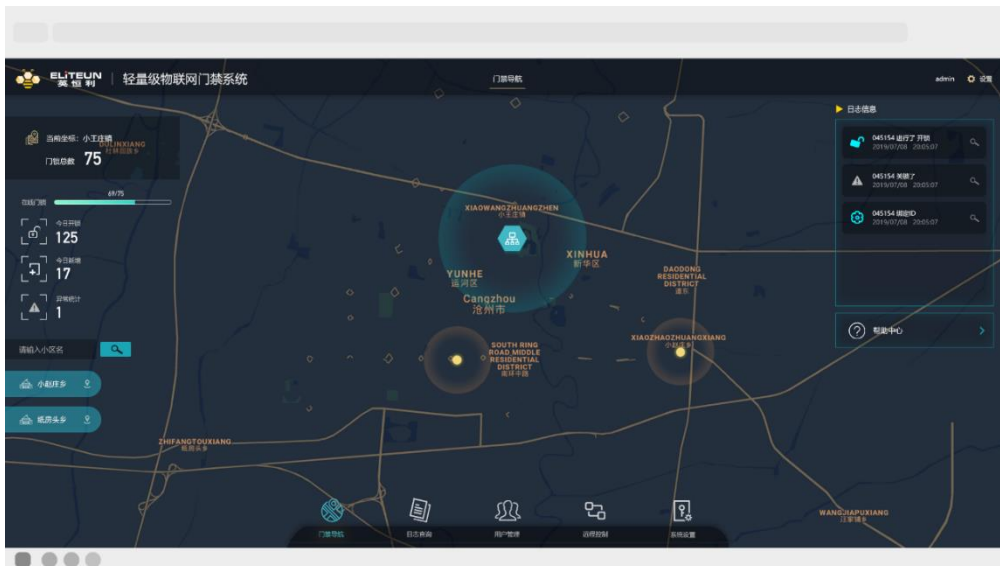
- Support 65,000+ face matching library and 250,000 face recognition records
- Rich interface protocols which support SDK and HTTP protocol under various platforms such as Windows/Linux
- Wiegand interface input/output

## 5 Performance Specifications of Components

### 5.1 LIACS Application User Interface

#### 5.1.1 Overview

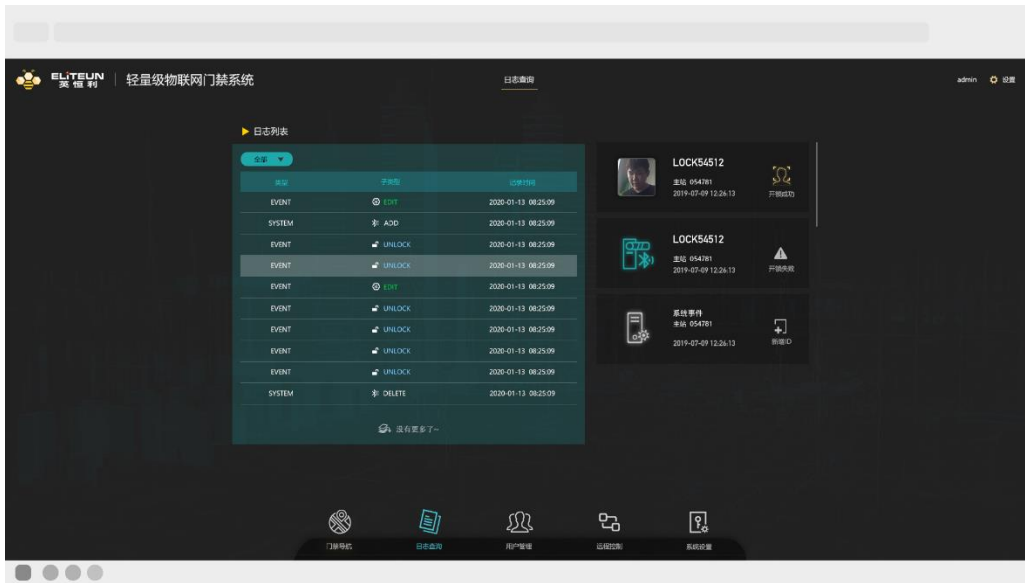
Homepage provides an overview of all locks and their statuses in a designated area.



#### 5.1.2 Log query

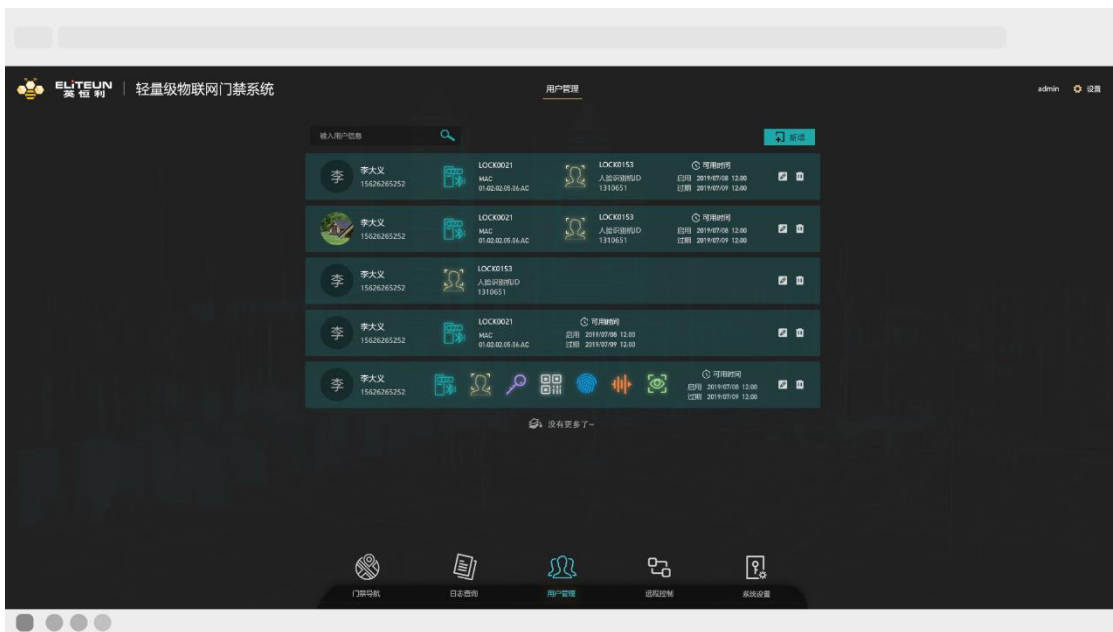
Every access and all personnel information are recorded.





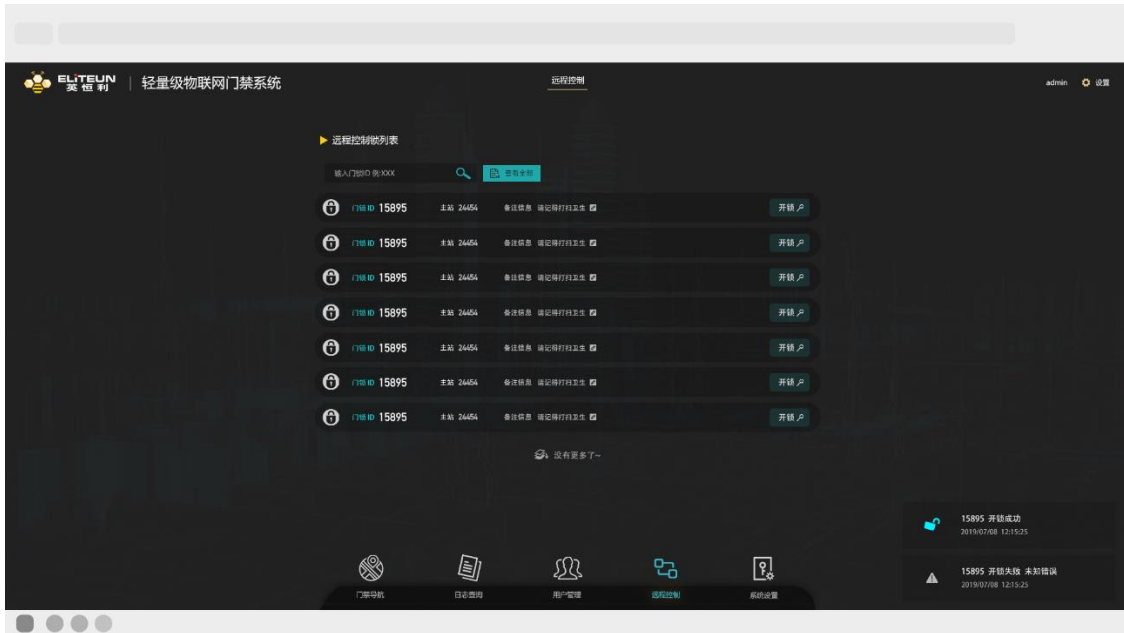
### 5.1.3 User management

Access authorization, triggering methods are displayed and maintained here.



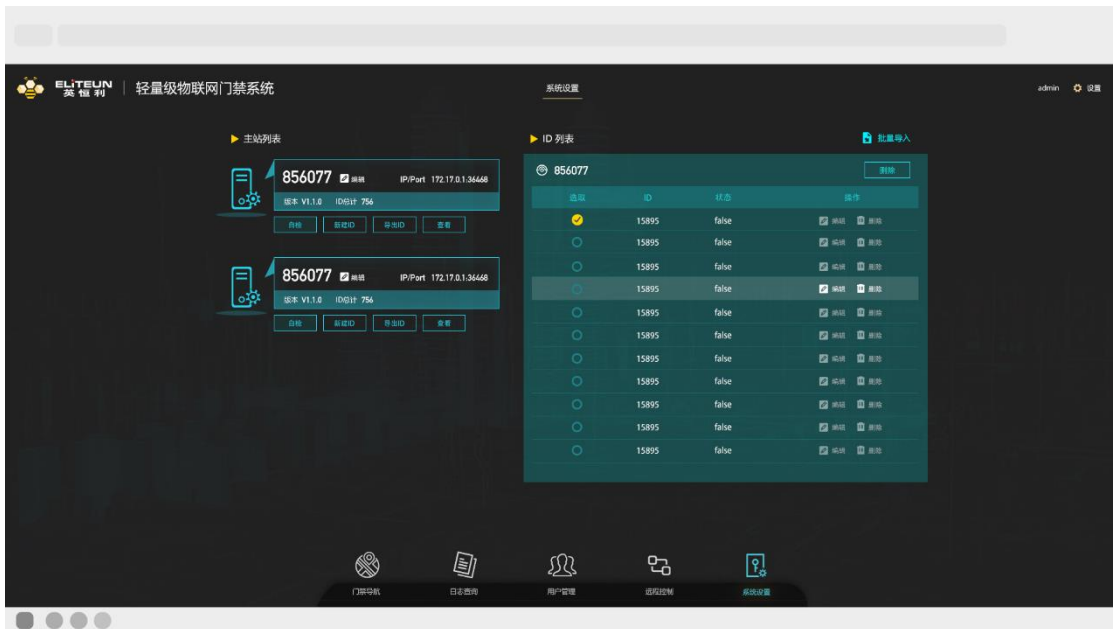
### 5.1.4 Remote control

Locks can be controlled remotely at browser end for exceptional cases.



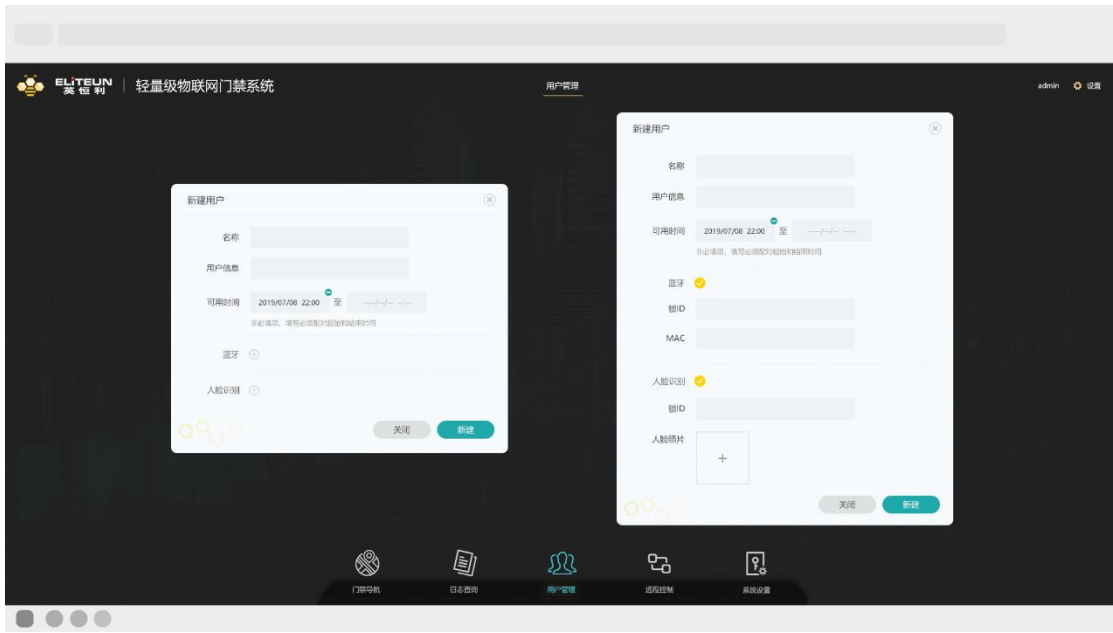
## 5.1.5 Settings

Locks are added, monitored and managed. Status report can be exported.



## 5.1.6 Create user

User information is added, and authorization is assigned.



### 5.1.7 Help

It provides FAQ and general settings.



## 5.2 Specification of Relay Server

Category		Specification
Processor	CPU	Intel Celeron Processor J1900, 4 core

	Frequency	2.0GHz Turbo 2.42GHz
	L2 Cache	2MB
	BIOS	American
Memory	Type	1 single channel SODIMM slot,DDR3L 1066/1333/1600MHz
	Max capacity	8GB
	Socket	1*204-pim SO-DIMM
Display	Chipset	Intel IBay Trail, max power consumption: 10W
	Graph engine	DirectX11.1,OCL 1.2,OGL 3.2
	VGA	Maximum resolution: 2650×1600@60Hz
	HDMI	Maximum resolution: 1920×1200@60Hz
	Dual-display	VGA+HDMI, Synchronous / asynchronous dual-display
Ethernet	LAN1	10/100/1000/ Mbps Realtek 8111F, wake-on-LAN
Audio	Main system	Audio control chip: Realtek ALC662, dual track, stereophonic, line out
I/O	Serial	scalable
	USB	1×USB3.0 4×USB2.0
Other	Watch dog timer	
Extension	Mini-PCIE	1 × Standard Mini-PCIE
Storage	HDD	SATA2.5"HDD (Highest data conversion rate: SATA2.0)
	SSD	1 × Standard mSATA socket
Software	OS	Windows7 Windows8 Windows10
	Linux	ubuntu/LINUX/CENTOS
Power supply	Power type	DC-IN5.5*2.5
	Input voltage	12V
	Power adapter	DC 12V 3A/36W (AC TO DC,100~240V)

### 5.3 Specification of Bluetooth Access Controller

Category	Specification
Communication interface	RS-485
Operating frequency	2.4~2.485GHz (BT4.2)

Power type	DC 12 1A
Operating conditions	-20°C~+85°C; 10%~95%RH
Fastest response time	1s

## 5.4 Specification of Face Recognition Machine

Hardware	Specification
Processor	Sextuple processor + 2G memory + 32G flash
Operating system	Linux
Storage	Support TF card storage
Camera	Two cameras; effective pixels 2MP; 1920*1080
Performance	Specification
Installation height	1.2~2.2 meters, adjustable angles
Viewing distance	0.5~5 meters, adjustable lens
Viewing angle	30 degrees horizontally, 30 degrees vertically
Response time	Less than 1 second
Storage capacity	Max record 250,000 snaps
Face database	Max base 65,000 snaps
Interface	Specification
Network interface	1x RJ45 10M / 100M adaptive Ethernet port (WiFi interface can be customized)
Physical interface	Wiegand input/output; USB; digital output A+/B-
Other	Specification
Operating temperature	-35°C - +60°C
Operating humidity	0% ~ 90% RH(no-condensing)
Power supply	DC12V/3A
Aperture diameter	36mm
Power consumption	20W(MAX)
Screen	7in



Weight	1.5kg
Dimension	240(L) * 128(W) *28(H) mm