Traxbean

GPS Positioning Management

System User Manual

Catalog

Brief Introduction

System Overview

Traxbean Personnel Location Management System is a comprehensive personnel management system that integrates IoT devices, artificial intelligence, and mobile internet. It is suitable for managing various groups of individuals who may require certain levels of coordination, constraint, and data collection, including community correctional offenders, individuals serving sentences outside of prison, elderly individuals in need of assistance, construction site workers, and patients in mental health hospitals.
This system utilizes IoT devices such as smartwatches, smart handcuffs, or ankle monitors, along with other auxiliary IoT devices such as indoor positioning beacons, sleep monitoring devices, and fall detection devices. Through these devices, limited yet valuable data is collected to assist and manage these individuals, referred to as "cared-for individuals," while ensuring their dignity, privacy, and freedom are respected. The system not only improves management efficiency but also provides cared-for individuals with multidimensional guarantees in terms of health, safety, communication, and detection of abnormal conditions.

Through artificial intelligence and mobile internet technology, this system can provide the following assistance and services to cared-for individuals:

- Dignified wearing of products that may be mandatory
- Indoor and outdoor location positioning services
- Setting of geofence and dynamic fences based on schedules
- Push services in multiple languages, including text, voice, and images
- SOS emergency call system for urgent situations
- Monitoring of health data such as heart rate, blood pressure, blood oxygen, and body temperature
- Sleep quality detection and detection of abnormal conditions during sleep to prevent sudden death and accidents
- Vital sign detection and fall detection for individuals living alone
- Real-time monitoring of various abnormal alarms
- Collaborative assistance with guardians, such as proximity reminders, alarm notifications, and task assignments
- Rich text and graphical reports, as well as setting of detection data thresholds
- AI assistance to answer questions, fill in gaps in knowledge
- AI-assisted management for coordination across multiple time zones, languages, and departments

Features

- The terminal primarily serves the population care workers who use IoT smart devices

such as smartwatches, sleep detection and fall detection devices to provide data to the system, receive assistance and management. The terminal used by care personnel is also an interactive terminal, which can carry out two-way passage, SOS emergency call, and receive text, voice, and picture information push.

- Guardians can participate in the system through smart watches or mobile apps to get information push.

- The management service personnel (hereinafter referred to as the management personnel) can monitor the terminal data in real time through various tools such as the Web system, the LED large screen system, and the mobile phone App, and sound alarms will be issued in case of emergency, and field personnel can also receive emails, short messages and push notifications. In addition, the system provides rich graphical reports and various query methods, as well as artificial intelligence assistance to help managers improve efficiency and avoid mistakes.

➢ System Require

- Server-side software requirements. As the core component of this system, server-side software is a cross-platform distributed design architecture, which can run on Linux server or Windows server. There are many versions of Linux system, as long as the version after 2010 can basically meet the requirements of the operating system. For the Windows operating system (OS), Windows Server 2006 or later can meet the requirements.
  Other software and hardware support:
  - ➢ Database: MySQL 8.0 or above, MariaDB 10.3 or above, Redis 5.0 or above
  - ➢ Running environment: NodeJs 12.0 or higher
  - ➢ Application server Nginx or IIS server
  - ➢ Hardware requirements: 4-core CPU, 16G memory, 500G hard disk (can manage 5000+ personnel, data storage for more than 1 year)

- The management terminal requires that the latest version of Edge or Chrome browser be used for the management terminal, and the computer has a CPU of i3 or higher or other cpus of the same condition, and 16 GB of memory
- Large screen LED software requirements, LED large screen is optional, according to the selection of how much data and complexity and refresh frequency and the selection of display equipment is different, we recommend 4 core CPU, 16G or more memory
- Guardians and administrators App requirements, the Traxbean APP installation requirements for Android 10 or above, iOS 11 or above
- The terminal IoT devices, such as smartwatches and other IoT smart devices, are determined by the manufacturing factory. The main requirement is to support direct connection to the server via mobile network or WiFi network and send data through

TCP or MQTT. The official operating systems provided for smartwatches are Android 4.4 and Android 8.1. The handcuff and ankle monitor products have a lower software version, which is Android 4.4. The smartwatches have the Android 8.1 version. Both devices support open SDK, facilitating collaboration with manufacturers and software companies to develop independent applications.

QuickStart

Installation and Setup

The installation steps are as follows, taking the example of installing on a Linux server:

- Prepare the operating system environment and check if the hardware meets the requirements
- Plan the installation directory, data storage directory, and log storage,directory for the application, and set the access permissions for each directory.
- Plan the TCP, MQTT ports, and HTTP/HTTPS ports, and configure the firewall.
- Plan the domain names for each application.
- Install the runtime environment Node.js and the application production environment manager PM2.
- Install the application server software Nginx.
- Install the database software, MySQL and Redis.
- Upload the files for modules such as API, Gateway, Web, Feedback, and LED.
- The LED module files can also be stored locally, as the LED module communicates via WebSocket.
- Configure the database connection, log directory, file access links, and other relevant configurations for the API. Start the API project.
- Configure the API access paths and open ports for the Gateway, as well as the log directory. Start the Gateway.
- Configure the API access paths and other parameters for the Web.
- Configure Nginx for the directories where each application runs and set up SSL certificates.
- Set up PM2 to manage each application.
- Check the running status, logs, and databases of each application.
- Set up software for data backup.
- Run the database initialization script and start the project.

Login and Account Manage

After the system is installed, open the browser based on the specified domain name
During the initial system installation, the user name is rootadmin and the password is ******. You can change the password yourself.

Navigation Interface

- Login Page: The login page allows users to enter their username and password to log in. Users can choose different languages for login, with support for 16 languages from different countries. Customized software can modify the login page according to specific

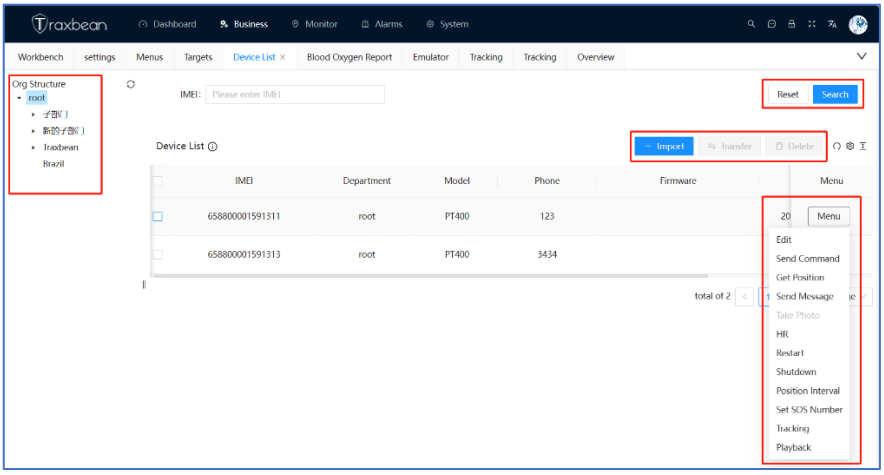
needs. This system is a SaaS system, allowing operational users to support different customers using different domains and login interfaces, enabling simple customization for clients.

- Error Page: Displayed when a logged-in user lacks permissions or encounters a connection error.
- Normal Working Page: The normal working page is divided into two main sections: the header and the workspace.
  - Header: Consists of three parts. The leftmost part displays the logo, which can be customized for different companies. The middle part is the menu, automatically adjusted based on the user's permissions. The rightmost part is the user quick access section, containing features such as search, AI technical support, lock screen, fullscreen mode, language switch, and personal settings.
  - Workspace: The workspace is divided into two sections. The top section displays multiple tabs that are currently open, while the bottom section is the actual working area.
- Frequently Used Functions in the Navigation Bar:
  - Search: Allows direct search by entering the menu or function name, with the search result automatically locating the corresponding function.
  - AI Technical Support: Provides learning and support for using the system through chat.
  - Language Switch: Supports 16 languages from different countries.

User Manual

Device Manage

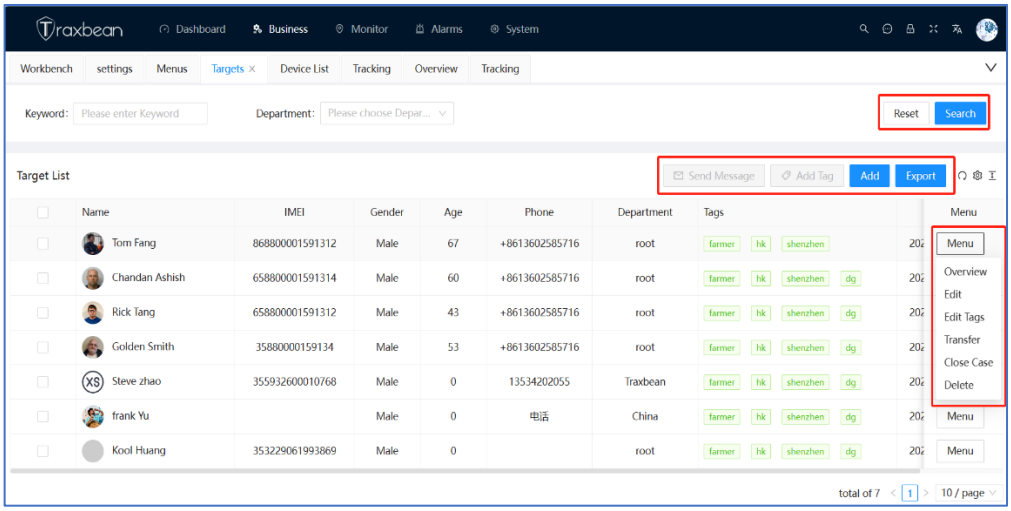
- Function Introduction:
  The basis for terminal users to use this system is IoT devices, such as smartwatches. This module mainly describes the related functions for managing these devices.
  To access the device management interface:
  In the English menu, select Business -> Devices -> Device List.
- Importing Devices:
  In the device list interface, click the "Import" button. Select the corresponding department, device model, and paste the IMEI list. Multiple IMEI numbers should be separated by line breaks. Choose your time zone and click "Confirm" to complete the operation.
- Editing Device Information:
  In the device list interface, select the device you want to edit. Click the dropdown menu and choose "Edit" to modify relevant information such as name, phone, and time zone.
- Migrating Devices:
  In the device list interface, select the device(s) you want to migrate. Click the "Transfer" button and choose the target department in the pop-up window. Click "Confirm" to transfer the device(s) to the selected department. This function facilitates transferring devices between different departments or agents.
- Deleting Devices:
  In the device list interface, select the device(s) you want to delete. Click the "Delete" button. It is not recommended to delete devices indiscriminately as it may affect other users' access to the terminal.
- Searching Devices:
  In the device list interface, use the search bar at the top to search for devices. Currently, searching by IMEI number is supported.
- Device Quick Commands:
  In the device list interface, for the convenience of device testing, you can perform the following basic settings and tests. This interface allows playing historical tracks, real-time monitoring, sending commands, sending messages, taking photos, testing heart rate, testing blood pressure, setting SOS numbers, and setting GPS transmission intervals.



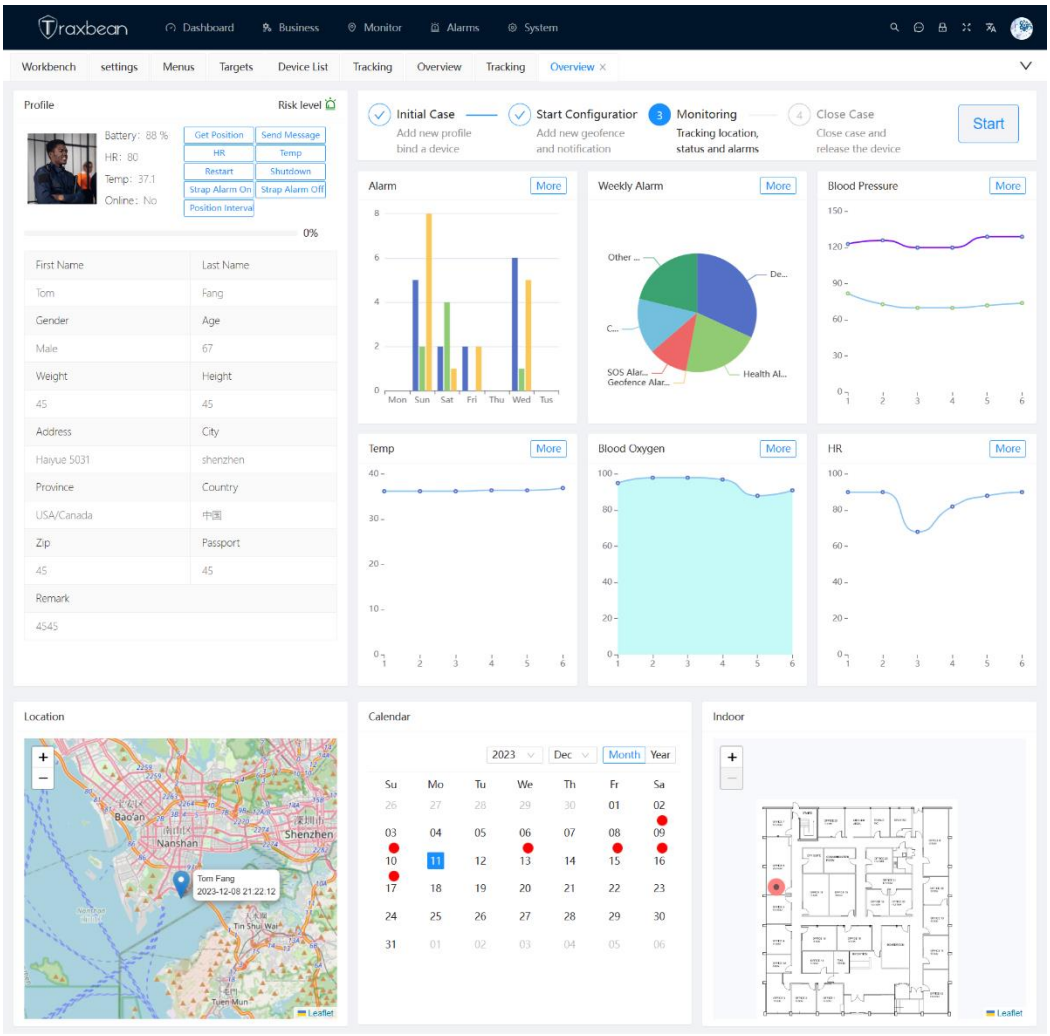
➢ Persons Manage

- Function Introduction:
  This is the core management module of the system, which manages all functions related to personnel care and management.
  To access the module:
  In the English menu, click Business -> Persons -> Targets.
- Adding a Care Target:
  In the targets list interface, click the "Add" button. A window for adding a care target will appear. In the first step, select the IMEI number of the associated smartwatch. Usually, this IMEI number can be obtained when assigning the smartwatch to a specific care target. Then, fill in the information about the care target.
- Editing Care Target Information:
- In the targets list interface, select a specific care target. Choose the action menu and click "Edit" to open the editing interface and modify the care target's information.
- Migrating Care Targets:
  In the targets list interface, select a specific care target. Choose the action menu and click "Transfer" to open the transfer care target interface. Select the department to transfer the care target to and click "Confirm" to complete the transfer.
- Deleting Care Targets:
  In the targets list interface, select a specific care target. Choose the action menu and click the "Delete" button. Click "Confirm" to complete the deletion.
- Closing Care Target Records:
  When a care target completes a service cycle and the smartwatch and other devices need to be reassigned to other care targets, the current care target record needs to be closed to release the devices.
  In the targets list interface, select a specific care target. Choose the action menu and click "Close Case". A message window will appear where you can enter the reason for closing. Click "Confirm" to close the record.
- Searching Care Targets:
  In the targets list interface, enter keywords in the search bar to perform a search.

- Exporting Care Targets:
- In the targets list interface, clicking "Export" will export all care targets under the current search conditions.



- Tag Care Targets:
  In addition to grouping care targets by department, if there are numerous care targets within the same department, you can also use tags to group them.
  In the targets list interface, select the care targets you want to group by checking the checkbox next to each target. Click "Add Tag" and add tags according to your management needs. When searching, you can use the tag names as keywords to perform searches.
- Sending Messages:
  In the targets list interface, select one or more care targets by checking the checkbox next to each target. Click the "Send Message" button to open the message sending window. Here, you can choose to send text, voice, or image messages. When sending a voice message, the user can input text, and the system's AI will convert the text into voice and send it to the care target. When sending an image message, the user needs to predefine the image information and then select the predefined image information to send.
- Care Target Overview:
  In the targets list interface, select a specific care target. Choose the action menu and click "Overview" to open the details page of the care target. This page provides more comprehensive information and operations related to the care target.

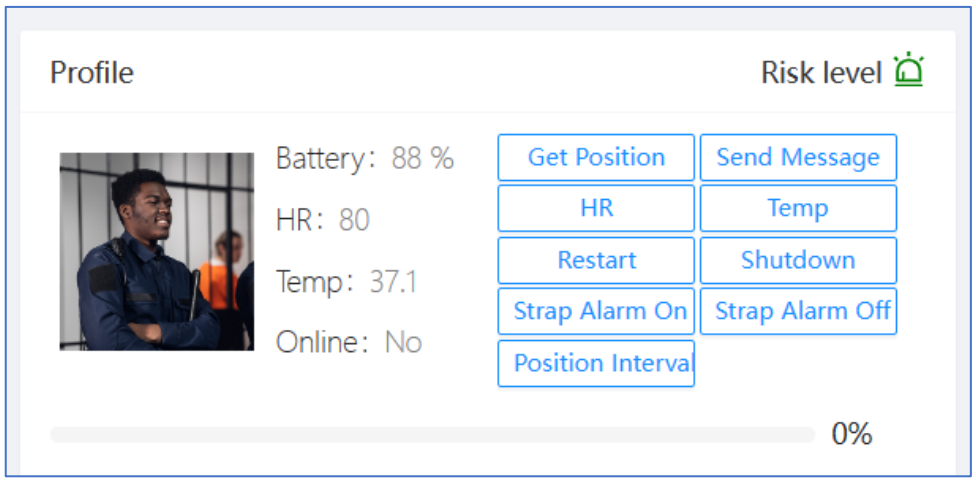


- Real-time Location:
  On the top-left corner of the care target's overview page, locate the "Real-time Location" button. Clicking the button will send a location request to the smartwatch and retrieve the real-time location data.
- Heart Rate Monitoring:
  On the top-left corner of the care target's overview page, locate the "Heart Rate" button. Clicking the button will send a heart rate detection request to the smartwatch and retrieve the heart rate data.
- Body Temperature Monitoring:
  On the top-left corner of the care target's overview page, locate the "Body Temperature" button. Clicking the button will send a body temperature detection request to the smartwatch and retrieve the temperature data.
- Blood Pressure Monitoring:
  On the top-left corner of the care target's overview page, locate the "Blood Pressure" button. Clicking the button will send a blood pressure detection request to the smartwatch and retrieve the blood pressure data.
- Blood Oxygen Monitoring:

On the top-left corner of the care target's overview page, locate the "Blood Oxygen" button. Clicking the button will send a blood oxygen detection request to the smartwatch and retrieve the blood oxygen data.

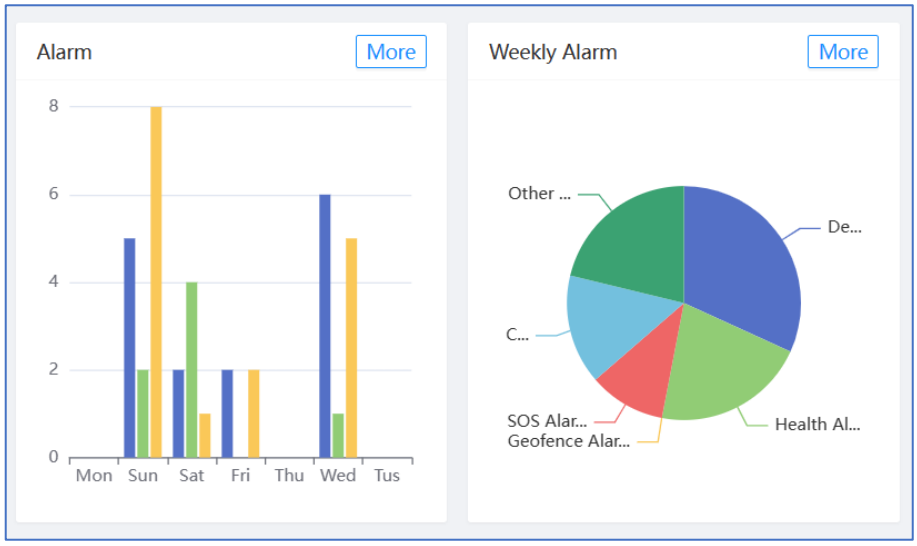
- Taking and Uploading Photos:
  On the top-left corner of the care target's overview page, locate the "Take Photo" button. Clicking the button will send a photo-taking request to the smartwatch and retrieve the photo data.
- Setting GPS Interval:
  On the top-left corner of the care target's overview page, locate the button for setting the GPS interval. Clicking the button allows you to set the interval for GPS data uploading.
- Setting SOS :
  On the top-left corner of the care target's overview page, locate the button for setting SOS. Clicking the button allows you to set the emergency contact numbers.
- Setting Strap Alarm On/ Off
  On the top-left corner of the care target's overview page, locate the button for Strap Alarm On/ Off.
- Restart the Device:
  On the top-left corner of the care target's overview page, locate the button for restarting the device. Clicking the button will remotely restart the device.
- Shutdown the Device:
  On the top-left corner of the care target's overview page, locate the button for powering off the device. Clicking the button will remotely turn off the device.

All the commands mentioned above are dependent on the actual capabilities of the device. The supported functions of a device are defined by its model. Additionally, the permissions for issuing each command can also be defined in the permission management system.

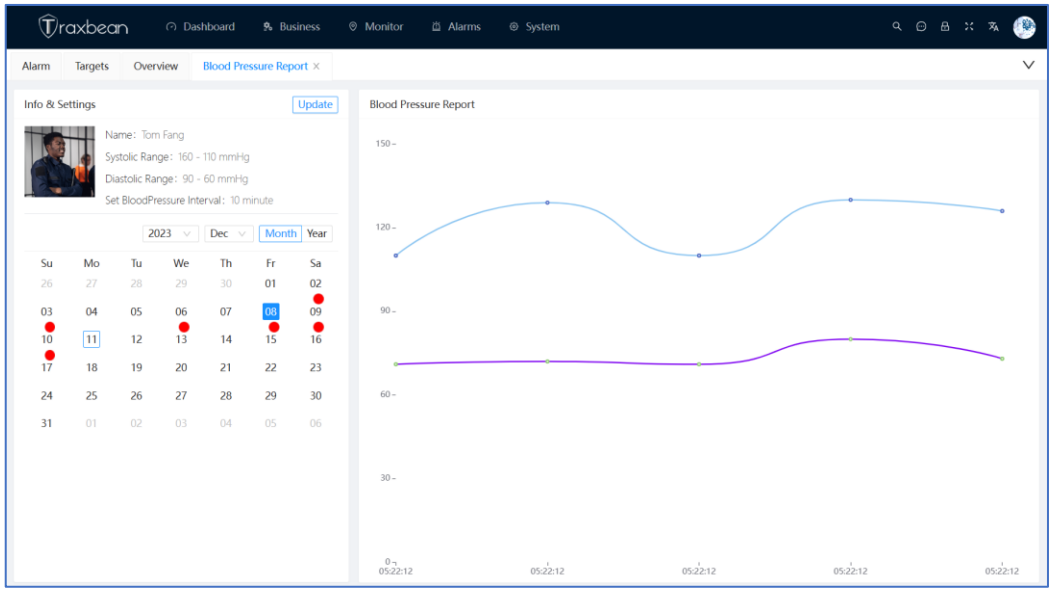


- Alarm Manage:

In the care target's overview page, there are two graphical charts displaying the related alarm information for that care target. One chart is a bar graph showing the number of different types of alarms within a week. The other chart is a pie chart showing the distribution of various alarms within a week. These charts help the management personnel understand the data or any abnormal alarms related to the care target.
As shown in the figure below, clicking the "More" button will open the alarm list interface, which displays all the alarms associated with the current care target.



- Blood Pressure Manage:
  In the care target's overview page, there is a graphical chart for blood pressure. Clicking "More" allows you to view the historical daily blood pressure reports as needed, and you can also set the threshold for abnormal blood pressure alarms.
  On the left side of the calendar, if there is data available for a specific date, an icon will be displayed. A green icon indicates normal data, while a red icon indicates abnormal data.

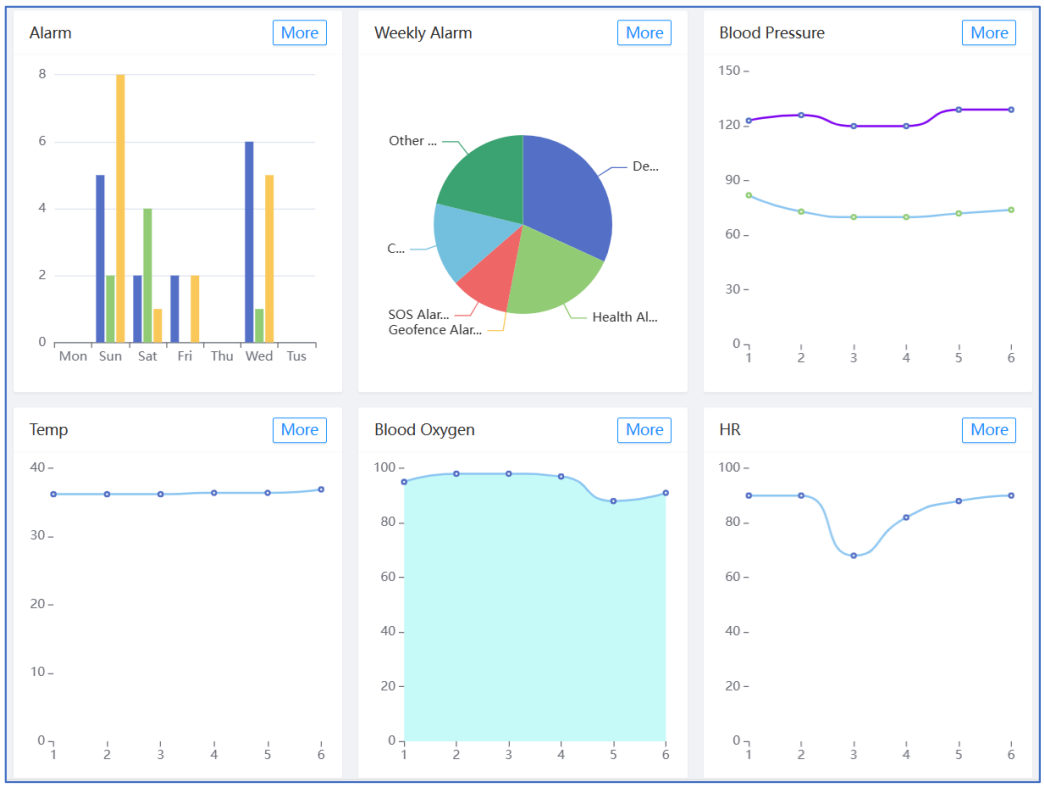


- Body Temperature Manage:
  In the care target's overview page, there is a graphical chart for body temperature. Clicking "More" allows you to view the historical daily temperature reports as needed, and you can also set the threshold for abnormal temperature alarms.
  On the left side of the calendar, if there is data available for a specific date, an icon will be displayed. A green icon indicates normal data, while a red icon indicates abnormal data.

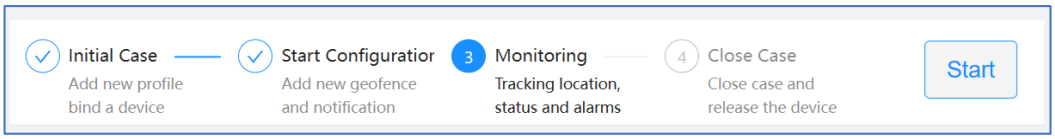
- Blood Oxygen Manage:
  In the care target's overview page, there is a graphical chart for blood oxygen. Clicking "More" allows you to view the historical daily blood oxygen reports as needed, and you can also set the threshold for abnormal blood oxygen alarms.
  On the left side of the calendar, if there is data available for a specific date, an icon will be displayed. A green icon indicates normal data, while a red icon indicates abnormal data.

- Heart Rate Manage:
  In the care target's overview page, there is a graphical chart for heart rate. Clicking "More" allows you to view the historical daily heart rate reports as needed, and you can also set the threshold for abnormal heart rate alarms.
  On the left side of the calendar, if there is data available for a specific date, an icon will be displayed. A green icon indicates normal data, while a red icon indicates abnormal data.

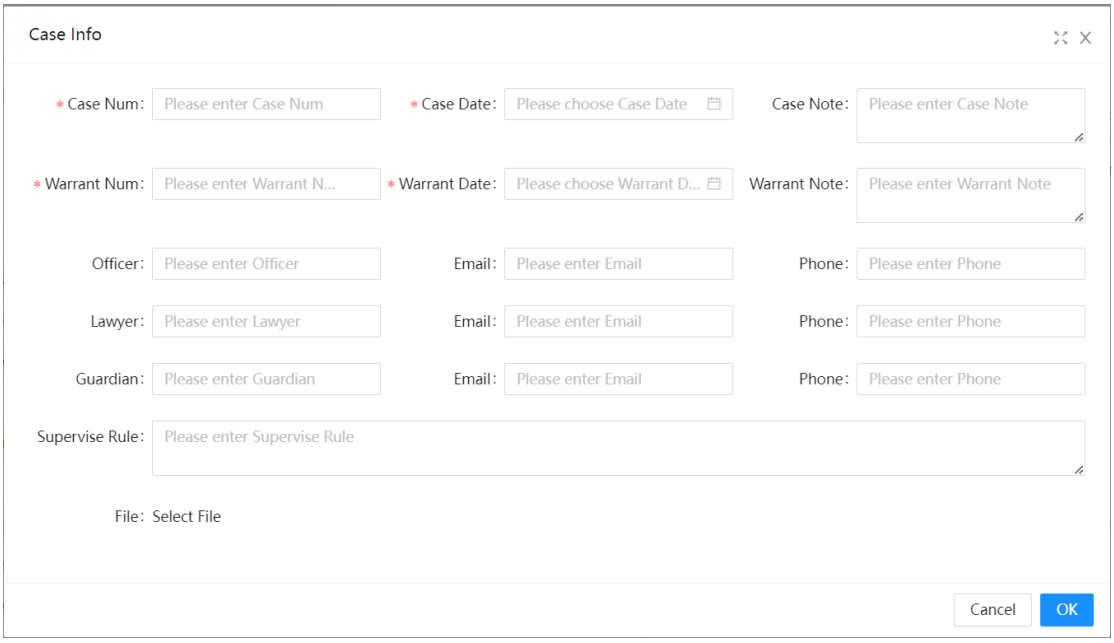
- Sleep Manage:
  In the care target's overview page, there is a graphical chart for sleep. It displays the sleep status of the most recent day, such as the proportion and duration of deep sleep and light sleep. Clicking "More" allows you to view the detailed sleep reports for each day, including sleep status, anomalies, breathing, heart rate, and more.



- Initial Case-File Upload:
  On the top of the care target's overview page, click the "Start" button to expand all the functionalities related to the care target management process. Click on "Upload File" to upload relevant files.



- File Manage:
  On the top of the care target's overview page, click the "Start" button to expand all the functionalities related to the care target management process. Click on "Edit Profile" to manage related files, perform actions like deleting files, and more.
- Case Info:
  On the top of the care target's overview page, click the "Start" button to expand all the functionalities related to the care target management process. Click on "Case Info" to add case-related information. This feature is mainly targeted towards community correction personnel.

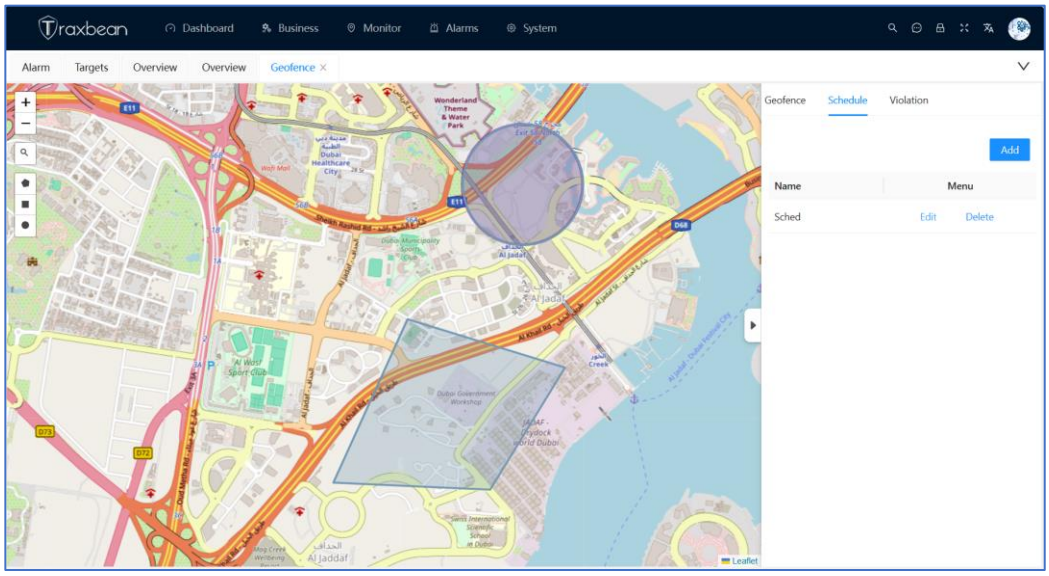


- Geofence List

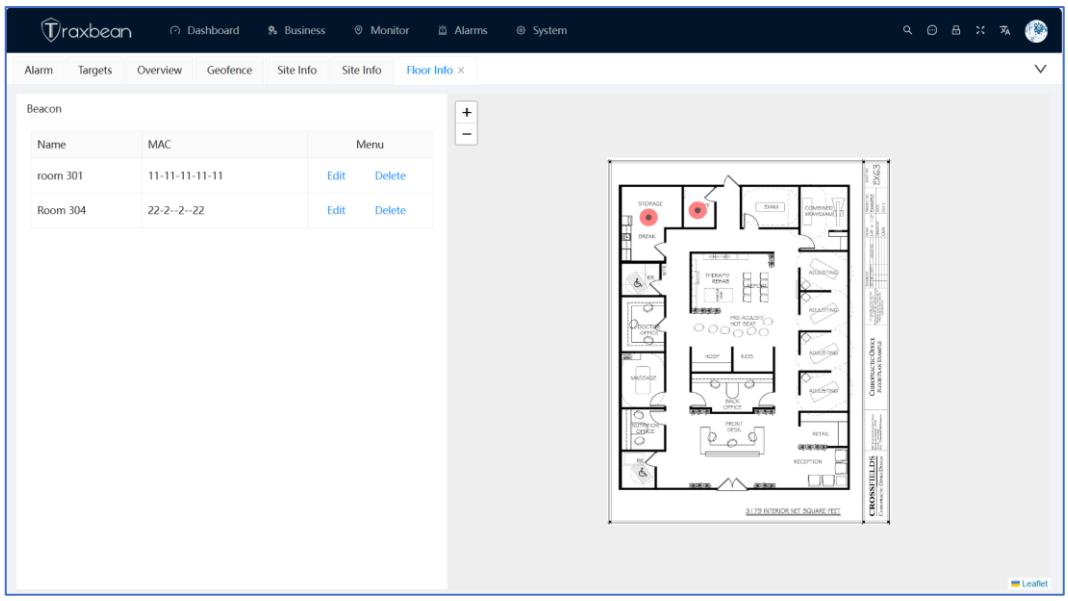
On the top of the care target's overview page, click the "Start" button to expand all the functionalities related to the care target management process. Click on "Geofence List" to establish an electronic fence for the current care target.

The system supports prototype fences and polygon fences. You can directly operate on the map, and the displayed results are real-time.

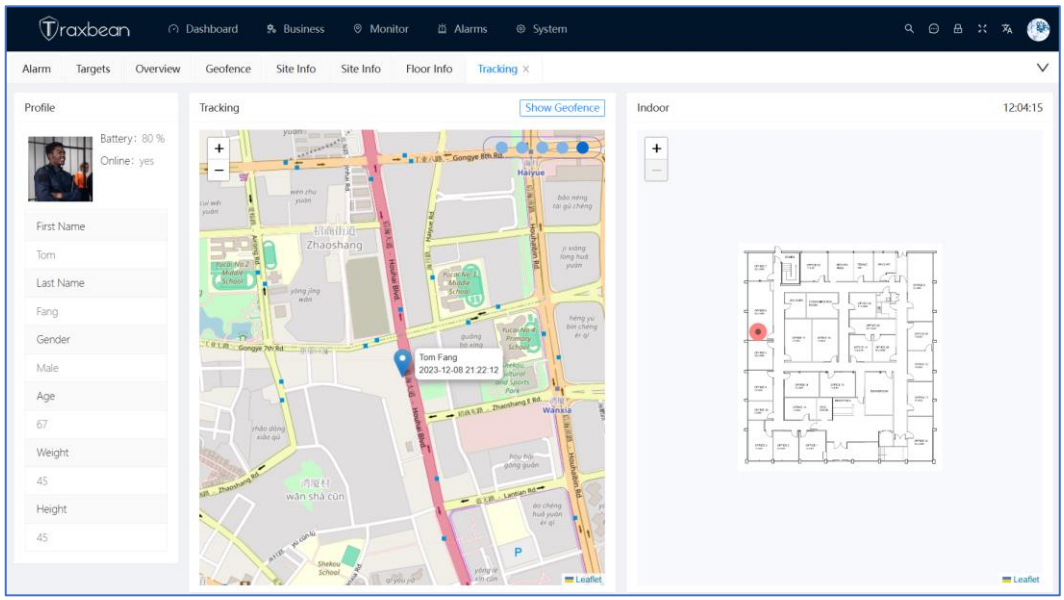
On the right side of the geofence interface, you can set a schedule for the geofence, specifying the curfew time when it is valid.



- Home beacon Settings
- In the care target's overview page, click the "Start" menu and then click on "Home beacon Settings" to manage indoor positioning devices and indoor usage devices, such as sleep monitoring millimeter-wave radar, fall detection millimeter-wave radar, indoor positioning beacons, and more.

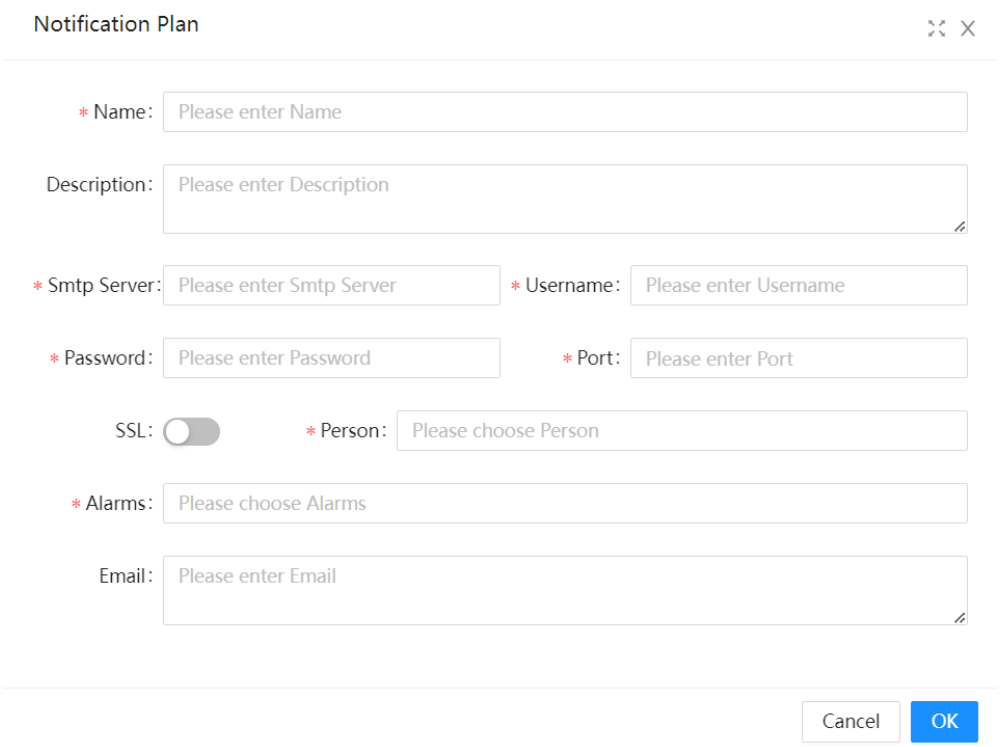


- Location Tracking:
  In the care target's overview page, click the "Start" menu and then click on the "Location Tracking" link to initiate real-time monitoring of the care target. If the care target is also equipped with an indoor positioning device, the indoor map will be displayed simultaneously. The location updates for both indoor and outdoor maps will be obtained simultaneously.



- Notification Plans

  In the care target's overview page, click the "Start" menu and then click on "Notification Plans". A window will pop up where you can input the notification plan name and the email addresses of the guardians who need to be notified. The system will then send alert messages to the specified email addresses.

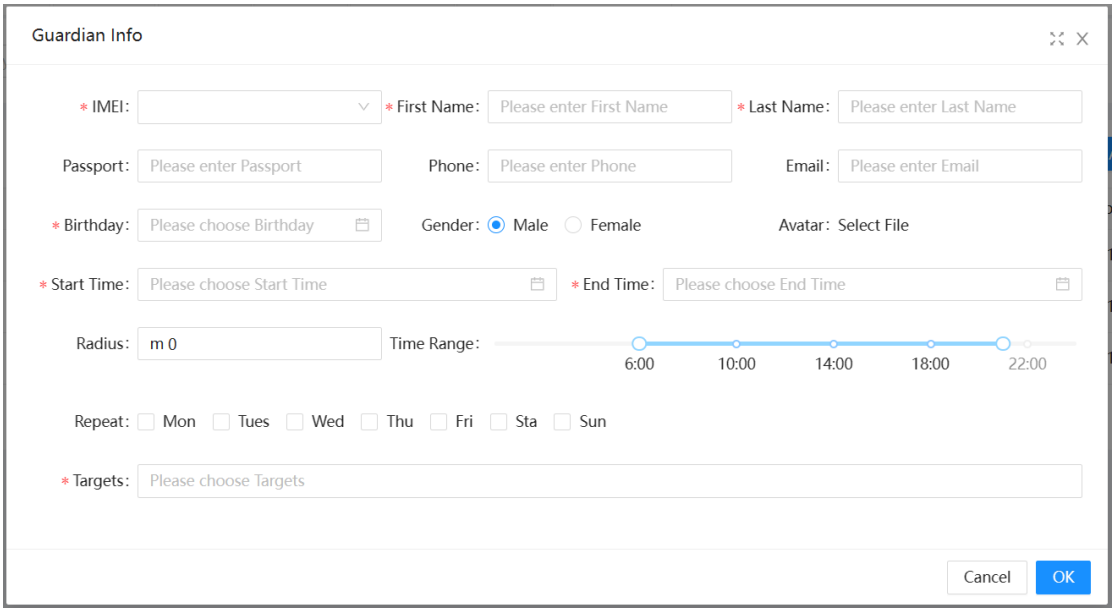


- Location Playback
- In the care target's overview page, click the "Start" menu and then click on the "Location Playback" link. A time selection window will pop up where you can input the desired time. The system will then start playing the historical trajectory of the care target for that specified time. Currently, only outdoor map location playback is supported.
- Location Export
- In the care target's overview page, click the "Start" menu and then click on the "Location Export" link. A time selection window will pop up where you can input the desired time. The system will then start exporting the historical trajectory of the care target for that specified time. Currently, only outdoor map location export is supported.
- Reward Management
- In the care target's overview page, click the "Start" menu and then click on the "Reward Management" link to access the management interface for rewards and penalties records.
- Event Timeline
- In the care target's overview page, click the "Start" menu and then click on the "Event Timeline" link to access the timeline display, which shows all the operations related to the care target.

➢ Guardian Manage

- Function Introduction:
  A guardian is a person who has a close relationship with the care target. They can be the guardian of an elderly person, a volunteer in community corrections, a victim in domestic violence cases, or a protector, among others.
  To access the corresponding menu in English, click on "Business" -> "Persons" -> "Guardian".

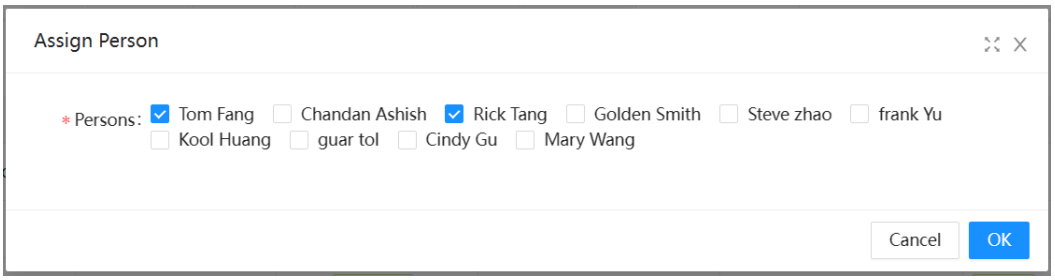
- Add Guardian:
  In the Guardian management interface, click on "Add" to enter the Guardian management add page. One of the core functions of a guardian is close-range alarm, so distance alarm settings, effective time, and other information will be set in the guardian's profile. You can also select one or more care targets associated with this guardian.



- Edit Guardian Information:
  In the Guardian management interface, select a specific guardian, choose the menu, and click on "Edit" to enter the editing page for guardian information.
- Delete Guardian:
  In the Guardian management interface, select a specific guardian, choose the menu, and click on "Delete". After confirmation, the guardian information will be deleted.
- Search Guardian:
  In the Guardian management interface, in the search area at the top, you can search for guardians based on specific criteria.
- Export Guardians:
  In the Guardian management interface, you can click on the export button to export the list of guardians based on the current search criteria.

➢ App User Task Manage

- Function Introduction:
  Some administrators or guardians may choose to use the mobile app to receive data updates for the care targets. This function module primarily manages these app users, including user authorization, password modification, and user deletion.
  To access the corresponding menu in English, click on "Business" -> "App User List".
- Approve App Users:
  As this system is a SaaS system used by multiple companies, when a user registers an app account without specifying an OrgCode, the system does not know which company should manage and authorize their app user after registration. In this function, users can be approved under the company by using their registered email address.
- Authorize App Users:
  In the App User management interface, select a specific app user and click on the edit button to open the authorization page. From there, you can authorize the selected app user to one or more care targets.



- Modify Password:
  If an app user forgets their password, the administrators can use this function to help them reset their password.
- Delete App User:
  In the App User management interface, select a specific app user and click on the delete button. After confirmation, the app user can be deleted.

➢ App Task Manage

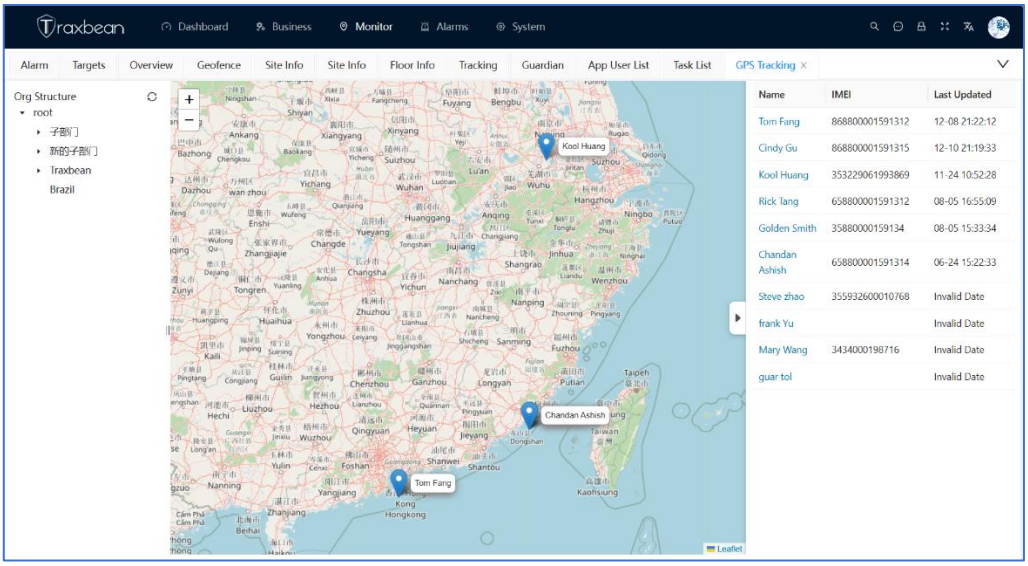
- Function Introduction:
  In the personnel management system, it is necessary to assign tasks to app users. In the App User management interface, specific app users can be selected and edited to complete this module.
  To access the corresponding menu in English, click on "Business" -> "Tasks" -> "Task List".
- Add Task:
  In the Task List interface, click on "Add" to open the task creation page. Enter the task details and select the users to whom the task will be assigned. Tasks can be one-time or recurring.
- Edit Task:

In the Task List interface, select a task and click on "Edit" to begin editing the task information.

- Delete Task:
  In the Task List interface, select a task and click on "Delete". After confirmation, the task information will be deleted.

➢ Outdoor Position Monitor

- Function Introduction:
  Display the location of all personnel on the same map.
  To access the corresponding menu in English, click on "Monitor" -> "GPS Tracking".
  You can select the nodes of the department tree structure on the left side to display the location of care targets in a specific department.



➢ Indoor Position Monitor

- Function Introduction:
  Indoor positioning is mainly implemented by installing multiple Bluetooth or Wi-Fi beacons indoors. When a smartwatch detects these Wi-Fi or Bluetooth devices, it uploads their MAC addresses. By comparing the positions of these devices on the indoor map, the smartwatch's indoor location can be determined. The indoor positioning function consists of two main parts: defining the indoor map and presenting the smartwatch's indoor location.

- Location Management:
  To access the corresponding menu in English, click on "Monitor" -> "Indoor" -> "Location List".

Setting up indoor positioning involves several steps:

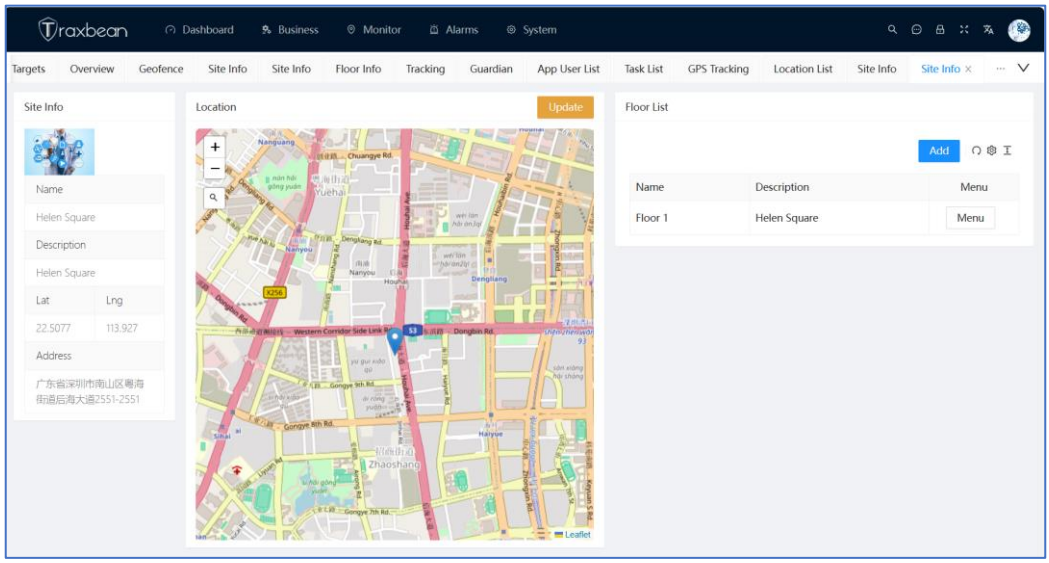
1， Add Location: Each location is defined by its latitude and longitude on the map and assigned a name.

2， Add Floor: Each location can have multiple floors, and each floor can have a floor plan uploaded.

3， Mark Location Device: This step involves marking the names and MAC addresses of the installed positioning devices on the selected floor plan.

- Add Location:

  In the Location Management interface, click on "Add Location". A location requires a name, an icon, and defining its latitude and longitude on the map.



- Add Floor:

  In the Location Management interface, select a location from the location list and click on "View" to enter the settings page for that location. On the right side of this page, there is a list of floors. Click on "Add" to add a new floor. Enter the name and upload the floor plan.

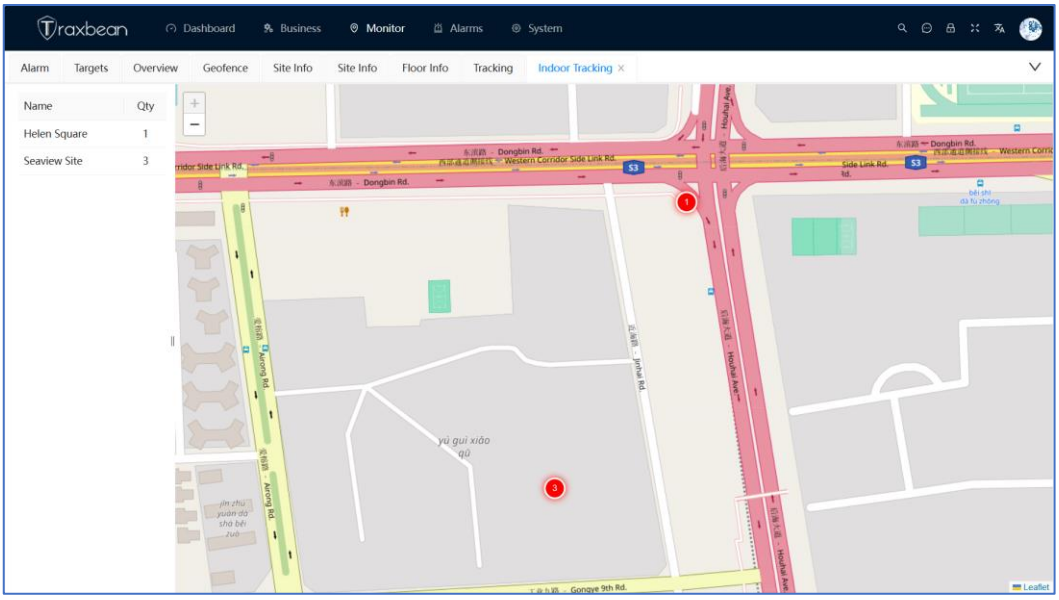
- Mark Beacon:

  In the location details page, select one of the floors and click on "Settings" in the menu. This will open the marking interface. Based on the actual installation positions of the devices, click on specific locations on the map to mark them.

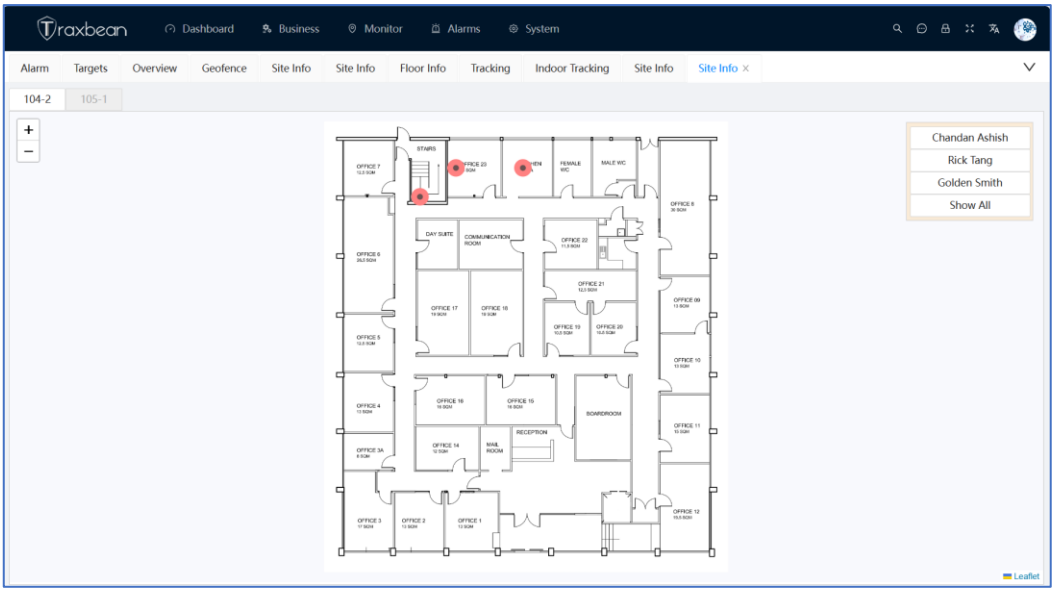
- Indoor Tracking

  To access the corresponding menu in English, click on "Monitor" -> "Indoor" -> "Indoor Tracking"

  When entering the page, it will first display which location has indoor positioning personnel and show the count on the map. By clicking on the image on the map and selecting "View Indoor Map," the indoor map positioning page will open.



When entering the page, it will first display which location has indoor positioning personnel and show the count on the map. By clicking on the image on the map and selecting "View Indoor Map," the indoor map positioning page will open.

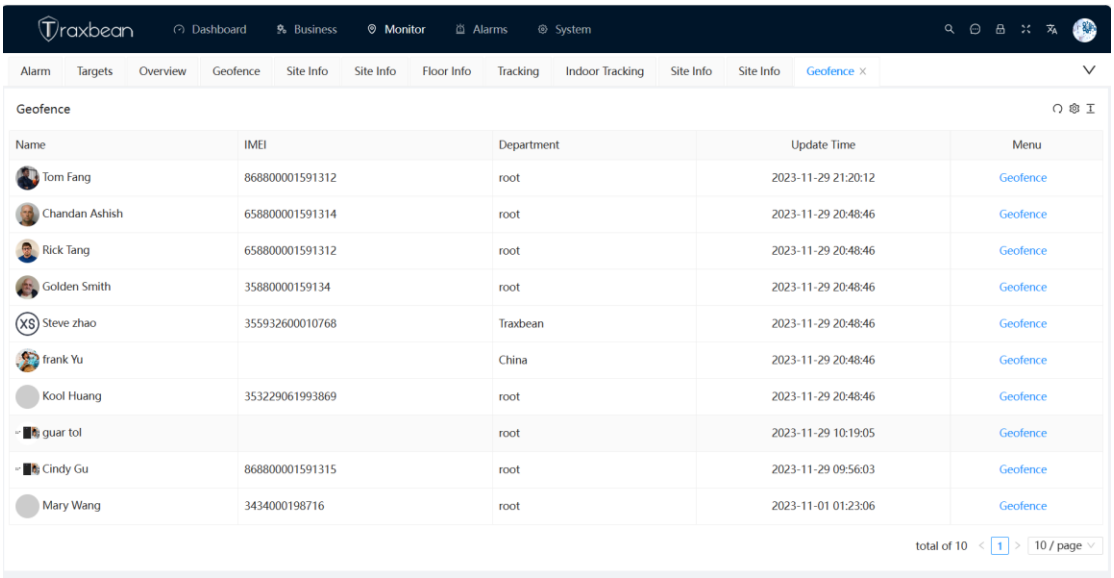


➢ Geofence Manage

Function Introduction:

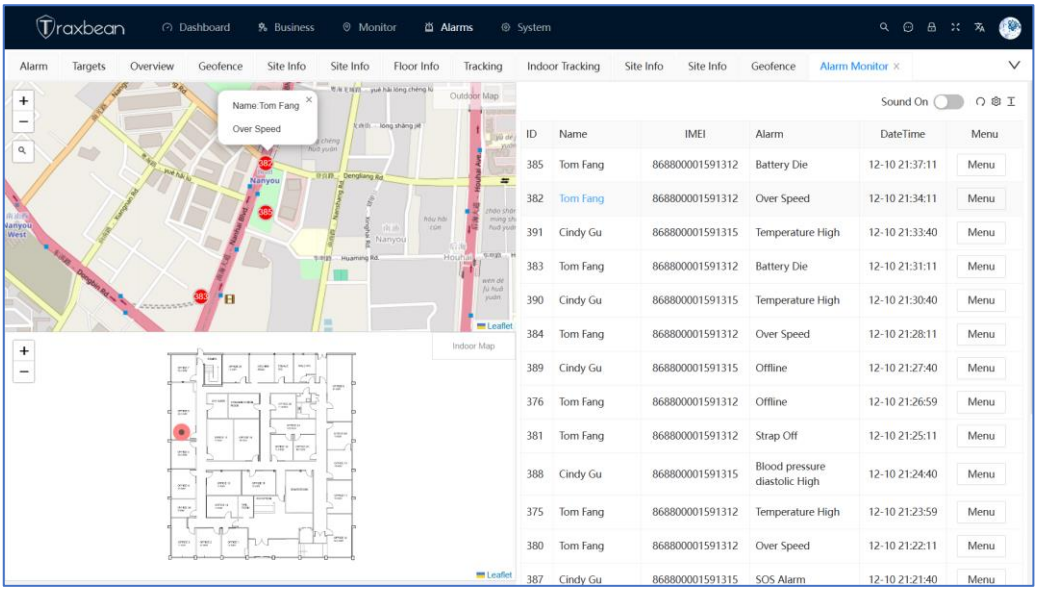
To access the corresponding menu in English, click on "Monitor" -> "Geofence"

The management of geofences and the geofence functionality in the care target module are the same. In the geofence module under the monitoring center interface, you can enter the geofence management interface by clicking on a care target in the list. In the care target module, you can access it by clicking into the geofence management page from the care target details page.

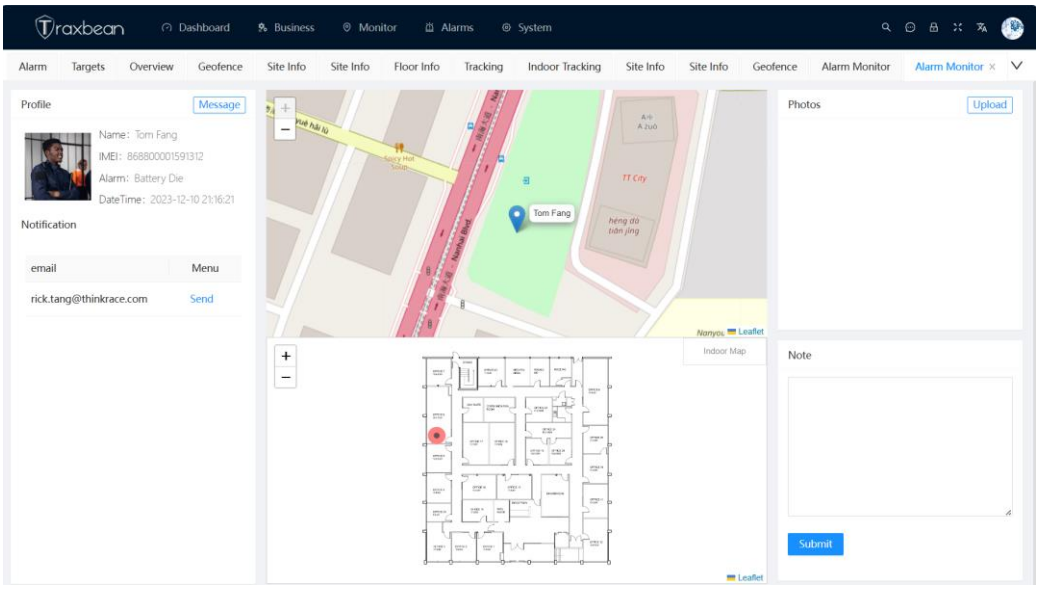


➢ Alarms Report And Manage

- Function Introduction:
  The management and display of alarms related to care targets include two main pages. The first page is the Alarm Monitor, which displays real-time alarms generated. It is primarily used by the staff in the monitoring center to promptly view and handle alarms as needed. The second page is the Alarm Report, which contains all historical alarms. It allows users, mainly administrators, to search and export results based on specific criteria.
- Alarm Monitor:
  To access the corresponding menu in English, click on "Alarms" -> "Alarm Monitor"
  The Alarm Monitor displays a real-time alarm list on the right side. The sound switch can be turned on so that when a new alarm is generated, the system will play a sound to alert the on-duty staff. On the left side of the Alarm Monitor, there is a map that can simultaneously display both outdoor and indoor maps. This allows the management personnel to quickly locate the precise position where the alarm occurred. By selecting a specific alarm and clicking on the menu, options such as deleting the alarm or viewing the alarm details can be chosen.



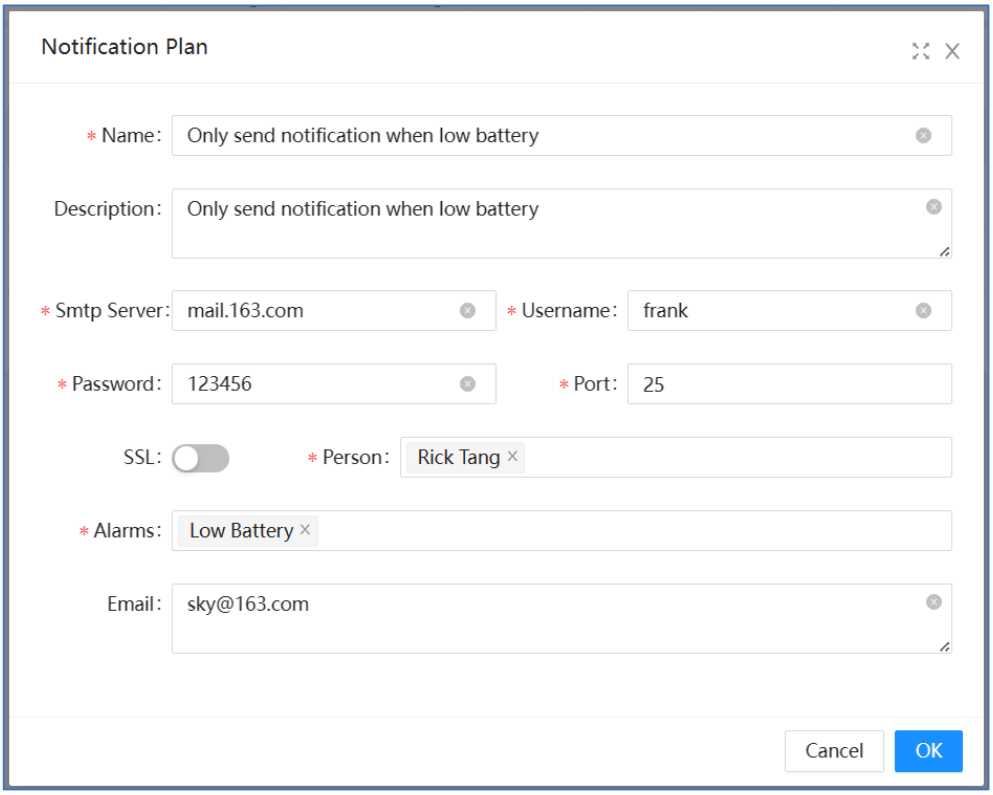
Clicking on "View" opens the alarm details page, where you can see more detailed information about the alarm. This includes the detailed information of the care target, alarm details, outdoor and indoor locations where the alarm occurred, and the people who have been notified about the alarm. If necessary, you can click on "Resend Notification" to resend the notification, or click on the "Send Message" button in the top-left corner to send text, voice, or image messages to the care target.
Additionally, if the management personnel have already taken action on this alarm, they can fill in a note on the right side of the page or upload images to provide an explanation of the actions taken.



- Alarm Report
  To access the corresponding menu in English, click on "Alarms" -> "Alarm Report"
  On this page, management personnel can export the alarm report based on search criteria.

➢ Notification Plan Manage

- Function Introduction:
  We have implemented a notification plan feature that allows specified individuals to be notified via email or SMS when certain alarms are generated by care targets. The notification schedule can be customized based on alarm types, specific time periods, or selected care targets, providing flexibility in its configuration.
  To access the corresponding menu in English, click on "Alarms" -> "Notification"
- Add Notification Plan
  On the notification plan list page, click on "Add" to open the page for adding a new notification plan.
- Edit Notification plan
  On the notification plan list page, select a notification plan and click on "Edit" to open the page for editing the notification plan information.



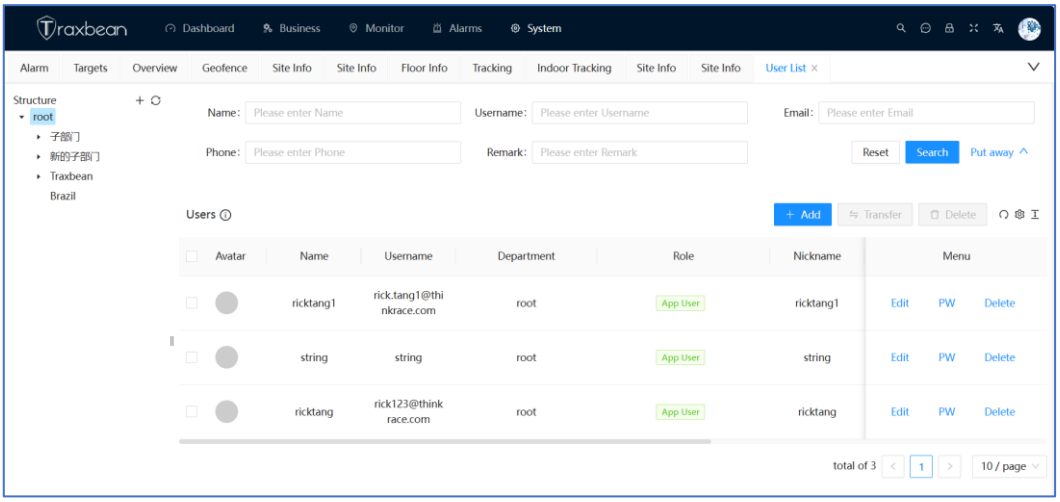
- Delete Notification Plan
  On the notification plan list page, select a notification plan and click on "Delete". Confirm the deletion to remove the notification plan.

➢ System Manage

- Function Introduction:
  This module primarily manages system parameters, users, permissions, and other related information.

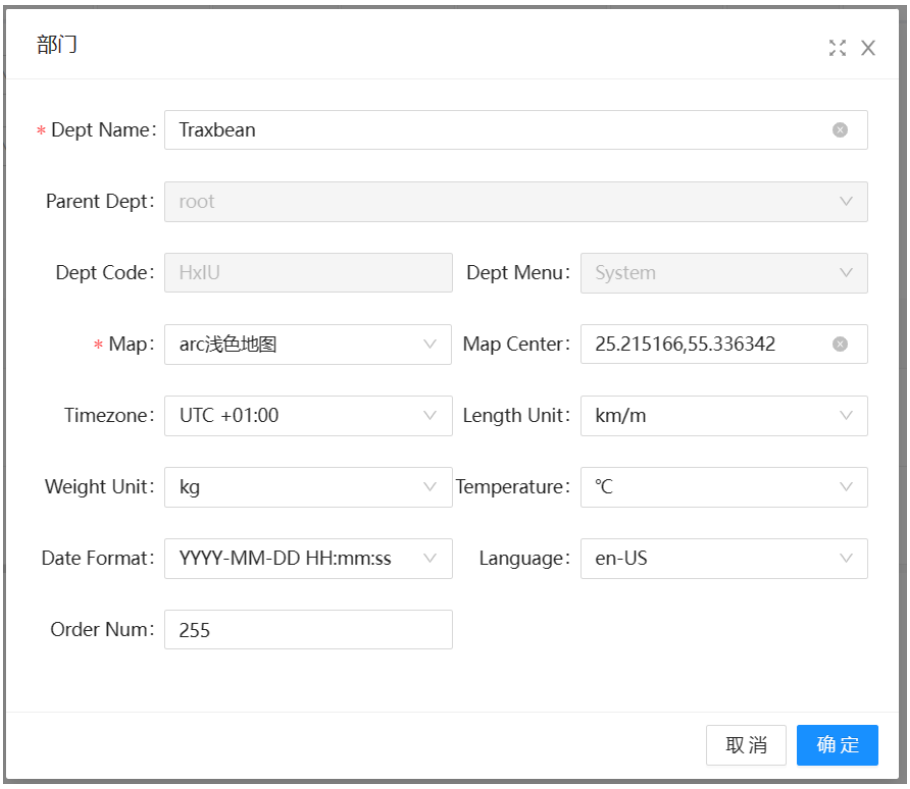
..1 Department Manager

- Function Introduction:
  The design architecture of this system is based on the SaaS (Software as a Service) model, which allows multiple companies and departments to use it simultaneously. Department management enables the segregation of devices, care targets, and users across different departments, catering to companies with subsidiaries or subordinate agents.
  To access the corresponding menu in English, click on "System" -> "Permission" -> "User List".
  Once you enter the module, you will find a tree structure representing departments in the top-left corner of the page. This area serves as the department management functional zone.



- Add Department:
  On the top-left corner of the page, where the department tree structure is displayed, click on the plus (+) button to add a new department.

- Edit Department:
  On the top-left corner of the page, where the department tree structure is displayed, select a department and right-click. Then, click on the "Edit" option in the right-click menu to open the department information editing page.
  In the department information editing interface, apart from the parent department and department name, there are several other pieces of information, such as:
  Default Map: After selection, all users under this department will display the chosen map as the default.
  Language and Timezone: After selection, all users under this department will default to the chosen language and timezone.
  Map Center: After selection, all users under this department will have the chosen location set as the center point when loading maps.
  Additionally, there are settings for time format, length units, weight units, and temperature units, following the same logic. These settings facilitate the use of different measurement units for different clients.



- Delete Department:
  On the top-left corner of the page, where the department tree structure is displayed, select a department and right-click. Then, click on the "Delete" option in the right-click menu. Confirm the deletion to remove the department. Please exercise caution when performing this operation.
- Department Settings:
  As a SaaS architecture software, users from different departments may belong to different companies. They may wish to have their own company-defined domain, login interface, and display their company's logo on the interface. To achieve this, you can right-click when managing departments and enter the theme editing option.

..2 User Manage

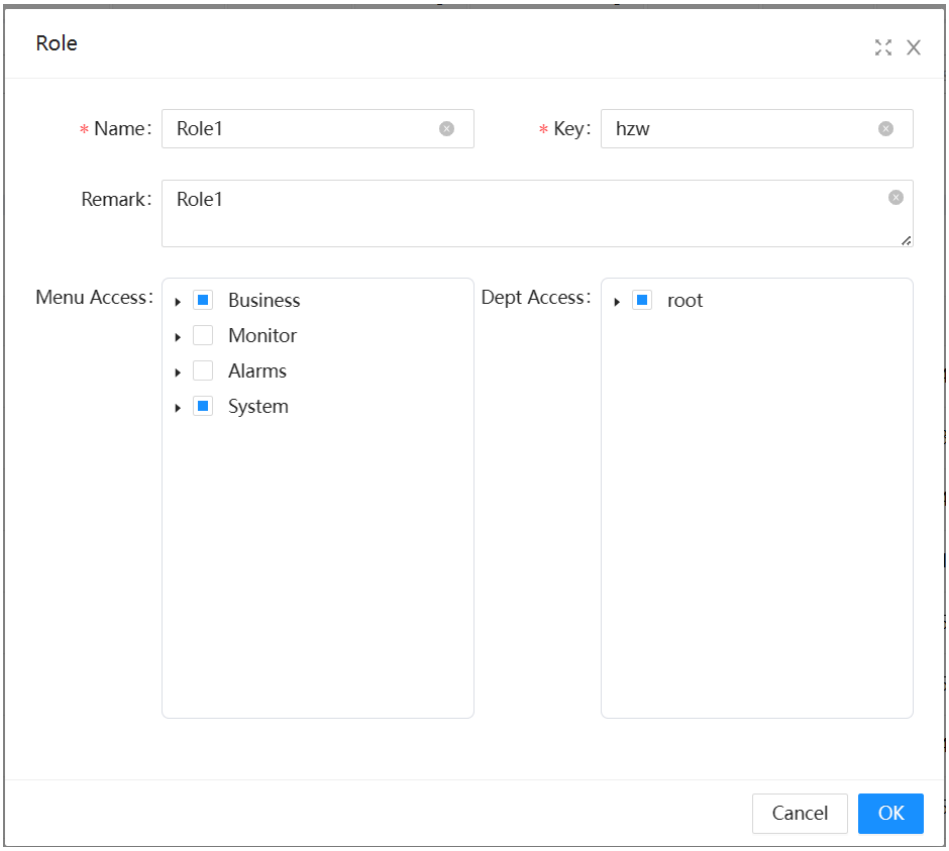
- Function Introduction:
  This module manages the users who log into the system and their permissions
  To access the corresponding menu in English, click on "System" -> "Permission" -> "User List"
- Add User:
  In the user list, click on the "Add" button to open the interface for adding a new user. Note that each user can only be assigned up to three roles.
- Edit User:
  In the user list, select a user and click on "Edit" to open the interface for editing user information.
- Delete User:

In the user list, select a user and click on "Delete". Confirm the deletion to remove the user.

- Change Password:
  In the user list, select a user and click on "Change Password" to open the interface for setting a new password.

..3 Role Manage

- Function Introduction:
  The main functionality of role management is to define a set of menus and functions as a role and authorize these role-defined functions to a specific user.
  To access the corresponding menu in English, click on "System" -> "Permission" -> "Roles"
- Add Role:
  On the role list page, click on the "Add" button to open the interface for adding a new role.
- Edit Role Information:
  On the role list page, select a role and click on "Edit" to open the interface for editing role information.



- Clone Role:
  The clone function allows for the quick creation of a role. On the role list page, select a role and click on "Clone" to duplicate the role's information and create a new role.

- Delete Role:
  On the role list page, select a role and click on "Delete" to remove the role.

..4 Map Manage

- Function Introduction:
  This module manages the different tile resources used for map visualization in the system, using Leaflet as the map rendering engine. By loading different map tile layers, users can utilize different maps.
  To access the corresponding menu in English, click on "System" -> "Parameters" -> "Map Config"
- Add Map Resource:
  On the map resource list page, click on "Add" to enter the interface for adding a new map resource.
- Edit Map Resource:
  On the map resource list page, select a map resource and click on "Edit" to enter the interface for editing the map resource.
- Delete Map Resource:
  On the map resource list page, select a map resource and click on "Delete". Confirm the deletion to remove the map resource.

..5 Photo Message

- Function Introduction:
  Within the options for sending messages to the care recipient's smartwatch, there is an option to send pictures. These pictures are predefined within this module.
  To access the corresponding menu in English, click on "System" -> "Parameters" -> "Photo Message".
- Add Photo Message:
  On the photo message list page, click on "Add" to open the interface for adding a new photo message.
- Edit Photo Message:
  On the photo message list page, select a photo message and click on "Edit" to open the interface for editing the photo message.
- Delete Photo Message:
  On the photo message list page, select a photo message and click on "Delete". Confirm the deletion to remove the photo message.

● Open API

1. Function Introduction:

Any user of this system, as long as they have the company's smart devices, the username, and password for this system, can integrate data into a third-party platform through the Open API.

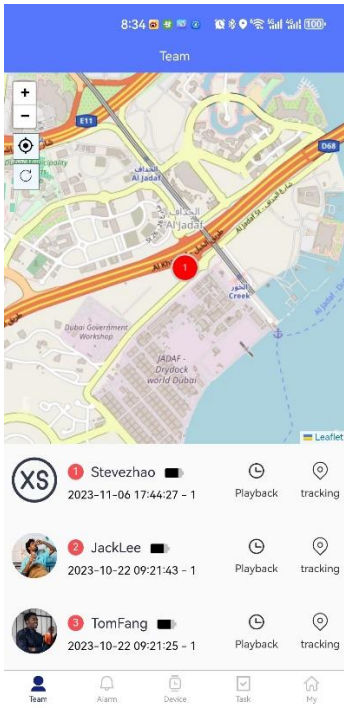
2. Calling Method:

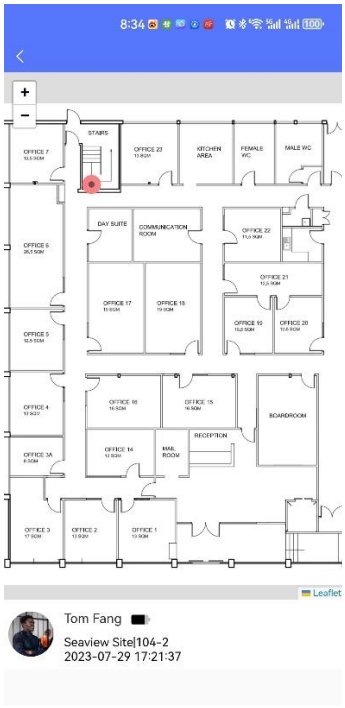
- Step 1: Call the User Login API to obtain a token.
- Step 2: When calling other API, include the token in the HTTP header, with the name "Authorization".

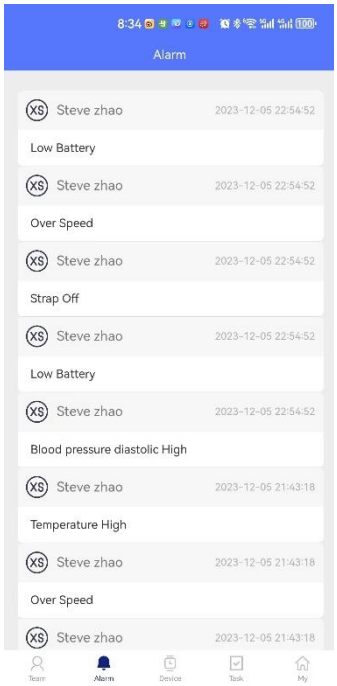
3. Open API

https://napi.amber360.com/swagger-api/#/

Phone App Function Introduction

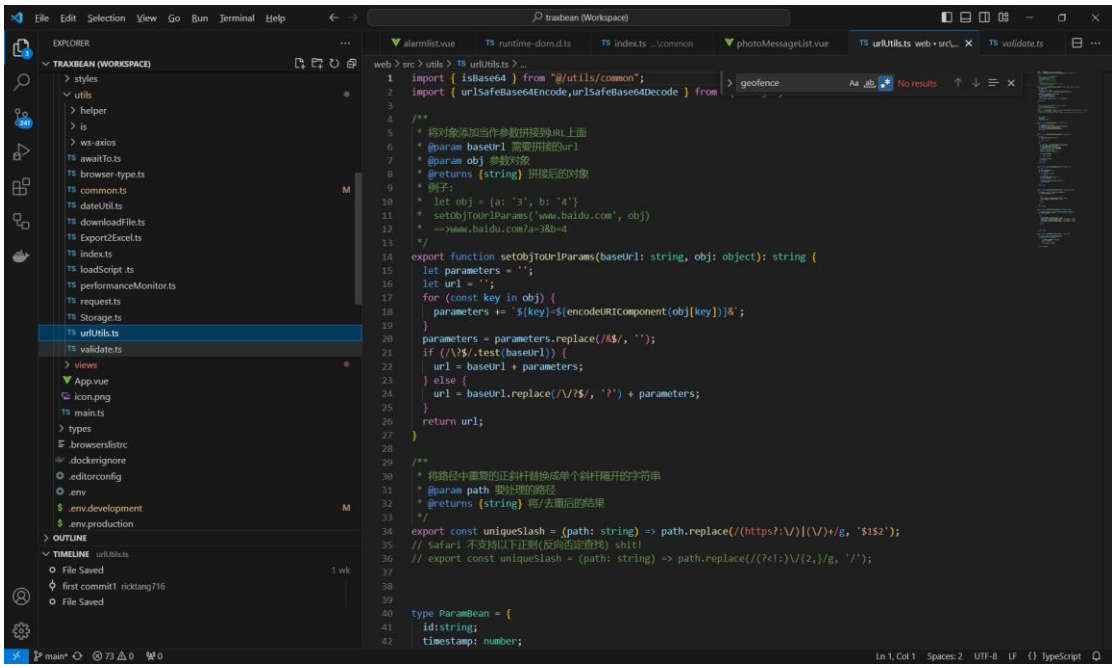






Development Tools And Environment

1. VS Code



● Common Problem

- **What is the positioning accuracy of the GPS smartwatch?**
  The positioning accuracy of the Traxbean GPS smartwatch typically depends on various factors, including the strength of satellite signals and the surrounding environment. Generally, the positioning accuracy of GPS smartwatches can range from a few meters to tens of meters, but the specific accuracy may vary depending on the environment.

- **Why does the GPS smartwatch sometimes have inaccurate positioning?**
  There can be several reasons for inaccurate positioning with the Traxbean GPS smartwatch. These include signal obstruction (such as tall buildings or dense forests), GPS antenna design, weak satellite signals, etc. Additionally, environmental conditions, weather, and the position and orientation of the watch can also affect the positioning accuracy. It's worth noting that GPS is ideally designed to work in an open sky environment, facing towards the sky.

- **Does the GPS smartwatch support indoor positioning?**
  The Traxbean GPS smartwatch primarily relies on GPS satellite signals for positioning, so the positioning accuracy may be limited in indoor environments due to signal obstruction from buildings. However, some GPS smartwatches may incorporate other positioning technologies such as cell tower positioning or Wi-Fi positioning to enhance their positioning capabilities indoors.

- **Does the GPS smartwatch support multiple positioning technologies?**
  Yes, the Traxbean GPS smartwatch supports multiple positioning technologies, including GPS, cell tower positioning, and Wi-Fi positioning. By combining multiple positioning technologies, the watch can provide more accurate positioning results in different environments.

- **Does the GPS smartwatch support real-time positioning?**
  Yes, the Traxbean GPS smartwatch supports real-time positioning functionality. Guardians can track the watch's location in real-time and receive timely updates on the positioning information through the corresponding application or platform.

- **What is the primary communication method of the GPS smartwatch?**
  The primary communication method of the Traxbean GPS smartwatch is typically through wireless networks such as 2G, 3G, 4G, or Wi-Fi devices. This enables the transmission of location data, remote control, monitoring, and other functionalities.

- **Can the GPS smartwatch work in remote mountainous or desert areas without network signal?**
  If there is no network signal, the GPS smartwatch can still use GPS satellite signals for positioning. However, to achieve real-time communication and data transmission, the

watch needs to be within an area with network signal coverage or be connected to other devices through alternative communication methods (such as Bluetooth) to transfer the location data to servers.

- **Does the GPS smartwatch support data synchronization?**
  Yes, the Traxbean GPS smartwatch supports data synchronization. When the watch is in an area without network signal, it can cache the location data and upload it to the server or monitoring center once the network connection is restored.

- **Can the GPS smartwatch transmit data via Wi-Fi?**
  Yes, the Traxbean GPS smartwatch supports data transmission via Wi-Fi. In areas with Wi-Fi network coverage, the watch can communicate and transfer data with the internet through Wi-Fi.

- **Can the GPS smartwatch work in my country?**
  Traxbean GPS smartwatches typically use the Global Positioning System (GPS), which means they can work globally, including in your country. However, the features and frequency band coverage of the watch may vary depending on the region and the provider. Currently, we sell such products in more than 80 countries, including the United States, Canada, Mexico, Brazil, Argentina, Colombia, Chile, Australia, New Zealand, Japan, South Korea, Singapore, Malaysia, Indonesia, Thailand, Vietnam, India, Bangladesh, Pakistan, United Arab Emirates, Saudi Arabia, Qatar, Oman, Lebanon, Israel, Kazakhstan, Uzbekistan, Russia, Ukraine, Mongolia, Nigeria, Ghana, Kenya, South Africa, Rwanda, Morocco, Turkey, Greece, Italy, France, Germany, Austria, the United Kingdom, the Netherlands, Norway, Switzerland, Sweden, and more. When consulting sales, it is important to confirm with the sales representative regarding the frequency bands of the communication networks in your country.

- **Is there a fee for using GPS on the smartwatch?**
  Using the GPS positioning function does not incur direct charges. GPS positioning is a free service provided by the GPS satellite system. However, if you use a GPS smartwatch that requires internet connectivity and transmits data through cellular mobile networks, there may be charges related to your mobile network plan.

- **Can the GPS smartwatch only use GPS satellite positioning?**
  Currently, Traxbean GPS smartwatches not only support the GPS satellite positioning system used in the United States but also provide positioning through other satellite systems, including China's BeiDou satellite navigation system and Russia's GLONASS satellite navigation system. These multi-system positioning capabilities allow for more satellite signal sources, improving the accuracy and reliability of positioning. Therefore, GPS smartwatches can use multiple satellite systems simultaneously to obtain location information.

- **What is the battery life of the GPS smartwatch?**

  The battery life of GPS smartwatches varies depending on the watch model and usage. Generally, in GPS positioning mode, the battery life of the smartwatch is relatively short, ranging from a few hours to a day. In smartwatches, using other features such as calling, message notifications, etc., also impacts battery life. The battery life of the watch is usually specified in the product specifications. Traxbean GPS smartwatches, through intelligent battery management and power consumption control, can perform better than their counterparts. For some models like PT880 and TR40, we have achieved a standby time of 1-2 weeks by slightly increasing the battery size.

- **Can the GPS smartwatch be made with a metal casing?**

  GPS smartwatches can be designed with a metal casing. However, a metal casing may interfere with the signal reception of the GPS antenna and 4G antenna. Due to the shielding effect of metal on electromagnetic signals, the metal casing may weaken or obstruct the reception of GPS and 4G signals. Therefore, designing a GPS smartwatch with a metal casing poses some challenges and may not be conducive to the normal operation of positioning and communication functions. For these reasons, manufacturers generally do not recommend using a metal casing on GPS smartwatches.

- **Does it support geofencing functionality?**

  The Traxbean system supports various geofencing functionalities, including circular and polygonal geofences. It also supports setting the effective time period for geofences, allowing for flexible application in various management scenarios.

- **How long is the historical trajectory saved?**

  The Traxbean system typically retains one year of historical trajectory. If you need to keep the data for a longer period, please contact us or consult sales for a separately deployed system.

- **How does the SOS button on the GPS smartwatch work?**

  The SOS button is usually located on the side or front of the GPS smartwatch. When a user encounters an emergency situation, pressing the SOS button triggers a series of emergency response measures. The watch will send an emergency signal and the current location information to pre-set contacts or emergency rescue agencies, while also sending the data to the connected server. This feature helps users quickly obtain assistance and support in emergency situations. The SOS button requires the watch to be in an environment with network signal coverage.

- **How does the heart rate monitoring function of the GPS smartwatch work?**

  The heart rate monitoring function of GPS smartwatches typically uses an optical heart rate sensor. The optical sensor on the underside of the watch scans the skin optically and measures the heart rate by detecting subtle changes caused by blood flow. By analyzing and processing these changes, the watch can monitor and display the user's real-time heart rate data.

- **How is the temperature monitoring function of the GPS smartwatch implemented?**
  The temperature monitoring function of GPS smartwatches typically uses a temperature sensor. These sensors measure the temperature of the watch in contact with the skin. Users wear the watch on their wrist, and the sensor records and monitors the temperature changes on the skin over a period of time. By analyzing this data, the watch can provide the user's temperature information. In fact, in most hospitals, doctors measure body temperature on the forehead or ear, as these areas are closer to the actual body temperature, whereas the temperature on the wrist may differ to some extent.

- **How is the blood pressure monitoring function of the GPS smartwatch implemented?**
  Currently, GPS smartwatches typically cannot directly measure blood pressure. The blood pressure monitoring function of GPS smartwatches is an estimated value, usually obtained by using an optical sensor to measure heart rate and blood oxygen saturation, and then calculating an estimation using algorithms. However, the accuracy of this estimation may not be as reliable as that of professional medical devices. Therefore, if you need accurate blood pressure measurements, it is recommended to use dedicated medical equipment.

- **How is the blood oxygen monitoring function of the GPS smartwatch implemented?**
  The blood oxygen monitoring function of GPS smartwatches usually utilizes an optical sensor to measure blood oxygen saturation. The optical sensor emits light of different wavelengths and calculates the oxygen level in the blood by measuring the light absorption through the skin. In this way, the watch can provide the user's blood oxygen saturation data.

- **Does the GPS smartwatch support scheduled monitoring of health data?**
  Yes, GPS smartwatches support scheduled monitoring of health data. Users can set the time intervals for scheduled data monitoring in the system according to their preferences. Once set, the watch will automatically perform health data measurements, such as heart rate and blood oxygen, at the specified time intervals and store the data on the watch or synchronize it with the server application.

- **Does the GPS smartwatch have an abnormality alert function for health data?**
  Yes, users can set threshold values (min/max) for each type of health data in the system. When the server receives new health data, it can generate alerts for health abnormalities. These alerts will be displayed in the system backend or sent to users through email, SMS, or app notifications according to their settings.

- **How does Traxbean's sleep monitor work?**
  The sleep monitor of Traxbean utilizes a built-in millimeter-wave radar transmitter to emit millimeter-wave signals, which are then reflected by the human body, the mattress, and the surrounding environment. The receiver of the sleep monitor captures these reflected signals, which contain information related to human movement, respiration, and heartbeat. By analyzing the characteristics of the signals, such as amplitude, frequency,

and phase, the sleep monitor extracts changes in these physiological parameters. For example, it can identify sleep stages (light sleep, deep sleep, rapid eye movement, etc.), respiratory rate, heart rate, and other information.

- **How is the fall detection feature implemented in Traxbean?**

  The fall detection algorithm of the GPS smartwatch utilizes built-in accelerometers and gyroscopes to collect user motion data. After preprocessing and feature extraction, a specific fall detection algorithm is used to determine if a fall event has occurred based on parameters such as acceleration and angular velocity. Once a fall is detected, the watch triggers an alert mechanism. However, since the watch is worn on the wrist and wrist movements can be flexible, there may be some degree of false positives.

  Traxbean also provides a fixed-position millimeter-wave radar fall monitoring device. The millimeter-wave radar fall monitoring system utilizes millimeter-wave radar technology to detect and identify human fall events by emitting and receiving millimeter-wave signals. The working principle is as follows: The system first emits millimeter-wave signals, which are high-frequency electromagnetic waves that can penetrate non-metallic objects. When the signals reflect off the human body and the surrounding environment, the receiver of the fall monitoring system captures these reflected signals. By analyzing the characteristics of the signals, such as amplitude, phase, multipath effects, etc., the system can extract parameters related to human motion. Then, using a specific fall detection algorithm, the system determines if a fall event has occurred.

- **How do electronic handcuffs/ankle cuffs work?**

  Electronic handcuffs/ankle cuffs are devices that are locked onto the wrists/ankles of individuals under supervision, using technologies such as mobile communication and GPS positioning to monitor and control their movements. They typically include components such as a GPS module, sensors, communication module, and electronic lock. The sensors detect the location and activities of the supervised individual, and the data is transmitted through the communication module to the monitoring center or relevant personnel for real-time monitoring and management.

- **Are electronic handcuffs/ankle cuffs waterproof and resistant to damage?**

  Traxbean electronic handcuffs and ankle cuffs, which are typically worn 24/7, can achieve an IP68 waterproof rating, allowing them to be used while swimming or bathing. They are designed to have good resistance to damage and are not easily broken. However, in some countries, safety regulations require that electronic handcuffs and ankle cuffs can be cut open in emergency situations using special tools. Therefore, the resistance to damage is relative. Moreover, in today's society, it is necessary to treat the wearers with a certain level of dignity, so it is not appropriate to make the devices large or use excessive amounts of metal. The focus is more on designing electronic handcuffs/ankle cuffs that are difficult to break and implementing a strict management system to prevent wearers from easily damaging the devices.

- **Do electronic handcuffs/ankle cuffs have an emergency alarm function?**
  Traxbean electronic handcuffs and ankle cuffs are equipped with an emergency alarm function to respond to emergencies. These features may include emergency buttons or triggers that the supervised individual can press to send an emergency signal to the monitoring center or relevant personnel for assistance or handling of the emergency situation.

- **How are battery life and charging handled for electronic handcuffs/ankle cuffs?**
  The design life of electronic handcuffs/ankle cuffs is over 5 years, and they can be reused. The battery warranty from the factory is 1 year, but it does not mean that the battery can only work for one year. Generally, the battery will experience some degree of attenuation after one year of use.
  Since electronic handcuffs/ankle cuffs need to be worn for a long time and cannot be easily removed, we have designed a mobile charging device that can directly charge the device while the user is wearing it.

- **Does the Traxbean system have API that can be accessed?**
  The Traxbean system has a rich set of API. Customers can build a complete system based on the API or integrate the data into their own systems using the API.

- **Can Traxbean's smartwatch provide an SDK for application development?**
  Yes, an SDK can be provided.

- **What is the operating system of Traxbean's smartwatch, and what language is used for development?**
  The operating system of Traxbean's smartwatch is Android, and it is developed using Java.

- **Is Traxbean's positioning system open source?**
  No, it is not an open-source system, but the system's source code can be obtained by paying a certain fee.

- **I already have a company account for Traxbean. Can it be used by colleagues in branch offices?**
  Yes, it can be used. Traxbean is a SaaS (Software as a Service) architecture system that can be used by multiple companies simultaneously, and customers can also allow their branch offices to open accounts.

Appendix Table

- Term List

- GPS: Global Positioning System, a technology for satellite-based positioning and navigation.
- Positioning: Using GPS technology to determine the geographical location of a device or user.
- Geofence: A geofence is a virtual geographical boundary used in GPS tracking software to define specific areas or zones. Users can draw geofences on a map, and when a device enters or exits the area, the GPS tracking software will trigger corresponding events or notifications.
- Home Beacon: A home beacon refers to a beacon or signal transmitter used within the software system to establish a designated home location or reference point. It serves as a fixed reference point for navigation or positioning purposes.
- Historical Track: A historical track refers to the past movement path of a device or user recorded and stored by GPS tracking software. The software periodically logs the location data of the device or user to form trajectory data.
- API: API stands for Application Programming Interface, which is a set of defined interfaces that specify interactions between software components. It provides a standardized way for different software systems to communicate and exchange data. Through API, data from this software can be accessed by third-party software.
- SDK: SDK stands for Software Development Kit, which is a collection of tools for developing software applications on a smartwatch. It includes various resources such as documentation, sample code, and libraries to assist developers in creating and building software applications more easily.
- Care Recipient: A care recipient typically wears or carries a personal locator or handheld device with a positioning device that regularly uploads their location information to a tracking system using GPS technology. Through the tracking system, caregivers, family members, or relevant individuals can remotely and real-time monitor the location, activity trajectory, and status of the care recipient.