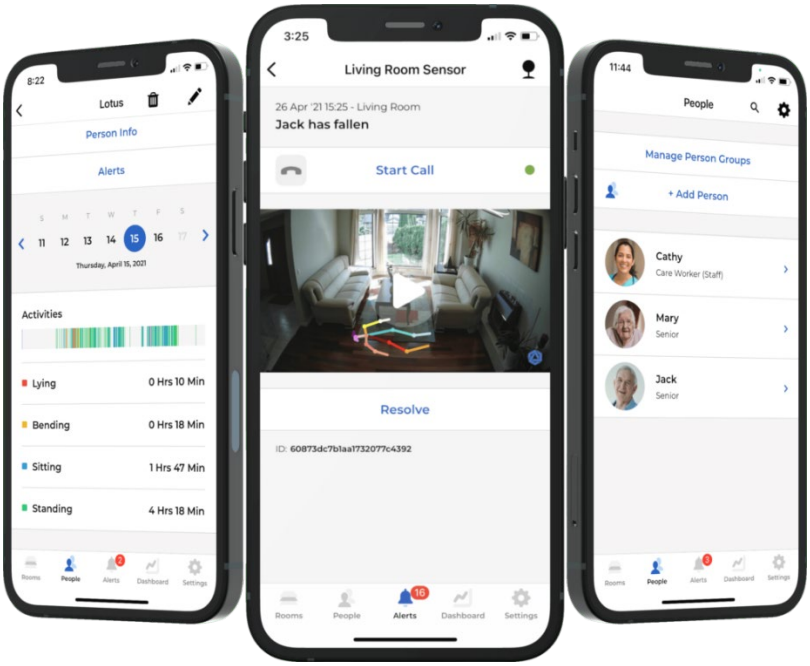
AltumView
Systems Inc.

AltumView Sentinare Smart Activity Sensor

User Manual



June 20, 2025

AltumView Systems Inc.

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Revision History

Date	Version
October 23, 2019	Firmware version: 0.6.225 App version: 1.4.6
November 11, 2019	Firmware version: 0.6.225 App version: 1.4.6 Minor revision
November 14, 2019	Firmware version: 0.6.227 App version: 1.5.0
November 16, 2019	Firmware version: 0.6.228 App version: 1.5.0
February 8, 2020	Rearranged chapter order
February 25, 2020	Firmware version: 0.7.242 App version: 1.7.9
April 5, 2020	Firmware version：US-0.7.248, CN-0.7.259, CA-0.7.262. App Version: 1.7.24 Changes：1.3, 1.5, 2.1, 3.2, 4.1, 4.2.5, 4.2.13, 4.2.14, 4.2.16, 5.2, 7.1
July 26, 2020	Firmware version: CA-0.8.268, CN-0.8.264, US-0.8.253 or later App version: 2.2.18 or later Main Changes: • New feature: Fall Risk Assessment (Sec. 7) • New feature: False Alert management (Sec. 6.2) • Merge Area and Zone into Room • Other changes to reduce false alarms • Improved streaming performance with lower delay and bandwidth • Restart and Factory Reset via Bluetooth • Turn on phone loud speaker in 2-way audio • Add 2-way audio server connection indicator • Add LED and alert chime toggles • Add waving detection sensitivity
Nov. 6, 2020	Firmware version: CA-0.8.274, CN-0.8.268, US-0.8.260 App version: 2.4.16 Main Changes: • New feature: Region of Interest (Sec. 4) • New feature: User Group (Sec. 5) • New feature: Web interface (Sec. 10) • The “Wandering Risk” flag is removed, which can be achieved by defining a person group for people with wandering risk. • Display ROI map in the background. • Change floor map color. • Change to colorful stick figures. • Improved face recognition and tracking. • Improved IR light control.

	• Improved Bluetooth connection. • Fixed support of Chinese WiFi names.
February 16, 2021	Firmware version: CA-0.9.280, CN-0.9.273, US-0.9.268 App version: 2.5.6 Main Changes: • Added person information and medical history page. • Added Visits page in the Dashboard. • Improved hand waving detection performance in night vision mode. Changed the default value of Delay Fall Alert to OFF, and the default Viewing Privacy mode to Natural.
May 2, 2021	Firmware version: CA-0.9.280, CN-0.9.273, US-0.9.268 or later App version: 2.5.27 Main Changes: • Rebranded the app and sensor names to Sentinare • Updated the Rooms page to allow easier navigation between rooms and sensors • Added Switch Account description • Updated Add Person part
May 18, 2021	App version: 2.5.28 Added the privacy mode in Room management.
May 22, 2021	Added Ch. 11: API.
July 20, 2021	Firmware version: CA-0.9.285, US-0.9.271, CN-0.9.275 or later. App version: 2.7.20 Main Changes: • Added stick figure recording/playback feature in the sensor page • Added device online/offline status in the Room page • Added people and device status summaries in the Dashboard page • Various bug fixes, such as in fall risk assessment.

Nov. 15, 2021	Firmware versions:
	• Cypress sensor: No change
	• Sentinare 2 sensor: US-0.1.177, CN-0.1.177, CA-0.1.182.
	App version: 2.7.46
	Main Changes:
	• Sentinare 2 firmware:
	  ○ Voice call is enabled
	  ○ Fall risk assessment is enabled
	  ○ Fixed flipped view bug in normal installation
	  ○ Fixed setting up WiFi bug for iPhone 6/6s/7 with iOS 12
	  ○ Fixed color distortion problem
	• App:
	  ○ Changed the fall risk assessment UI
	  ○ Fixed stopped streaming problem when the app is minimized and screen is turned off

	○ Fixed session expired error ○ Moved privacy mode setting from “Room” to “Calibrate” page ○ Modified ‘Person” page
Dec. 20, 2021	Firmware versions: • Cypress sensor: US-0.9.274, CN-0.9.277, CA-0.9.287. • Sentinare 2 sensor: US-0.1.182, CN-0.1.184, CA-0.1.189. App version: 2.7.54 Main Changes: • Cypress firmware: Adding low-light mode • Sentinare 2 firmware: ○ Adding low-light mode ○ Fixed the bug that face recognition sometimes does not work ○ Fixed some WiFi connection bugs ○ Fixed some stick figure recording bugs • Sentinare App: ○ Fixed Android 11 and iOS 13 permission request problems for Bluetooth, Local Network, and Location ○ Duplicated Privacy Mode and Upside Down Installation toggles in the sensor page and Calibrate pages ○ Improved Bluetooth timing ○ Added command in the alert notification to open the sensor page directly
Mar. 21, 2022	Firmware version: • Cypress sensor: US-0.9.274, CN-0.9.277, CA-0.9.287. • Sentinare 2 sensor: US-0.1.184, CN-0.1.186, CA-0.1.191. • App version: 2.8.48 Main Changes: • Added Link Alexa Together for US server • Added Purchase Subscription page • Added multiple-choice health conditions in People page • Combined hand-waving toggle and hand-waving sensitivity toggle • When trying to add a sensor that is already in another account, the app can now display the previous account name • Fixed flashing white light bug after power cycle • Fixed various WiFi/Bluetooth connection bugs
May 11, 2022	Firmware version: • Cypress sensor: No change. • Sentinare 2 sensor: US-0.1.205 (US), CA-0.1.205 (Canada), CN-0.1.205 (China). • App version: 2.8.71 Main Changes: • Properly wipe network configuration and alerts during removal from the account. • No longer send a “connect” message to the server after subscribing to MQTT.

	• Fixed a LED blinking yellow issue after factory reset (rare). • IR mode tuned and night vision works better. • Delay BLE advertisement by 10 sec. • LED color turns to purple instead of red during manual factory reset, to be consistent with Cypress. • LED dims based on ambient lighting.
June 27, 2022	Firmware version: • Cypress sensor: No change. • Sentinare 2 sensor: US-0.1.206 (US), CA-0.1.206 (Canada), CN-0.1.206 (China). • App version: 2.8.89 Main Changes: • Fixed a bug where sometimes a sensor can send many alerts to the server. • Fixed a bug where an added sensor would broadcast its serial number instead of its given name and the indication that it's already added. • Various UI improvements.
Sept. 18, 2022	Firmware version: • Cypress sensor: No change. • Sentinare 2 sensor: US-1.0.228 (US), CA-1.0.228 (Canada), CN-1.0.228 (China). • App version: 2.9.06. Main Changes: • New feature: Added "Detect Anyone" option in the Restricted Region. Alert will be triggered whenever a human stick figure is detected in the region. This option does NOT require face recognition and is useful when face recognition is not reliable. • **Change to waving hand alert: Only people with "Senior" type can trigger the alert when they face the sensor and their faces are recognized**. Also finetuned the alert generation algorithm to make it more intuitive. • Improved the voice call quality. • Change to head photos: When taking head photos using iPhone, the image circle will turn green when the head is in the circle and the yaw angle is within 45 degrees, and will turn red otherwise. Add warning sign if there are less than 4 photos. • Change to the free plan: device limit increased from 3 to 5. • Various UI changes to make it more user friendly. • Bug fix: Potentially fixed the issue of losing calibration results in some special cases. • Change to WiFi: Support the WPA2-PSK+FT (Fast Transition) mode.
Feb. 27, 2023	Firmware/App versions: • Cypress sensor: No change • Sentinare 2 sensor: US-1.1.239, CA-1.1.239, CN-1.1.239 • App version: 2.9.48

	Main changes:
	• New features:
	  ○ New Overstay Detection option in Region of Interest, which can be used as a backup for fall detection.
	  ○ New Absence Detection option in Region of Interest.
	  ○ New weekly (free plan) and daily (paid plan) account summary via emails.
	  ○ New limited access of secondary user: Account owner can assign a secondary user to selected (instead of all) rooms and people (paid plan).
	  ○ New configurable hand-waving detection: Anyone can trigger the hand-waving alert by default. Users can customize who can trigger it.
	  ○ The LED of the sensor can be completely turned off.
	  ○ Alert resolved date and time are displayed.
	• **The fall detection performance is improved significantly.**
	• Improved voice call connection and quality.
	• Password should be at least 10 chars to improve the security (Existing passwords can still be used).
	• Improved sensor WiFi strength display.
	• Improved Bluetooth handling.
	• The insufficient photos warning sign for People can be enabled or disabled.

May 29, 2023	• Add Sentinare 3 information in the user manual.
July 31, 2023	Firmware/App versions: • Sentinare 2/3 sensor: 1.1.245 • App version: 2.9.77 Main changes: • Uses Sentinare 3 images and icons when connecting to Sentinare 3. • Increased the alert sound by 10 dB. • Added silhouette rendering option in the Settings page, in addition to stick figure. • API integration needs permission first. • Reorganized the Settings page in the App. • On iOS, receiving an alert will now play sound and vibrate while the app is opened. • Various improvements to Bluetooth and reliability. • A person not facing the sensor will not trigger a hand-waving alert. • Improving sensitivity of restricted region: any stick figure with at least one keypoint in the region will trigger the alert. • Switching server will not require firmware change if it is the latest version. • Consolidated useful tips in Sec. 1.8.2 and 1.8.3 of the manual.
Nov. 1, 2023	Firmware/App versions: • Sentinare 2/3 sensor: 1.1.254. • App version: 2.9.112. Main changes: • New feature:

	○ Remote calibration ○ MicroSD card local video recording on Sentinare 3 (beta test version, only available to selected accounts) ○ Add Active Window in Region of Interest • Improved hand waving detection performance • Hand-waving detection: only raising hand is needed at high sensitivity • Calibration allows taking multiple background images to optimize installation before running automatic floor detection • The sensor will play a sound when taking background image during calibration
Feb. 12, 2024	Firmware/App versions: • Sentinare 2/3 sensor: 1.1.433. • App version: 2.9.124. Main changes: • New feature: ○ Allowed hidden WiFi SSID to be used. • Improved the robustness of WIFI connection significantly, especially for low bit rate and weak WiFi signals. • Added icon to indicate weak WiFi signal. • Improved calibration speed. • Fixed excessive handwave alerts that could be generated when the sensor was installed up-side-down. • Improved and reduced logging. • Improved date and time setup logic. • Improved UI and layout. • Allowed assigning a person to secondary users in the People page. • Fixed an issue that would affect subscription purchase. • Fixed an issue where no notification was received after linking with Alexa Together in some cases.
May 1, 2024	Firmware/App versions: • Sentinare 2/3 sensor: 1.1.454. • App version: 2.9.142 (China iOS app release will be delayed). Main changes: • New Feature: ○ Add Show Heatmap command in the Sensor page and Recording page. ○ Add Set Fall Detection page with three sensitivities. Low sensitivity is the previous version in 1.1.433. Medium (default) and high sensitivities are new. • Improvements: ○ Improved hand-waving detection with less false alarms. ○ Accounts with enterprise plan will not show the Manage Subscription command.
July 12, 2024	Firmware/App versions:

	• Sentinare 2/3 sensor: no change (1.1.454).
	• App version: 2.9.154 (China iOS app release will be delayed).
	Main changes:
	• New Feature:
	  ○ Add View Snapshot button in the alert page (valid for 30 minutes after the alert).
	  ○ Add a “Mark as a True Alert” button on Resolve Alerts page.

August 14, 2024	Firmware/App versions:
	• Sentinare 2/3 sensor: 2.0.502.
	• App version: 2.9.155 (China iOS app is also available).
	Main changes:
	• Improvements:
	  ○ Improved fall detection algorithm that can significantly reduce false alarms, such as those triggered by sitting in a wheelchair.
	  ○ Improved View Snapshot speed.
	• New feature:
	  ○ Add link to use case document on how to se Sentinare in different scenarios.

August 26, 2024	Firmware/App versions:
	• Sentinare 2/3 sensor: 2.0.510.
	• App version: 2.9.155 (no change).
	Main changes:
	• Improvements:
	  ○ The high/medium-sensitivity fall detections in 2.0.510 have less false alarms than 2.0.502 and 1.1.454.
	  ○ The low-sensitivity fall detection in 2.0.510 is identical to the low-sensitivity fall detection in 1.1.454, as a backstop.
	  ○ Delay Fall Alert can be enabled in all three fall detection sensitivities.
	  ○ Medium-sensitivity with Delay Fall Alert enabled is recommended.

Nov. 15, 2024	Firmware/App versions:
	• Sentinare 2/3 sensor: 2.0.521.
	• App version: 2.9.165
	Main changes:
	• Improvements:
	  ○ Improve fall detection
	  ○ Reduced logging
	  ○ Refresh alert list automatically when a new alert is received
	• Move “Duplicate Alert Prevention” from “Settings” to device page
	• Add “allow Beta Firmware” switch on device page
	• Remove “Ignore false alert” choice from Resolve alert page
	• Remove “Manage false alert” button from Alert page
	• Add a “Pull to refresh for update” button on Alerts page

	• Add the "Last updated "time on Alert page

Feb. 20, 2025	Firmware/App versions:
	• Sentinare 2/3 sensor: 2.0.541
	• App version: 2.9.165 (no change)
	Main changes:
	• Improvements:
	  ○ Fixed bugs for occasional stopped streaming and failing to connect to server.
	  ○ Improved hand-waving detection algorithm:
	  ▪ Hand raising is supported in both medium and high sensitivities, in addition to hand waving.
	  ▪ Easier to trigger hand-waving/raising alerts in all sensitivities.

Apr. 15, 2025	Firmware/App versions: • Sentinare 2/3 sensor: 2.0.548 • App version: 2.9.188 New Feature: • Added Advanced Fall Detection in Set Fall Detection to eliminate false alarms for fall detection (subscription required) (Not available in the China server yet). • Added multiple regions of interest (ROI) on a single sensor. Improvements: • Improvements on WIFI setup.
May 12, 2025	Firmware/App versions: • Sentinare 2/3 sensor: 2.0.554 • App version: 2.9.197 New Features: • When Advanced Fall Detection is enabled (subscription required. Not available in the China server yet), more real falls will be detected. Our system can now minimize both false alarms and missed detections! • Support for static IP address (mobile app update required, available in the future) Improvements: • Fixed a bug where an Overstay Detection could have its duration reset, causing unexpected Overstay alerts. If this happens, the Region of Interest needs to be redefined after upgrading to firmware 2.0.554.
June 20, 2025	Firmware/App versions: • Sentinare 2/3 sensor: 2.0.560 • App version: 2.9.197 (no change) Change: • Disable the change to Advanced Fall Detection in firmware 554/555 temporarily until a bug is fixed (which could cause some false

	alarms). The change to Advanced Fall Detection in version 548 is still enabled, which can reduce false alarms.

1. Quick Start Guide and General Information

1.1 Introduction

Thank you for choosing the Sentinare smart activity sensor system, the ideal solution for senior care, remote patient monitoring, telehealth, and other applications where privacy is indispensable. The Sentinare sensor has a build-in AI chip, and uses the latest deep learning algorithms to monitor the activities of people, collect useful activity statistics, and notify the caregivers immediately when emergencies such falls are detected. It also performs fall risk assessment. To protect the privacy, only stick figure animations are transmitted, instead of raw videos. The stick figure animations can be saved in the cloud, which can be used to analyze people's health, investigate incidents, improve quality of service of care workers, help doctors to detect some diseases earlier (such as Parkinson's disease, dementia, and depression), and help doctors and patients during rehabilitation.

Most contents in this user manual apply to all of the first-generation Sentinare sensor (Cypress, launched in 2018), the second-generation Sentinare sensor (Sentinare 2, launched in 2021), and the third-generation Sentinare sensor (Sentinare 3, launched in June 2023). A few features and operations are slightly different and are explained separately.

Cypress

Sentinare 2

Sentinare 3

1.1.1 Main Features

Sentinare has the following main features. We are also constantly adding new and exciting features to the system.

- Privacy Preservation
- Fall Detection

- Fall Risk Assessment
- Waving Hand Detection
- Region of Interest (ROI) Monitoring:
    - Entrance/Exit Record
    - Restricted Region Alert
    - Overstay Detection
    - Absence Detection
- Stick-Figure Recording
- Face Recognition
- Activity Statistics
- Activity Heatmap
- Voice Call
- Infrared Mode
- Secondary User
- Daily/weekly summary via email
- Mobile app and web app
- API for third party integration

1.1.2 Key Performances

The key performances of the Sentinare sensor under good lighting conditions are as follows (the performance will be degraded in poor lighting conditions or night vision mode):

Fall Detection:

- Best detection distance：< 6m (20 ft)
- Max detection distance：10m (30 ft)

Waving Hand Detection:

- Best detection distance：< 5m (15 ft)
- Max detection distance：8m (25 ft)

Face Recognition:

- Best recognition distance：< 3.5 m (11.5 ft)
- Max recognition distance：5m (16.5 ft)

Voice Call:

- Best voice distance：< 5 m (15 ft)
- Max voice distance：10m (30 ft)

Data Usage:

- Without stick figure recording: ~10MB/day

    - Equivalent to only 16 secs of 720p YouTube video at 5Mbps
- With stick figure recording: ~40MB/day
    - Assumptions: Only one person is in the view for about 10 hours per day
    - Equivalent to only one minute of 720p YouTube video at 5Mbps

1.1.3 Security

Our system has adopted various security protocols, including the TLS/SSL cryptographic protocols, the secure AWS protocols, the Oauth 2.0 authentication protocol, and the light-weight, secure, and scalable MQTTS protocol designed for IoT devices. Together with the fact that only stick-figure animations are transmitted instead of videos, our system is thus more secure than traditional surveillance camera systems. We also have AWS cloud servers in different countries to make sure the data do not leave its original country.

1.1.4 Specifications

Product Name	Sentinare 2/3 Smart Activity Sensor
CPU	Rockchip RV1126
4G/LTE	Not supported yet
Wi-Fi	Sentinare 2: 2.4G/5GHz,802.11a/ac/b/g/n **Sentinare 3:** 2.4GHz only, 802.11b/g/n (5GHz is NOT supported) WPA2-PSK or WPA2-Personal security protocol
Bluetooth	4.1
Built-in Mic, Two-Way Audio	Yes
Image Sensor	1080p
Diagonal View Angle	Sentinare 2: 138° Sentinare 3: 158°
Infrared	Supported
Power	5W

Power Supply	Sentinare 2: • Input AC: 100-240V, 50/60 HZ, 0.4A • Output DC: 5V, 2A, 1.5m 20 AWG micro USB cable Sentinare 3: • Input AC: 100-240V, 50/60 HZ, 0.3A • Output DC: 5V, 2A, 2.5m Type-C USB cable
Usage	Indoor only
Pan/Tilt	No
Sensor Size	Sentinare 2: 75 x 65 x 50 mm Sentinare 3: 104 x 50 x 19 mm
Sensor Weight	Sentinare 2: 110 g Sentinare 3: 73 g
Packaging Net Weight	Sentinare 2: 280 g Sentinare 3: 233 g
Packaging Gross Weight	Sentinare 2: 400 g Sentinare 3: 462 g
Packaging Size	Sentinare 2: 170 x 118 x 80 mm Sentinare 3: 153 x 120 x 80 mm
Certificates	See Sec. 1.11.

1.1.5 3D Diagrams

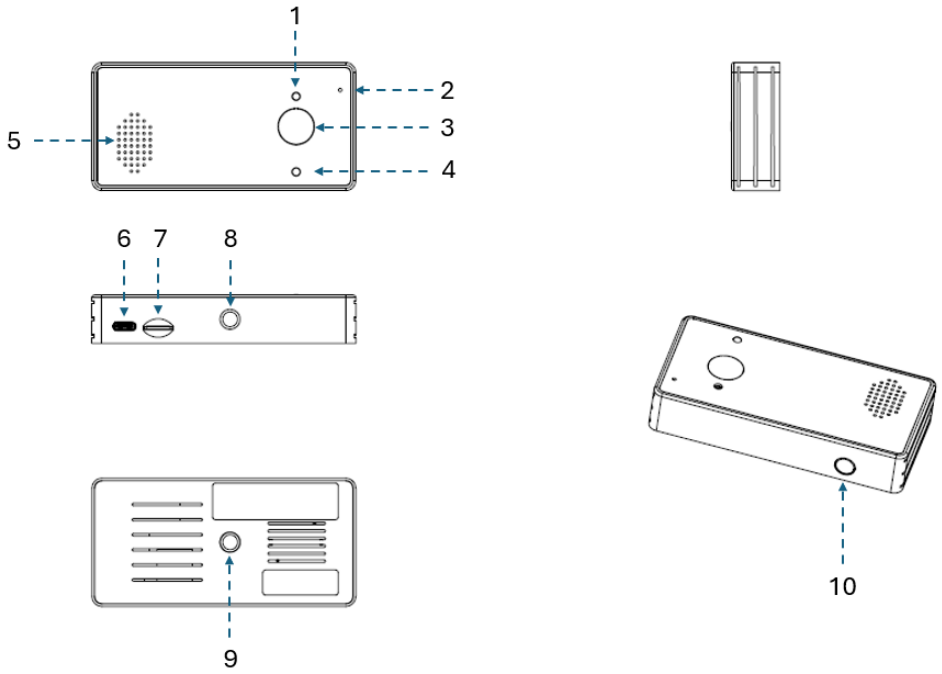


Diagram illustrations:

1. Ambient light sensor
2. Microphone
3. Lens
4. LED light
5. Speaker
6. Type-C USB power supply
7. SD card slot (not functioning)
8. ¼" mounting hole in the bottom
9. ¼" mounting hole in the back
10. Factory reset button

1.2 Installing iOS App from Apple App Store

The iOS version of the Sentinare app (formerly known as the Cypress) can be downloaded from AltumView website www.altumview.com or www.altumview.ca, or by searching " Sentinare Activity sensor" in the Apple App Store, or using the following link:

https://apps.apple.com/app/sentinare-activity-sensor/id1426892725

Available on the App Store

1.3 Installing Android App

The Android version of the Sentinare app can be downloaded from the following links:

https://play.google.com/store/apps/details?id=com.altumview.app

https://altumview.ca/android-download/

1.4 Creating an Account

Create a new account from the Sentinare Activity Sensor App. Choose the server in your country. Each sensor is pre-registered on the whitelist of only one server. If there is no server in your country, choose the US server. See Sec. 2 for details.

1.4.1 App Permissions

The Sentinare app needs certain permissions to work properly. When you first use the app and some of its features, it will ask for the following permissions. Please allow these accesses when the app is running. These permissions can be changed in the Settings page of your mobile device.

- Push notification (required to receive alerts from the Sentinare sensor)
- Bluetooth
- Location (required to use Bluetooth)
- Local network (required to use voice call)
- Microphone
- Camera

Note that many phones have various power saving settings that could disable push notification when the Sentinare runs in the background. Please refer to the user manual of your phone to ensure that push notification is enabled for Sentinare. Sometimes you need to change multiple power saving settings. On iPhone, please turn off Low Power Mode in the Settings/Battery page.

1.5 Adding the Sensor to the Account and Setting up WiFi

Since you may need to try several installation positions before finding the best spot, it is recommended to add the sensor to your account and set up WiFi first, before installing it. If you encounter any problem, please refer to Setup WiFi in Sec. 4 for details.

Plug in the USB adapter and the USB cable to power up the sensor (do not press the factory reset button), and wait until its LED flashes white for about 20 seconds. Go to the Rooms page in the App, expand a room, and tap “+Add Device”. Select your new sensor from the searched list, and type a name for it. The sensor will then search available WiFi networks. Select your WiFi and enter the password. Upgrade the firmware if prompted.

After setting up WiFi, the App will ask you to do calibration, which is required for fall detection. Since the sensor has not been installed properly yet, you can select Later in the “Calibration Required” page, and do the calibration after the installation of the sensor in the next step.

1.6 Installing the Sentinare Sensor

Unplug the power of the sensor. Find an installation position that is about 1.8-2.2m (6-7 ft) above the floor. Install the sensor temporarily, such as using packing tape.

Tilt it down slightly so that it can monitor most of the room and the floor for fall detection without occlusion. The sensor should not rotate to the left or right, i.e., the line between the lens and the LED light should be vertical. Otherwise, the fall detection algorithm could be confused and generate false alarms.

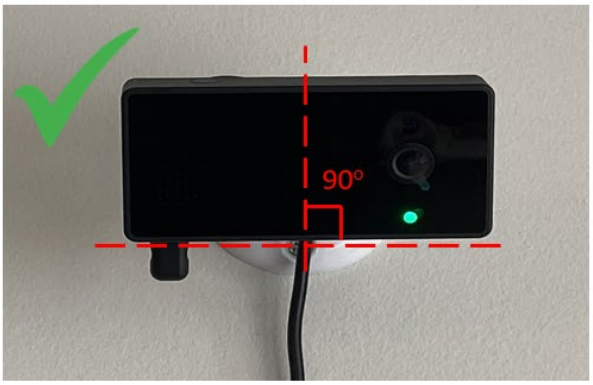
Note: If you want to use face recognition feature, it is recommended to install the sensor no more than 2m high, otherwise it cannot see people' face clearly, and the face recognition performance will be affected.

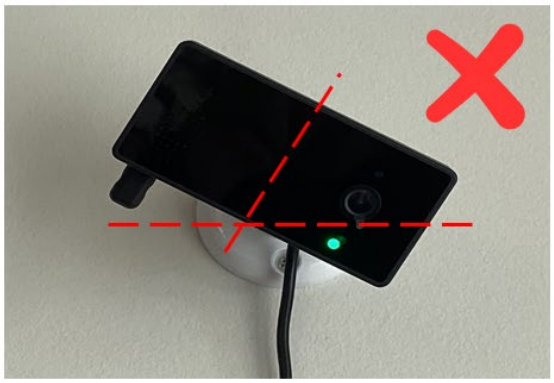
The bracket of the sensor can be mounted on a horizontal surface, on the wall, or on the ceiling.

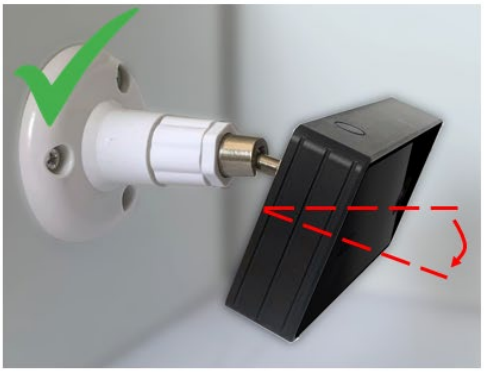
The sensor can be installed upside-down. In this case, you need to turn on the Upside-Down Installation flag in the App. See Sec. 4 for details.

Please avoid facing the sensor at strong light sources such as a big window.

The following are different ways to install the Sentinare 3 sensor. Sentinare 3 comes with an **8ft Type C USB cable**. You can use other Type C USB cables if you need, as all Type C USB cables can carry at least 3A current, and Sentinare 3 only needs 2A at the most.

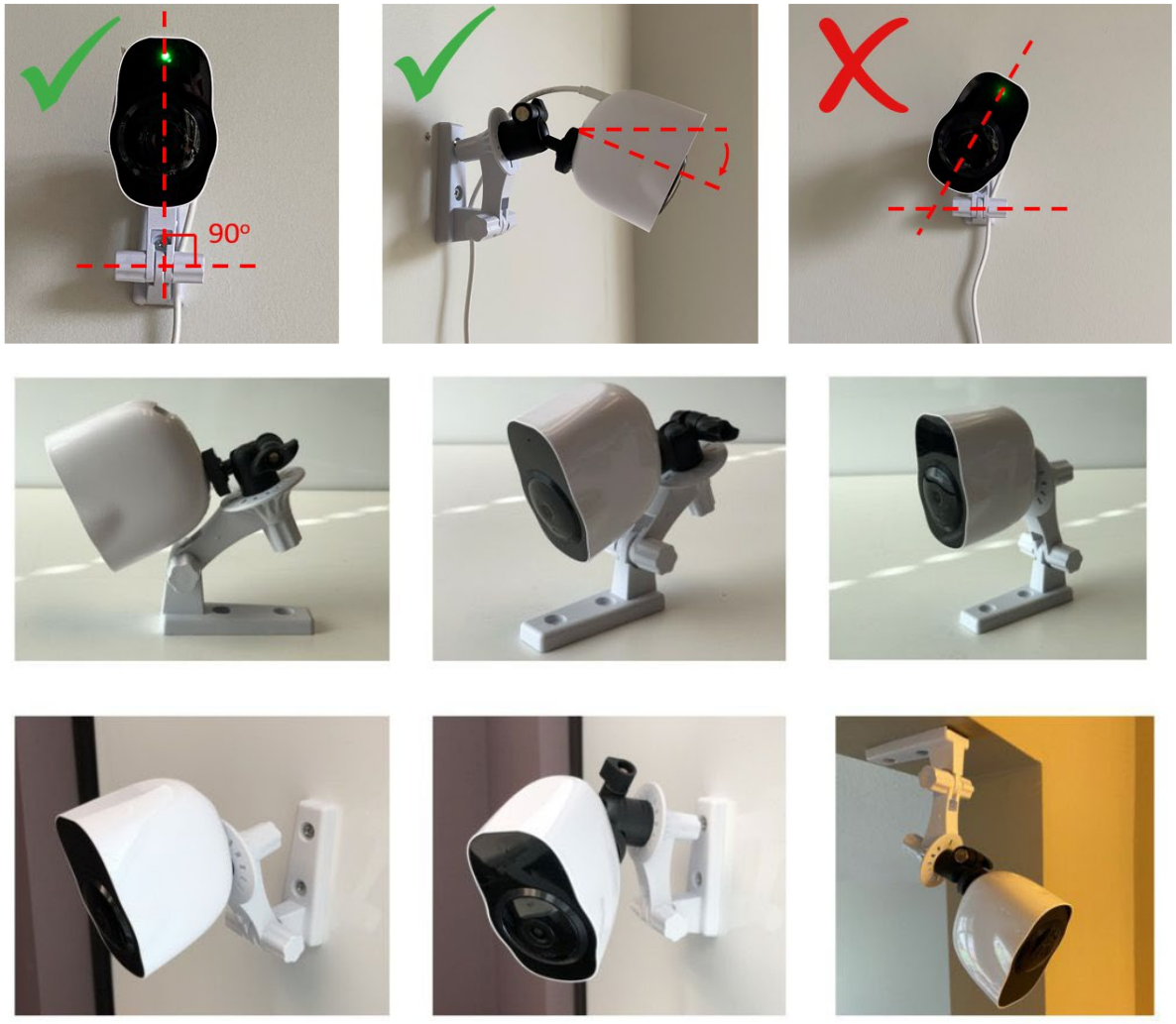






The following are different ways to install the Sentinare 2 sensor, with the optional ball head. Sentinare 2 comes with a USB power adapter with 1.5-meter 20 AWG micro USB cable. Please only use the provided USB adapter and cable. Please do NOT use other USB adapter or cable, as they may not be able

to power the sensor properly. If the cable is not long enough, use AC power extension cord to connect the USB adapter to AC power.



1.6.1 Other Mounting Options

The Cypress/Sentinare sensor has standard mounting hole with ¼”-20 tripod screw thread. Therefore it can be used with many other mounting stands. The following are some adhesive mounting stands with 360-degree ball head that can be used with our sensor. Hook & loop tapes such as Velcro can also be used instead of the double-sided adhesive tapes.

https://www.amazon.com/dp/B00BPRLNQ2

https://www.amazon.com/dp/B08MDZQ2XYhttps://www.amazon.com/dp/B08NCC2RKG

In addition, you can also use the following **removable** 3M Command hanging strip, which can be removed without leaving any mark on the surface. We recommend the large size (3.65” x 0.73”, hold up to 5 lbs) or medium size (2.75” x 0.73”, hold up to 3 lbs) to ensure hold.

https://www.amazon.com/dp/B0751VFF2P

1.7 Calibrating the Sensor

The details of the calibration are described in Sec. 4.1.4.

Power up the sensor. Go to the sensor page in the App, click Calibrate. The app will guide you to capture a background image, and automatically detect the floor, which is required for fall detection. This will take about 30 seconds. Adjust the sensor position and angle until you are satisfied with the calibration result, before finalizing the installation. You can also manually edit the detected floor area.

Note that if the sensor position, angle, or privacy mode is changed in the future, the calibration must be performed again to update the background and the floor so that the sensor can detect falls properly.

The sensor is now ready to look after your loved ones! Please check the details in the User Manual for other features, such as adding people, defining region of interest, and changing various settings.

1.8 Disclaimers, Limitations and Tips

1.8.1 Disclaimers and Limitations of the AI Algorithms

Please note that as in any other Artificial Intelligence products, the algorithms of our products are not perfect, although we are working hard to improve them constantly. By purchasing our products and using our services, you agree to our terms and conditions as stated in our website and in the App, including the disclaimers, limitations of our products and services, and limitation of liability. In particular, you agree that the device is not guaranteed to detect all possible abnormal events that it is designed for, and is not guaranteed to collect all information without any error. We cannot guarantee in any way that the device will prevent accidents, death or personal injury to you or others, or prevent property damage, illegal entry, or undue delay in any emergency service response, and we are not liable in any manner for any injury, loss or damage resulting therefrom. If you do not agree with these clauses, you should not use our products.

The following Is a list of known issues and limitations of our AI algorithms. The list is by no mean complete, and is updated frequently.

- Not all emergencies such as falls and waving hand can be detected correctly, because the performances can be affected by many factors, such as lighting, distance, angle, and occlusion. For example, if the body pose is vertical and straight in the image after the fall (similar to a standing position), it is more challenging for the sensor to detect.
- The action detection is not always correct, especially when some parts of the body of the person are covered by other objects.
- The face recognition performance can be affected by many factors, such as sensor height, person face angle, lighting condition, strong glass frame, and lack of strong face features of some people.
- The face tracking could have temporary error when multiple people's motions cross over.
- **Faked stick figures**: Sometimes the AI algorithms could mistakenly detect some other objects as human bodies and generate some faked stick figures, usually very small or at fixed locations. Rearranging the objects that cause the problem might be able to eliminate the faked stick figures.
- **Small change of stick figure position:** The locations of some key points in a stick figure could have a few pixels of difference between neighboring frames, due to the limited precision of the AI algorithm. As a result, the displayed stick figure in the app could exhibit some jittering artifacts even if the person is not moving.

1.8.2 Tips on Fall Detection and Backup

The fall detection performance of Sentinare is affected by many factors, such as distance, sensor's angle, the person's pose after fall, lighting condition, and occlusion.

As discussed in Sec. 1.6, if possible, please install the sensor at about 1.5-2.5m (5-8 ft) above the floor, and tilt it down slightly so that it can monitor most of the room and the floor for fall detection without occlusion.

Falls with vertical and straight body poses (similar to standing poses) in the image are the most challenging to be detected. If possible, please install your sensors so that the most possible falls are not in vertical position in the view, or install two sensors that are 90 degrees to each other to avoid vertical falls in both sensors, and maximize the coverage.

Three fall detection sensitivities are available. The default is medium. Users can switch to high sensitivity if the people being monitored has high risk of falling, or if the room has small floor areas such as bedrooms and bathrooms, which are more challenging for fall detection. Note that switching to high sensitivity will also increase the chance of false alarms.

The hand-waving detection (Sec. 4.2.8) and the overstay detection (Sec. 4.2. 7) features can be used as backups for fall detection. The former needs the person to actively wave hand to the sensor. If possible, please teach the person being monitored how to trigger the waving hand alert if they need help. Different hand-waving detection sensitivities can be selected.

The overstay detection (Sec. 4.2.7) can be set up as another backup in places where fall detection could fail and the person is not supposed to stay long, such as bathrooms, the narrow area next to the bed, the stairs, or hallways with narrow vertical floor areas on the Sentinare app. This feature can also be used to detect sitting too long and encourage healthy lifestyle.

Finally, the absence detection (Sec. 4.2.7) can serve as another layer of backup. It can be set up in an area where a person should show up regularly. An alert will be generated when nobody is detected for the defined duration, which could happen when the person has accident in another place not covered by the Sentinare sensor.

1.8.3 Tips on Reducing Number of Alerts

The following are some methods to reduce the number of alerts (can be true alerts or false alarms):

- Turning on Delay Fall Alert for a sensor (Sec. 4.2.14). In this case, the sensor will wait for 30s before sending a fall detection alert.
- Turning on Duplicate Alert Prevention (Sec. 9.4). In this case, after an alert is generated from any sensor in a Room, the subsequent alerts of the same type from any sensor of the same Room within the specified period of time will not be sent to the App, even if they are true alerts.
- Ignoring Similar Alerts (Sec. 6.2): If certain types of false alarms are frequently generated from the SAME location, you can turn on the Ignoring Similar Alerts flag when resolving the alert. Subsequent alerts of the same type from the SAME location will be ignored. This feature should be used with caution. Please see the discussion in Sec. 6.2.

1.8.4 More Use Cases

The following document provide further details and examples on how to set up Sentinare in different scenarios, such as detecting falls in stairs, leaving bed, going to bed, avoiding sitting too long, and sharing with secondary users.

https://www.altumview.ca/documents/AltumView-Use-Case.pdf

1.9 Troubleshooting

1.9.1 Known Issues

- **Night vision performance**: The performance of the product in night vision mode is generally worse than the day light mode.

- **No voice call for IPV6**: The voice call does not work when the user's IP address is in IPV6 format. We are working to resolve this.

- **Could not make voice call:** Sometimes the security settings of some WiFi routers could prevent making voice call from the Sentinare app to the Sentinare sensor. To verify if this is your case, please use the method in Sec. 4.2.6 Voice Call, and make necessary adjustments to the settings of your WiFi router.

- **Sentinare 2 voice call quality**: The voice call of Sentinare 2 has some noise and echo at the app side (not the sensor side). The voice volume at the sensor side could be a bit low. We will continue to improve the voice call quality in future versions. Sentinare 3 has much better voice call quality.

- **Slow Calibration**: The calibration step usually takes about 30s. Sometimes due to slow network connection, the calibration could take 1.5-2 minutes. This will be improved in a future release soon.

- **LED flashing white**: For Sentinare 2, if the WiFi strength is very weak, the device's LED might turn to flashing white after failing to reconnect to Wifi. To resolve this issue, please make sure that Wifi signal is strong enough, and power cycle the device. It will reconnect to Wifi again and come back online.

- **Firmware upgrading cannot start**: The firmware upgrade of Sentinare sensor usually needs about five minutes. If after clicking the upgrade firmware command in the App, the status of the sensor in the app quickly change from upgrading to the normal status, and the firmware version is still the previous version, please first try again and make sure it is not due to network glitch. If after a few attempts, the upgrade still cannot start, please restart the sensor. Sometimes manually factory reset is needed (se Sec. 4.2.15) before upgrading again.

- **Firmware upgrading got stuck**: When upgrading the firmware, if the status of the sensor in the app is “Upgrading…” for a long time, please press the screen and pull down to refresh the page, because sometimes the app is not able to refresh by itself. Sometimes when upgrading the firmware, the sensor could be stuck and keeps flashing blue light for a very long time (more than 10 minutes). In this case, please first check in the app if the sensor is offline or not, and set up the WiFi again if it is offline. If it is online, it is safe to unplug the power of the sensor and re-plug. If the download was complete, the sensor will upgrade to the new version after restarting. Otherwise the download will continue automatically and the sensor will still flash blue. Multiple unplugs might be needed for the sensor to complete the upgrading. If it still keeps flashing blue after several unplugs, please perform a factory reset from the app or manually perform the factory reset (see Sec. 4.2.22) before upgrading again.

  Difficult to update firmware: If firmware update is not successful due to weak WiFi signal at the sensor’s location, please move the sensor closer to the WiFi router temporarily, finish the update, then move it back to the original location.

- **Error message “No such image (code 39)”**: This error message might popup while calibrating. Please restart or power cycle the device, then calibrate the device again.

- **Alert notification only has one person**: Currently the alert notification only includes stick figure clip of one person, not other persons in the view, although all persons are still included in the View Recording page. In the future, we will include all persons in the alert notification.

- **Web Hub login error**: When logging into the Sentinare Web Hub (Sec. 10), if you get the following error, please clear the cookie and cache of your web browser, or use the incognito mode of your browser, or use a different type of browser:

  {"status_code": 401, "message": "Token is invalid or expired.", "success": false, "error": {"name": "AccessDeniedError", "code": 28}}

1.9.2 Other Troubleshooting

- **Verification Email**: If you could not receive the verification email after registering a new account, please check if your email is spelled correctly, and check the junk folder of your email account.

- **Firmware and App Versions**: Please always use the latest firmware and app versions. Some new features in the firmware (or App) may not work with an old app (or firmware).

- **App Permissions**: The Sentinare app needs certain permissions to work properly. Please see Sec. 1.4.1 for details, especially the notes about disabling power saving in order to receive push notifications.

- **WiFi Protocol**: For security reason, only secure WiFi networks with WPA2-PSK (or WPA2-Personal) protocol are supported. Open, WEP, WPA, and WPA2-Enterprise are not supported. See the Setup WiFi section in Sec. 4 for details.

- Slow WiFi: if the WiFi signal is very weak and slow, you can disable the Sentinare sensor's "Stick-Figure Recording" feature from the Sentinare app, the device will only stream stick-figure video when you open the app.

- **Very Weak WiFi Signal:** If the WiFi signal at the Sentinare sensor's location is too weak for the sensor to remain online, you can consider purchasing a WiFi extender, such as the following: https://www.amazon.com/dp/B07N1WW638

- **Whitelist**: When you try to add a sensor to your account, if you get an error message stating that the sensor is not in the whitelist of the server, it means that the sensor is registered in a different server from the server that your user account is registered. You need to register your account in the correct server. Currently, three servers are available, in US, Canada, and China. If you purchase your Sentinare sensor in these countries, your sensor is default to your country's server. If you purchase your sensor from other countries, your devices are usually registered in the Canada server, unless we notify you otherwise.

- **Calibration after Position Change**: After setting up the WiFi, floor calibration should be performed in order to use the fall detection feature. Every time after the position or angle of the sensor is changed, the calibration must be performed again, otherwise the fall detection will not work properly.

- **Cannot Find Device**: At any time, each Sentinare activity sensor can only connect to one device or app via Bluetooth. Sometimes if your Sentinare app gets a Bluetooth-out-of-range error when trying to connect to a Sentinare sensor, please make sure the sensor is not currently connected to other device or app via Bluetooth. Sometimes the other device could be your cell phone. To check if this is the case, please go to the phone's Settings > Bluetooth page. If the sensor is connected in this page, please turn off the phone's Bluetooth to stop the connection, then turn on the Bluetooth, and connect to the sensor from the Sentinare app again. You can also factory reset the device to disconnect its Bluetooth link.

- **Duplicate Alert Prevention**: To test the various alert features of the system, please set the "Duplicate Alert Prevention" in the Setting page to be "None", such that every alert will be

sent to the App. In addition, please turn off the “Delay Fall Alert” in the sensor page, such that an alert will be sent immediately after a fall is detected, without waiting for 30 seconds.

1.9.3 General Error Recovery Procedure

If the app behaves unexpectedly or stops responding, please force close the app using the following methods for iOS and Android respectively, and then restart it.

https://support.apple.com/en-ca/guide/iphone/iph83bfec492/ios
https://support.google.com/android/answer/9079646?hl=en

If the sensor behaves unexpectedly or stops responding, please try the following recovery approaches one by one:

- Restart the sensor using the Restart command in the sensor’s page in the App.
- If the problem persists, manually power down and power up the sensor again.
- If it still does not work, remove the sensor from the account, and re-add it, using the Remove Sensor and Add Sensor commands in the App.
- If the problem still cannot be resolved, please perform a factory reset.
  - If Bluetooth connection with the sensor is available, the factory reset can be done via the App, by clicking the Show Advanced Settings command at the bottom of the sensor page, then clicking Factory Reset.
  - Otherwise, manual factory reset can be done using the reset hole in the back of the Cypress sensor or the reset button of the Sentinare 2 sensor. See Sec. 4.2.22 Factory Reset for details.

1.10 Technical Support

If you have any technical questions, please contact us at contact@altumview.com.

1.11 Certificates

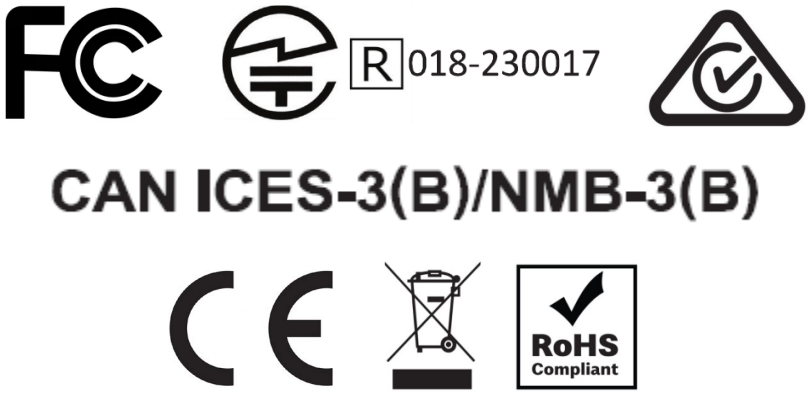
Sentinare 2:

FCC ID (US)	2ATH6-AVG20WF5
IC (Canada)	25095-AVG20WF5
JRL (Japan)	201-220353
TBL (Japan)	D 22 0092 201

Sentinare 3:

FCC ID (US)	2ATH6-AVG30WF6

IC (Canada)	25095-AVG30WF6
JRL (Japan)	018-230017
RCM (Australia)	RCMP23894 001
CE (Europe)	SZCR2412004809ATV
RoHS (Europe)	CANEC25007208701



1.12 US FCC Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generate, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

RF Exposure Warning

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This product may not be collocated or operated in conjunction with any other antenna or transmitter

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.

1.13 Canada ISED Interference Statement

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

Cetappareilestconforme à la norme RSS d'Industrie Canada. Son fonctionnementestsujet aux deux conditions suivantes:

(1) ledispositif ne doit pas produire de brouillagepréjudiciable, et

(2) cedispositifdoit accepter tout brouillagereçu, y compris un brouillage susceptible de provoquer un fonctionnementindésirable.

IMPORTANT NOTE:

Radiation Exposure Statement:

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

Déclarationd'exposition aux radiations:

Cetéquipementestconforme aux limitesd'exposition aux rayonnements IC établies pour unenvironnement non contrôlé. Cetéquipementdoitêtreinstalléetutilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Industry Canada (IC)

CAN ICES-3 (B)/NMB-3(B)

AltumView Systems Inc.

1.14 Canada GACA Interference Statement

GACA approves that this electrical Article as described above meets the requirement of the standard/regulation(s) listed below:

Complies with	Standard/regulation(s)
ACMA mandated	AS/NZS CISPR 32: 2015+A1: 2020, AS/NZS 4268: 2017+A1: 2021, AS/NZX 2772.2: 2016+A1: 2018,
	ARPANSA RPS S-1 Radiation Protection Series S-1 (Rev.1) (Test report: SZCR230900316101, SZCR230900315103, SZCR230900316104)
Electrical Safety	
EESS-National Equipment Database Registration	Above models is registered as level product

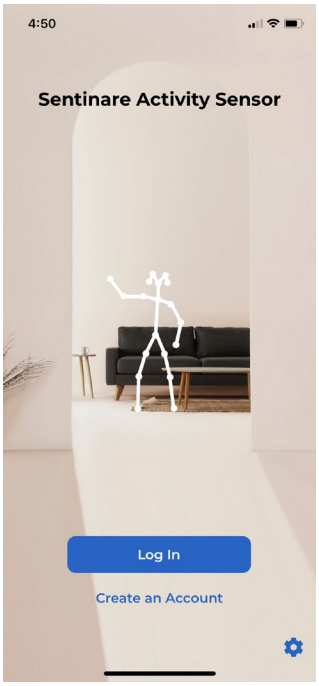
2. User Account Management

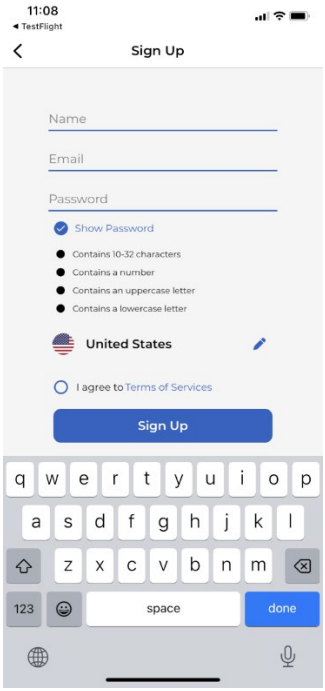
2.1. Create an Account

-
- Open the Sentinare app, and tap the “Create an Account” in the front page.

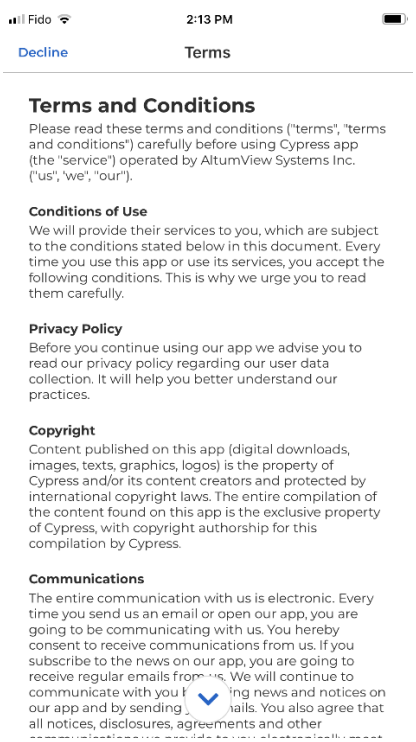
- On the “Sign Up” page, tap the pencil icon to choose a server location. Currently there are three servers: Canada, United States, and China. When a sensor is sold, its serial number is added to the whitelist of one of our servers, based on the country where the device is sold.

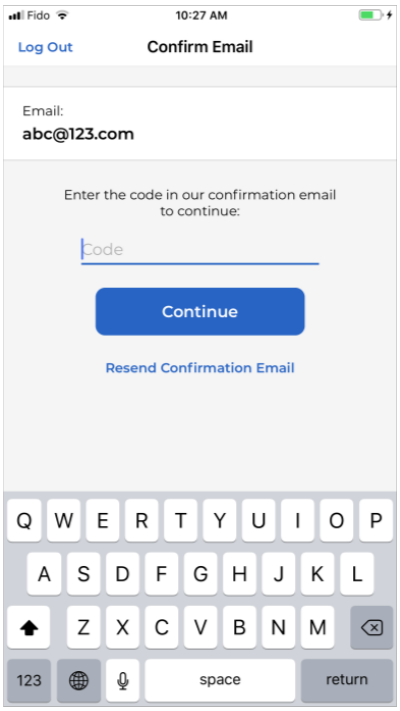
- Fill in name, email, and password, and tap the “Sign Up” button. The email address and password are required for future login. The password should have 10-32 characters, and include at least one number, one uppercase letter, and one lowercase letter.

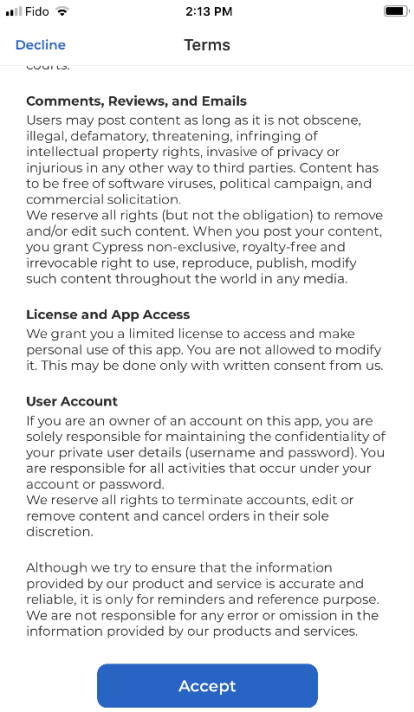




- To use this product, you need to accept our “Terms of Services”. **Please click Terms of Services and read it carefully.** Use the drop-down button to see the entire document. If you accept these terms of services, please tap the “Accept” button at the bottom of this page. The terms of services can also be found in the Settings page of the App, or AltumView website.



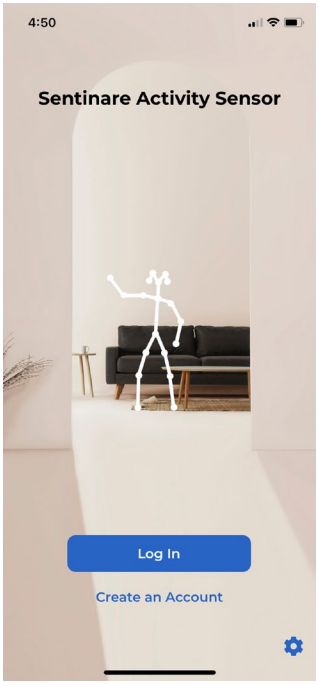


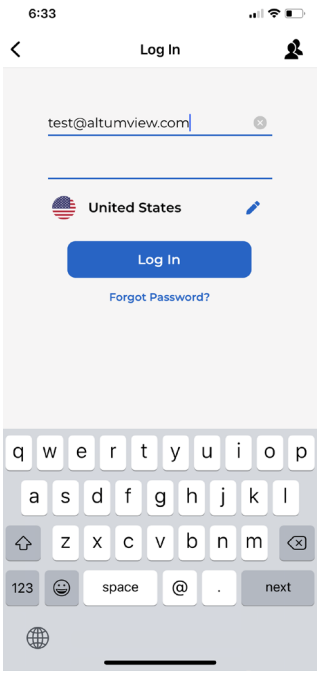


- After clicking Sign Up, you will receive a verification code through email with a subject “Complete Sentinare Activation” from altumview.com. If you could not get it after a few minutes, please make sure your email is spelled correctly, and check your junk mail folder.
- Enter the verification code in the “Complete Sentinare Activation” page in the App, as shown below, then tap “Continue” to enter your account.

2.2 Login

- Tap the “Log in” button in the front page to open the Log In page, where you can log in to your account using your email and password. You also need to specify the server for your sensor.





- Forget Password: If you have forgotten your password, you can tap on "Forgot Password?". In the next page, enter your registered email address, and tap “Send Recovery Email”. You will get an email with a link in it (check your junk folder if necessary). Click the link in the email, a web page will be opened, where you can type a new password with the same requirements as above. After that you can go back to the app to log in with the new password.
- Switch Account: The app can save the login information of multiple accounts, and allow switching between them without having to re-type the login information. To switch to a saved account, users can tap the multiple-people icon in the upper right corner of the login page, and select the desired account. More details are explained in the Switch Account part in Sec. 9. Note that only the current logged-in account can receive alerts.
- App version and Dark Mode: In the front page, tap the setting wheel icon in the lower-right corner can display the app version and choose to use Dark Mode.

2.3 Secondary User

The Sentinare app allows multiple people to log in to the same account using the same email and password simultaneously and access all the settings and data of the account at the same time, including receiving alerts. This allows multiple caregivers to share the load.

For customers from long-term care facilities or home care service providers that need to give limited access to some app users (such as care workers), so that they can only access certain sensors and people instead of all of them in the account, the secondary user feature can be used. This is only available in the paid plan of the App.

The secondary users can access the data of the assigned rooms, sensors, and people, and receive alerts from them, but cannot change the settings of the account, e.g., adding or removing sensors in the account. Please refer to Sec. 9.7 for details.

Important Note:

In order to receive the alerts, please ensure that the Sentinare app is logged in to your account and running in the background of your phone. You also need to enable push notification for the Sentinare App.

Note that many phones (especially Android phones) have various power saving settings that could disable push notification when the Sentinare runs in the background. Please refer to the user manual of your phone to ensure that push notification is enabled for Sentinare. Sometimes you need to change multiple power saving settings. On iPhone, please turn off Low Power Mode in the Settings/Battery page.

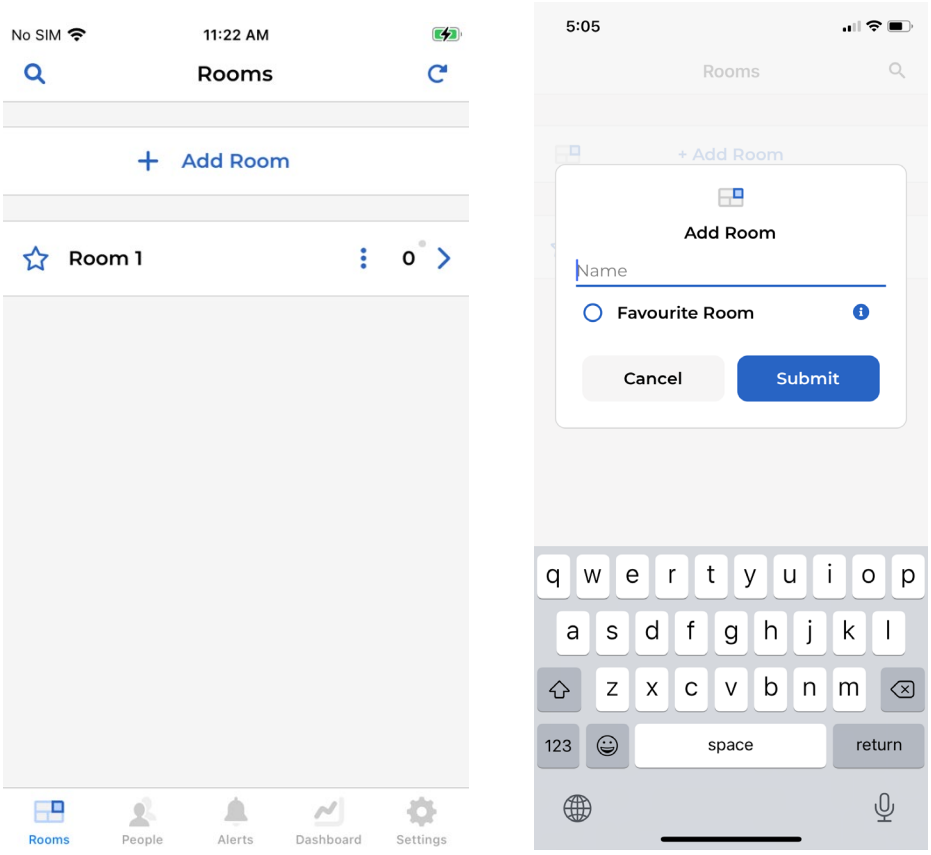
3. Room Management

Sentinare sensors can be added to the account and managed by tapping the Rooms icon at the lower left corner of the screen. Each sensor must be added to a Room, and a Room can have up to 10 sensors. The default maximum number of sensors in an account is 3. Subscription Plan is needed in order to increase the limit.

Only the main user can change the setting of the room, such as adding, deleting, and renaming.

3.1 List of Rooms

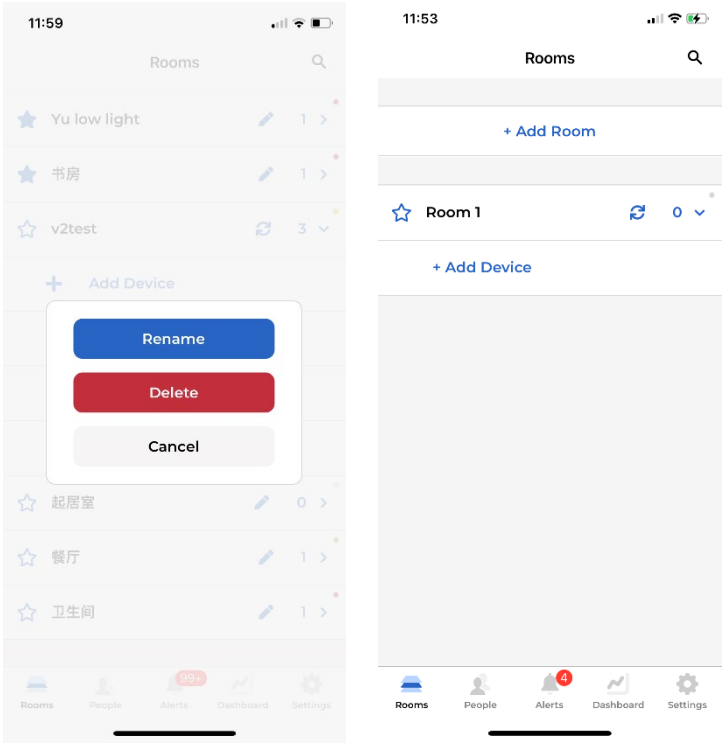
Tap on “Rooms” in the lower left corner of the screen to enter the Rooms page. This page lists all the rooms managed by this account. For a new account, a default Room called “Room 1” is created by the system.



Users can create a new Room in the Rooms page by tapping the “+ Add Room” command in the Rooms page. In the Add Room page, user can input the name of the new room, or check the “Favourite Room” flag to label a room as favourite, which will keep it at the top of the room list in the Rooms page. Favorite rooms are indicated by solid stars to the left of the room names. Other rooms are indicated by unfilled stars. Tap Submit will create the new room.

If there are many rooms, users can search a room in the Rooms page by tapping the magnifier icon in the upper right corner, and input a part of a room name to search it.

Tap the edit icon next to the room name, a pop-up window will show up, where user can rename a room or delete a room.



The number of devices in each room is displayed to the right of the pencil icon. The initial value is 0. Tap the room name or the arrow next to the number of devices will expand this room, and list the devices in the room under the room name. More details will be explained in the next chapter.

After a room is expanded, the pencil icon will become a refresh icon, which can be used to update the latest online/offline status of the sensors in this room.

The expanded room can be collapsed by tapping the room name or the number of devices.

In the expanded room section, users can tap “+ Add Device” to add a new device to the room, which will be detailed in the next chapter.

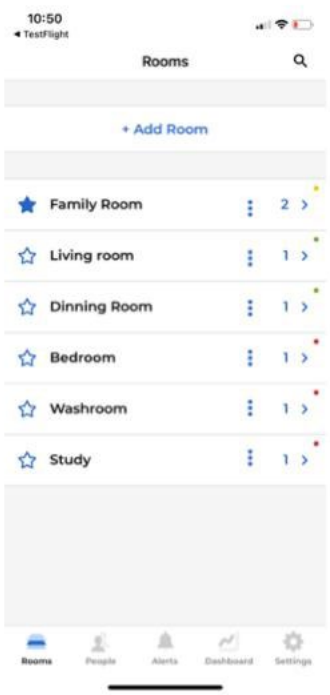
4. Device Management

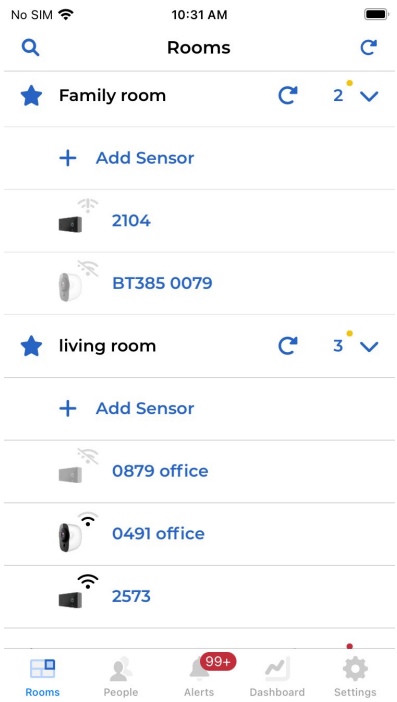
There can be up to 10 activity sensors in each room. In the Room page, users can see all the sensors in a selected room by tapping the room name or tapping the right arrow next to the room name, as shown below. If the WiFi icon to the left of a sensor is black, it means the sensor is online. If the icon is gray with a crossed line, the sensor is offline, and if the icon is gray with an exclamation mark, the sensor's WiFi strength is low and its connection to WiFi may be unstable. To refresh the sensor status, users can tap the refresh icon in each room.

To ensure the displayed sensor online/offline status is accurate, please refresh the sensor status using the refresh button in the upper right corner of the Rooms page or to the right of each room name after the room is expanded.

If a sensor is dis-connected to the WiFi, the sensor will try to re-connect to the WiFi periodically. If it is still offline for 15 minutes, the cloud server will send a sensor-offline notification to the mobile app. Every people logged into the same account will receive the notification. After that, the server will also send an offline reminder to the app twice a day. Sometimes manual WiFi setup is necessary if the sensor could not re-connect automatically.

Only the main user can manage the sensors, and secondary users can only view them.





In the Room page, a colorful dot is also displayed at the end of each room name, which indicates the online/offline status of the devices in each room. This feature allows users to know the operating conditions of devices in each room by a quick glance.

The dot can have 4 possible colors:

- Gray: There is no device in the room. This is the initial color for each room.
- Green: All devices in the room are currently online.
- Red: All devices in the room are currently offline.
- Yellow: Some devices in the room are online, and some are offline.

The online/offline summary of all devices in the account can be viewed in the Dashboard page (Sec. 8).

4.1 Add a Device

This section describes the main steps to add a sensor to an account, before it can be used. Both the Cypress and Sentinare sensors can be added and managed by the Sentinare App. The sensor should be installed at a height of about **1.5-2.5m (5-8 ft)** from the floor and tilted down slightly so that it can monitor most of the floor in the room and detect falls. Please refer to Sec. 1.6 for details.

4.1.1 Add a Device

Sentinare sensor must be added to a room in the app before it can be used. To add a device, the user must be within 5 meters of the sensor, and turn on the Bluetooth of the phone, for the Sentinare app to connect to the sensor via Bluetooth.

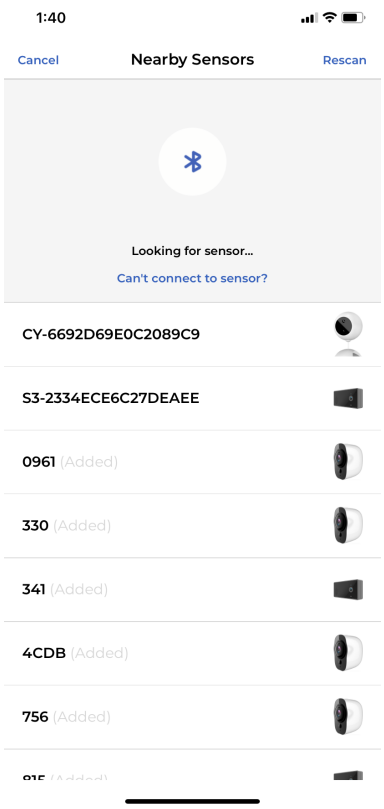
Note that sometimes the sensor could be connected to the phone instead of the Sentinare app. As a result, the app will not be able to connect to the sensor, and user could get a Bluetooth-out-of-range error message. To check if it is this case, user can go to the phone's Settings > Bluetooth page. If the sensor is connected in this page, user can turn off the Bluetooth to stop the connection, turn on the Bluetooth again, and then try to connect to the sensor from the Sentinare app again. Sometimes the Bluetooth-out-of-range error message could be caused when the sensor is paired to another phone nearby. In this case, the other phone needs to disconnect from the sensor from its Settings > Bluetooth page. Or the Sentinare is paired with some other devices, like Amazon Alexa, please turn off these devices and try to add the Sentinare sensor again.

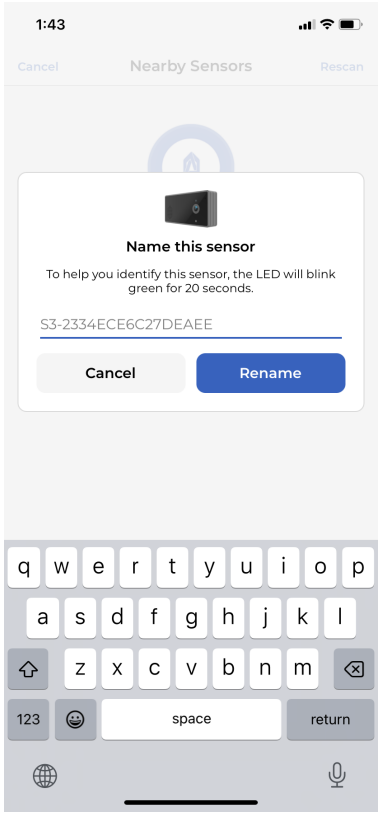
To add a device, tap the Rooms icon in the lower left corner, then expand a room in the Rooms page. In the individual room section, tap the "+Add Device", a Nearby Devices page will be displayed, in which the app will search and list all nearby devices, as shown below. Select the sensor to be added according to its serial number. The LED of the selected sensor will flash green for 20 seconds. In the next page, name the selected sensor to facilitate future management.

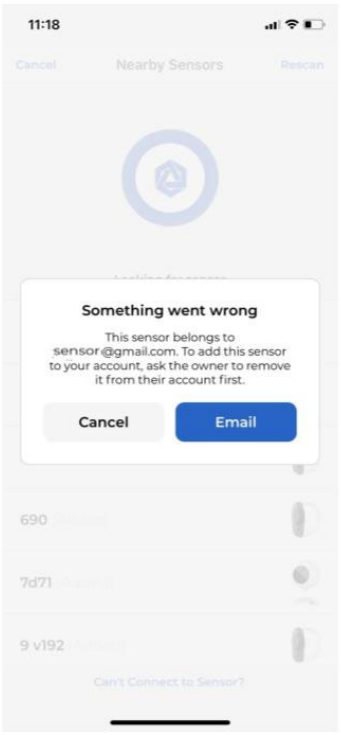
Users can only add sensors that have not been added by any user. A sensor can only be added to one room.

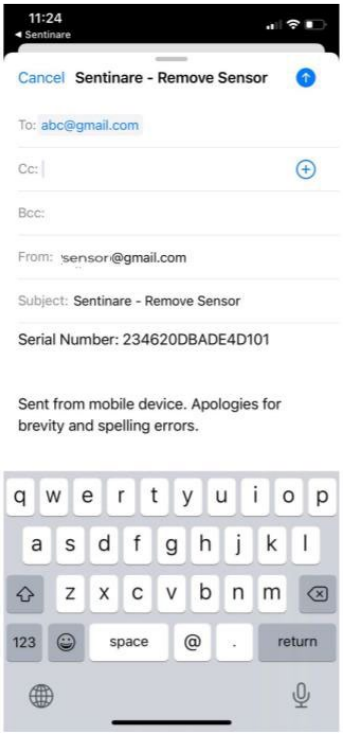
If a sensor has been added by other users, its status will be displayed as "Added", and it cannot be added to other rooms, unless it is removed from the original account.

If the user tries to add a sensor that belongs to another account (with status "Added"), a pop-up message will show up, which will display the current account that the sensor belongs to, so that the user can email the current owner to remove the sensor from their account. If you could not contact the current owner, please send an email to contact@altumview.com, and let us know the serial number of the sensor. We will remove the previous record from the server. You can then add it to your account.

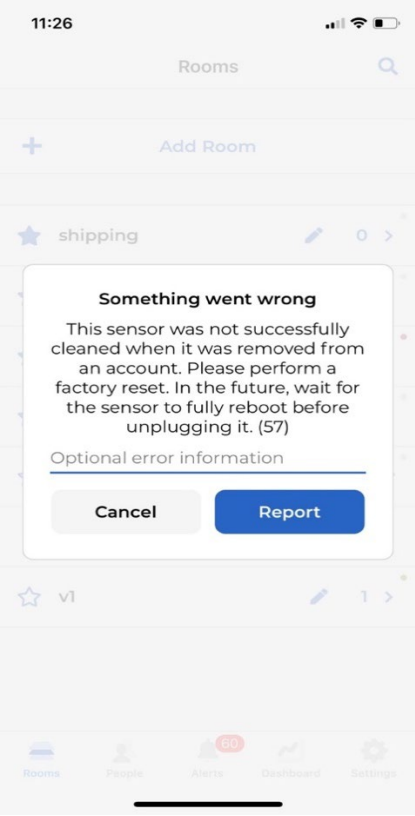








It is better to remove a sensor from an account via the app when the sensor is online, and wait for two minutes before unplugging the power, so that it can finish the removing operations. Otherwise, if a sensor is removed when it is offline, the sensor must do a manual factory reset, before it can be added to another account, as shown by the following image. Please refer to Sec. 4.2.13 Remove Device for details.



4.1.2 Set Up WiFi

After adding a sensor to a room, the app will set up the WiFi for the sensor. The sensor will first scan and list available WiFi networks. A sound will be played when the scan completed.

Note that for security reasons, to set up the WiFi, users must be within 5 meters of the sensor, and turn on the Bluetooth of the phone.

For the same reasons, only secure networks that support WPA2-PSK protocol are supported and listed by the Sentinare App. These networks need a password to access. Unsecure protocols such as Open, WEP, and WPA are not supported. The WPA2-Enterprise protocol is not supported, which requires individual username and password.

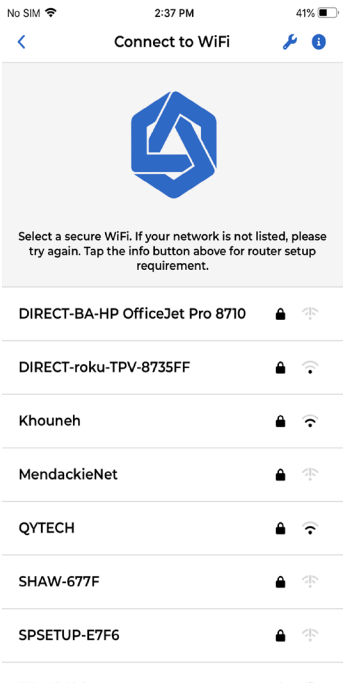
In most cases, the default configurations of most new routers are supported by Sentinare. If your sensor could not find your Wi-Fi network, you can manually connect to your network if you know the name of the SSID (this works with hidden network too, see below), or you may need to change some configurations of your Wi-Fi router. Please refer to next page for the detailed WiFi requirements, then log in to your router's admin account and make the changes, according to the instruction of your router.

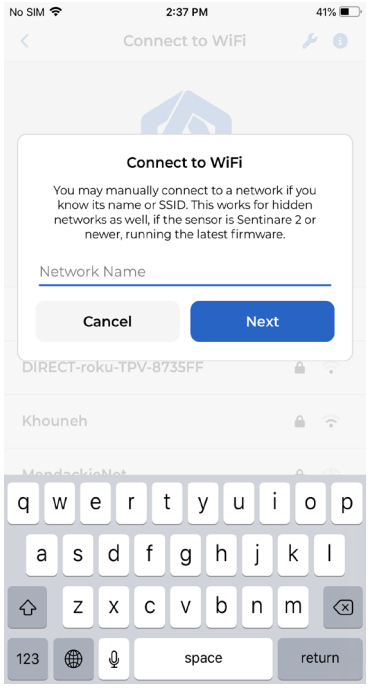
In the WiFi networks listed by the Sentinare App, select the desired WiFi network and enter its password, the LED on the sensor will first turn to red, then change to yellow and blue, and eventually shows a steady green light. After that, this sensor will be successfully added to the account, and will appear in the list of sensors in the selected room.

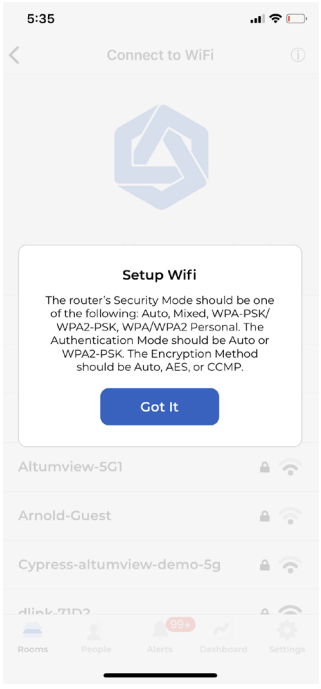
If your desired WiFi network is not shown in the list, you can rescan the networks for a few times, especially when the WiFi signal is not strong.

Connecting to Hidden WiFi: If you WiFi is a hidden one, you can tap the wrench icon on the upper right corner of the WiFi list page to open the "Connect to WiFi" page, enter the SSID name to connect the sensor to your network.

After a sensor is added into an account, the WiFi can be re-configured, as shown in Section 4.2.4.







Detailed Wi-Fi Requirements

The Cypress and Sentinare 2 sensors support 2.4GHz or 5GHz Wi-Fi with 802.11 a/ac/b/g/n standards.

Sentinare 3 sensor only supports 2.4GHz Wi-Fi with 802.11 b/g/n standards. 5GHz is not supported.

The supported router's **Security Mode** should be one of the following (different vendors could use different names):

- Auto
- Mixed
- WPA-PSK/WPA2-PSK
- WPA/WPA2 Personal.

The **Authentication Mode** of the router should be one of the following:

- Auto
- Mixed
- WPA2-PSK.

The **Encryption Mode** should be one of the following:

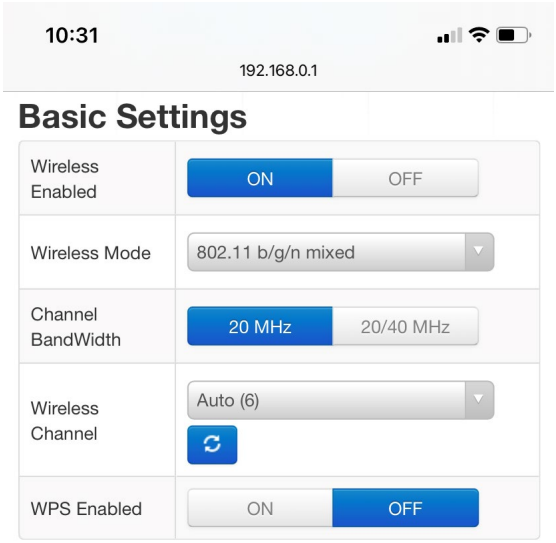
- Auto
- AES
- TKIP/AES
- CCMP.

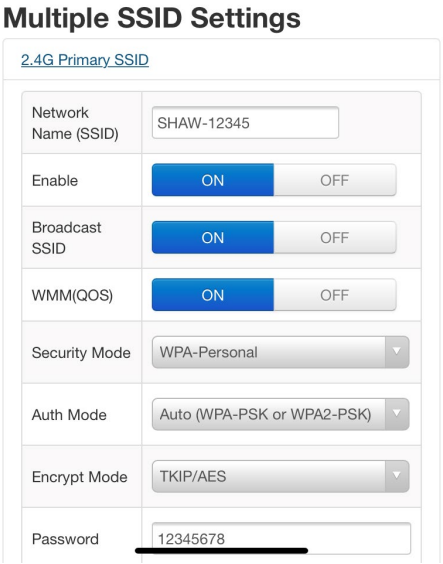
TKIP encryption is not recommended, since it is slower.

The information above is also listed by taping the information icon in the Connect to WiFi page of the App, as shown in the figure above.

Some routers have the WPS (Wi-Fi Protected Setup) feature or FT (Fast Transition) mode enabled by default (such as some Hitron routers provided by Shaw Communications in Canada), which is not supported by the firmware of Sentinare before September 2022. When the WPS is disabled, Sentinare will be able to find the Wi-Fi network.

The following is an example of the WiFi setup page of a router supported by Sentinare:





Weak WiFi Signal

If the WiFi signal at the Sentinare sensor's location is too weak, or if you have a **5GHz-only** WiFi (Sentinare 3 only supports 2.4GHz WiFi), you can purchase a dual-band WiFi extender, such as the following:

https://www.amazon.com/dp/B07N1WW638

https://www.amazon.ca/dp/B0D41G5N95

During the setup of the WiFi extender, ensure to activate the **2.4 GHz or dual-band WiFi option** to enable the extender to transmit the 2.4 GHz WiFi signal required by Sentinare 3.

Open WiFi Network (No Password Protection)

If the WiFi network you plan to use for Sentinare is an open WiFi network without password, you can consider purchasing a WiFi extender to establish a secure connection, such as the following that supports dual-band WiFi and can set up password

https://www.amazon.com/D-Link-Range-Extender-AC2000-DAP-1820-US/dp/B07NP4QFJ1

Upon setting up this WiFi extender, be sure to create a password for the extender's WiFi network and enable dual-band WiFi functionality, because Sentinare 3 only supports 2.4GHz WiFi and need a WiFi password.

5GHz-only WiFi Network

If the WiFi network you plan to use for Sentinare only supports 5GHz WiFi, you can purchase a WiFi extender mentioned above. During the setup of the WiFi extender, ensure to activate the 2.4 GHz or dual-band WiFi option to enable the extender to transmit a 2.4 GHz WiFi signal.

4.1.3 Upgrade Firmware

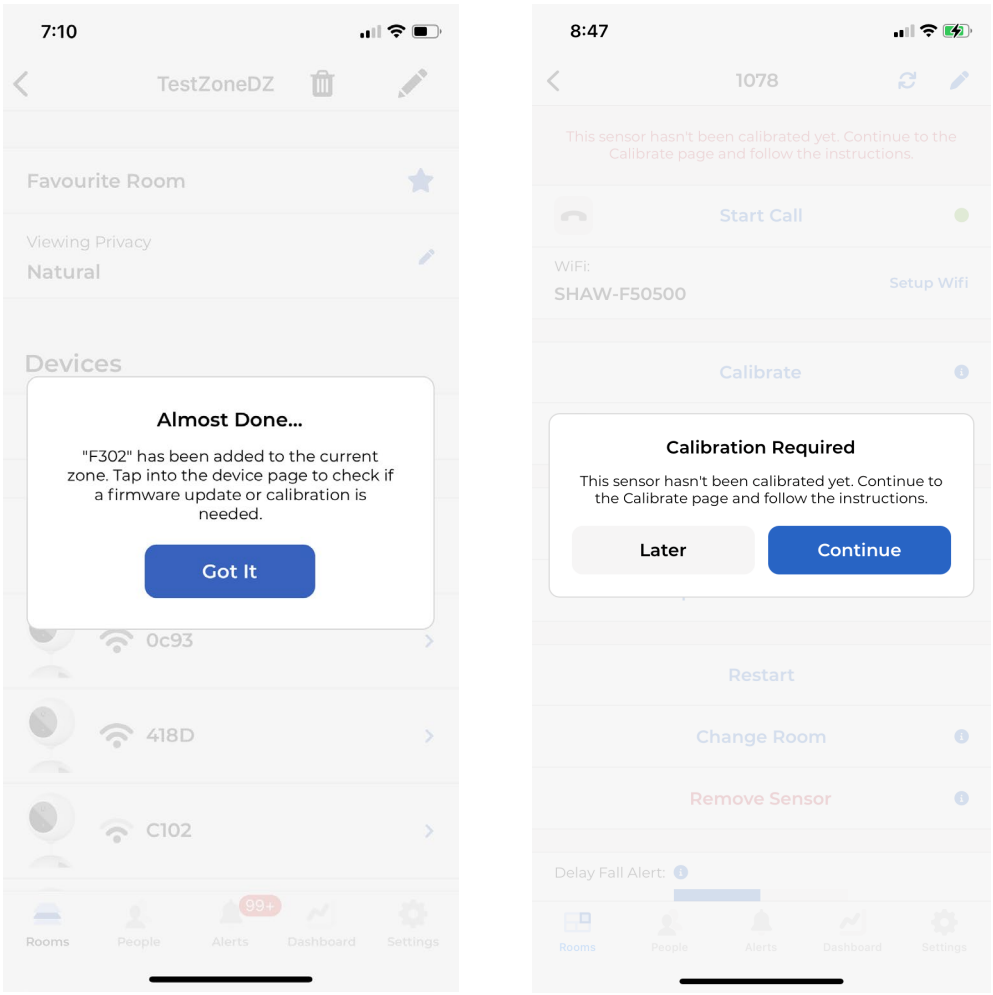
After adding a sensor to the system for the first time, the app will check the sensor's firmware version. If the firmware is not the latest one, the app will ask the user to upgrade the sensor's firmware before performing any other operations. After the first use, users can check new firmware version in the device page of the App, as shown in Sec. 4.2.

During the upgrading, the sensor might need to reboot multiple times, because sometimes it needs to upgrade to some important intermediate versions before upgrading to the latest version. The upgrade is complete when the sensor displays a solid green light.

When upgrading the firmware, if the status of the sensor in the app is "Upgrading…" for a long time, please press the screen and pull down to reload the page and refresh the status, because sometimes the app is not able to refresh by itself.

During downloading the new firmware, the LED of the sensor will blink blue. Usually, the downloading will take less than 5 minutes. Sometimes due to network issues, the download could be stuck, and the LED could blink blue for more than 15 minutes. In this case, it is safe to unplug the power of the sensor and re-plug. If the download was complete, the sensor will upgrade to the new version after restarting. Otherwise, the download will continue automatically, and the sensor will still blink blue. Multiple unplugs might be needed for the sensor to complete the upgrading. If it keeps flashing blue after several unplugs, please perform a factory reset from the app or manually perform the factory reset (see Sec. 4.2.22).

Sometimes if the Wi-Fi signal is too weak, the sensor could go offline and blink white after restarting. In this case, please make sure the Wi-Fi signal is strong and power cycle the device, or user can set up the WiFi again from the App, and the download and upgrade will then continue automatically, and the sensor will still blink blue.



For Cypress sensor, **make sure the sensor's power supply is not interrupted when the sensor is blinking purple during upgrading,** otherwise the sensor might fail to start up and must be returned for repair due to update failure.

4.1.4 Calibration

After adding a sensor to the system for the first time, and after the firmware upgrade, the app will ask the user to calibrate the sensor to detect the floor area in the room before it can be used for fall detection, as shown in the figure above.

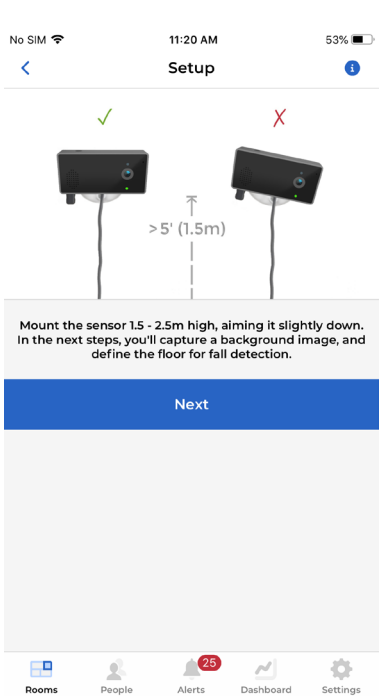
For the first calibration, users must be within Bluetooth range of the sensor (~5m or 15 ft) to do the calibration. Please ensure that the phone's Bluetooth is turned on, and that no other phone is paired to the sensor.

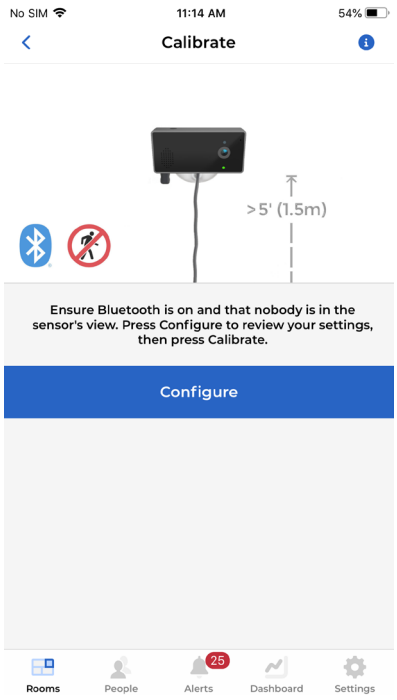
After the first calibration, future recalibrations can be done remotely by changing the Remote Recalibration toggle from “Deny” to “Allow”, as shown in Sec. 4.2.9.

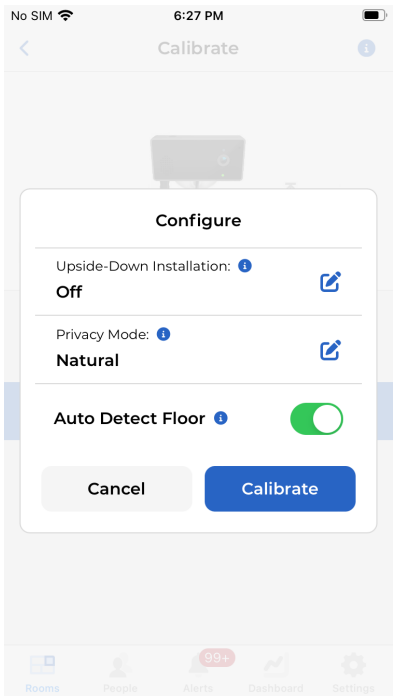
Notes:

- **The current algorithm only sends alert when falling to the calibrated floor area is detected. Falling on couch or bed is not considered dangerous and therefore will not trigger alert.**
- **Make sure that no people are in the view of the sensor during the calibration, to protect user’s privacy.**
- **Every time the position or angle of the sensor is changed, the calibration should be done again to update the background image and the floor area.**
- **Please refer to Sec. 1.8.2 and 1.8.3 on fall detection performance, backup plan, and how to reduce the number of alerts.**

To do the calibration, tap the “Calibrate” command. If the sensor has not been calibrated before, the app will first show the following instruction pages about the installation height and angle, and then show the calibration configuration page for users to choose other calibration options, such as if the sensor is installed upside-down or not, if the background image should be natural mode or privacy mode (discussed below), or if the users want the sensor to automatically detect the floor or not. After making these choices, press the “Calibrate” command will start the calibration, the sensor will take a background image and play a sound. If “Auto Detect Floor” is On, the sensor will automatically detect the floor in the background image.

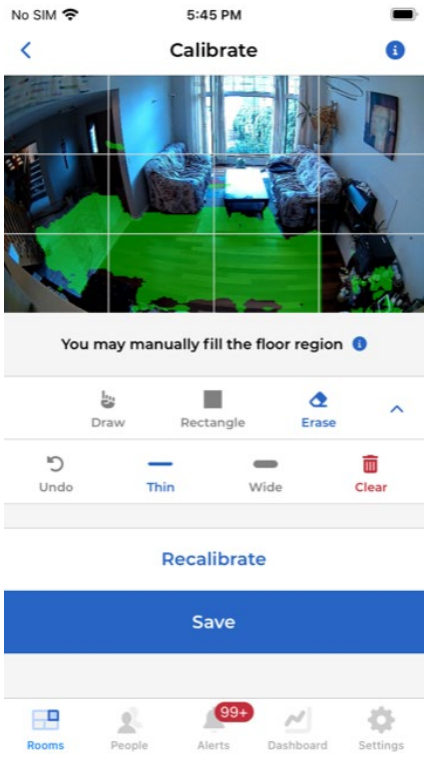




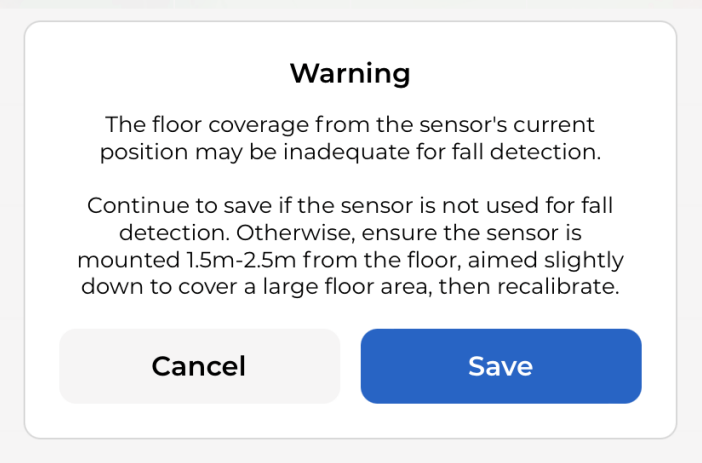


Recommended Installation

To ensure good fall detection performance, please install the sensor at a height of 1.5-2.5m and tilt down so that it can capture a large area of floor, as shown by the example below.



We recommend that the top of the floor in the image is at least 1/3 in height from the bottom of the image, and the floor area is at least 1/4 of the entire image (you can use the grid lines in the calibration page above as references). Otherwise the following warning message will be displayed. You can continue to save the result if this is the best you can get for your room, or adjust the installation height and angle of the sensor and redo the calibration.



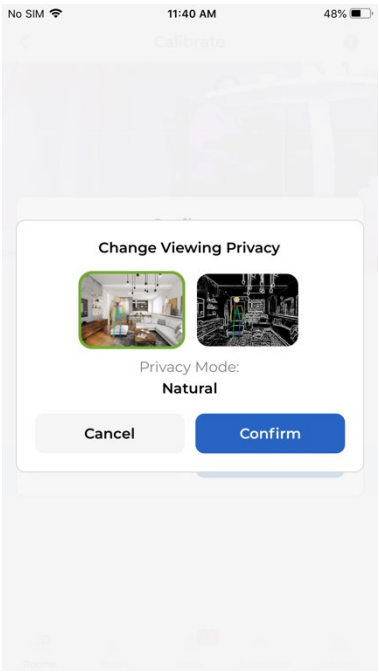
Auto Detect Floor Toggle

It is usually necessary to adjust the sensor's location and angle several times before finding the most suitable installation position and angle. In this case, it is better to turn off "Auto Detect Floor" first. Then the sensor will only take a new background image, but will skip the more time-consuming automatic floor detection step, making it faster for the user to check the quality of the background image, adjust the installation, and take a new image. After the user is satisfied with the background image, "Auto Detect Floor" can then be turned on. After that, the automatic floor detection algorithm will be applied to the final background image. Users can also manually fill up the floor area or edit the automatically detected floor area using the drawing tools in the Sentinare app.

For the Cypress sensor, the calibration takes about 15 seconds. For the Sentinare 2/3 sensor, if the "Auto Detect Floor" is on, the calibration takes about 30 seconds. If the "Auto Detect Floor" is off, taking a new background image takes just several seconds.

If the sensor was calibrated before, the app will first display the previous background image and floor map. Users can edit the floor map directly, or tap the "Recalibrate" command to take a new background image and obtain its corresponding floor area, as shown above.

Privacy Mode



In the “Configure” page, there is a “Privacy Mode” switch, where user can change the privacy mode of the device’s background image, as shown by the screenshot above.

The background image of each sensor can be set to “Natural” (default) or "Private" mode. When set to “Natural”, the original background image will be shown during streaming and in the alert messages. When set to “Private”, only the black/white edge information of the background image is shown during streaming and in the alert messages, as shown by the figures below. This can hide some details of the room and protect user’s privacy.

When the background image mode of a sensor is changed, to make the change effective, users have to re-calibrate this sensor to update the background.

Manual Calibration Editing Tools

Sometimes the auto calibration algorithm may mis-calibrate some non-floor areas as floor, or miss some floor areas, which could cause false fall detection alerts or miss some falls. In this case, users can manually modify the calibration result using the several editing tools in the Calibration page, before saving the calibration result, as shown by the screenshot above. These tools are:

- Draw: Use a finger to manually draw and fill arbitrarily shaped areas as floor.
- Rectangle: Use a finger to draw and fill a rectangular area as floor.
- Erase: Use a finger to erase some floor areas.
- Undo: Undo previous operations.

- Thin: Select thin drawing line.
- Wide: Select wide drawing line.
- Clear: Remove all floor areas.

Manual calibration editing can always be done remotely, because the background is not updated.

4.1.5 Other Important Settings

This completes the necessary steps to add a sensor to the account, and the basic features of the sensor can be used, such as sticker figure streaming, fall detection and waving-hand detection. However, to use other face recognition-related features, such as Region of Interest and statistics of daily activities, the people information needs to be added to the system, as show in Sec. 5.

Note that if the account already has some people's information (including their faces), the face features will be downloaded to a newly added sensor after the calibration, during which the sensor will display blue light. Once the download finishes and the light becomes green, the sensor will be able to recognize these people and the app will display their names in the steaming page.

There are some important settings that affect the behaviors of the sensor, such as the following. Please refer to the corresponding sections for details.

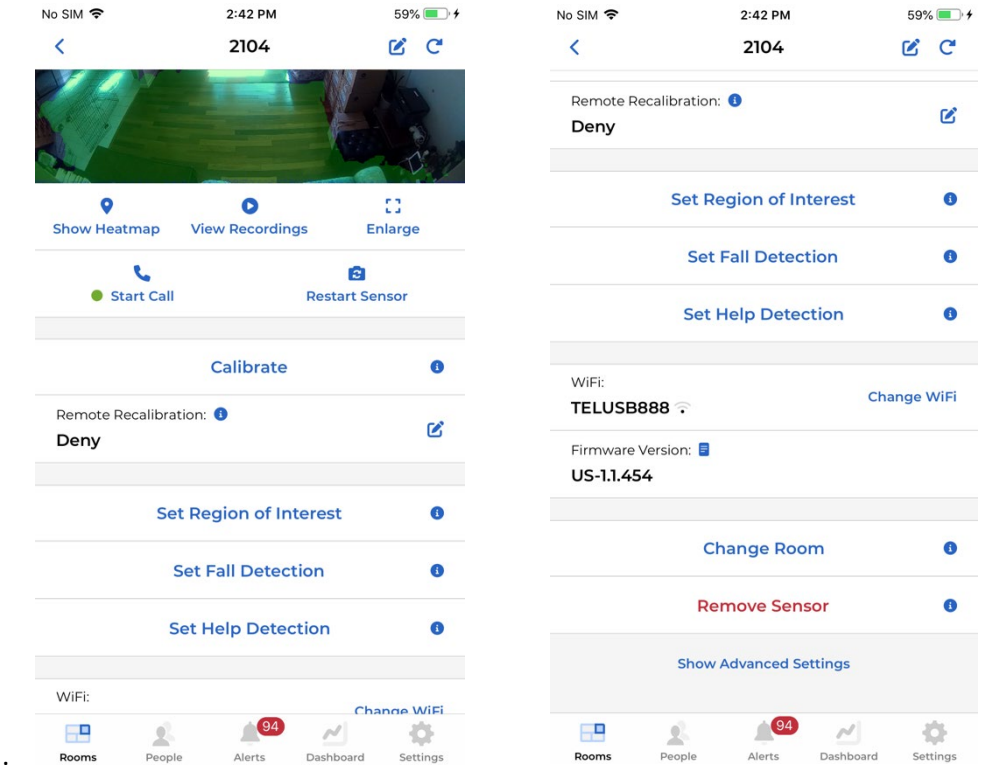
- Set Fall Detection (Sec. 4.2)
- Set Help Detection (Sec. 4.2)
- Duplicate Alert Prevention (Sec.4.2)
- Push Notification Status (Sec. 9)

4.2 Device Streaming and Setting

In the individual room page, tap on a sensor in the sensor list will enter the sensor's streaming and setting page, as shown below. This page allows users to view the video stream from the sensor in real time (people are rendered by stick-figure animation to protect privacy) and configure the device, such as renaming device, refresh the display, start voice call, editing WiFi, calibrating device, setting Region of Interest and hand-wave detection, checking recorded stick figures, updating device firmware, restarting device, moving device to another room, and removing device from system.

Users can also turn on or turn off some features, such as Delay Fall Alert and Set Help Detection Sensitivity.

Users can also access some advanced settings by tapping the Show Advanced Settings command, such as stick-figure recording availability days, serial number of the device, model number, last connected time, last calibrated time, IP address, MAC address. User can also turn on/off some other advanced settings, which will be explained in Sec. 4.2.15.



4.2.1 Rename Device

To rename the activity sensor, tap the pen icon in the upper right corner of the sensor settings page, and change the name of the sensor in the pop-up "Change Name" window.

4.2.2 Refresh Display

This button is on the upper right corner, next to the pen icon. It is used to refresh the streaming window in the sensor page, if the stick figures are not displayed automatically.

4.2.3 Show Heatmap

When enabled, this feature will display a heatmap on the streaming or recording page to show how much time people stayed at different locations of the room, as shown by the image below. This can help to identify some anomaly.

4.2.4 View Recordings

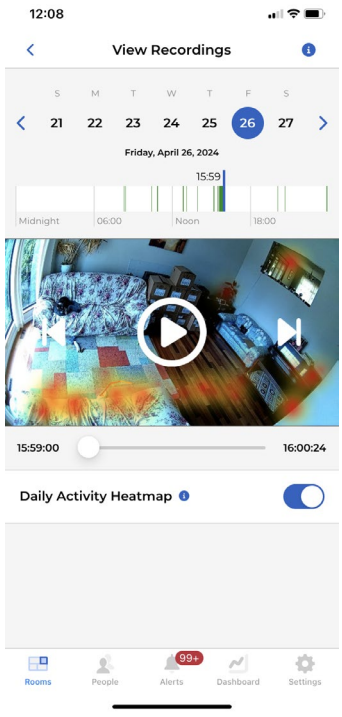
Sentinare protects people's privacy by only transmitting stick figures out of the sensor. It can also record the continuous stick figure activities in the server for future playback and analyses whenever a person appears in the field of view of a sensor. This feature can be used to analyze a person's health, investigate an incident, and improve the quality of service of an organization.

Free access to three days of stick figure is provided by default. Monthly fee is required if you need to access to longer periods of stick figure recordings.

To access the recorded stick figures from a sensor, go to the main page of the sensor, and tap the “View Recordings” command. In the next page, as shown by the following figure, users can use the calendar to select a day within the subscription plan. The activity bar below the calendar will indicate the times that stick figure recordings are available for the selected day. Users can move the cursor in the activity bar to select a specific time, and the corresponding records will be downloaded from the server for playback in the window below the bar.

Each segment of the stick figure recording is up to two minutes. To load the previous or the next segment, users can tap the left arrow or the right arrow at the two ends of the activity bar.

Turning on the Daily Activity Heatmap toggle will show the heatmap for that day, as shown by the following image.



4.2.5 Enlarge

Tap on this button will expand the stick figure streaming window to full screen.

4.2.6 Start Call

Users can make voice call to a sensor directly via the "Start Call" button in the device page, or in an alert page (explained later). The people being monitored at the sensor's side does not have to do any thing to accept the call. This is very helpful, especially in case of emergencies.

In Cypress sensor, during the two-way call, the LED of the sensor will blink cyan to indicate a voice call session is going on. Sentinare 2 will have this LED feature in the future.

Voice call can only be made when there is a green dot to the right of the Start Call command. When the dot is yellow or red, the voice call server is busy. If it is always yellow or red, please check the following troubleshooting steps.

Sometimes the security settings of some WiFi routers could prevent making voice call from the Sentinare app to the Sentinare sensor. To verify if this is your case, you can turn off the Wi-Fi of your phone and switch to your cellular service, then make voice call from the Sentinare app to the Sentinare sensor. If you can make the voice call using your cellular service, you can login to your WiFi router's admin page, and make necessary adjustments, such as the following:

- Turn on SIP ports used by voice call: TCP Ports 5060-5061, and UDP Ports 4000-32767
- Disable SIP ALG (Application Layer Gateway) in the security setting. Please refer to the following page on how to disable ALG for different routers: https://www.nextiva.com/blog/disable-sip-alg.html

More advanced corporate firewalls may require further adjustments, such as port forwarding. Please refer to the user manual of your WiFi router or check with your IT administrator.

If changing these WiFi settings still could not resolve the problem, you can try to restart the sensor and try to make a call. You can also try with iOS devices, which has better support of voice call than Android.

If the methods above could not resolve your voice call problem, please email your public IPv4 address to us at contact@altumview.com. You can use the following link to find your public IPv4 address:

https://www.whatismyip.com/

We will check if your IP address is banned by the VOIP server or not, which can happen sometimes for various reasons. If the address is banned, we can enable it, which should resolve the voice call problem.

4.2.7 Restart Sensor

Tapping "Restart" in the sensor page will restart or reboot the activity sensor. If the sensor is not connected to any WiFi network, but is within Bluetooth range of the user's phone, the Restart command can still work.

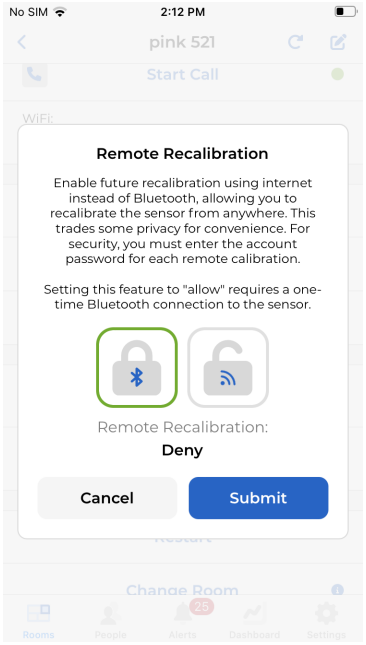
4.2.8 Calibration

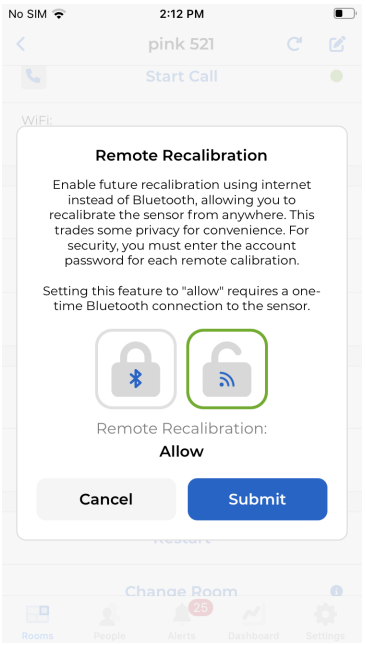
Users can calibrate the sensor by tapping the “Calibrate” command in the sensor page. When a sensor is first added to an account, the app will automatically bring the user to the Calibrate page. The detailed usage is given in Sec. 4.1.4.

4.2.9 Remote Recalibration

Remote recalibration allows users to recalibrate the sensor from anywhere, which can be useful in some cases.

Remote calibration can also be used in case of emergency to take one or multiple new images of the scene to evaluate the situation of the person being monitored.





By default, the status of remote recalibration is “Deny”. For security purpose, changing this feature to “Allow” requires an one-time Bluetooth connection to the sensor. **Users must be within Bluetooth range of the sensor (~5m or 15 ft) to enable remote calibration.**

For security purpose, users must enter the account password for each remote recalibration. During remote recalibration, the sensor will play a sound to indicate that the sensor is taking a new background image.

4.2.10 Set Region of Interest (ROI)

Regions of interest (ROI) can be set in the device setting page. Currently five types of ROI are supported:

- Entrance

- Exit
- Restricted Region
- Overstay Detection
- Absence detection

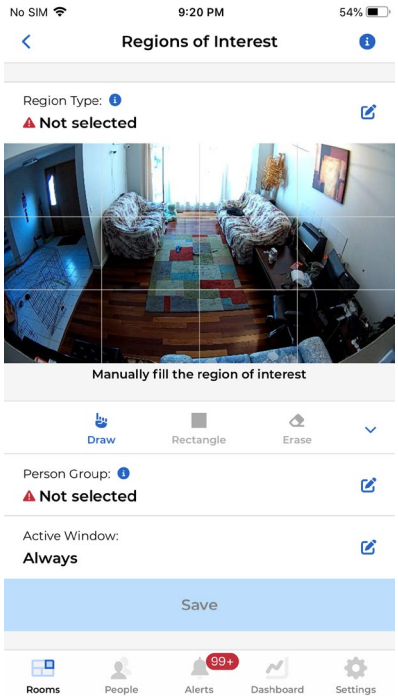
Multiple ROIs can be defined for each sensor.

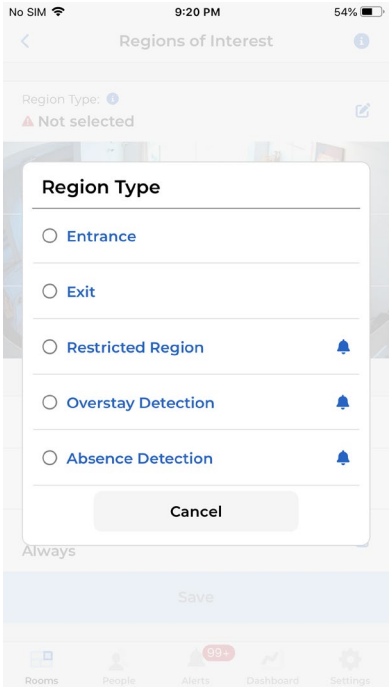
To use the ROI, users need to specify both the region types and person group (explained in Sec. 5).

Note that some ROI options are based on **face recognition**. Therefore, the distance between the sensor and the ROI cannot be too far. The recommended distance is less than 4.5m (15 ft), and the installation height should be around 2m (6 ft), so that the sensor can see people's front faces. In addition, the ROI should be large enough to include the person's body when the person enters the ROI. If the region area is less than 1/4 of the image, a warning message will be displayed when the ROI is saved. Moreover, the ROI can include more than one non-connected areas in the view.

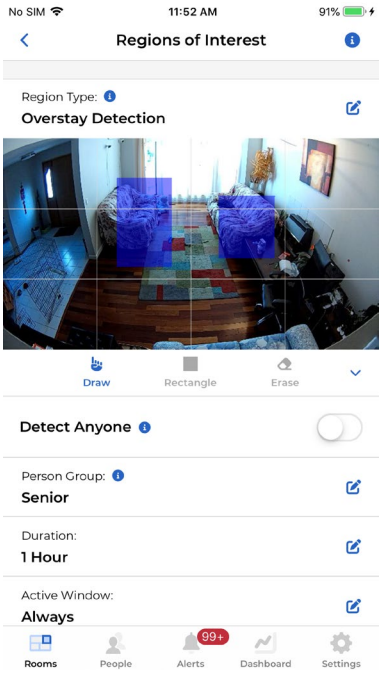
To define an ROI:

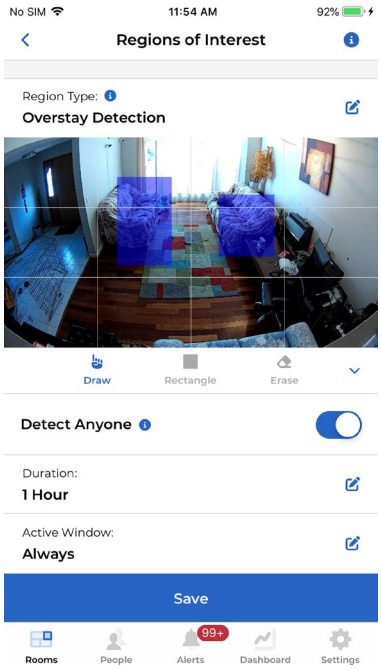
- Tap the **"Region of Interest"** button to navigate to the ROI page.
- Click the pen icon for the desired region type, then choose the region type from the list.





Users can then draw and fill the ROI on the screen using finger, using the same editing tools as in the Calibration page. The ROI will be displayed in blue within the app.

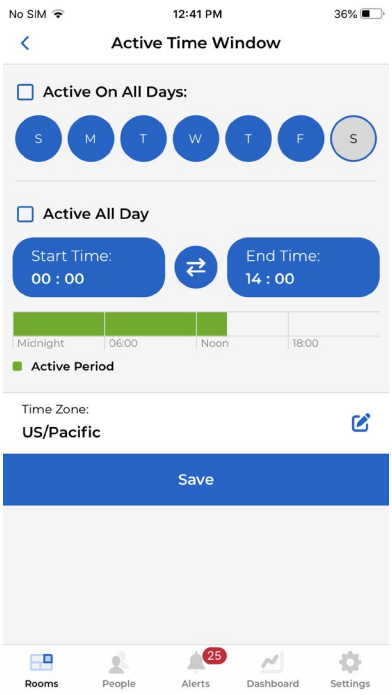




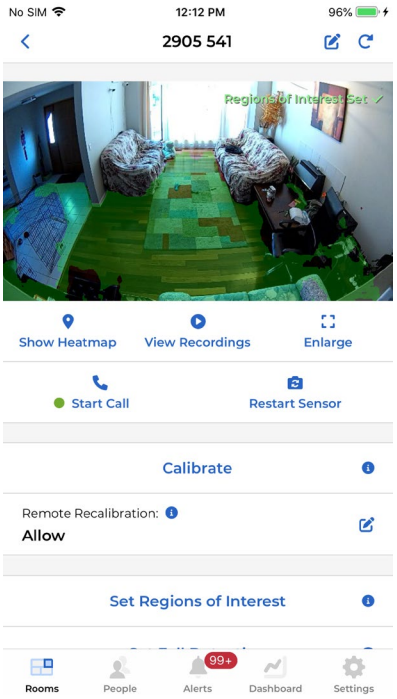
Users also have the option to decide whether to monitor **anyone** or only persons from a specific **People group**:

- If **"Detect Anyone"** is enabled (as shown above on the right), an alert will be sent whenever anyone triggers the alert. This setting uses human body detection rather than face recognition, making it especially useful when face recognition is unnecessary (e.g., for individuals living alone) or less reliable (e.g., during nighttime).
- If **"Detect Anyone"** is disabled (as shown above on the left), users must select a **Person Group** that can trigger the alert**,** which is defined in the "People" section. In this configuration, alerts will only be sent when a person triggering the alert is recognized and belongs to the selected group. Note that the accuracy of this feature could be affected by the accuracy of the face recognition.

Users can also set up the active time window of the ROI detection to make it more flexible, as shown below.

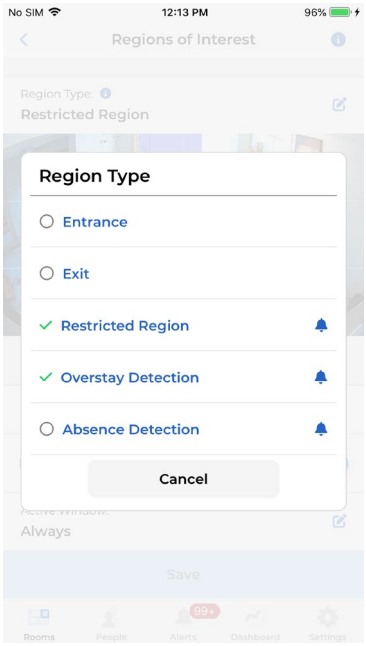


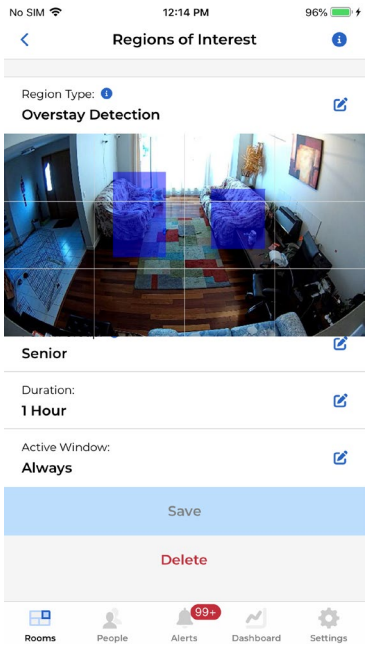
Once the ROI configuration is saved, a green note labeled **"Region of Interest Set"** will appear in the upper right corner of the streaming page.



To remove a previously defined ROI:

- Select the region type you wish to delete from the list.
- Navigate to that ROI and tap the **"Delete"** command at the bottom.





1) Entrance and Exit

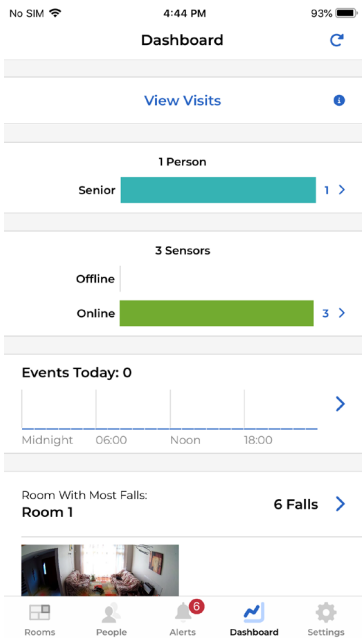
The Entrance and Exit ROIs can be used by organizations to achieve contactless visitor management, or attendance management system for employees. These two ROIs will not send alert to App. Users can check the check-in and check-out record from “View Visits” in “Dashboard” section on App; or from the “Visits” on Web.

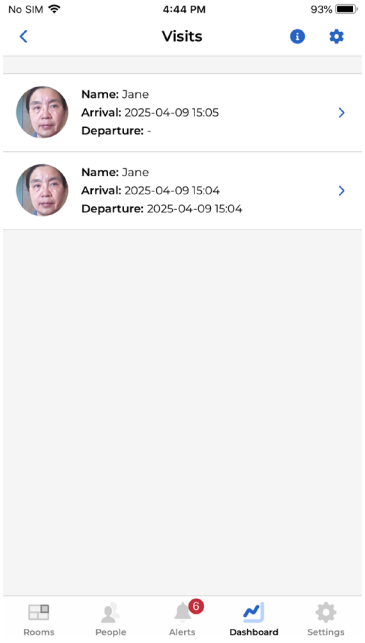
If a ROI is defined as an Entrance, when a person in the selected person groups enter the defined entrance region and the person’s face is recognized by the sensor, a check-in record will be generated.

If a ROI is defined as an Exit, when a person in the selected person groups enter the defined exit region and the person’s face is recognized by the sensor, a check-out record will be generated. A check-out record can only be generated if a check-in record has been generated for the same person.

After the person is first recognized in the entrance or exit region, no more records will be generated within 60 seconds for the same person.

The check-in and check-out records can be viewed and managed from the “View Visits” command in the Dashboard page, as shown below.





The check-in and check-out records can also be viewed and managed by logging into the following web interfaces using the same user account as the Sentinare app. The details are described in Sec. 10.

User account in the Canada server:
https://app.altumview.ca

User account in the US server:
https://app.altumview.com

User account in the China server:
https://app.altumview.com.cn

2) Restricted Region

If a ROI is defined as a Restricted Region, and the “Detect Anyone” is disabled, when the face of a person in the specified person groups is recognized in the region, an alert will be sent to the cloud and the app. If the person’s face is not recognized in the restricted region but is recognized after the face leaves the region, but is still in the same sensor’s view, the sensor can still send the alert.

After a restricted region alert is generated, no duplicated alert will be generated in 60 seconds.

One possible application of the Restricted Region is to monitor and prevent wandering of people with dementia. For example, users can first define a Person Group called “Dementia”, then assign people with dementia to this Person Group in their profile pages, and finally define a restricted region from the ROI page for the Dementia person group, such as the exit area of the senior care facility. After that, any person in the Dementia group entering the restricted region will trigger an alert, so that the caregivers can take necessary action to prevent wandering.

The restricted region feature can also be used to prevent falls. For example, for some patients with high risk of falling that have to spend most time in beds, a restricted region can be defined next to their beds, so that whenever they leave the bed, an alert will be sent, and the caregivers can come to help the patients, which can prevent falls.

4) Overstay Detection

If a ROI is defined as an Overstay detection region, when a person in the specified person groups is recognized and has stayed in the region for the defined duration, an alert will be sent.

If “Detect Anyone” is selected, an alert will be sent when any person stays in the region for the defined duration. Face recognition is not needed in this case.

The Overstay Detection can be used to detect lack of activity, and can also be used as a backup for fall detection in places where fall detection can be challenging and people are not supposed to stay for too long, such as bathrooms.

After an overstay alert is generated, no duplicated alert will be generated in 60 seconds.

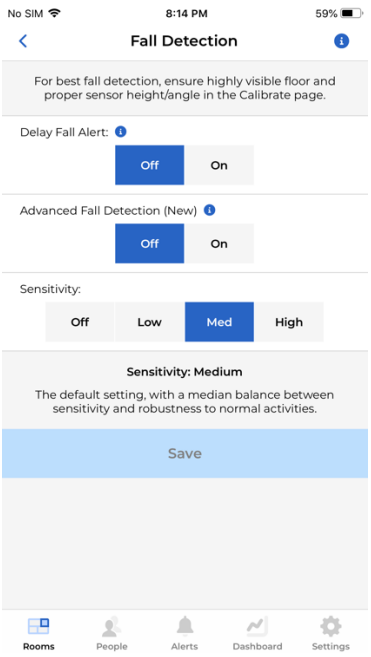
5) Absence Detection

If a ROI is defined as an Absence Detection region, an alert will be sent when nobody is detected within the region for the defined duration.

The Absent Detection can be very useful for early identification of abnormal situations of people living alone. It can be set up in areas where the person should show up regularly on a daily basis.
After an absence alert is generated, no duplicated alert will be generated in 60 seconds.

4.2.11 Set Fall Detection

The sensor allows user to modify the fall detection setting. The detection setting includes Dalay Fall Alert and fall detection Sensitivity.



1) Delay Fall Alert:

The “Delay Fall Alert” is a toggle switch. **When “Delay Fall Alert” is ON, the Sentinare activity sensor will only send fall alert 30 seconds after a fall is detected.** During this period, the LED in the senor will flash RED, indicating that a fall is detected. After 30 seconds, if the person still falls on the ground, the LED will turn to purple and a fall alert will be sent. If the person stands up within 30 seconds, the LED will turn off and no alert will be sent.

If the “Delay Fall Alert” is OFF (default value), an alarm will be sent immediately when a fall is detected. This is useful for demo or test purpose and is not recommended for practical use.

The change of “Delay Fall Alert” will restart the device to make it effective.

2) Advanced Fall Detection:

When the Advanced Fall Detection is enabled, a sophisticated AI algorithm in the cloud is utilized to reduce false alarms. A new firmware version will be released soon to reduce missed detection. **This feature requires a subscription (Not available in China server now).**

When a fall is detected by the sensor, a small encrypted snapshot image is sent to the cloud server for analysis by the large AI model in the cloud. The image is never stored or reused for any other purpose.

For users in the United States, Europe, and China, the images are processed within their respective regions. In other regions, image processing may be processed outside the local area.

3) Sensitivity

User can adjust the fall detection sensitivity. When the sensitivity is Off, the fall detection is disabled.

Three sensitivity levels are available: Low, Medium (default), and High.

In Low sensitivity mode, the sensor is less responsive to falls but more resistant to normal activities. It will only trigger fall detection alerts when the upper body of a person is on the floor. If a person falls but sits on the floor, the sensor is unlikely to send a fall detection alert (unless the Advanced Fall Detection mode above is enabled).

In Med sensitivity mode, the Sentinare sensor provides a medium balance between sensitivity and robustness to normal activity.

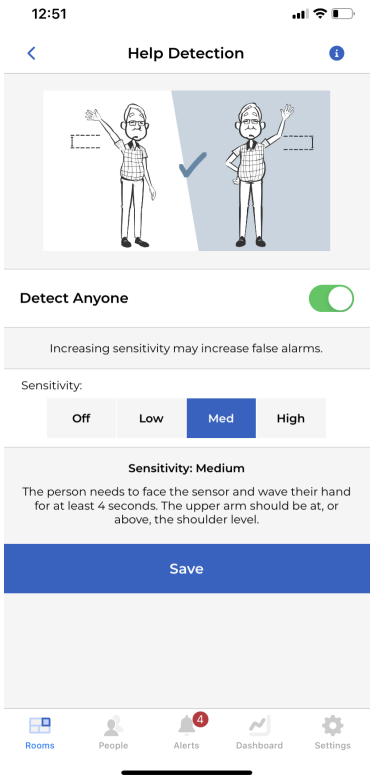
In High sensitivity mode, the sensor is highly responsive to falls but more likely to generate false alarms. Select this mode for individuals with high risk of falling or in rooms with small floor areas such as bedrooms and bathrooms. In many cases, it can trigger a fall detection alert even if a person sits on the floor after the fall.

When the Advanced Fall Detection is enabled, high fall detection sensitivity is recommended, as the false alarms will be filtered out by the server.

4.2.12 Set Help Detection

The sensor allows people to actively seek help by waving/raising hand to trigger an alert to the App. To reduce false alarms, the person must face the sensor so that the face of the person can be detected before an alert is sent out.

In the Help Detection page, users can define who can trigger the alert and adjust its sensitivity. By default, Detect Anyone is On and anyone can trigger the hand waving alert, even if their face photos are not added to the People page. When Detect Anyone is Off, users can select which person groups can trigger the alert. This allows the sensor to only send alert when persons in the specified groups are recognized by the sensor. This requires the persons' face photos to have been added to the People page. Note that face recognition performance can be affected by many factors, and is not always reliable.



Users can also adjust the hand waving/raising detection sensitivity. When the sensitivity is Off, this alert is disabled.

Three hand waving sensitivities can be selected: Low, Med, or High. The default value is Med.

In the low sensitivity, only hand waving can trigger the alert, not hand raising. To trigger the alert, the person needs to continuously wave his/her hand slowly for about **8-10** seconds, **and the upper arm should be raised to or above the shoulder height**. The LED of the sensor will first **blink red** during the hand waving, and then **flash purple** and send a waving hand alert.

Hand raising is supported in the medium and high sensitivities, in addition to hand waving. In this case, the person only needs to raise a hand to or above the shoulder height and keep the hand position for a few seconds. There is no need to wave.

In the medium sensitivity, the person needs to continuously wave or raise the hand for about **6-8** seconds.

In the high sensitivity, the person needs to continuously wave or raise the hand for about **4-6** seconds.

After a help detection alert is generated, the same alert will not be generated in 15 seconds. During this silent period, if hand waving or raising is detected, the LED will only flash red but will not turn to purple to send alerts.

Note that increasing the sensitivity also increase the chance of false alarms, which can be reduced via the Duplicate Alert Prevention setting in Sec. 4.

4.2.13 Change WiFi

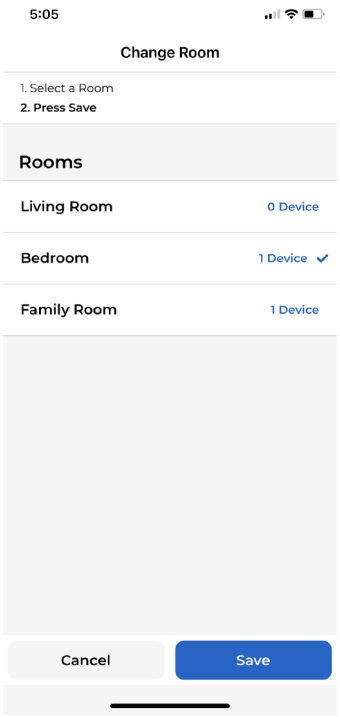
Users can set up the WiFi by tapping the “Edit WiFi” command in the sensor page. When a sensor is first added to an account, the app will automatically bring the user to the WiFi setup page. The usage detailed are in Sec. 4.1.2.

4.2.14 Updating Firmware

When a new firmware is available, an "Update to..." command will appear below the “Firmware Version” bar. Tap on the blue icon to upgrade the firmware. The sensor might need to reboot several times during the upgrading. Please refer to Sec. 4.1.3 for details.

4.2.15 Change Room

To move an activity sensor to another room, user can tap the “Change Room” command. In the next page, select the desired new room in the list of rooms, and then tap Save. The sensor will be moved to the new room, as shown below.



4.2.16 Remove Sensor

For security reasons, each sensor can only be added to one account**. If a sensor needs to be added to another account, it must be removed from the previous account first.** This can be done by tapping the "Remove Device" command in the sensor page. **It is strongly recommended to remove a device when it is connected to the WiFi and the internet**. In this case, after the "Remove Device" command is tapped, the sensor will reboot to finish the removing step. Please wait about **two minutes** for the reboot to complete before turning off the sensor. The sensor will first blink white light for about 30 seconds, then display steady white light during reboot, and blinks white light again after reboot.

If for some reasons a sensor must be removed when it is offline (this could happen when the sensor could not connect to the WiFi and internet, and could not communicate with the app either), the following scenarios will happen:

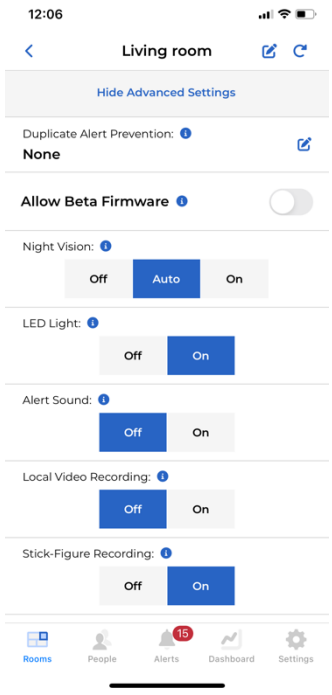
1. If after the offline removal, the sensor is powered on within the coverage of the same WiFi network as the network it was connected to before the removal, the sensor will automatically connect to the server via the WiFi network, and the server will instruct the sensor to reboot to finish the removal process from the previous account. After the reboot, the sensor is ready to be added to the new account (the LED will turn into flashing white light).

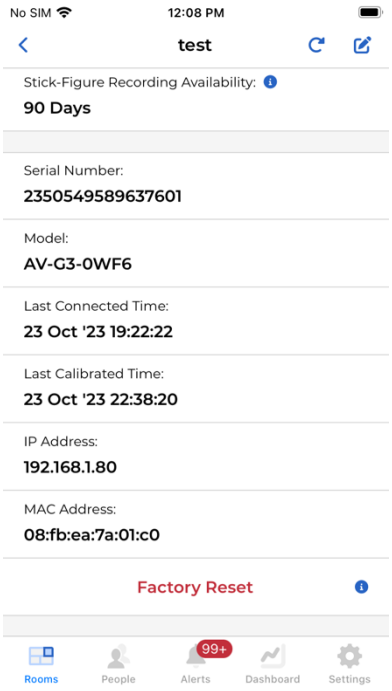
2. If after the offline removal, the sensor needs to be added to a new account that uses a different WiFi network from the previous network, the sensor's status will be displayed as "Added" when the app

scans for nearby devices. In this case, the sensor has to be manually factory reset before it can be added to the new account, a firmware upgrade will be required after that, see Sec. 4.2.22 Factory Reset for details.

4.2.17 Advanced Settings

At the bottom of the device page, tap the “Show Advanced Settings” command will display further information, as shown below, including length of stick figure recording, serial number, last connect time, last calibrated time, IP address, and MAC address, and some toggle switches. After that, the command will change to “Hide Advanced Settings”. Tap this will hide the advanced settings.





4.2.18 Duplicate Alert Prevention

The “Duplicate Alert Prevention” setting is used to prevent frequent alerts from a sensor. The value can be changed by tapping the pencil icon to the right of “Duplicate Alert Prevention”. When the setting is None, all alerts generated from this sensor will be sent to the cloud and the app. When the setting is not None, for example, 2 hours, only one alert of each type will be generated in every 2 hours for this sensor. This can reduce the false alarms. **The default value of “Duplicate Alert Prevention” is “None”.**

Only the administrator can change the value of the “Duplicate Alert Prevention” setting.

4.2.19 Allow Beta Firmware:

When enabled, this sensor can download the latest beta firmware which includes upcoming features, but is not officially available yet. A beta firmware carries the risk of potential malfunctions.

4.2.20 Configuring Night Vision

In the Advanced Setting, there is a toggle switch to control the night vision feature, including turning on, turning off, and using automatic mode. In the last case, the algorithm will automatically decide when to turn on and off the infrared LEDs.

4.2.21 LED Light Control

Different LED colors indicate different statuses of the device, as summarized below.

- Steady white: Device is starting. Please wait
- Flashing white: Ready to access to the network
- Flashing green: Device is connecting to the phone app via Bluetooth
- Steady green: the sensor is in normal working condition
- Steady red: Connecting to Wi-Fi
- Flashing yellow：Connecting to server
- Steady yellow: Cannot connect to server
- Flashing cyan: An audio call is going on
- Blue：Communicating with the phone via Bluetooth or is downloading files from the server
- Purple: Restoring factory settings, or sending an alert
- Flashing red: 1) When Delay Fall Alert flag is ON, if a fall is detected, the sensor will flash red for 30 seconds before sending an alert. 2) If a waving hand is detected, the sensor will flash red for a few seconds before sending the alert. 3) Wrong Wi-Fi password is entered when the sensor is trying to connect to a Wi-Fi

For Sentinare sensor, the LED can be turned Off via the LED Light toggle.

For Cypress sensor, when the LED Light toggle is Off, the sensor only tun off the steady green light when it is in the normal working condition. It does not affect the sensor to use LED to indicate other special statuses.

4.2.22 Alert Sound

When the Alert Sound flag is On, the sensor will play a sound when sending an alert, otherwise it will not play a sound when sending an alert.

4.2.23 Local Video Recording

The Sentinare 3 and Cypress sensors have a SD card slot for local video recording. The videos saved in the SD card can be very useful to analyze the incidents so that future incidents can be avoided, or as an evidence for legal purpose. **This feature is still beta version for Sentinare 3, and is only available to some selected accounts.**

When inserting the SD card, the metal pin side of the card should face the back of the sensor.

The recommended MicroSD card requirements are as follows:

- SanDisk Ultra/Ultra Plus, or similar from Samsung, Lexar or Kingston
- 32GB to 256GB
- SDHC or SDXC
- UHS-1, C10, U1 or V10
- FAT32 file system only (In Mac OS, this is called MS-DOS FAT. exFAT format does not work. In Linux, this is called VFAT)

Note that Windows cannot format SD card over 32GB to FAT32 format. You can use the free tools such as EaseUS to do it:

https://www.easeus.com/partition-master/format-sd-card-windows-10.html

Apple computers can format SD card over 32GB to FAT32 (MS-DOS FAT) format directly using the Disk Utility tool.

For Sentinare 3, when the “Local Video Recording” flag in ON, video clips will be continuously saved to the MicroSD card. Each file includes about 15 minutes of recording. When the card is full, the oldest files will be overwritten. Currently the SD card video recording will record the video even when there is nobody in the scene. In the future, an option will be added to only record videos when people are detected.

For Sentinare 3, to ensure the proper operation of the SD card, please insert the MicroSD card before turning the “Local Video Recording” flag ON; when removing the SD card, toggle this flag to OFF first. If you do not want to use this feature, do not insert a card in the SD card slot. When the SD card is not working properly, the app will display some error messages and prompt the users to reinsert the card, or even restart the sensor.

For Cypress sensor, when the toggle is ON, whenever a person is detected by the sensor, a video clip will be saved to the SD card of the sensor. If the toggle is OFF (default), a video clip is only saved in the SD card when an alert or presumptive alert event is detected. If no SD card is inserted in the SD card slot, no video will be recorded.

For privacy and security reasons, the videos in the SD card are not transmitted out of the sensor and can only be accessed by taking the card out of the sensor and copy the files to a computer.

The videos in the SD card are encoded by the H.264 standard, and can be played by many video players such as the VLC Player (https://www.videolan.org). The time stamp of the videos is in UTC time, a successor to the Greenwich Mean Time (GMT).

4.2.24 Stick Figure Recording

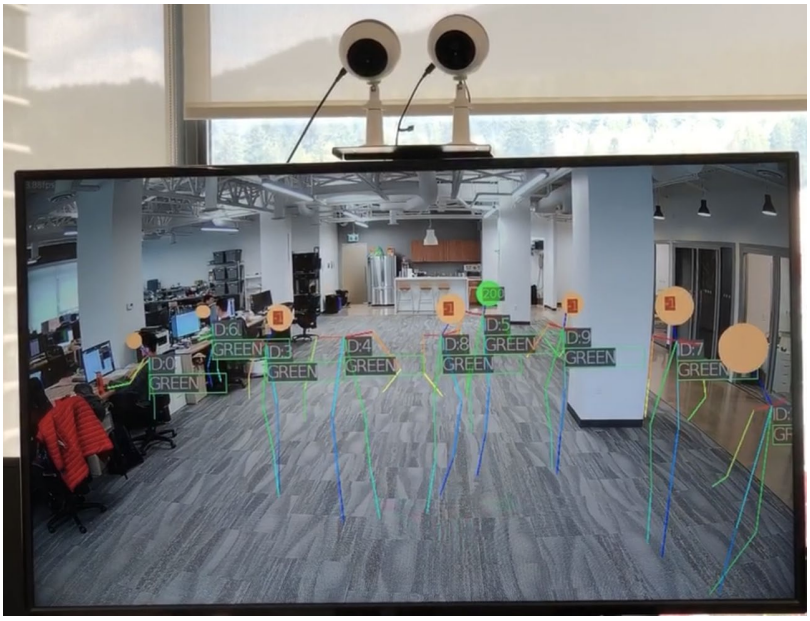
This toggle is used to turn on (default) or turn off the stick figure recording in the server. When the toggle is on, whenever a person is detected by a sensor, the stick figure activities will be recorded in the server. The recording can be accessed from the View Recordings page, as described in Sec. 4.2.7.

4.2.25 HDMI Output (Cypress Only)

Some Cypress sensors have HDMI output, which can be used to display the background image and stick figures on big screen TV. This is very useful for demo purpose.

For these sensors with HDMI output, the Advanced Setting includes a “HDMI Output” toggle switch, which can be used to turn on or off the HDMI output port of the activity sensor. The default value is Off. The change of “HDMI output” will restart the device to make the change effective.

The display device required by HDMI output is 1080P resolution and 60 frame/sec.



4.2.26 Factory Reset

In some rare cases, if the sensor fails to operate properly, a factory reset might be needed, which can be done in the App, or manually via the reset hole in the back of the Cypress sensor, or the reset button at the top of the Sentinare 2 sensor.

1) Factory Reset via the App

If the sensor can be connected to the app via Bluetooth, the factory reset can be done via the app by selecting the Factory Reset command in the advanced setting of the sensor page. This is convenient when the sensor is installed at a high position that is not easy to access.

For the Cypress sensor, the reset process takes about 2 minutes, during which the sensor's LED will change to flashing green, flashing white, solid white (rebooting), and finally flashing white, signaling that it is ready to be added to an account. Some firmware versions might need multiple reboots. Please do NOT unplug its power until the sensor is fully reset after two minutes, and the LED becomes flashing white light. After the factory reset, the sensor's firmware will revert to the initial version, all user data will be erased from the sensor, and the sensor will be removed from the current account. It can then be added to any account, after which the firmware needed to be upgraded.

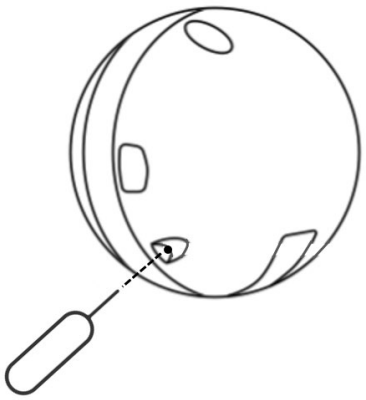
For the Sentinare sensor, the reset process only takes about one minute, during which the sensor's LED will change to flashing green, flashing white, red, solid white (rebooting), and finally flashing white, signaling that it is ready to be added to an account. Please do NOT unplug its power until the sensor is fully reset after one minute, and the LED becomes flashing white light again. Different from the Cypress

sensor, factory reset does not change the firmware version of Sentinare sensor, so it does not need to be upgraded, unless a new firmware version is available, but the sensor will be removed from the account. It can then be added to any account.

2) Manual Factory Reset

If the app cannot be connected to the sensor via Bluetooth, a manual factory reset is needed.

For the Cypress sensor, in the back of the sensor, there is a reset hole next to the SD card slot, as shown below. To perform the physical factory reset, insert a pin into the hole (from lower left to upper right direction, or 45 degree), gently press the reset button inside the sensor, and hold it for about 8 seconds, until the LED light becomes purple. After that, the sensor will reboot, and the LED will become solid white for about a minute, and will then become flashing white, signaling that it is ready to receive command from the App. Some firmware versions might need multiple reboots during the factory reset.



For Sentinare sensor, the reset button at the top of the sensor is needed to perform the physical factory reset. The procedure is as follows:

1. Unplug the power of the sensor.
2. Plug in the power of the sensor.
3. After the LED light becomes white, press the reset button within 3 seconds, and hold it for 2 seconds, the LED will **flash purple**, then release the button (**Note**: for Sentinare firmware versions **before 0.1.205**, the button should be released when the LED becomes **red**, not purple).

After these steps, the sensor will reboot. The LED will first become solid white, and then turn into flashing white, signaling that the sensor is ready to receive command from the App.

3) Switching to Previous Firmware Version (Sentinare sensor only)

The Sentinare sensor has another factory reset feature, which allows the firmware to switch to the previous version. This should only be needed if you are sure that the current firmware version is

corrupted and does not work even after the factory reset described above. **We recommend you to get our confirmation before doing this operation.** Note that sometimes you may also need to downgrade your app to the previous version that matches the previous firmware version.

To do this, in Step 3 of the factory reset prcedure above, after the LED light becomes white, press and hold the reset button within 3 seconds, the LED will become purple after 2 seconds. Continue to hold the button for about 20 seconds. The LED will become **blinking purple**. After this, release the button. The sensor will switch back to the previous firmware version.

4) After Factory Reset

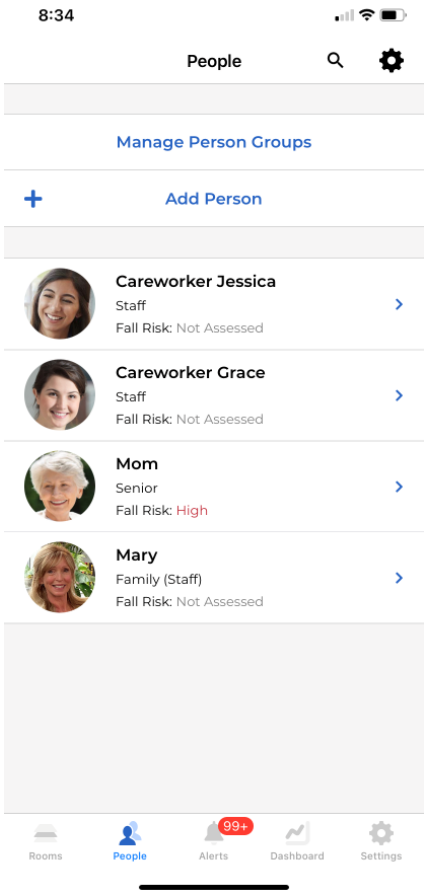
For both Cypress and Sentinare sensors, after the physical reset, the sensor still belongs to its previous account in the App, but the status will become offline. If the sensor needs to stay in the same account, users only need to set up the WiFi of the sensor again via the App, and then do the calibration. **The previous data of the device, such as recordings, will not be lost.**

If the sensor needs to be added to another account, the previous account owner should first remove the device from the previous account via the App, either before or after the physical reset. Otherwise, when the new account owner tries to add the sensor to the new account, an error message will be displayed, stating that the device belongs to another account., The new user can email the current owner to remove the sensor from their account, as discussed in Sec. 4.1.1. If you could not contact the previous owner, please send an email to contact@altumview.com, and let us know the serial number of the sensor. We will remove the previous record from the server. You can then add it to your account.

5. People Management

Tap on "People" at the bottom of the page to enter the "People" page. This page can define Person Group, add persons to the account (such as seniors, family members, and care workers), enter information of each person, and perform Fall Risk Assessment for a person.

The summary of numbers of people in different groups can be viewed in the Dashboard page (Sec. 8).



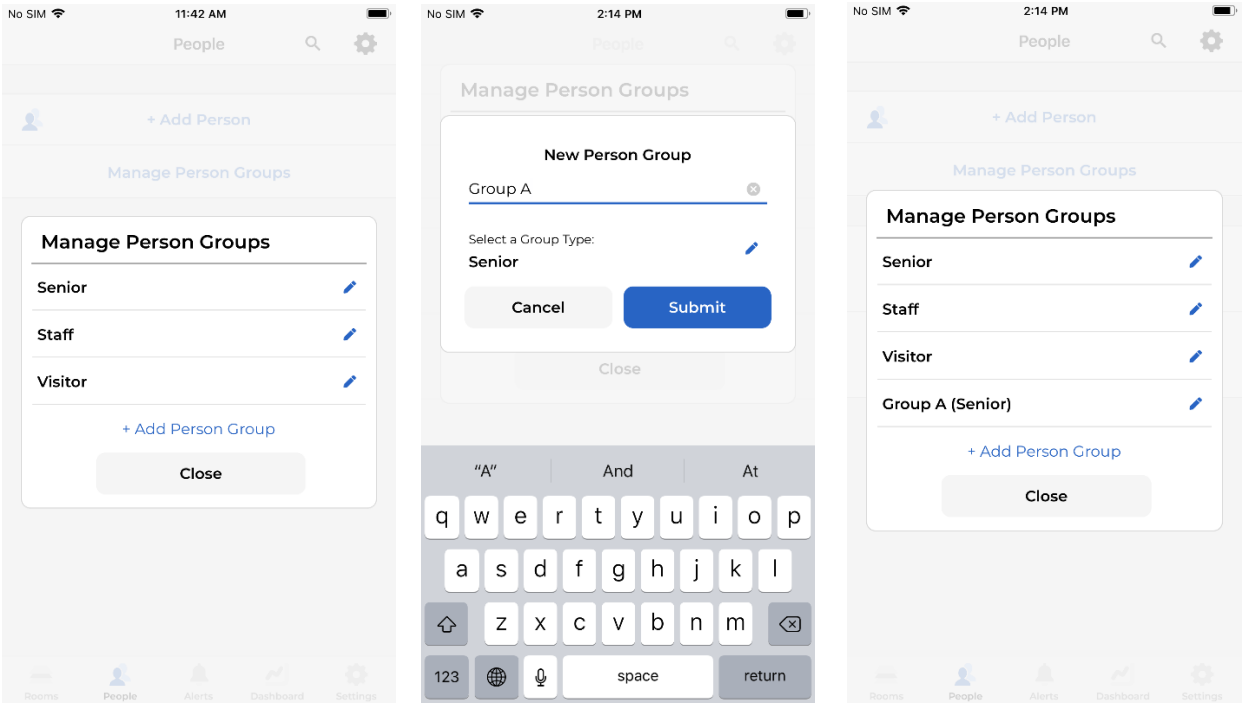
5.1. Manage Person Groups

To facilitate people management, the system allows users to define different Person Groups. Each person must be assigned to a person group.

User can see all the existing person groups by tapping the “Manage Person Groups”. By default, three person groups are pre-defined: Senior, Staff, and Visitor.

In the Manager Person Groups page, user can add a new person group by tapping the “+ Add Person Group” command. In the New Person Group page, user can specify the name of the new person group and the type of the person group. Currently, only three types are supported, namely Senior, Staff, and Visitors. Each of the three pre-defined person groups belong to one of the three person group types.

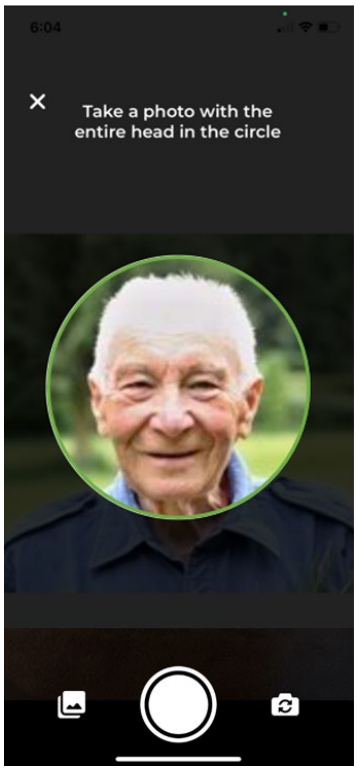
Only the administrator can manage Person Group.

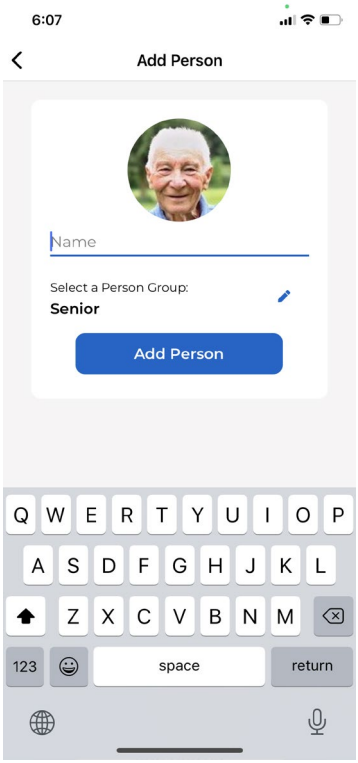


5.2. Add Person

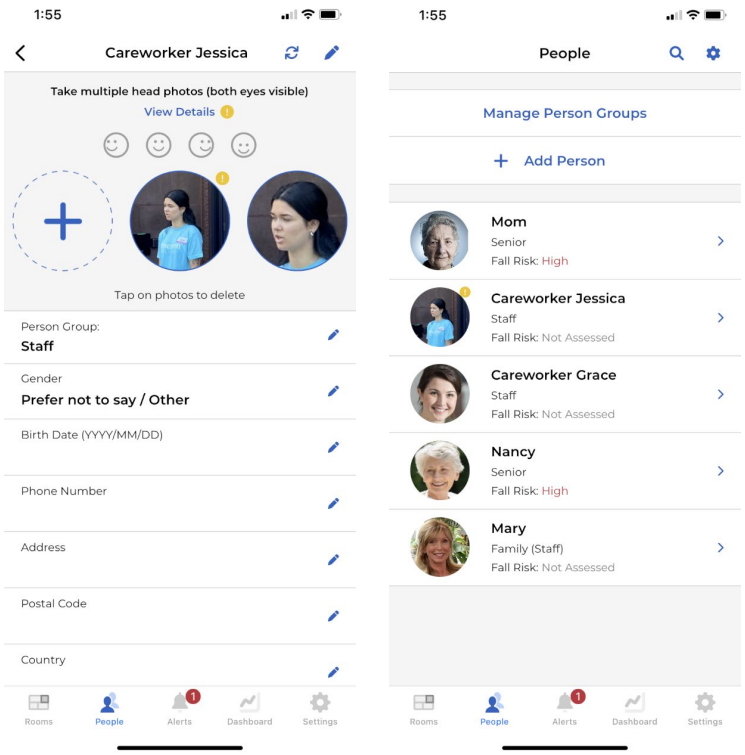
Only administrators can add new person. To add a person, tap on "+Add Person" at the top of the “People” page. The app first needs to get a front image of the person’s **head** from the camera or from the image library, as shown by the figure below.

After getting a head image, the “Add Person” page will appear, where the user can input the name of the person and assign this person to a person group, as shown below.





If a person's face in pictures cannot be recognized properly by the system (such as too small), a yellow warning sign will be showed on the right corner of the picture and the person's profile picture, as shown below.



In the next page, users can add or delete photos for the person. For best performance, take the following four photos of the person's **head**:

- Front view,
- 45° left and right views (**with both eyes visible**),
- 15° top view.

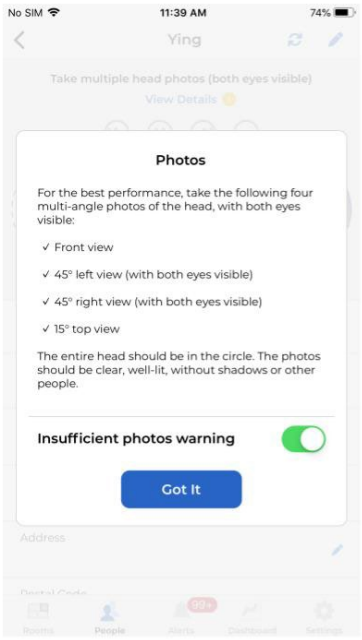
The **entire head** should be in the circle with both eyes visible. The photos should be **clear, well-lit, without shadows or other people**.

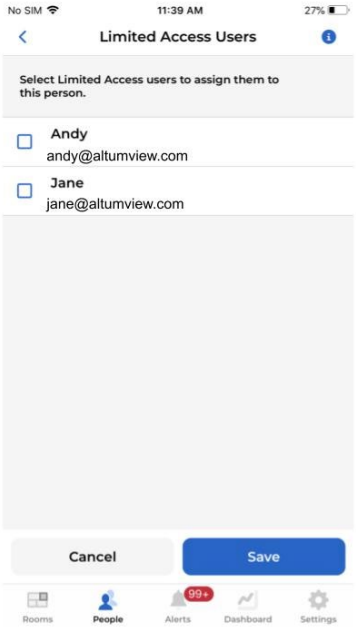
When taking head photos using iPhone, the image circle will turn green when the entire head is within the circle and the yaw angle of the head is within 45 degrees. The circle will be red otherwise.

To add a photo, users can tap on the "+" icon. To delete a photo, simply tap on the photo, but everyone must have at least one photo. Only administrators can delete photos.

If there are less than 4 photos for a person, a yellow warning sign, the insufficient photo warning, will be showed next to the person's profile photo.

User can check the requirement of photo by taping the "View Details" button on a person's page. The insufficient warning can be enabled or disabled via the "Insufficient photo warning" toggle. If the "Insufficient photos warning" is off, the yellow dot on the upper right corner of a person's photo will not be shown.

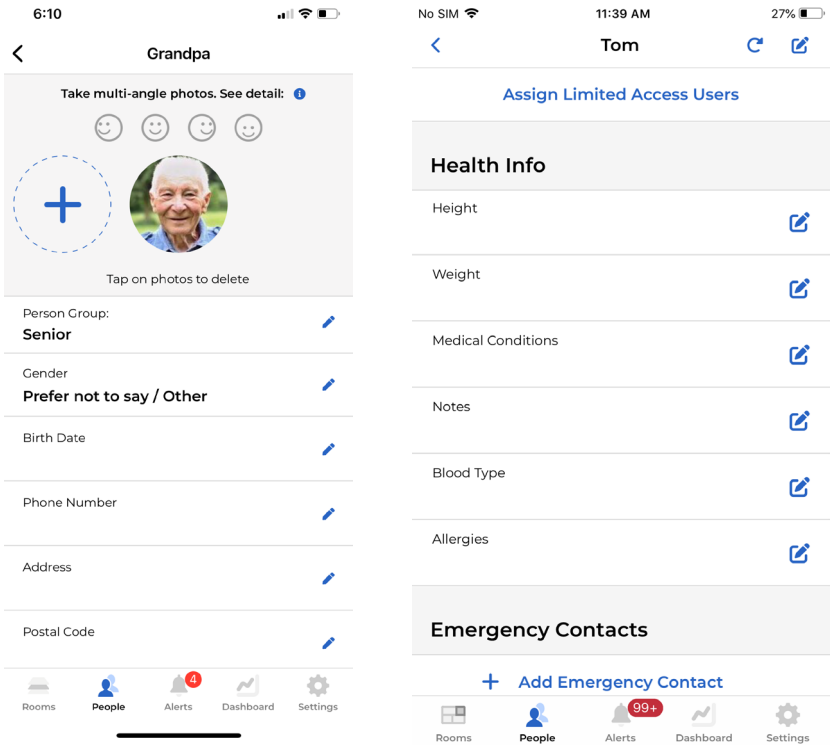




In this page, users can change the person's group, and input the person's detailed information, such as age, gender, address, and phone number. For persons in the Senior group, users can also input the health information and emergency contact (names and phone numbers). In the Medical Conditions field of the Health Info page, users can select more than 30 typical chronic medical conditions.

Note that the emergency contact is used by users such a long-term care facility. The Sentinare system does not use the emergency contact phone numbers for alert notification. It only sends notifications to the Sentinare App.

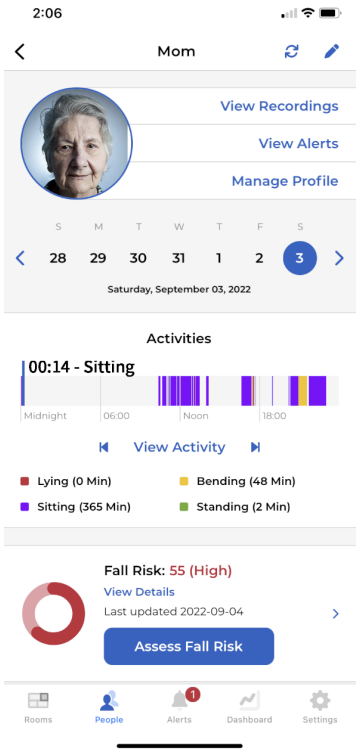
User can also assign this person to secondary users by tapping "Assign Limited Access Users". On the "Limited Access Users" page, just check the secondary user, this person will be assigned to the secondary users.



If a person's face cannot be detected, a yellow dot will show up on the right corner on the picture and the person's name.

5.3 Person Information

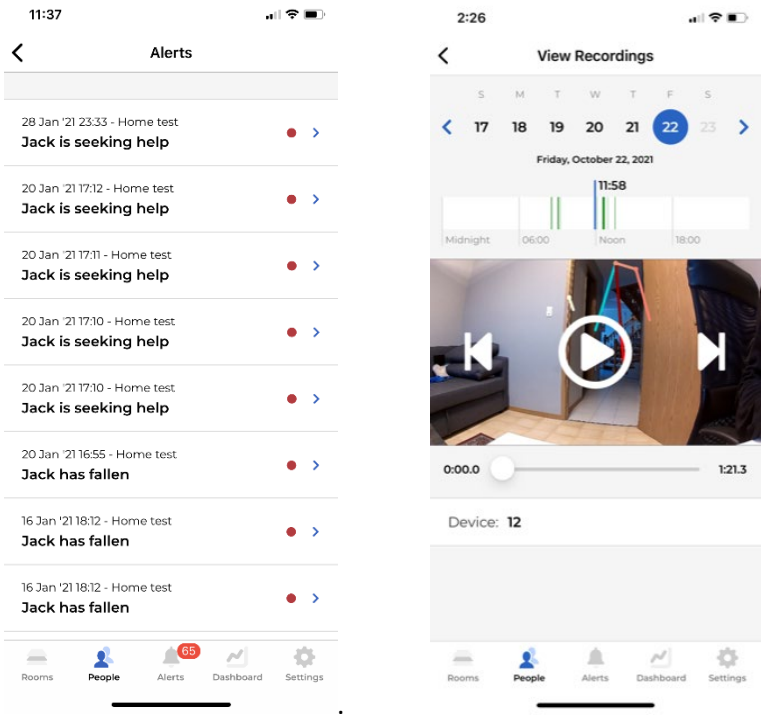
In the list of people, tap on a person will enter the person's page as shown below.



On the top of the person page, users can Delete the person or Rename the person by clicking the pen icon. All users can rename a person, but only administrator can delete a person. The person's name is cached in the app, so after a person is deleted, the app can still display the person's name in the streaming page, until the app is restarted.

Tap on the "View Recordings" command will enter the View Recordings page, where user can replay the skeleton recordings of this person, as described in Sec. 4.

Tap on the "View Alerts" command will enter a page that will list all the alerts of the person, as shown in the left figure below. Tap on an alert record will see the details of that record, as shown in the next chapter.



Tap on the “Manage Profile” command will open a person information page, as shown in Sec. 5.2.

Users can select a day in the calendar to check the activity statistics of the person in that day, including the time spent on different activities such as lying, bending, sitting, and standing. The statistics is updated once every hour.

In the people page, users can also perform Fall Risk Assessment, which will be described in Sec. 7. The pervious fall risk assessment result will also be shown here, if any.

6. Alerts

6.1 Alerts

When the device detects abnormal events, such as falls, waving hands, and various region-of-interest events, it will automatically send an alert to the mobile app via the cloud. To receive the alerts, the app must be logged in and running on the phone (it can run in the background), with push notifications enabled. Upon receiving an alert, the phone will play a sound. If the app is open, a pop-up window will also be displayed.

Notes:

1: Multiple people can log in to the same account on different phones and receive alerts simultaneously, even in the free plan.

2: Many phones (especially Android phones) have various power saving settings that could disable push notification when the Sentinare runs in the background. Please refer to the user manual of your phone to ensure that push notification is enabled for Sentinare. Sometimes you need to change multiple power saving settings.

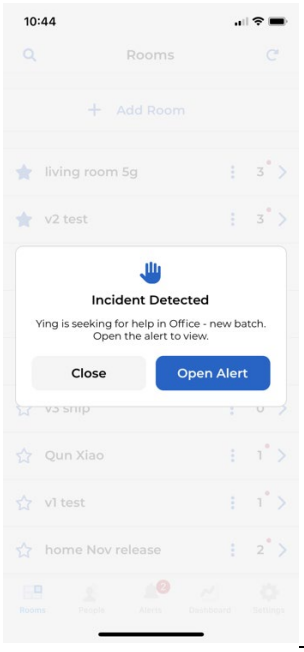
3: Currently the alert message only includes the stick figure activity of the person that triggers the alert, and does not include other people in the scene. To see all people in the scene, please use the View Recording feature (which has a few minutes of delay.)

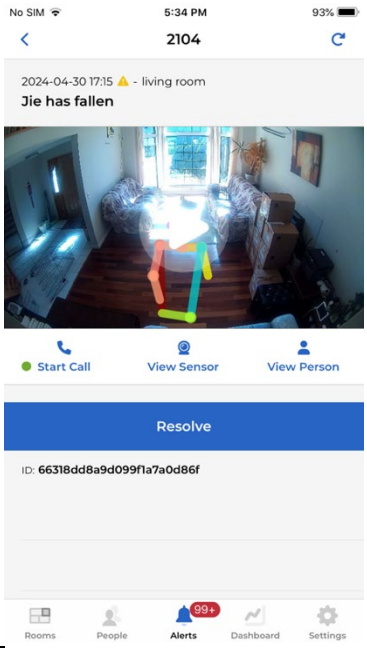
4: Android users can customize the push notification sound from the setting page of the Android phone.

After receiving an alert, tapping the "Open Alert" button on the notification popup will open the alert's page, as shown below. Users can use the "Start Call" command on this page to speak to the person or click the "View Sensor" command to go directly to the sensor's real-time streaming page to verify the situation. If the person is recognized, tapping the "View Person" button will open the page displaying that person's information.

Tapping the "Resolve" button will open the "Resolve this alert" popup window. Details about resolving alerts are discussed in Section 6.3.

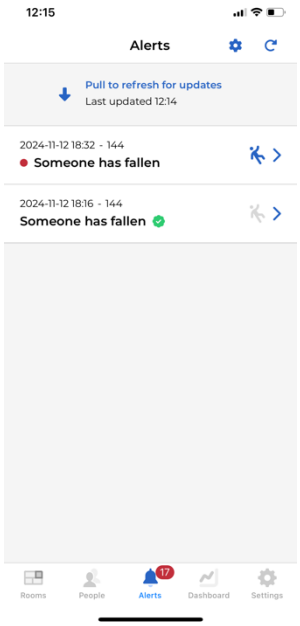
Users can also use the View Snapshot button to take a snapshot of the site if the sensor's Remote Calibration is set to "Allow" (Section 6.4).

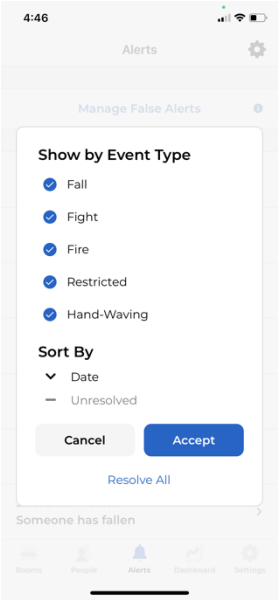




6.2 Managing Alerts List

Tapping the "Alerts" button at the bottom of the page displays a list of all alerts. Each alert includes the time, room, and a stick-figure animation representing the corresponding event. The alert list updates automatically when a new alert is received, with the last update time shown at the top of the page. Users can also pull down the screen or tap the refresh button on the top to manually refresh the list.

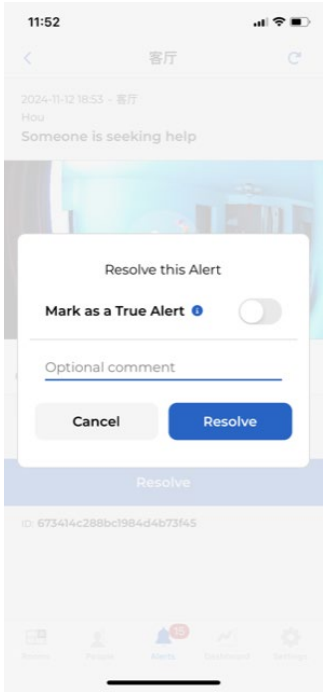


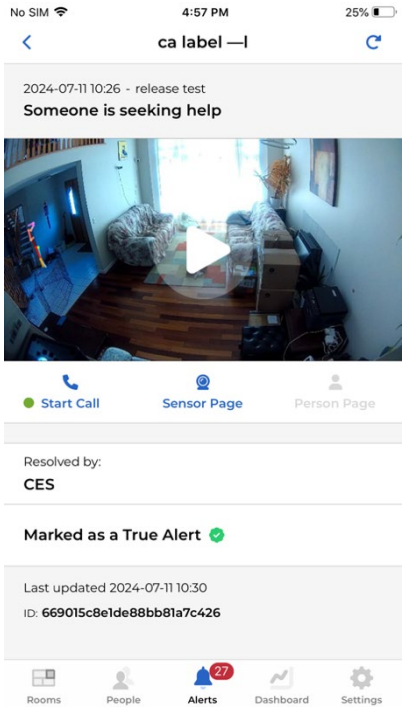


Tap on the Setting icon in the upper right corner of the alert list page, user can search and sort all alerts, as shown by the second figure above. Tap the “Clear filters” button to clear the display of the sorting and return to the full list.

6.3 Managing Alerts

Tapping the “Resolve” button on the alert page will show the “Resolve this Alert” page.

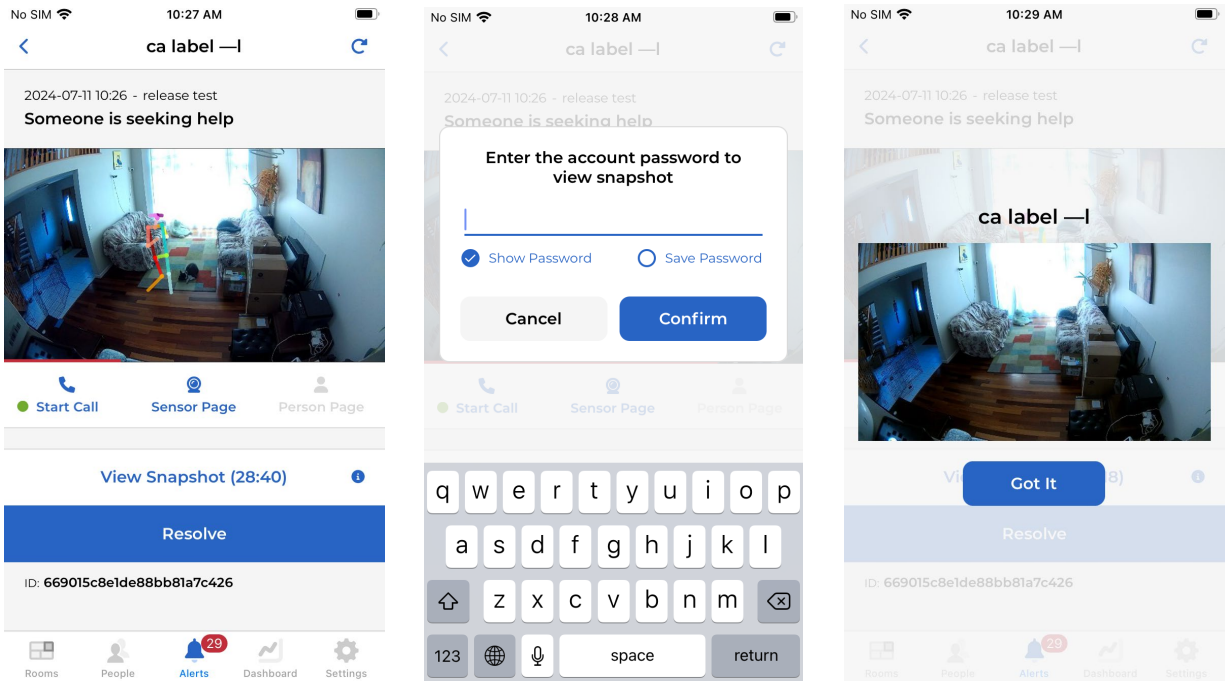




Users can choose “Mark as true alert” if the alert is a true alert (including simulated alerts), enter a description of the event, click the “Resolve” button, and submit it. After submission, the alert’s state in the alert record will change to "Resolved," the red dot will disappear, and the resolved date and time will appear in the “Last updated” section on the alert’s page. If “Mark as true alert” is selected, a green tick icon will be displayed for the alert in the alert list.

6.4 View Snapshot After Receiving an Alert

Users can use the View Snapshot button in the alert page to snapshots of the scene to verify the incident after receiving an alert. To do this, Remote Calibration must be enabled for the sensor, as in Section 4.2.9. To protect privacy, snapshots are available only within 30 minutes of the incident. When a snapshot is taken, the sensor will play a sound to notify the person on site.



After tapping the “View Snapshot” button, a popup page will prompt for the account password. User can choose to save the password to avoid entering it each time. After tapping on “Confirm”, a snapshot from the sensor will appear. This button is only available for 30 minutes after the alert is received.

7. Fall Risk Assessment

7.1 Introduction

The Sentinare activity sensor can also perform fall risk assessment. This allows users to evaluate the fall risk of seniors or patients regularly in long-term care facilities, community centres, or at homes, without having to go to hospitals to do the test, and identify people with high fall risk earlier, so that necessary interventions can be taken to reduce falls and the damages they could cause.

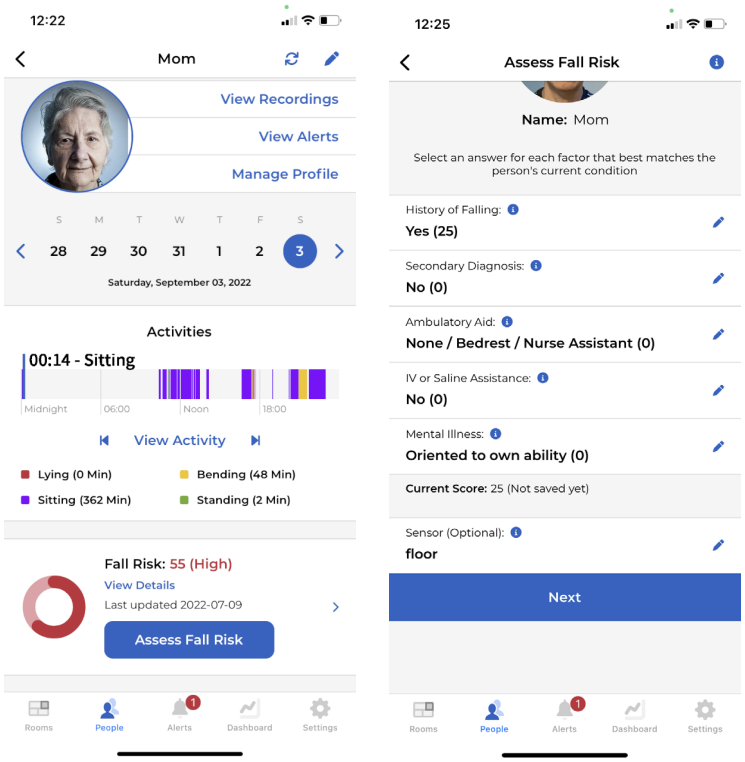
The method implemented by the Sentinare activity sensor is based on the widely used Morse Fall Risk Assessment Scale, which assign scores to the following six factors, and the total score is used to determine the fall risk.

- History of falling in the last 3 months
- Secondary diagnosis
- Ambulatory aid
- IV or saline assistance
- Mental illness
- Gait quality

The Morse method's average sensitivity and specificity is over 80%, and interrater reliability is 0.96, meaning repeated tests by different examiners are highly consistent. Therefore the method has been widely adopted around the world.

7.2 Morse Fall Risk Assessment Scale

To perform fall risk assessment for a person, tap the Peoples icon in the bottom of the screen, and select the person in the list of people. In the person's individual page, tap the Assess Fall Risk button to go to the Assess Fall Risk page, as shown below.



In the Assess Fall Risk page, users first need to answer 5 questions about the health conditions of the person being tested. The questions and rules of scores are as follows. These details can also be found in the app by tapping the information icon next to each question.

1: History of falling in the last 3 months:

- 25: if the patient has immediate history of falls within the past 3 months.
- 0: Otherwise.

2: Secondary diagnosis:

- 15: If **two or more** medical diagnoses are listed on the patient's record that may increase risk for falls, considering factors such as illness/medication timing and side effects such as dizziness, frequent urination, unsteadiness.
- 0: Otherwise.

3: Ambulatory aid:

- 0: If the patient walks without a walking aid (even if assisted by a nurse), uses a wheelchair, or is on bed rest and does not get out of bed at all.
- 15: If the patient uses crutches, a cane, or a walker.
- 30: If the patient walks clutching onto wall or furniture for support (e.g., needs help, but does not ask or does not comply with order for bed rest).

4: IV or saline assistance:

- 20: if the patient has an intravenous apparatus or is attached to other medical equipment.
- 0: Otherwise.

5: Mental illness:

To test mental status, ask the patients “Are you able to go to the bathroom alone or do you need assistance?”. The score will be

- 0: If the patient’s reply is consistent with the hospital/facility’s record.
- 15: If the patient’s response is not consistent with the record, or if the patient’s response is unrealistic.

7.3 Gait Analysis

The last step of the Morse Fall Risk Scale is to assess the gait or walking quality of the person. Sentinare activity sensor performs this through the popular 3m Timed Up & Go (TUG) test, which was initially designed for seniors, but has also been found to be accurate for people with Parkinson's Disease, Alzheimer’s, hip fracture, routine orthopaedic surgery, and other conditions. The TUG method’s average sensitivity and specificity is also over 80%, and interrater reliability is 0.98.

7.3.1 Room Setup

To do the gait analysis, users need to select a room with a Cypress or Sentinare 2 sensor and an empty area of at least 3m long, and ensure that the entire test area can be captured by the sensor, so that the recording can be played back later for analysis.

Please do the following preparation:

- Place an armchair in the room.
- Place a marker (such as a colored tape) 3m away on the floor in front of the chair.

The person doing the test can wear their regular footwear and can use a walking aid, if needed. If necessary, another person can accompany the senior during the test to prevent them from falling.

7.3.2 The Gait Test

The person being evaluated will start from the sitting position in the chair, and place his/her back against the chair and rest his/her arms on the chair’s arms.

The app user taps the **Start** button on the app, and the person being evaluated will start to do the following.

1: Stand up from the chair.

2: Walk to the marker on the floor at a comfortable and safe speed.

3: Turn around.

4: Walk back to the chair.

5: Sit down again.

After the person sits back to the chair, the app user taps the **Stop** button in the app.

One practice walk is allowed.

Next, tap the Submit button in the app, the gait score and the total score of the Morse Fall risk Scale will be displayed in the Result Breakdown page of the app.

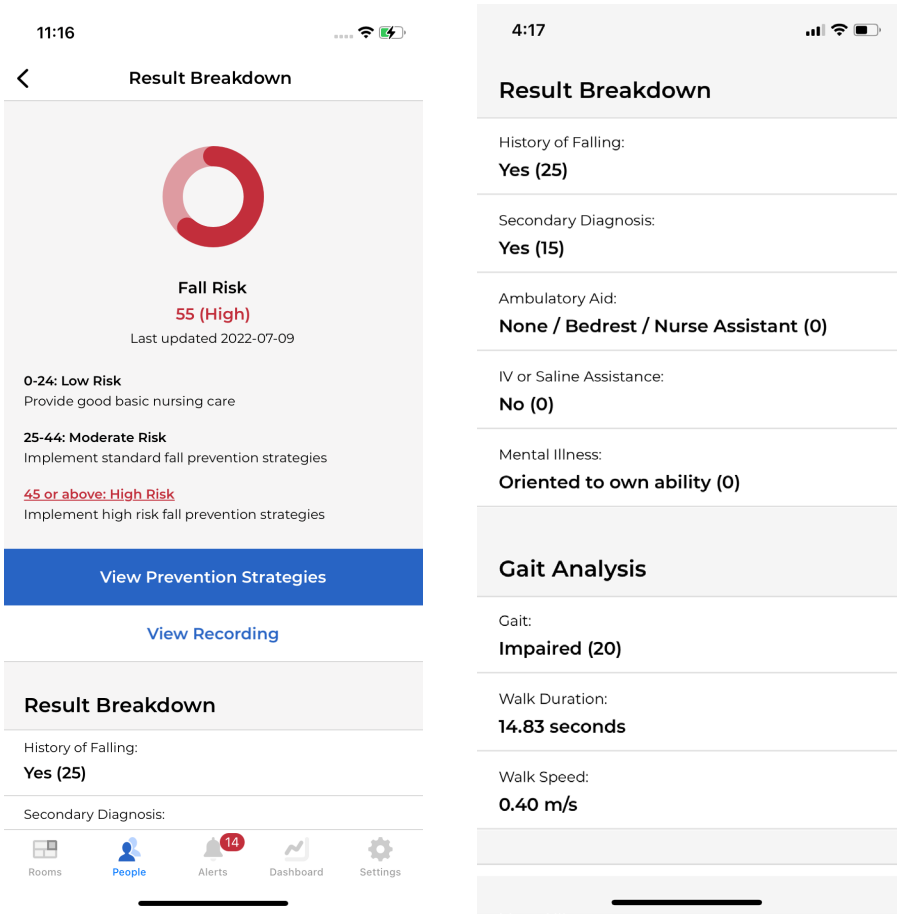
Based on the person's gait analysis, the sensor will give the person's gait score as follows:

- 0: Normal gait (or if the person is always on bed rest or on wheelchair)
- 30: Weak gait
- 45: Impaired gait

7.4 Final Morse Fall Risk Scale

The final Morse fall risk scale classifies the total score from the six parts above into three categories:

- Low Risk: 0-24
  - Only need to provide good basic care
- Moderate Risk: 25-44
  - Need to implement standard fall prevention interventions
- High Risk: >=45
  - Need to implement high risk fall prevention interventions



The app also gives some strategies on how to prevent falls for different levels of fall risks.

Users can also play back the recording of the last fall risk assessment by clicking the View Recording command in the Result Breakdown page.

8. Dashboard

Tap on “Dashboard” in the menu at the bottom of the screen to view some statistics about this account, as shown below.

The first part of the dashboard shows the visit records, which is explained in Sec. 8.1.

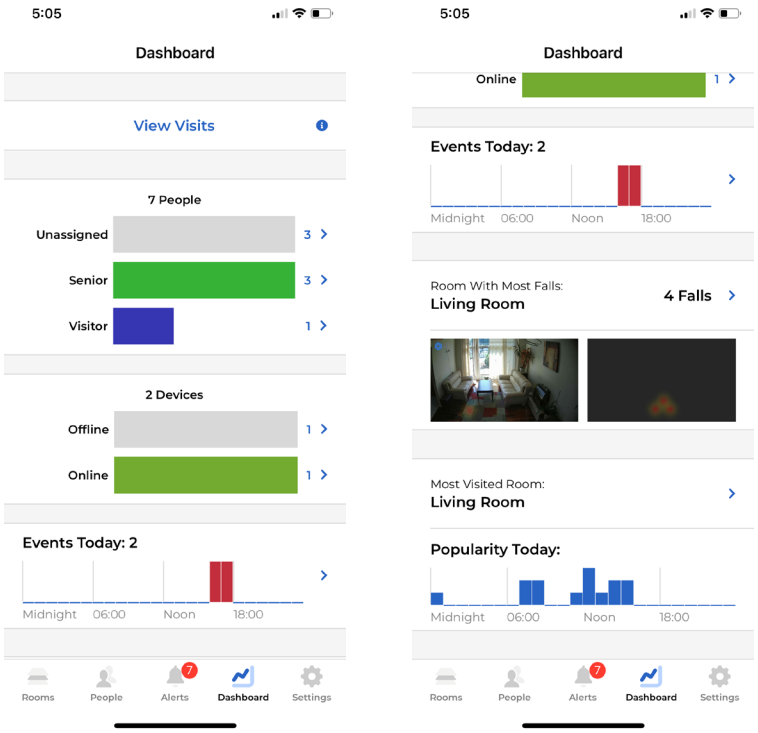
The dashboard page first displays the total number of people in the account, including the total in each person group. Tapping the name of each person group will show the list of all people in it.

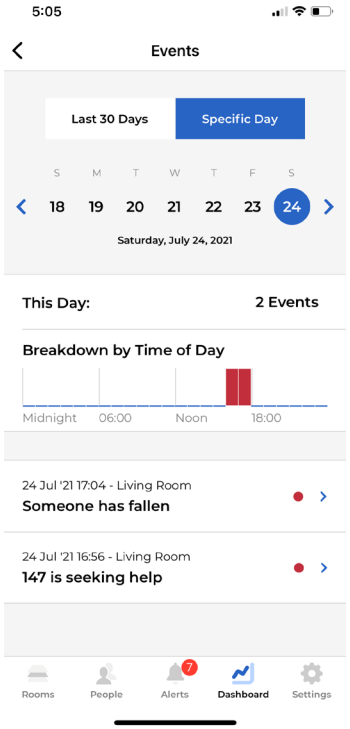
The next part displays the total number of devices in the account, and the numbers of online and offline devices. Tapping the offline and online categories will show the list in each group.

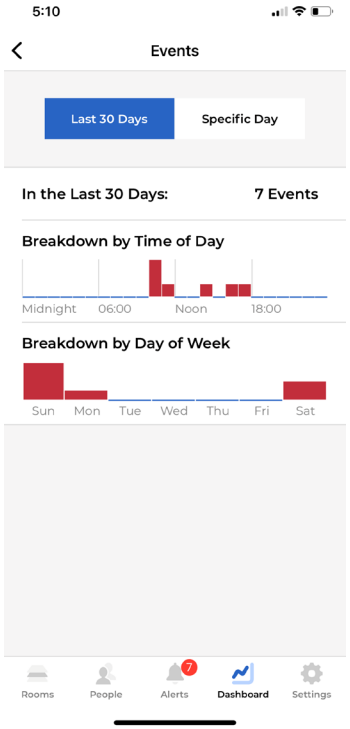
The next part shows the total number of events and the time of each event in the current day. Tapping this part of the screen will show the details of these events. In this page, users can also check the records of other days or the total records of the last 30 days.

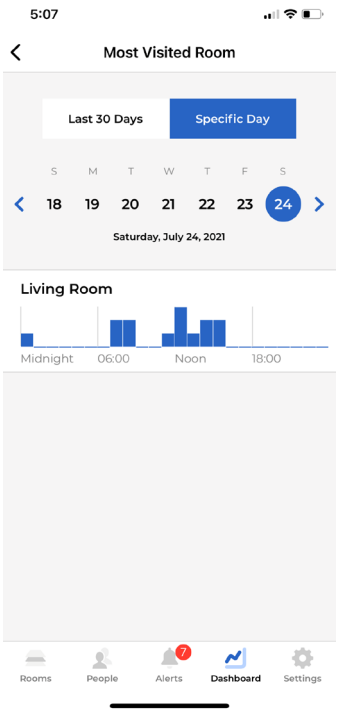
The next part of the dashboard page shows the room with most falls, and the heat maps of the fall locations.

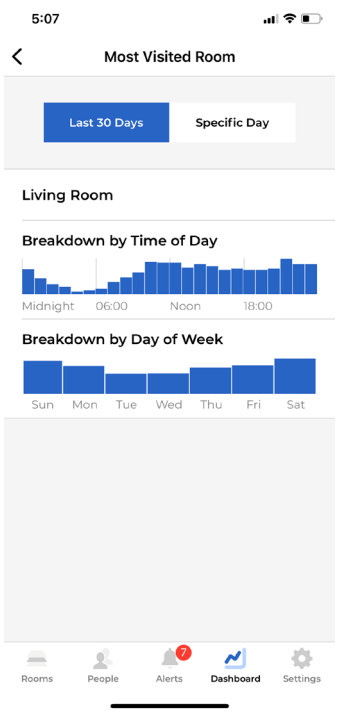
The bottom of the dashboard page displays the most visited room today. Tapping this part of the screen, users can check the most visited room in other days or the last 30 days.




5:05
Events
Last 30 Days
Specific Day
S M T W T F S
18 19 20 21 22 23 24
Saturday, July 24, 2021
This Day:
2 Events
Breakdown by Time of Day
Midnight 06:00 Noon 18:00
24 Jul '21 17:04 - Living Room
Someone has fallen
24 Jul '21 16:56 - Living Room
147 is seeking help
Rooms People Alerts Dashboard Settings


5:10
Events
Last 30 Days
Specific Day
In the Last 30 Days:
7 Events
Breakdown by Time of Day
Midnight 06:00 Noon 18:00
Breakdown by Day of Week
Sun Mon Tue Wed Thu Fri Sat
Rooms People Alerts Dashboard Settings


5:07
Most Visited Room
Last 30 Days
Specific Day
S M T W T F S
18 19 20 21 22 23 24
Saturday, July 24, 2021
Living Room
Midnight 06:00 Noon 18:00
Rooms People Alerts Dashboard Settings

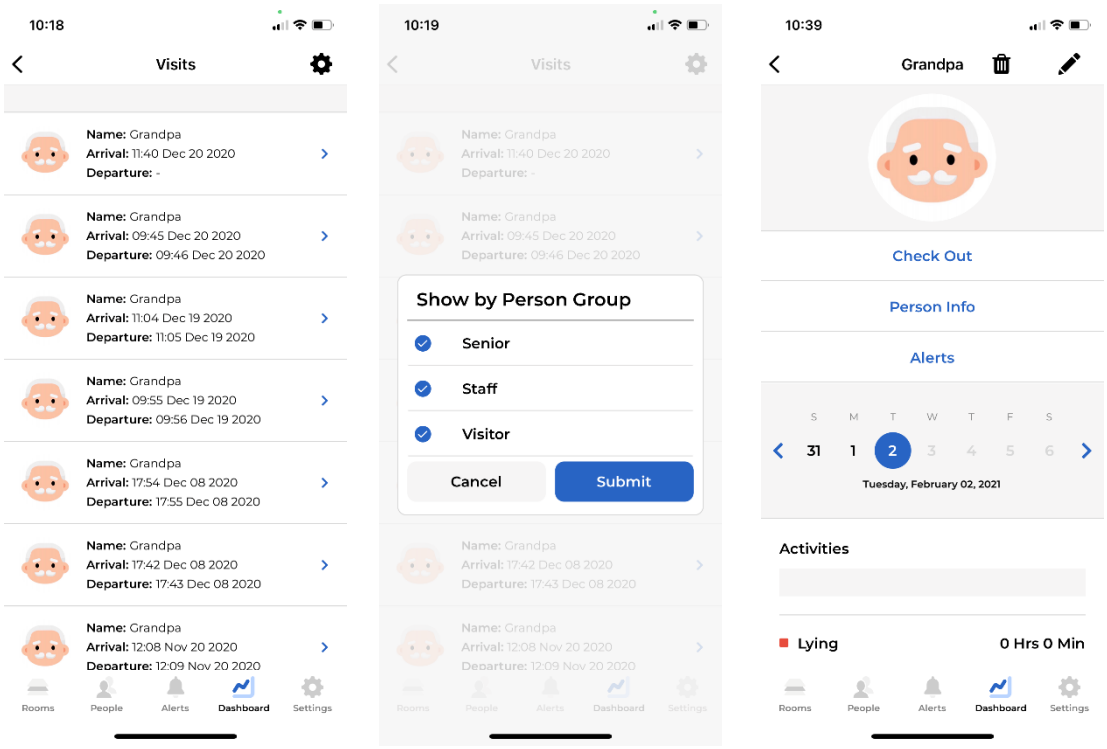

5:07
Most Visited Room
Last 30 Days
Specific Day
Living Room
Breakdown by Time of Day
Midnight 06:00 Noon 18:00
Breakdown by Day of Week
Sun Mon Tue Wed Thu Fri Sat
Rooms People Alerts Dashboard Settings

8.1 View Visits

Tap on the “View Visits” command will enter the “Visits” page, which shows all the entrance and/or exit records detected by sensors for which the entrance and/or exit are defined via the Region of Interest page in Sec. 4.

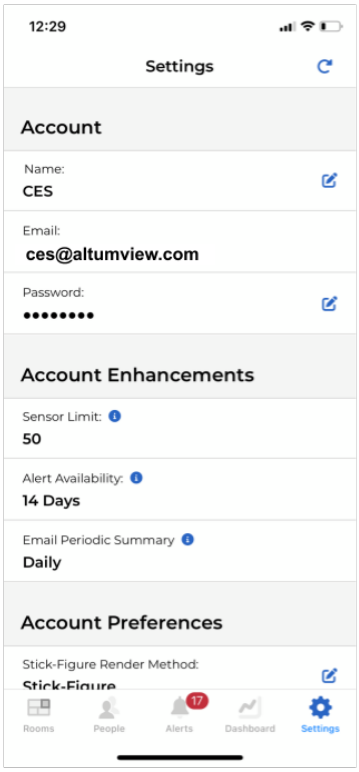
In the Visits page, tap on the setting icon in the upper right corner, users can select what person group’s records to display, as shown by the figure below. The filtering can be removed by tapping “Clear Filters”.

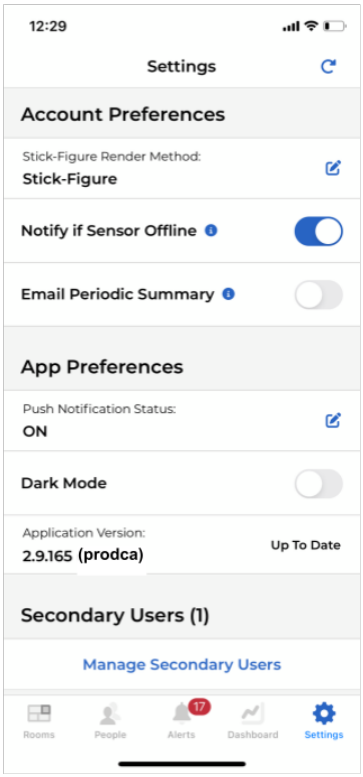
From the Visits page, users can also manually check out a person, if his/her departure time was not recorded for some reasons. This can be done by tapping a record whose departure time has not been logged. In the next page, tap the “Check Out” command, as shown by the following figure, a pop up window will show up for users to input the departure time of the person.

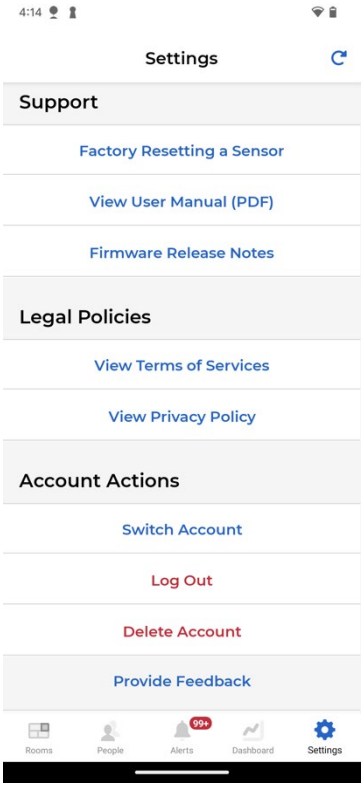


9. Account Settings

Tap on "Settings" in the bottom right corner to enter the account setting page.







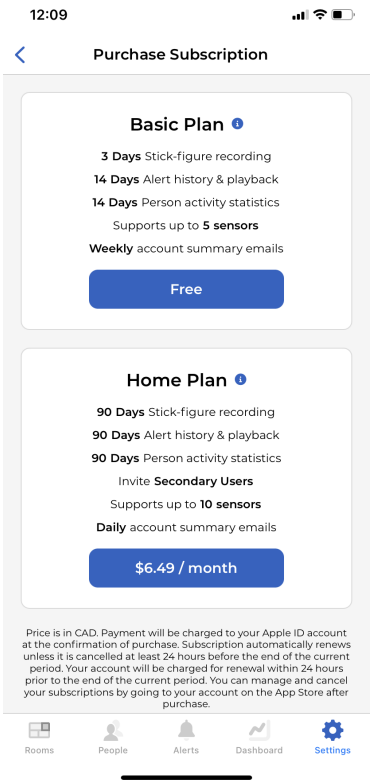
9.1 Account

In the Account section, the name and password of a user can be changed.

9.2 Account Enhancements and Subscription Plan

In the Account Enhancements section, the maximal number of devices and the alert/recording availability of the account are displayed.

Click the “Manage Subscription” button will open the Purchase Subscription page, as shown below.



Currently, three plans are offered:

1. Free Basic Plan (default):

It provides 3 days of continuous stick figure recording, 14 days of alert history & playback, 14 days of person activity statistics, up to 5 sensors in the account, and does not have the capability of inviting secondary user. This is suitable for most consumer users.

2: Home Plan (Paid):

It provides 90 days of continuous stick figure recording, 90 days of alert history & playback, 90 days of person activity statistics, up to 10 sensors in the account, and can invite secondary users. This is suitable for some individual consumers or small businesses who have 6-10 sensors, need to access long-term data, and invite secondary users.

3: Enterprise Plan (Paid):

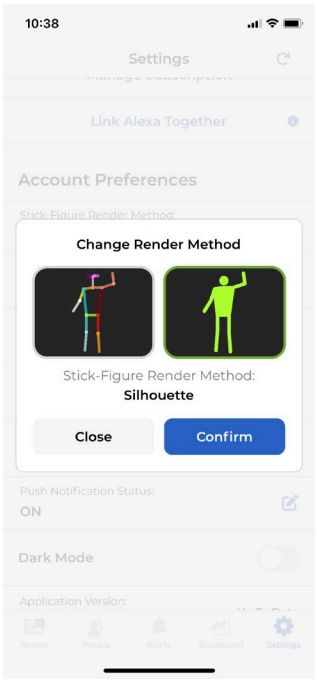
This is for businesses or institutions requiring a large number of sensors, API integration, or more technical support. Please contact our sales team for a custom solution, or email to contact@altumview.com. We will change the relevant parameters in the server, including number of sensors, days of stick figure recording, and days of alert and statistics history.

9.3 Account Preferences

The Account Preferences section include four settings:

9.3.1 Stick-figure Render Method

To provide privacy, the Sentinare sensor only sends the stick figure data of each person to the server. The Sentinare app provides two ways to render a person, stick figure or silhouette. This can be selected via the Stick-Figure Render Method toggle.



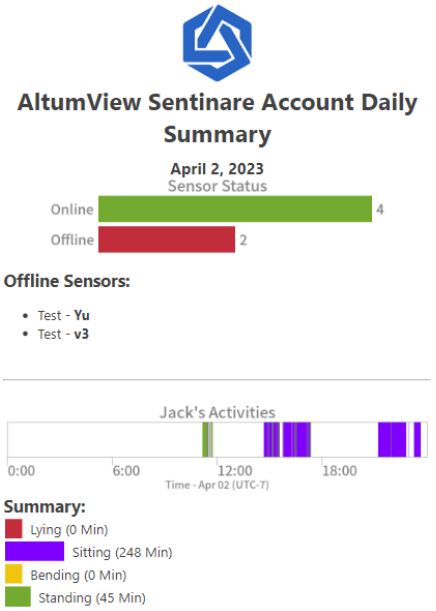
9.3.2 Notify if Sensor Offline

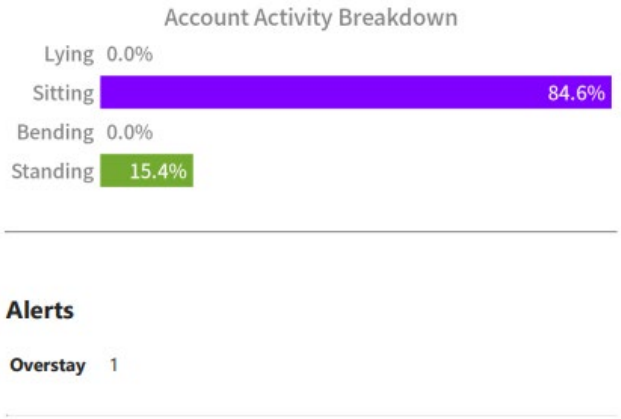
If turned on, when a sensor goes offline, a notification will be sent to the app after 15 minutes. After that, a push notification about offline sensors will be sent twice a day.

9.3.3 Email Periodic Summary

If turned on, an email will be sent periodically informing about sensor status and people's activities recorded by the sensors, as shown below.

For the free plan, the email is only sent weekly for one day's summary. For the paid subscription plan, the summary is sent daily.





9.4 App Preferences

9.4.1 Push Notification Status

Sentinare activity sensor can detect abnormal events like falls and send alerts to user's mobile device immediately. However, to take full advantage of this feature, the user needs to enable the Sentinare app to receive such notifications via notification banner and sound at the System Setting of their device. This can be turned on and off by the "Push Notification Status" command in the Sentinare setting page.

Note that many phones have various power saving settings that could disable push notification when the Sentinare runs in the background. Please refer to the user manual of your phone to ensure that push notification is enabled for Sentinare. On iPhone, please turn off Low Power Mode in the Settings/Battery page.

9.4.2 Dark Mode

This toggle changes the UI of the app between the normal mode and the dark mode.

9.4.3 Application Version

The mobile app version is displayed in this part.

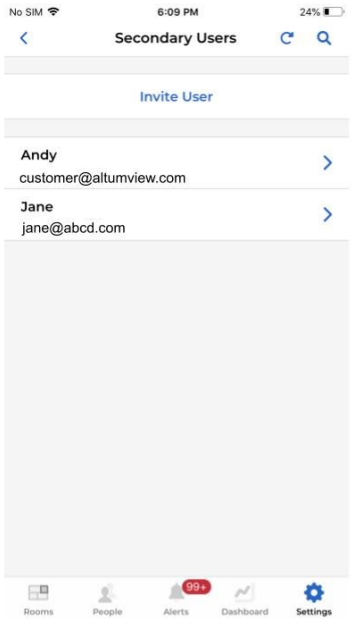
User can tap the “Check for Update” command to find out if there is any newer version of the app.

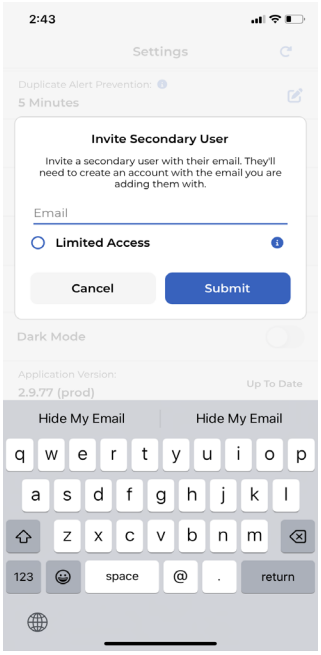
9.5 Secondary User

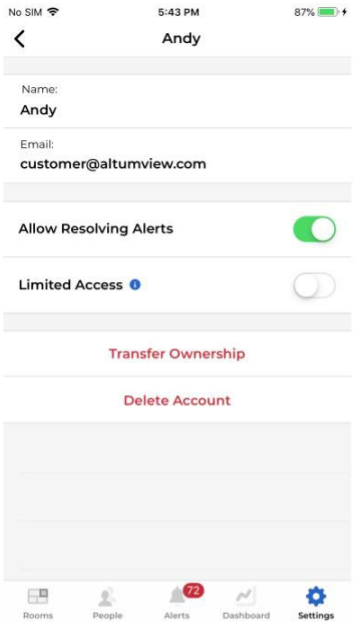
In the paid Home Plan or Enterprise Plan, users can invite some secondary users to the account, and select which rooms and people they can have access to. The secondary users can only view information about the assigned rooms, sensors, and people, and receive alerts from them, but they cannot access information of other rooms, sensors, and people, and cannot change the settings of the main account. The procedure to invite a secondary user is as follows.

- Log in as the main user of an account.
- Tap “Manage Secondary Users” on the “Settings” page to open “Secondary Users” page.
- Tap “invite User”.
- In the Invite Secondary User page, as shown below, fill in the email address of the invited user, check “Limited Access” if they only need to access some rooms and people, and tap "Submit" to send the invitation. **The Email address should not have been used by an existing Sentinare account.**
- The invited user will receive an email from altumview.com with a registration web link.
- After clicking the web link, the invited user can register a new account by entering the invited email address, name, and password. The new account will become a secondary account of the account that generates the invitation. After that, the secondary user can log in to the Sentinare app using the new secondary account.

- If “Limited Access” is not selected when inviting the secondary user, the new user will have access to all rooms, sensor, and people in the main account. If “Limited Access” is checked, the main user can select in the next page which rooms and people the secondary user can have access to, and whether they can resolve alerts, as shown below.







All secondary accounts of an account are listed under the Invite User command in the setting page, as shown below. Select a secondary user account, in the secondary user page, account owner can modify the secondary user's access, delete the invited account, or even transfer the ownership of the main account to the secondary account.

After a secondary user account is deleted, the email for that account can be used to create a new main or secondary account, by following the corresponding instructions for creating new account.

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9.6 Legal Policies

9.6.1 View Terms of Services

The Terms of Services can be obtained by tapping the "View Terms of Services" in the Setting page.

9.6.2 View Privacy Policy

The Privacy Policy can be obtained by tapping the "View Privacy Policy" in the Setting page.

9.7 Account Actions

9.7.1 Switch Account

Sometimes users might need to use multiple accounts, and switch among them from time to time. To save the efforts in typing in different user names and passwords, users can use the Switch Account feature, so that the app can remember the user names and passwords of multiple accounts, and easily switch among them without retyping the login information.

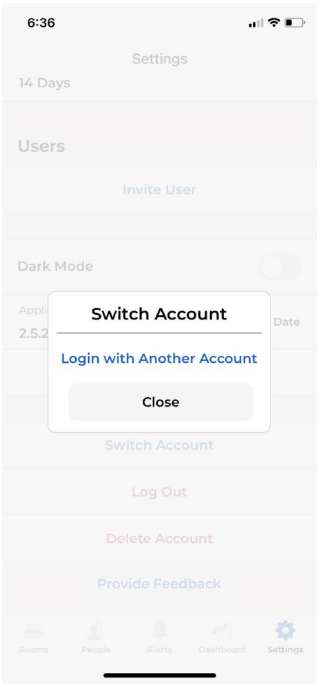
Note that only the current account can receive notifications such as alerts, even if multiple accounts are saved by the app.

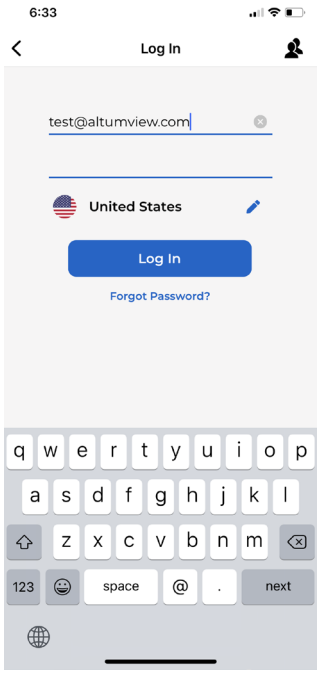
To switch to another account, tap the Setting icon in the lower right corner of the screen, go down to the bottom of the page, and tap Switch Account.

If the login information of other accounts have already been saved, the app will list these accounts. Users can simply tap an account, and the app will automatically switch to that account, without having to re-type the user name and password.

If no other account information has been saved by the app, or a desired account is not in the list, users can tap the Login with Another Account command, and the app will go to the login page, where users can input a new account login information. The previous account will not be logged out, and users can switch to it later. However, only the current account can receive notifications such as alerts. Other accounts saved by the app will not receive notifications.

When the login information of multiple accounts are saved via the Switch Account feature, users can also choose which account to switch to in the login page, by tapping the multiple-people icon in the upper right corner of the login page.





9.7.2 Log Out

User can log out from the app by taping “Log Out” in the setting page.

9.7.3 Delete Account

By taping “Delete Account” in the setting page, users can delete all user accounts, reset all devices, delete all people and photos, and erase all alert history.

9.7.4 Provide Feedback

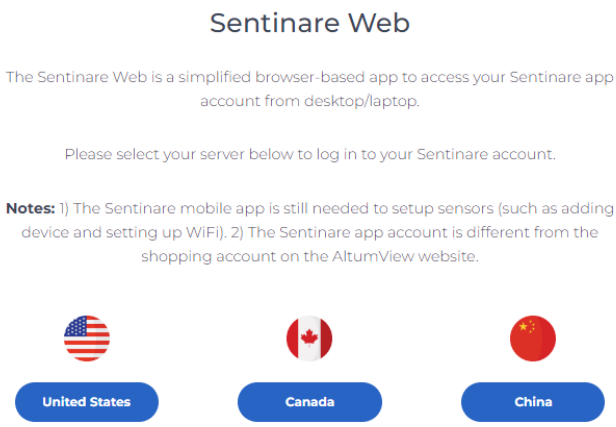
By taping “Provide Feedback” in the setting page, users can send feedback to us.

10. Sentinare Web App

In addition to the Sentinare mobile app, the Sentinare sensor system also comes with a simplified browser-based Sentinare Web app, which is very useful for institutional customers. Most features of the Sentinare app are available in the web interface, except for device setting up (adding device, setting up WiFi, calibration, etc.), which requires mobile devices that can connect to the Sentinare sensor via Bluetooth.

To access the Sentinare Web, www.altumview.ca, click Product in the menu, then select Web App, or go to the following address directly.

https://www.altumview.ca/sentinare-web/



In the page above, select the Sentinare server you use.

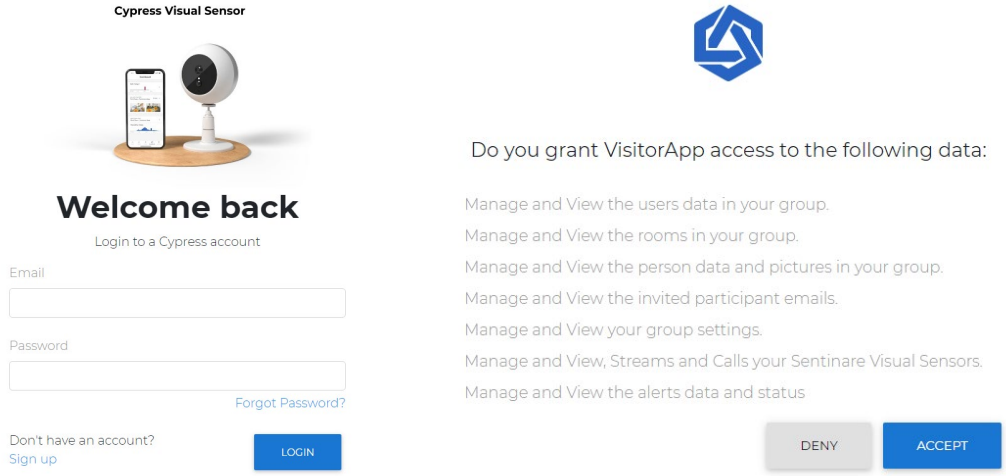
The Web app of different servers can be accessed directly from the following addresses (must include the https part):

For accounts created in the Canada server: https://app.altumview.ca

For accounts created in the US server: https://app.altumview.com

For accounts created in the China server: https://app.altumview.com.cn

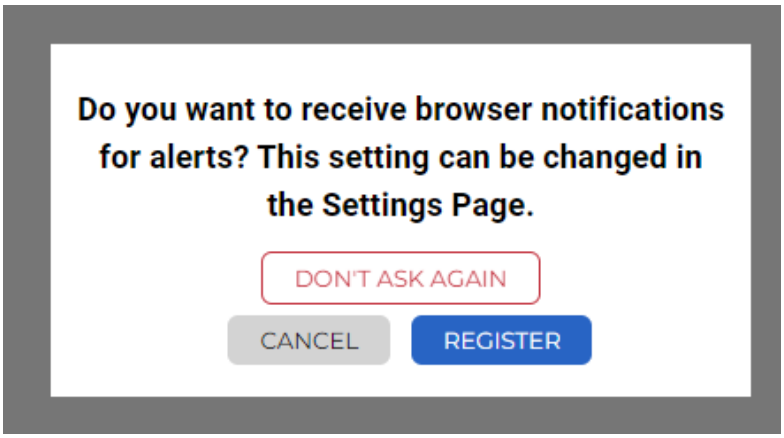
You will see the following login page. Logging in using your Sentinare mobile app account, you will first be prompted to allow the web hub to access your user data, as shown below.



If you get the following error when logging into the Sentinare Web Hub, please clear the cookie and cache of your web browser, or use the incognito mode of the browser, or use a different type of browser:

{"status_code": 401, "message": "Token is invalid or expired.", "success": false, "error": {"name": "AccessDeniedError", "code": 28}}

After that, the following pop-up message will ask if you want to receive push notifications for alerts.

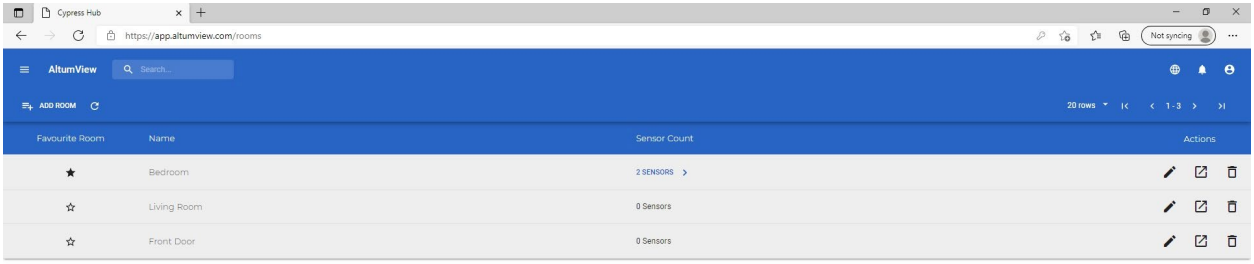


Note that even if you accept push notification by clicking “Register”, you still need to change your web browser’s setting so that the website above can send push notification.

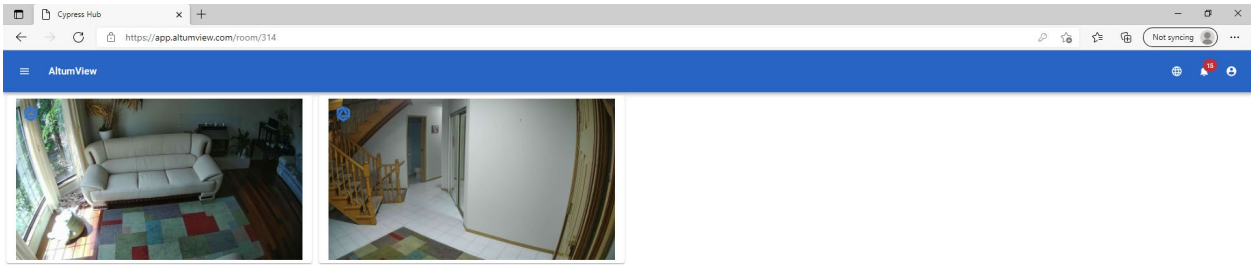
Different browsers have different ways to turn on push notification. Please search it for your browser. For example, for Google Chrome browser, this can be done by going to Settings > Privacy and Security > Site Settings, then scroll down to Permission > Notifications. In the “Allowed to send notifications” section, add the website above, such as https://app.altumview.com.

10.1 Rooms

After login, the following Room page will be displayed, where users can go to each room, and also change the name of a room by clicking the pencil icon.

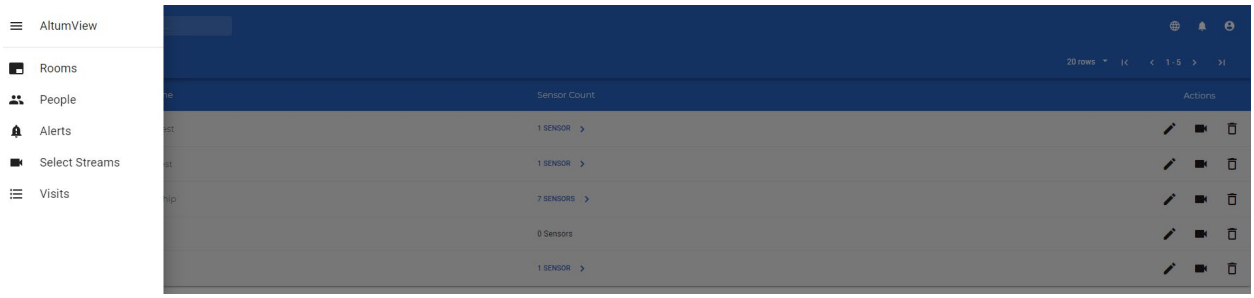


Clicking the icon next to the pencil, users can display the real-time streamings from all devices in that room, as shown below.



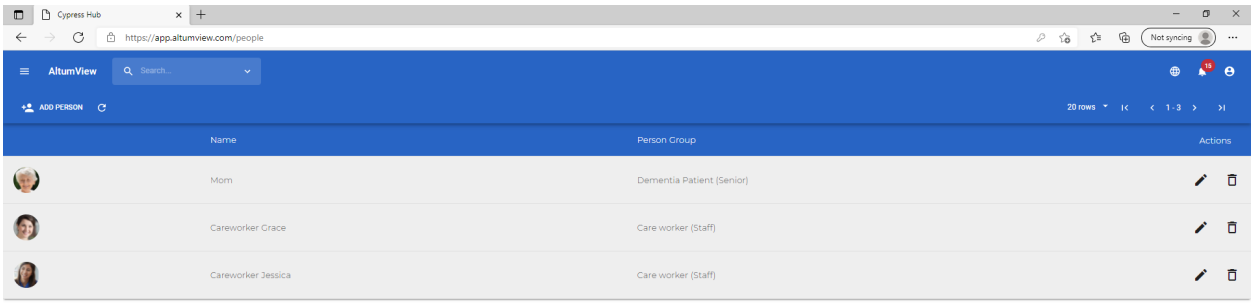
Users can select the language of the page by clicking the globe icon on the top right corner of the page.

Clicking the menu icon in the upper left corner, users can switch to other pages, including People, Alerts, Select Streams, and Visits (the entrance/exit records defined in the Region of Interest page of the Sentinare app), as shown below.

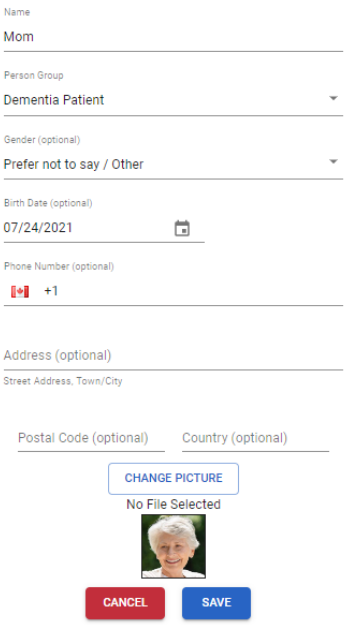


10.2 People

Click on the “People” in the menu will display all the people in the account. The list is the same as that in the Sentinare mobile app.



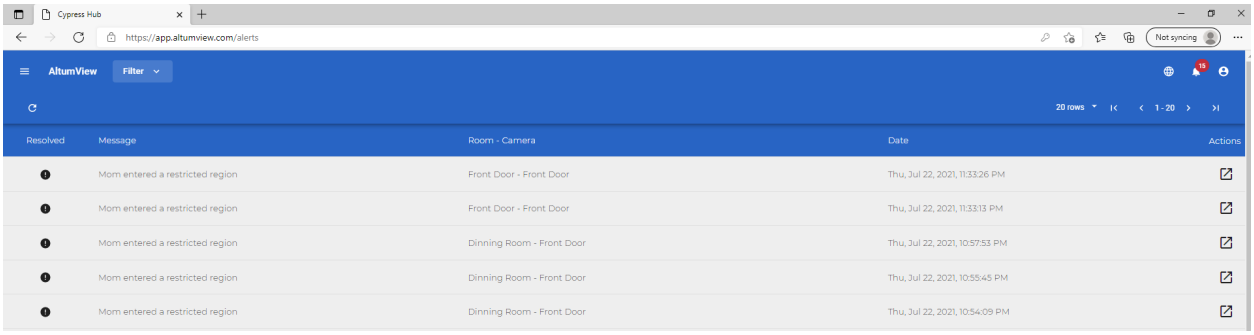
Users can add new person here by clicking “Add Person”. On the popup window, input new person’s name, person group, gender, birth date, phone, and address, then upload one picture, and click “Save” will create a new person. This new person will also appear on the Sentinare mobile app’s “People” list.

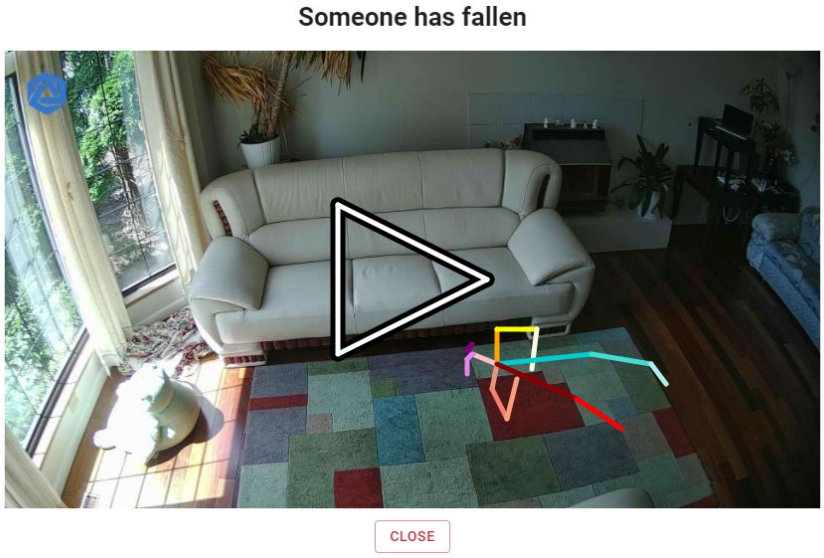


Users can also delete a person in the “People” page by clicking the garbage can icon at the right end of the person’s record. The deleted person will also be deleted from the Sentinare mobile app.

10.3 Alerts

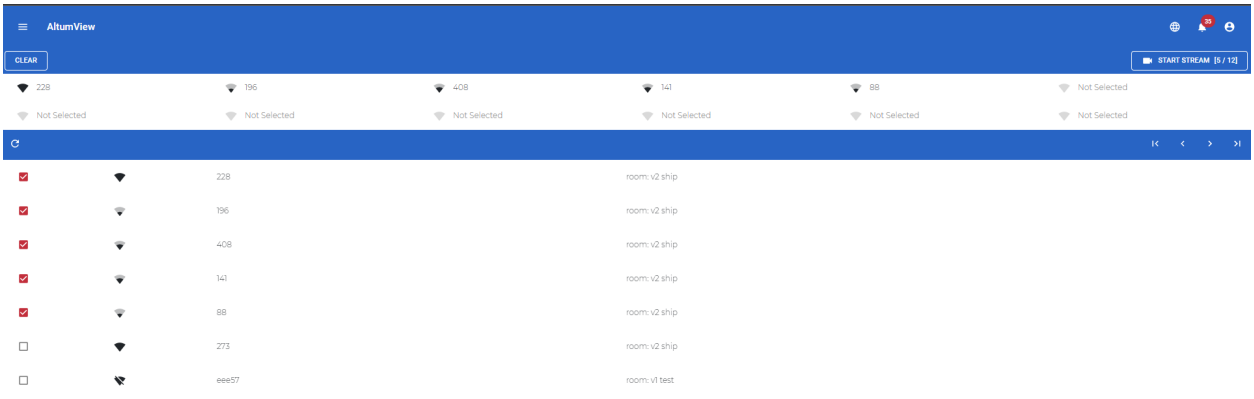
In the menu, click on the “Alert” option, or the bell icon on the top right corner of the web page, all the alerts in the account will be listed. The alert list is the same as that shown in the Sentinare mobile app. Users can use the “filter” button on the top of the page to filter the alerts, or play the alert clip by clicking the icon under the Actions, as shown below.

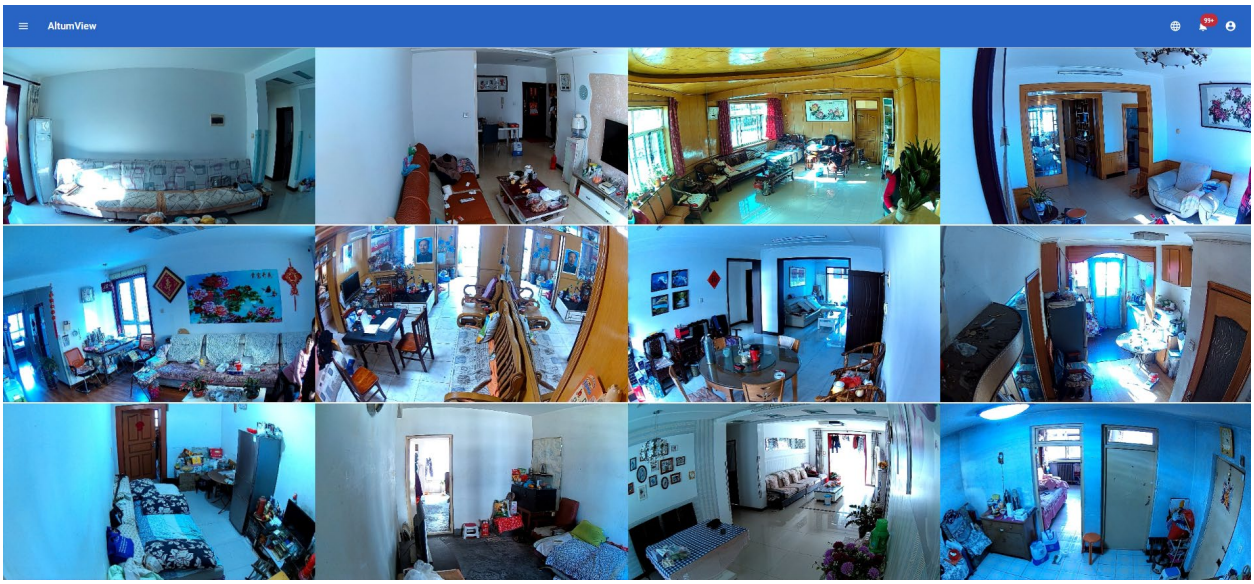




10.4 Select Streams

In the menu, click Select Streams, users can select up to 12 sensors from different Rooms, then click the Start Streams command in the upper right corner. This will display the real-time views from the selected sensors in the same page.





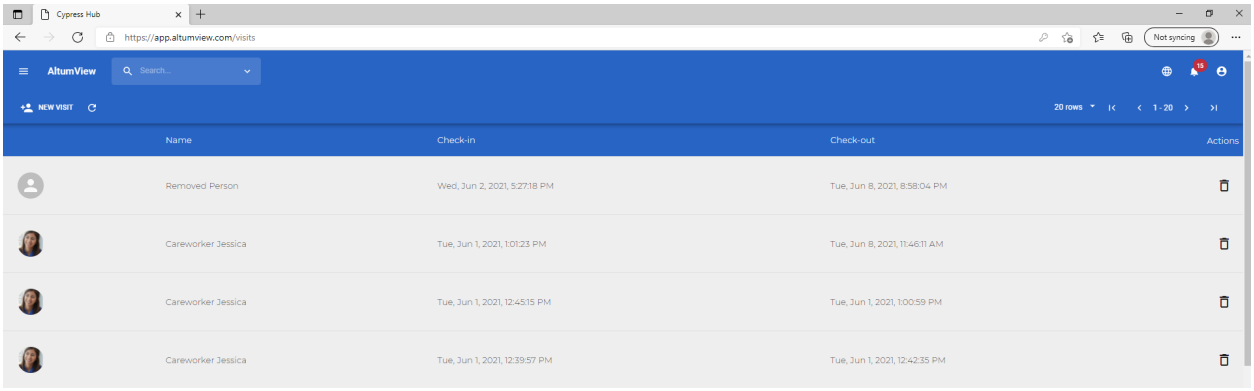
10.5 Visits

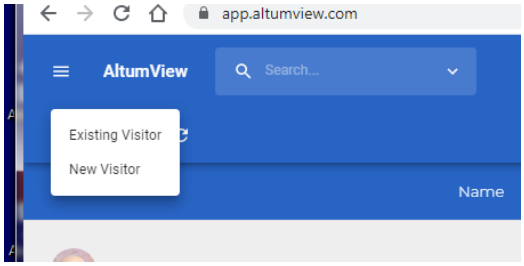
In the menu, click the Visits option will display all the entrance/exit records.

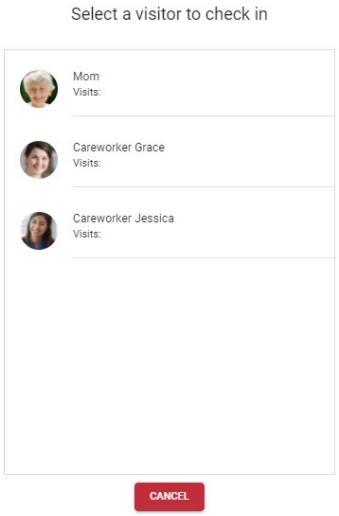
Each entrance/exit record includes a visitor's name, photo, "Check-in" and "Check-out" time.

An entrance/exit record can be generated by sensors for which entrance/exit are defined via the ROI page. If the person's face can be recognized, the check-in and check-out time can be created automatically by the Sentinare sensor. A check-out record can only be created when this person's status is check-in.

Users can also manually create check-in and check-out records. To create a check-in record, user can click on "New Visit" on the top right corner of the page, choose "Existing Visitor" if the person is already in "People" list, click the person on the "Select a Visitor to Check in" list, a new check-in record is created. The check-out time can be manually modified by clicking the "Check-out Now".







If the person is not in the “People” list, click “New Visitor” to create a new person, a new person and this person’s check-in record are created.

User can also delete a record by clicking the garbage can on the right side of the record.

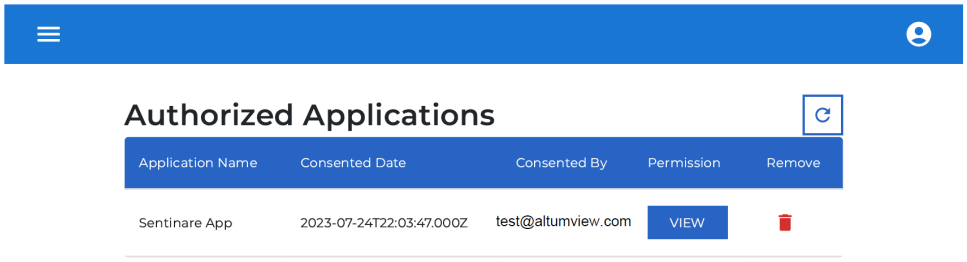
11. API for Third-Party Integration

The Sentinare system provides cloud API for third-party integration. All the data from the Cypress or Sentinare sensor can be retrieved from the API, and integrated into other systems.

To do the integration, you need to first get permission from AltumView by sending an email to contact@altumview.com. After we enable the API integration for your Sentinare account, you can go to one of the following URLs (must include the https part), depending on which server you are using:

- USA: https://accounts.altumview.com
- Canada: https://accounts.altumview.ca
- China: https://accounts.altumview.com.cn

Log in using your Sentinare account, you will see the following page.



Clicking the menu icon in the upper left corner (which is not available if you do not have the API integration permission), you will see the following menu, where you can final the AP FAQ file, as well as detailed OAuth API document and the Cypress/Sentinare API document.

Clicking OAuth 2.0 Credentials in the menu, you will see the following page.

In this page, you can manually create your client credentials using the “Create Grant” button near the top right, which will create your Client ID and Secret. Please keep them for your record.

If you need Sentinare to forward alerts to your system, please click the Setup command under Alert Forwarding. In the next page, please provide your forward alert webhook. The system will generate a RAS Public Key. Please read the Alert Forwarding document and example in this page to learn how to receive alerts.

For the next steps, please follow the instructions and examples in the API FAQ file, which can be found in the menu of the page above.