

Product Test Review

FX – Functional eXperience

AltumView Sentinare 2

Video camera/sensor, single camera package.

The vendor website can be found [here](#).

Full product specifications can be found [here](#).



Product Review Summary

Updated October 2023

Sentinare 2 is a camera-based activity and fall detection sensor. It's primary functionality is to detect when an individual has fallen, and to alert a caregiver via a mobile app, in near-real time. It does so by using artificial intelligence (AI) to detect that the fall has occurred.

The camera has gesture (hand waving) recognition to enable the senior to generate an alert without having a fall take place.

Other functionality includes observing the activity pattern of the individual. These movements are categorized into sitting, standing, lying, and bending. Categories of individuals can be custom created or the default of Senior, Staff, Visitor can be used.

The camera can be set up to detect entry and exit from rooms, or to send alerts when entry, exit or elopement occurs.

A mobile app is used to set up the camera and view alerts, activities, etc. A web app is also available to view alerts, activities, and history.

The individual is represented as a stick figure in the app, as a privacy feature. Multiple individuals can be distinguished if the face recognition feature is set up.

Target Market

The product targets 3 markets:

- 1) The Consumer market - intended for use by the adult child or designated caregiver to monitor the senior for falls and activity.
- 2) The Long Term Care and Retirement Home market - operators can deploy this selectively or community-wide as a technological complement to the care they provide.
- 3) The Home Care market - operators can use this as a technological aid that complements care being provided to seniors in their communities.

Test Results

Overall, the simplicity and functionality of the Sentinare 2 camera (sensor) is quite impressive. At roughly \$250 CAD, this product delivers on fall detection, activity detection, ease of use, privacy, and completeness, at a reasonable price point.

Fall detection worked well enough that it was a valuable feature, with about 80% accuracy. False positives can be marked in the app, helping the machine learning algorithm get better, though we did not experience any.

We were impressed with the system's ability to differentiate between multiple individuals (some configuration required), which we have not seen in other similar products. This enables the camera to be used in settings with multiple occupants, and to see when staff or visitors are present.

False positives increased at the edge of the camera's usable vision, in the last 5-10 degrees of viewing angle.

We also tested this in a busy conference area with >10 people in view, and the fall detection worked occasionally. This would not be a typical use case, but it was positive to see that it worked at all in a crowded room.

Challenges included installation and the form factor.

The installation needs to be user friendly for this product to be ready for broad consumer adoption. Current installation suggests screwing the camera to a surface (door frame, shelf, wall), causing associated damage. Running power to the camera from a standard wall outlet can be difficult due to the height at which the camera must be mounted (2 m) and the typical height of wall outlets (30 cm). A battery powered version would provide a better installation experience, though would also need to meet performance requirements. We solved for these issues by using velcro tape (Gorilla) rather than screws, and a lightweight 1 metre extension chord (works but aesthetically not awesome).

There are some issues with the camera configuration and set up that will prove challenging to most users (manual adjustment of floor area), and they have an important impact on potential accuracy for fall detection. These issues can be overcome with improved app user interface design to facilitate usability.

Commercial Readiness

Retail, and some enterprise customers may dislike the camera form factor as it may seem intrusive for seniors who would feel like they are being watched over. A more discrete housing could be an option (e.g. picture frame) for the consumer market in particular. Also, the activity indicator light should be disabled once deployed.

We believe there may be reasonable product-market fit for cost-sensitive Long Term Care and Retirement Home operators due to the price point, good functionality, and simple deployment and management of the solution. The Sentinare 2 could be installed in each LTC room to provide fall detection and visibility to resident activity levels. The form factor may not be an issue with LTC operators or residents. Challenges will be to tuck away the power cable and any extension that might be needed to avoid creating a hazard, and also managing

each location individually using a generic email (e.g. location123@sampldomain.com).

Operators deploying the Sentinare 2 would need to manage staff and visitor configuration in the system (for face recognition), or forego that altogether if staff churn is too high to make it feasible to maintain and keep current.

AltumView has well documented integrations available through APIs and web hooks, so data from the Sentinare 2 could be integrated into a nurse call system, or other higher order resident management system to minimize the number of apps that staff have to use (context switching).

Potential Product Roadmap

We envision the product roadmap will address some of the challenges noted, and that the device form factor may look more like a motion detector than a camera that can be securely mounted high in the corner of a room on a wall, and wired into building electricity or a wall outlet, preferably while hiding the wiring.

The associated mobile and web apps could be (re)built in a modular fashion to enable toggling of features associated with specific market segments, or tiered paid functionality. In this way the vendor would have to maintain only one software stack while supporting the development of various hardware versions. Optimizing the UI/UX is a required exercise in continuous improvement. Evolution of the AI functionality is expected to make fall detection and activity categorization increasingly accurate.

For the enterprise operator environment, the fleet management functionality would need to be robust and easy to use, which is not the case today for multi-location installations. We would also recommend pre-built integrations with the most common target platforms (e.g. nurse call systems like Notify, Sara, etc) for easy connectivity and data flow. This can all come with time as the product matures.

Review Details

Packaging

The packaging was basic, efficient, intuitive, protective, and professional.

Installation

The camera itself looks similar to an Arlo or Nest camera. The lens is clearly visible so that the front of the camera is obvious.

The instructions recommended a mounting height above floor level of 1.5–2.5 m, or high enough so that the camera has a clear view of the room and floor area. It is very important that it can clearly see the entirety of the floor space for proper operation and fall detection. This will require the camera to be tilted downward.

Mounting the camera requires screw down installation. This means that the wood screws provided need to be screwed into a shelf, wall, or door frame to secure the camera completely. This is not optimal, since it causes associated damage to the surface it is mounted on. This is a significant nuisance since the user will want to move the camera around the room to find the best location for the camera. Creating screw holes necessitates their repair if the camera is moved.

The mounting base provides good rotation, making it easy to adjust the camera angle once the location has been selected and the camera screwed down. The user manual has good instructions and photos for clarity.

The camera needs to be aligned vertically, but can be mounted right-side up or upside-down, which is convenient as the tripod screw is asymmetrically located on the back of the camera body. It is important to take note of the orientation as it will be required when configuring the camera.

The complication with the recommended mounting height of 1.5–2.5 m is that the camera needs to be plugged into an electrical outlet – it is not battery powered. Most electrical outlets are 30–40 cm above floor level per building code, meaning the power chord to the camera has to be 2 m or longer to accommodate for length (vertical & horizontal), and slack to plug it into the back of the camera. The power chord included in the package was too short to make camera mounting at that

height possible. We used a tripod with the camera at 180cm (or 6 feet), with an electrical extension cable.

Recommendation: Include a longer pliable power cable. Also provide a gravity mount option for the camera so it can be placed on a shelf or similar surface without requiring it to be screwed down or an easy to install magmount (like Arlo).

Configuration

Once the camera is powered on, a mobile app is used to configure it. The Sentinare mobile app for iOS, v 2.9.77, was used. Adding a room was easy. Adding a camera (sensor) requires Bluetooth to be enabled to connect to the camera. This was straight forward to do. The workflow in the app guides the user to proper installation, and orientation, such as vertically straight up versus tilted sideways, though we noticed that the images showed the LED on top, which is referred to as an upside-down installation.

Recommendation: Change the install photo in the app to show the camera with the LED at the bottom, so that the user understands this is a right-side up orientation, and since the next screen asks the user to confirm right-side up or upside down orientation. The current sequence in the app is confusing.

Connecting the camera to WiFi was straight forward.

Once a camera is added, it goes through a calibration during which it essentially detects what it sees in the room, specifically it needs to identify the floor area correctly (the accuracy of this will affect fall detection accuracy). The floor area is shown in green on a small portion of the smartphone screen. We found the accuracy of auto-determining floor area was quite good, but we did have to make some manual adjustments - for example it showed a part of a sofa that it considered floor.

Making these adjustments to the floor area in the app requires some degree of user familiarity with how these systems work. We expect this would be confusing and challenging for the average user, as it requires "erasing" the incorrectly identified areas (like the sofa), using your finger, on a small part of the screen on your phone. This is prone to over-erasing, or error in general, and can be exceedingly frustrating for the user. We had to restart the process a few times to get the floor area identified accurately.

Recommendation: Since identifying the floor area is an important component of the configuration and resulting identification of falls, the UI should be rethought for the erasing/painting part, to make it easier to complete with higher accuracy. Perhaps a simple fix is to make it possible to erase/paint in landscape orientation.

A region of interest, such as a doorway, can also be identified, similar to how the floor area is modified, though in this case the user would “paint” using their finger, adding the green area (rather than erasing it). A similar recommendation would apply for this step of the process for better user experience.

Overall Functionality

Privacy

Each person moving through the space is redacted to a stick figure representation to accommodate privacy concerns. The rendering of this on the screen is good. There is also an option to set a privacy mode for the room rendering which can be used.

Fall Detection

In our testing, we found this to be accurate about 80% of the time, which is a good result. We received some false positives: at the edge of the camera’s vision (last 5-10 degrees), and sometimes the camera would detect someone lying on the ground intentionally (e.g. stretching, yoga). We also found that some falls were not correctly identified, depending on the speed and initial starting point of the fall sequence.

The camera captures a video of each fall that is detected, rendering the person to a stick figure, which can be reviewed by caregivers.

Alerts were received within 20 seconds or less. We attempted to normalize for fall simulations, using several candidates with different heights and body proportions. We tested fall detection with the delay setting to “off”, so that the alert is sent without delay. When implemented, it is likely better to set the delay to “on”, so that the camera confirms the fall over a longer sample time to reduce possible false positives.

We did not test with animals or small children to assess how the system interprets them, though we do not foresee this being an issue.

Multiple People

Within the app, people that might move through the space can be grouped into seniors, staff, visitors, and custom groups. This grouping is used in conjunction with setting the region of interest and combining it with groups for alerts and actions.

One of the features that is highly valued and unique is the ability to accurately identify different people moving through the space. It does require taking 4 photos of each individual at different facial angles to enable face recognition, but it was easy to do in the app. Once this is done, each person is identified by a name label above their stick figure representation as they move through the space. Enabling this functionality provides activity and entry/exit analytics for each individual.

Hand Waving Detection

This feature worked well at the “high” sensitivity setting, though intermittently on other settings. It did not generate any false positives during our test cycle. Alerts were received within a few seconds, and the arm waving duration required was about 5 seconds. This is a useful feature to enable an alert to be triggered without a fall.

Two-way Communication

In this new hardware, this worked and the audio from the camera has been significantly improved.

Region of Interest Detection

Though this was set up in the app, we did not monitor it for correct detection. The vendor’s materials suggested 2 cameras be used to accurately detect separate entrance and exit points. There is also a setting for restricted regions that can be set to “detect anyone”, which uses body detection, whereas the other settings use face detection (which would need to be set up for this to work properly).

Activity Tracking

The system appeared to track activities correctly for each individual, and categorize them appropriately, though more extensive testing would be required over a longer period of time with a larger sample population to assess this feature properly.

Fall Risk Assessment

The documentation in the user manual explains how the fall risk score is derived using two well known methods: the Morse Fall Scale, and the Timed Up and Go gait analysis. It is a thoughtful inclusion of functionality, adding an extra clinically oriented element that uses a questionnaire for the MFS, supplemented by the camera detecting and scoring the TUG portion.

The in-app guide is very useful and provided a scored result, with a level of severity indicated, though we are unable to confirm accuracy, which would need to be tested over time.

Integration with Alexa

This was not tested as it is only available in the US currently, but would be an interesting and useful feature, as described in the documentation.

Documentation & Videos

The user manual (found [here](#)) is comprehensive and includes helpful photos. It also sets expectations around good performance of the system (section 1.1.2), which generally suggests the individual be within 4.5 m from the camera.

The vendor has some helpful videos available on their YouTube channel, [here](#).

Mobile App & Web App

Generally the mobile app (for iOS) works well, has a good user interface, and provides a good user experience. The issues we found have been mentioned elsewhere in this review, and could aid in ease of use. Click depth could be optimized, as well as the click journey. It seems like the app has been built from the perspective of the vendor, whereas it could be optimized more based on how it is used in the real-world, using in-app metrics. Perhaps this is something to revisit once there is a large enough base of regular users.

The web app is intended for a higher level (i.e. enterprise) view though with the ability to look at individual details. The UX is basic and parallels the layout of the mobile app. More work is required on the web app to make it more valuable. For now it seems sparsely utilitarian in its implementation. It does not easily support multi-site deployments.

Extensibility

Well documented integrations such as OAuth 2.0, APIs, and web hooks are available through the web app/portal, making it fairly straight forward to integrate data from this system into a nurse call system or other higher order resident management or care app.

This documentation also helps to make the system developer friendly, whereby new functionality, such as proximity detection between individuals, could be developed by a 3rd party.

Purchase Options

The vendor has their own website where the product or bundles can be purchased in \$USD. The vendor's order page can be found [here](#). We noticed at publication that the vendor does not sell the Sentinare 2 on their webpage anymore, only their newer product, the Sentinare 3, which has rectangular form factor.

The vendor also has a store on the Amazon.ca marketplace where the product or bundles can be purchased in \$CAD. The Amazon marketplace site can be found [here](#). The vendor does still sell the Sentinare 2 on Amazon.

Our purchase was made through the vendor's website directly and arrived within a few business days.

Potential enterprise customer would need to contact the vendor directly. We have found the vendor to be very responsive.

If you would like to learn more about the Sentinare camera sensor, we would be happy to address any questions you may have. Feel free to contact us at info@agetechlabs.ca.

If you are ready to purchase a Sentinare camera sensor, we can point you in the right direction. Feel free to reach out to us at info@agetechlabs.ca.

Product Specifications

These specifications were obtained from the vendor's website (found [here](#)).

Sentinare 2:

- CPU: Rockchip RV1126
- DRAM: 2GB
- eMMC Storage: 8GB
- Wi-Fi: 2.4G/5GHz
- Bluetooth
- Image Sensor: 1080p
- View Angle: 120° diagonal
- Built-in microphone and speaker
- Power: 5W
- Power Adapter: Input: 100-240V, 50/60 HZ, 0.4A. Output: 5V, 2A, 1.5-meter 20 AWG micro USB cable
- Mobile device requirements: iOS 12.0 or later; Android 7.0 or later
- Indoor use only
- Pan/Tilt: No
- Sensor Size: 75 x 65 x 50 mm
- Sensor Weight: 110 g
- Packaging Net Weight: 280 g
- Packaging Gross Weight: 400 g
- Packaging Size: 11.3 x 8 x 16.3 cm
- Included in each box: One Sentinare 2 sensor, stand with mounting screws, power adapter, micro USB cable, ball head, quick start guide
- 1 Year Limited Manufacturer Warranty
- iOS mobile app version 2.9.77

Document History

We periodically update the information in this review. This is a quick view of what's been updated and when.

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| Original release | Mar 1, 2023 | Full FX review. |
| Update | May 16, 2023 | Charging & Battery; Analytics; |
| Retesting of updated hardware & software | August 18, 2023 | Hardware: model AV-G2-IWF5 Software: mobile app v 2.9.77 (prodca) |

- Some Things to Keep in Mind

We hope you find our reviews helpful and instructive, and we do our very best to ensure they continue to provide value for both operators and vendors.

Here are some key points to keep in mind:

- **We aim to be suitably comprehensive in our testing.** Our testing aims to get a representative view of the product's function and performance, and to test the vendor's specific claims, in the real-world. The testing is not exhaustive, meaning that we do not test an infinite number of times, and we do not test every use case permutation. We aim to test the majority of use cases or permutations we believe would be of highest value to operators, so it is possible we did not test for your use case. If you cannot find something you are looking for, please reach out to us at info@agetechlabs.ca.
- **We aim to be impartial in our testing and reviews.** We follow an adapted scientific method (reference [here](#)) so that our testing is structured and has grounding in science and applied engineering. However, we are human, and that means we bring our biases, likes, and dislikes to this process. Following the scientific method is meant to limit the impact of those on our testing and reviews, but sometimes our enthusiasm (or the opposite), may come through in our reviews.
- **We aim to provide a representative view of product function and performance.** Our testing and reviews do not guarantee performance or function of the product. Our goal is to provide a representative view of the how the product works, its areas of strength, and its limitations, as we see them. However, this does not guarantee how the product might work for you or your use case.
- **We are product agnostic.** We aim to provide an operator-centric, "how it works in the real-world" view of product functionality and performance, so in alignment with our impartiality, we are not product promoters. *Our testing and review of a product is not an endorsement in any way.* We do this work so operators can make more informed decisions of their own, and so vendors can receive some candid feedback to evolve their product.