ALT Viewer for iOS app

User Guide (Version 0.1)

ALT Viewer app and Structure Sensor (also referred to as "Sensor" below) can turn your iPad or iPhone into a very sensitive motion detector capable of detecting the tiniest movements of your body associated with your respiration and heartbeats.

Note that ALT Viewer app turns the light emitter of the Structure Sensor and starts acquiring data when ALT Viewer app starts!

ALT Viewer app demonstrates a data plot having two curves on it (Figure 1).
The first, blue curve, follows your respiration: an inhale lifts the curve up, and an exhale brings it back down. The second, red curve, on the plot follows your heartbeats: a heartbeat causes it to go up and then down, creating a "peak" on the plot.

As shown in Figure 1, there were one inhale/exhale respiration cycles and seven heartbeats captured in the data shown on the plot. The respiration cycle is indicated by the blue square bracket located above it, and several of the heartbeats are indicated by the red arrows.
Duration of the time axis (horizontal "X-axis") of the plot is currently fixed at 12 seconds.
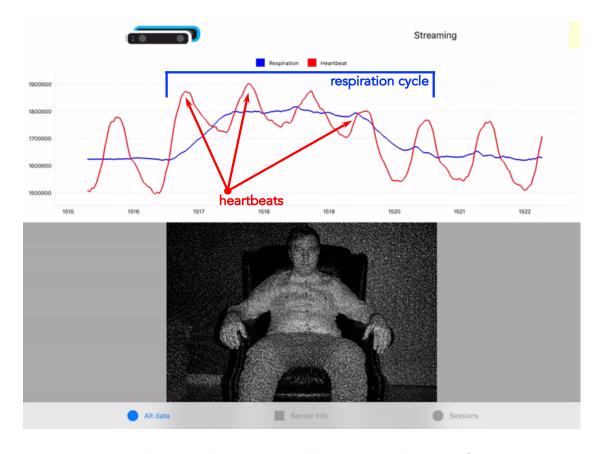

Figure 1. Distance between the Sensor and the person is about 4.5 ft (1.4 meters).

To use the ALT Viewer app after installing it on your iPad and connecting the Structure Sensor gadget to it, you will first and foremost need to secure the iPad with the Structure Sensor attached to it on an iPad holder / stand / mount / docking station.

You will not get any meaningful results if you hold the iPad in your hand!

ALT Viewer app and Structure Sensor turn iPad into a very sensitive motion detector which will detect its own movements too. It will also detect movements of the people and objects around you if they get into the Sensor's camera field of view. If you place the iPad or Sensor on a shaky base which is prone to vibrations caused by you or by people or by something else around you, you will likely see those vibrations on the plot instead of your heartbeats and respiration.

The small yellow rectangle in the top right corner of the app (Figure 1) changes its transparency depending on the level of the iPad's vibrations and/or motion: the lower the level the more transparent the rectangle becomes. Normally, when there are no significant iPad movements or vibrations, you might observe slight transparency variations of the rectangle when you pay attention to it. If you notice that the rectangle becomes opaque (even for short periods of time) and if, at the same time, you cannot see a clear picture of your heartbeats and respiration cycles on the plot, that likely means that you need to find a steadier base to put your iPad and Structure Sensor on.

When you want to observe someone's heartbeats, that person should remain calm and relaxed, which is the same request they would hear when getting their ECG done at a hospital.

To observe someone's heartbeats and respiration, start by placing the iPad and Structure Sensor at 4-5 feet (1.2 - 1.5 meters) from that person. Video under the data plot in the app shows video stream captured by the infrared (IR) camera of the Sensor (Figure 1). Use this video to position your iPad and Sensor such that the person whose heartbeats and respiration you want to observe is in the view of the Sensor's IR camera (Figure 1).

There is no need to point Sensor's camera to any particular area of the person's body. The technology behind the ALT Viewer app does not require Sensor's camera to see one's face or any other area of skin. The technology works when a person is completely covered by a very thick blanket or wears very loose-fitting clothes. Check that yourself, it is quite a lot of fun! Because ALT Viewer app uses IR camera of the Sensor, the app can be used both during daytime and during nighttime.

Because there is an optical filter in front of the IR camera in the Sensor, the video can be relatively dark, especially if the person you are observing is it at a relatively large distance from the Sensor. If that is the case, you can activate the "High gain" mode of the Sensor's IR camera by going to the "Sensor info" tab in the app and clicking on the "High gain" toggle. We recommend that you use this "High gain" setting to position your iPad/Sensor system only and that you then switch it off.

Distance between the Sensor and the person you are observing will affect the data you see on the plot. If you put iPad with the Sensor attached to it too close to the person you are observing, the amplitude of the heartbeats signal ("peaks" on the red curve) will be too small during respiration cycles for you to see, as shown in Figure 2. The person was at approximately 2.7 feet (0.8 meters) from

the Sensor when the data shown in Figure 2 were collected. To get heartbeats signal having bigger amplitude during inhale/exhale cycles, try moving the Sensor to a larger distance from the person. Figure 1 shows data obtained when the sensor was moved away from the person to approximately 4.5 feet (1.4 meters).

Figure 2. Distance between the Sensor and the person is about 2.7 ft (0.8 meters).

If you want to observe you own heartbeats and respiration, you would have to be a little bit creative at this point because the Sensor's mounting bracket, when attached to an iPad, puts the Sensor on the back side of the iPad so the Sensor's camera faces away from you when the iPad's screen faces you. Let us know which solutions to observe your own heartbeats and respiration you come up with, we would really appreciate that!

If, despite all your efforts, you are not able to get good data which show clear heartbeats and respiration signals, please let us know!
Send us an email to support@lvetechnologies.com
We will try to figure out what is going on and help you.

Troubleshooting tips:

If the person you are observing (or yourself, if you are tracking your own pulse and respiration) stay relaxed but the plot does not follow their (or your) heartbeats and respiration (see Figures 1 and 2 above) and instead shows some signal variations which are irregular in their duration and/or

amplitude, try moving the Sensor from its position by about 0.5' – 1' (15 – 30 cm) either closer to you or away from you.