# Using STRUCTURE sensor

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I summarize what I did for using the STRUCTURE sensor.

## 1. Hardware setup

First, let me explain hardware setup. I had the following devices:

- 9.7-inch iPad Pro & Power adapter for iPad Pro
- STRUCTURE sensor & Power adapter for STRUCTURE sensor & Lightning cable (for connecting the STRUCTURE sensor with the iPad Pro)
- STRUCTURE sensor bracket (for installing the STRUCTURE sensor on the iPad Pro)

Then, I did the following things:

1) I combined the STRUCTURE sensor with the bracket. I combined them by tightening four screws at the back of the STRUCTURE sensor.
2) Then, I installed the STRUCTURE sensor-combined bracket on the iPad Pro.
3) Finally, I connected the STRUCTURE sensor with the iPad Pro using a lightning cable.

* Note that iPad Pro and STRUCTURE sensor have each internal battery. Before using the devices, each device is needed to be charged using each power adapter.
* In the bracket, there is a subsidiary power button that helps you to press a real power button in the iPad Pro. However, I found that this subsidiary power button often does not work.

## 2. Software setup

After the hardware setup above, I just installed the following several apps through App Store. All the following apps are provided by the occipital (STRUCTURE sensor maker).

| Type | Name of App |
|---|---|
| Basic Viewer | ***Structure*** : Shows images in 3 modes (IR / Depth / Depth + Color) |
| | ***Viewer*** : Shows images in 3 modes (RGB / Depth / Surface normal) |
| Calibration | ***Calibrator*** : Does calibration between iPad camera and STRUCTURE sensor IR camera |
| 3D Scanner | ***Scanner*** : Does a 3D scan of objects (supposedly on a plane), and shows scanning results in 3 modes (X-ray view / Shaded view / Color view). |
| Indoor Mapping | ***Room Capture*** : Does indoor mapping, showing immediately green meshes. It also provides hole filling, and shows results in 2 modes (Top view / X-ray view). |
| | ***CANVAS*** : Does indoor mapping, showing immediately gray surfaces. |
| Augmented Realty | ***Fetch*** : Provides an augmented reality game. The game starts after simple scanning of the environment. |

* The ***Scanner***, ***Room Capture***, ***CANVAS*** apps provide a menu for sending scanning results through email. After transferring the results to our PC, we can process the results using applications such as CloudCompare, MeshLab.

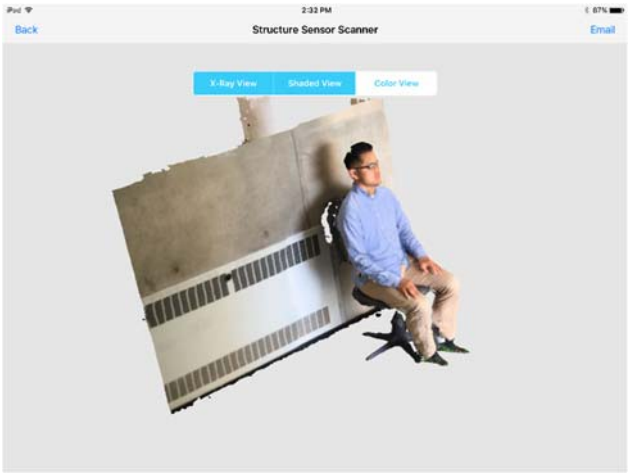
All the apps are intuitive and easy to use. Just pressing a few buttons are all we need to run the app. Rather than text-based description, I think the following videos will greatly help you to understand about the STRUCTURE sensor and related apps. I highly recommend you to see the videos:

- Structure Sensor 3D Scanner Unboxing and Augmented Reality Tests
  https://youtu.be/f7wTrLUERHE

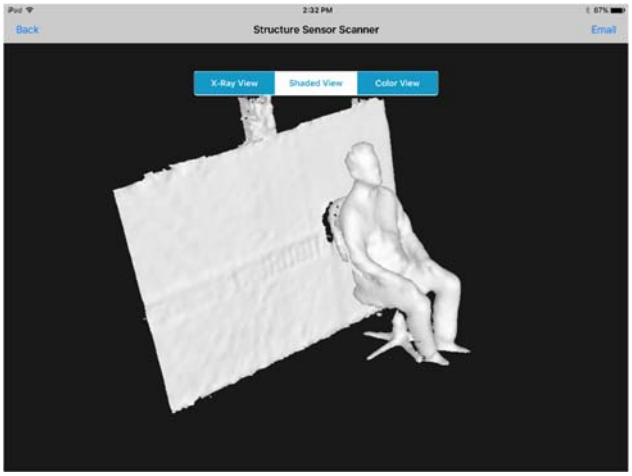
- 3D scanner - Structure Sensor unboxing and first use
  https://youtu.be/anhO9ZBX_7A

- Structure Sensor Tutorial: Viewer and Scanner Demo Apps
  https://youtu.be/nFyT2q8f_i4

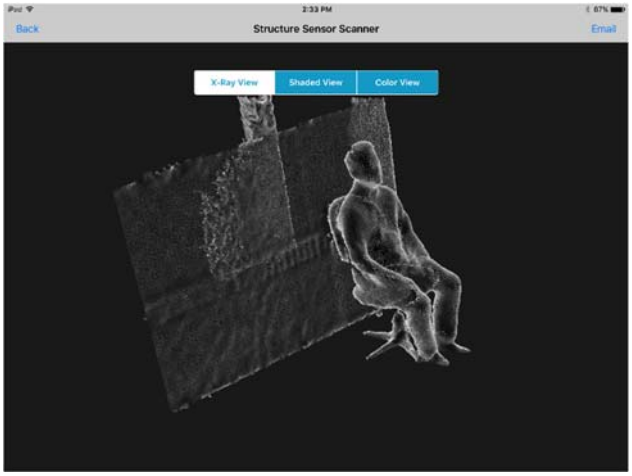
I am also attaching some results using the above apps. These three figures are scanning results from the app ***Scanner***. Thanks to Mr. Kunwoo Park. Mr. Park helped the scanning of my sitting body. He is a first-time user of the device. He immediately learned how to use this app.




Color View

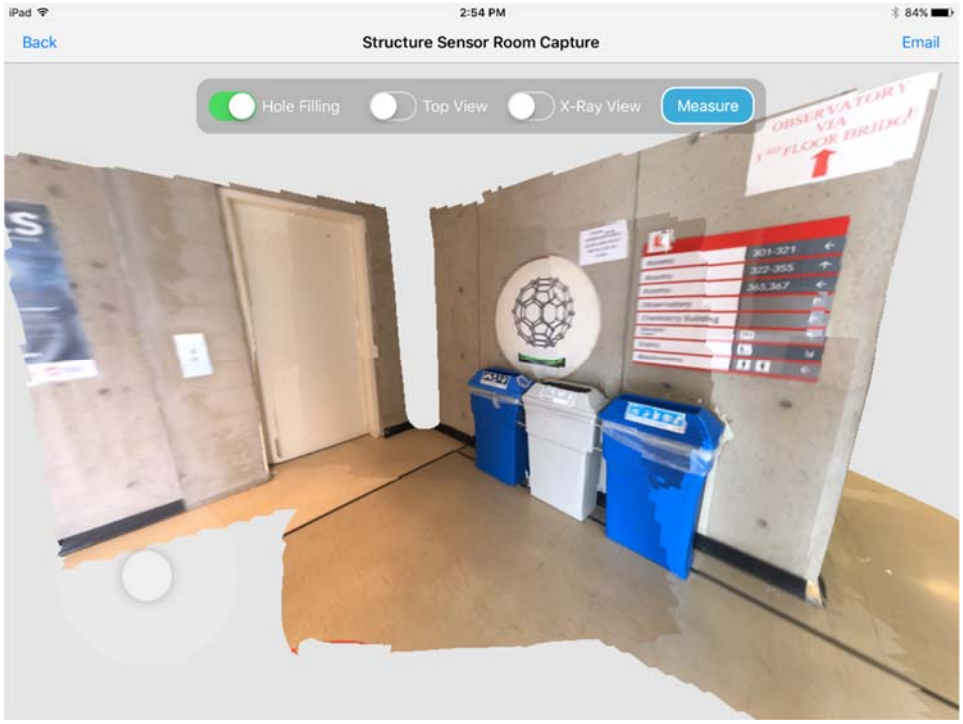



Shaded View




X-Ray View

These two figures are the indoor mapping results. One is from ***Room Capture***, the other is from ***CANVAS***. I scanned the place around an elevator on the third floor, Petrie Building.




Result from the app ***Room Capture***


Result from the app ***CANVAS***