

Exercise 1: Use ArcGIS Dashboards to share imagery results

 How can I print an exercise to PDF format?

Introduction

Imagery can be used in many ArcGIS applications.

In ArcGIS Online, you can add imagery layers to web maps to provide context and guide various workflows. Results that are derived from imagery analysis can also be shared to and used in various web maps and apps. In a previous section, you used ArcGIS Image for ArcGIS Online to detect buildings using a deep learning package. You conducted the analysis and viewed the results in a web map; however, there are other methods that you can use to explore and share your imagery. One method is to review and share the data in ArcGIS Dashboards. A dashboard is a powerful tool that allows you to configure various elements—such as maps, lists, charts, gauges, indicators, and tables—in a way that enables quick and efficient data review.

Scenario

Imagine that you are a GIS lead for the city of Athens, Texas, and you asked your team to create a dashboard to review the results of a deep learning building footprint detection analysis. You know that a layer must be added and saved to a web map in order to be displayed in a dashboard. You explain to the team that a web map with the building footprints as well as some contextual elements will need to be created first to help you understand the results. You will review the building footprints in the dashboard and rely on your understanding of imagery in ArcGIS to propose recommendations on the next steps to detect all the building footprints.

This exercise provides a simplified starting point for what is often a much more in-depth workflow. The data and parameters that are used in this exercise are not intended to be a comprehensive list of what might be required for this type of analysis.

Note: The exercises in this course include View Result links. Click these links to confirm that your results match what is expected.

Estimated completion time in minutes: 30 minutes

 Expand all steps ▾

 Collapse all steps ▲

- Step 1: View the dashboard

In this step, you will view the dashboard that includes the detected building footprints.

- a In a web browser, go to www.arcgis.com and sign in using your MOOC credentials.
- b At the top of the page, to the left of your profile icon, click the Search button , and then type **building dashboard owner:esritrainingsvc** and press Enter.
- c On the left side, under Filters, turn off the Only Search In Imagery In Action option, if necessary.
- d Locate the Review Of Building Footprint Results Detected Through Deep Learning item, and then click View Dashboard.



[Step 1d***: View the dashboard.](#)

Note: The figures that are listed in your dashboard may be slightly different from the preceding graphic, depending on your screen size.

You can also click the name of the dashboard to view its item page.

The dashboard displays a web map the NAIP imagery layer that was used to extract building footprints. It also includes the feature layer containing the extracted building footprints. The feature layer serves as the source of the data displayed in the indicator elements on the left side of the dashboard.

- Step 2: Explore the dashboard

In this step, you will explore the dashboard to consider how well the deep learning package detected the buildings. The web map in the dashboard can be interactively modified during the review process.

- In the upper-right corner of the map, click the Legend button to open the legend.

Legend X

All buildings detected

Confidence

- > 90 - 99.9
- > 80.4 - 90
- 70 - 80.4

Natural color imagery

- Red: band_1
- Green: band_2
- Blue: band_3

Color infrared imagery

- Red: band4
- Green: band_1
- Blue: band_2

[Step 2a***: Explore the dashboard.](#)



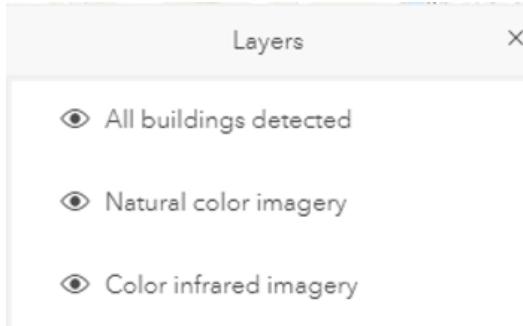
Which layer types have been added to the web map?

- Answer

A feature layer containing the building footprints and two imagery layers have been added.

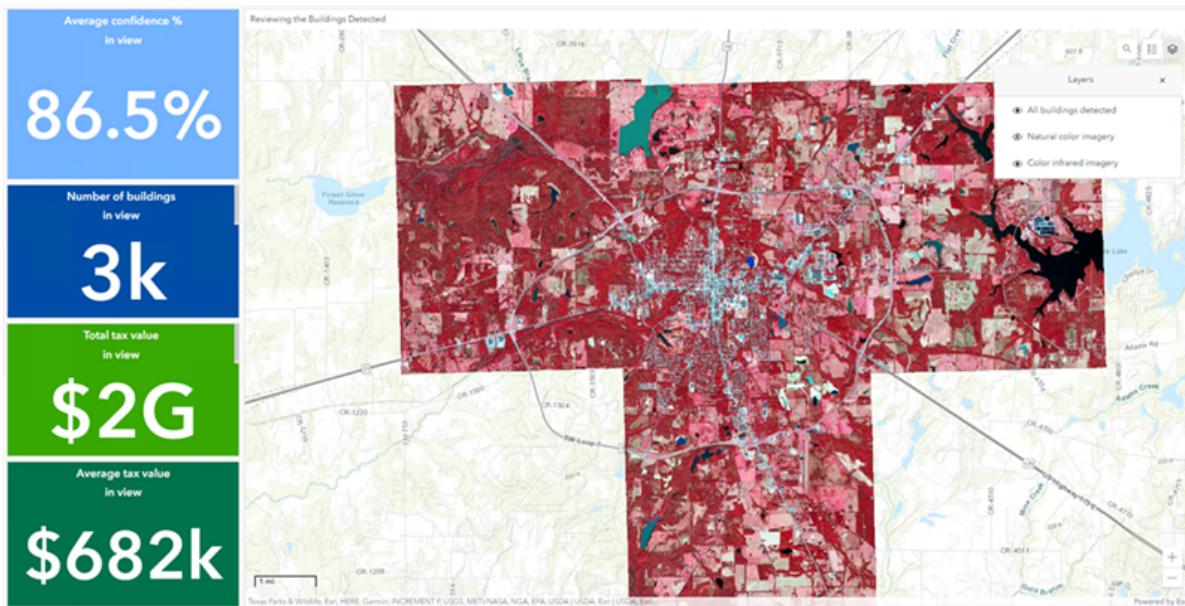
The map element usually contains the data that will be the focus of the rest of the elements in the dashboard. Therefore, it is important to review the data included in the map element to understand the data that is populating the elements.

- b Next to the Legend button, click the Layers button  to show the list of available layers.



*Step 2b***: Explore the dashboard.*

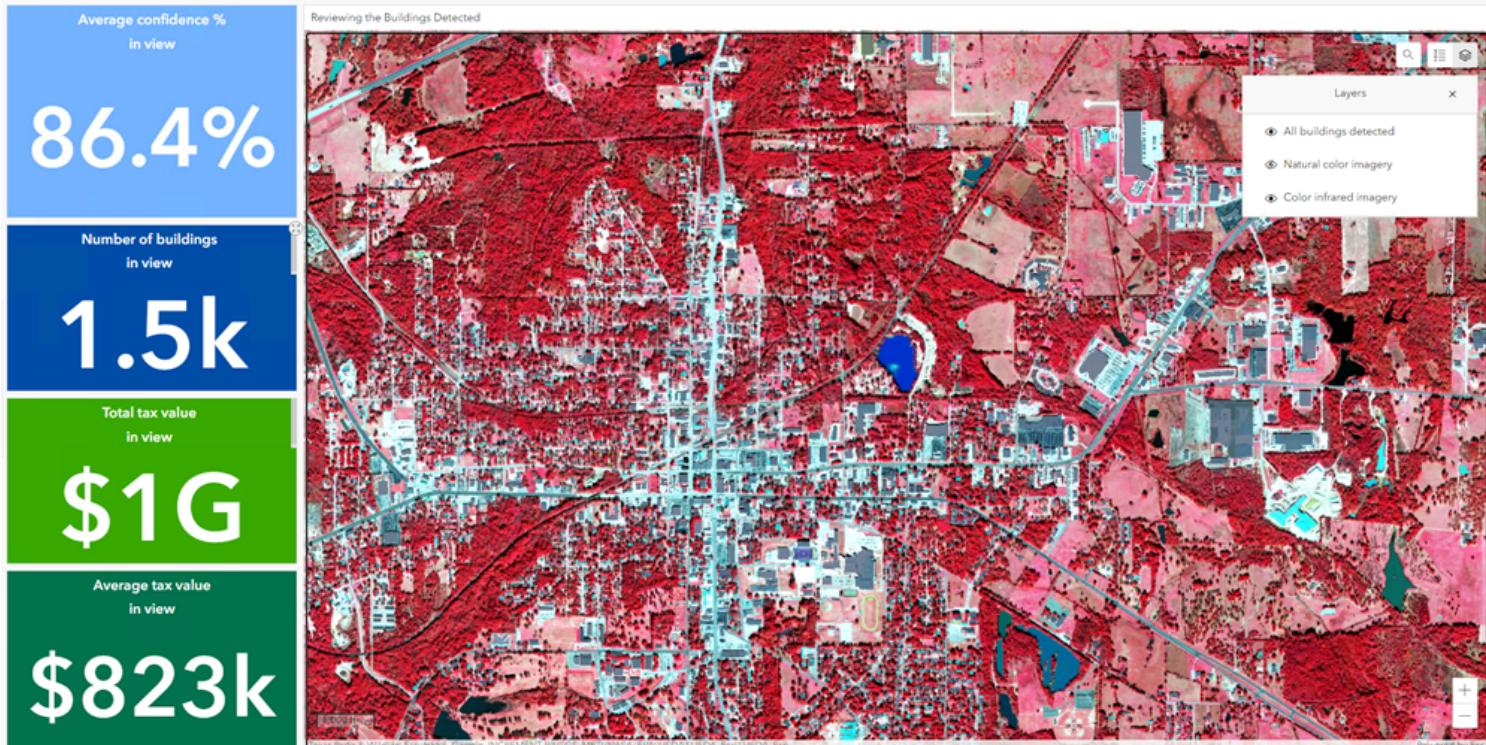
- c In the Layers window, to the left of Natural Color Imagery, click the Visibility button  to make the layer invisible.



*Step 2c***: Explore the dashboard.*

The Color Infrared Imagery layer is now visible for you to use when reviewing the building footprints. It is the same NAIP layer as the Natural Color Imagery layer, but it is displayed with a different raster band combination.

- d Zoom in near the lake in the middle of the map.



*Step 2d***: Explore the dashboard.*

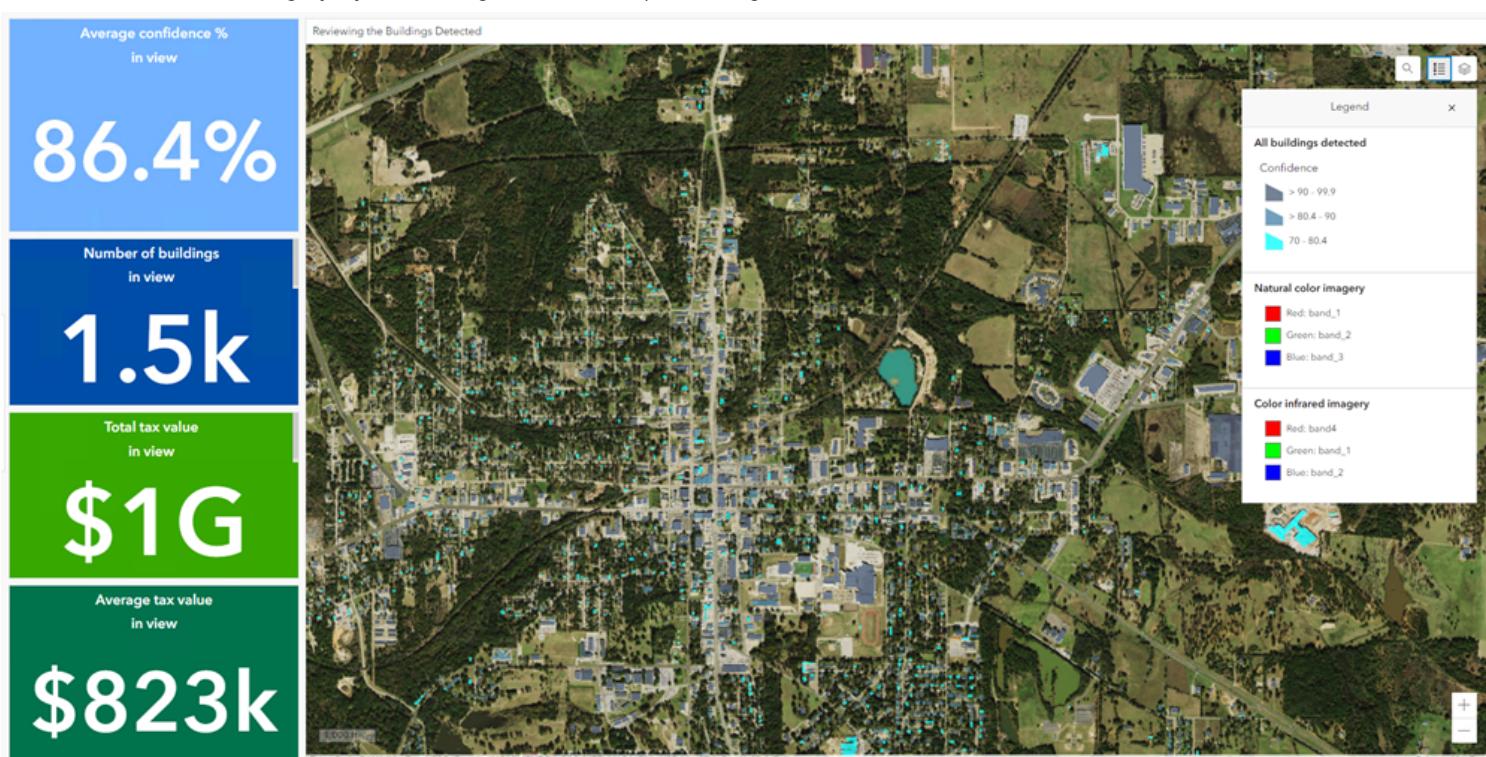
? What happened to the elements on the left side of the dashboard?

- Answer

The values all changed in each of the elements. Note that the values change based on how far that you zoom in.

The elements in the dashboard have been designed to react to spatial extent changes in the map and update accordingly.

- e Make the Natural Color Imagery layer visible again, and then open the legend.



*Step 2e***: Explore the dashboard.*

? Which attribute is being used to symbolize the detected buildings?

- Answer

The Confidence attribute is being used to symbolize the building footprints.

The colors of the detected buildings layer reveal some information about the confidence value reported during the deep learning detection.

- f Zoom in to the map and click one of the building polygons.

In the pop-up window, you will see three pop-up pages that are associated with the layers in the map. For each building footprint, you will see the pixel values of the two imagery layers in the web map. By clicking through the pop-up pages that are associated with the imagery layers, you can see the pixel values at the location that is selected in the map.

In addition to the pixel values, the pop-up reports the building number, confidence value, and the calculated tax value.

Note: The tax value was generated by a simple calculation of the area within each polygon, multiplied by a value to simulate the price per square foot. These values are fictitious and should not be used other than to demonstrate the capabilities of the dashboard.

- g Near the upper-right corner of the pop-up, click the arrows to review the information on each page.

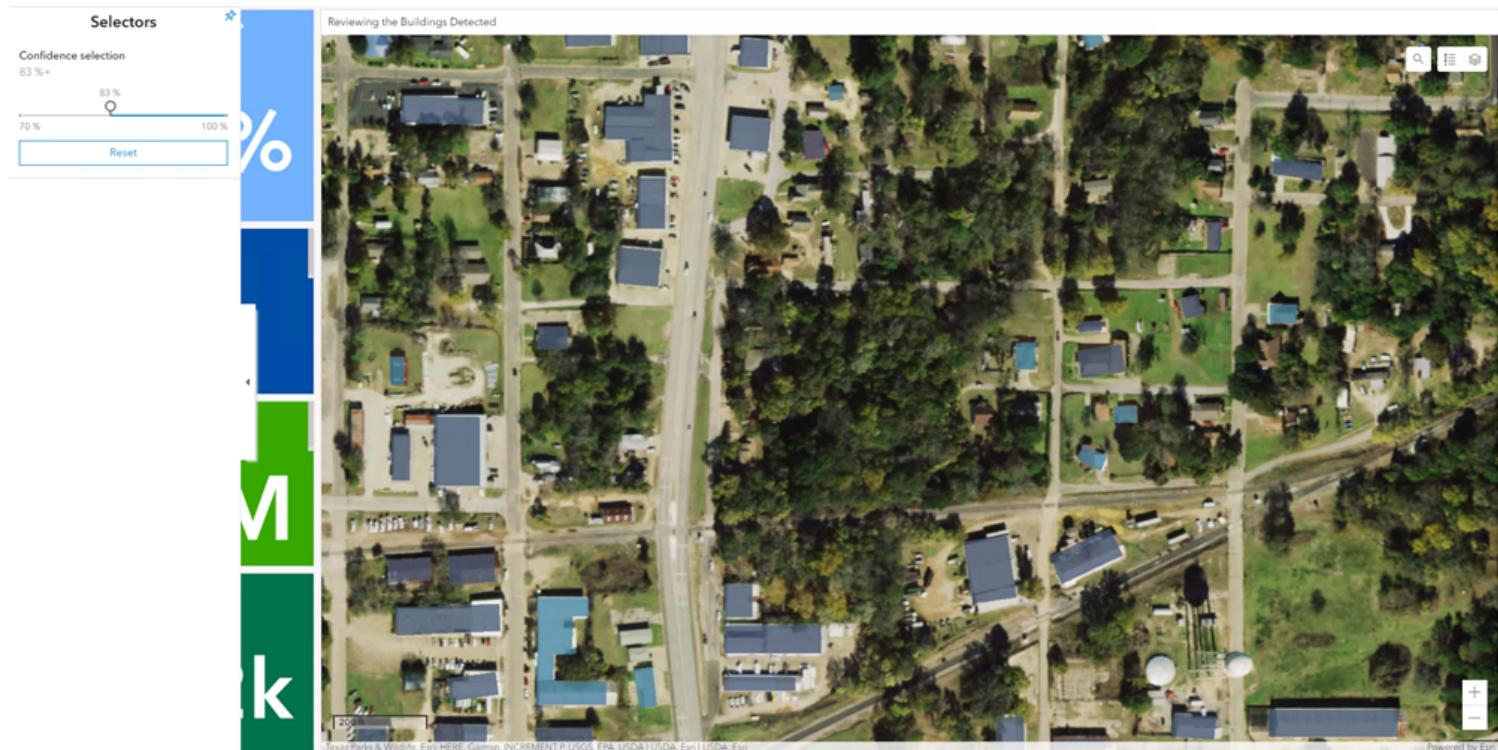
- h Close the pop-up and legend.

- i On the left side of the dashboard, next to the elements, notice the arrow in the sliding panel, as indicated in the following graphic.



- j Click the arrow in the minimized panel to expand the Selectors panel.

- k At the top of the Selectors panel, drag the slider bar to the right.



?

How does the map change?

- Answer

Only the building footprints with a higher confidence value remain in the map.

The buildings in this feature layer were extracted by setting a 70 percent minimum confidence threshold. With the selector, you can dynamically reveal which buildings were detected within a certain confidence range above the 70 percent threshold.

I Adjust the slider to different values and notice how the footprints change, zooming out in the map, if necessary.

m When you are finished, in the Selectors panel, click Reset, and then collapse the Selectors panel.

- Hint

Click the arrow in the middle of the right edge of the Selectors panel.

In this step, you used a dashboard to review characteristics about the detected building footprints.

- Step 3: Review the building footprints

You will now more closely review the building footprints throughout the city.

- a Zoom and pan throughout the map to review the building footprints in each of the three confidence classes.
- b Turn the visibility of the All Buildings Detected layer and the Natural Color Imagery layer on and off to get a better look at the buildings.
- c Take note of any characteristics about the buildings that were detected and the buildings that were not detected.

Some of the themes could include the following characteristics:

- Are missing buildings covered by other features?
- Which roof color is missed more often?
- Which roof color is always detected?

?

What are your observations about the missing buildings?

- Answer

Some buildings appear to be partially covered by trees. Others have varied roof forms in one building.

Due to various factors, some buildings may not have been detected.

?

What are your observations about the buildings classified with a confidence value between 70 percent and 80 percent?

- Answer

Some buildings appear to be less obscured by trees as the missing buildings or have pixel values spectrally similar to the roads in the imagery layer.

?

What are your observations about the buildings classified with a confidence value between 80 percent and 90 percent?

- Answer

Some buildings appear to be in irregular shapes but have the desired spectral similarities as the other buildings.

The differences that you notice here may not be as obvious, but they are still important to consider. Gathering details about what is causing the lower confidence values will allow you to configure the deep learning algorithm more effectively.

?

What are your observations about the buildings classified with a confidence value between 90 percent and 100 percent?

- Answer

Some of these buildings are clearly visible in the imagery layer and are easily recognizable.

The building footprints detected with the deep learning package represent a good start to the process of mapping all the buildings in the city. Buildings have been missed, but many have been found.

- d If you would like to continue working with the dashboard, continue to the stretch goal; otherwise, close the web browser.

- Step 4: Stretch goal (optional)

If you would like to further review the detected building footprints, you can perform the following tasks.

1. Identify the next step in refining the building footprint detection.

Note: In a real-world project, additional steps would be necessary.

- a Based on your experience with imagery in ArcGIS over the course of this MOOC, determine the next steps that would you take to identify more buildings.
- b Use the Lesson Forum to post your questions and answers and be sure to include the #stretch hashtag in the posting title.

2. Add additional elements to the dashboard to help review the data more effectively.

Note: To add additional elements to the dashboard, first make a copy of the dashboard by performing the following steps:

1. View the dashboard in a web browser.
2. In the web browser address bar, click between `https://<your organization>.maps.arcgis.com/apps/dashboards/` and the number/letter sequence, and then type `new#id=` without any spaces before or after it, as indicated in the following graphic.

`https://mooc20.maps.arcgis.com/apps/dashboards/new#id=577e45fb43ef43b6aa4e62b59a4fc072`

3. Press Enter.
4. On the Create New Dashboard page, for Title, add your initials to the existing title.
5. At the bottom of the page, click Create Dashboard.

You will now be able to edit the new copy of the dashboard. You can add elements or alter the way that the current ones are configured.

- Modify the dashboard in a way that will aid your review.

For more information about ArcGIS Dashboards, go to ArcGIS Dashboards Help: Create a dashboard.

- c Use the Lesson Forum to post your questions and be sure to include the #stretch hashtag in the posting title.

- Step 5: Conclusion

Thank you for participating in this MOOC. There are numerous opportunities to use various ArcGIS apps and tools to visualize and analyze imagery, including those which you learned about in this MOOC. These exercises are an introduction to working with imagery in ArcGIS and should help you better understand how to use ArcGIS to gain insight into and answer questions about your data.