

Image Analysis for ArcGIS FAQs¹



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How Do I Generalize an Image Classification?

Use Image Analysis and Spatial Analyst to generalize a classification. Once a classification has been completed it is often desirable to smooth or filter the classified layer to produce a more generalized classification—a preliminary step before converting to a vector format. This document describes how to use ArcMap to generalize a classification.

What You Will Need and Other Assumptions

- Classified thematic image
- The generalization process consists of a window of a given size (typically 3 x 3 pixels) that moves across the classified image and performs an analysis of the pixels in the window. The RegionGroup procedure identifies contiguous groups of pixels of the same class, and the nibble function *eliminates* groups of pixels that do not meet a minimum size criterion—the class values of eliminated pixel groups are replaced by class values of surrounding larger pixel groups.

Overview of Steps

1. Smooth the image using Image Analysis.
2. Complete the generalization process the image in Spatial Analyst using the Raster Calculator.
3. Inspect the results.

Step-by-Step Example

1. Start ArcMap from your Desktop, or on the Windows Taskbar click **Start | Programs | ArcGIS | ArcMap**. Ensure the Image Analysis and Spatial Analyst extensions are visible. If not, from ArcMap's main menu select: 1) **Tools | Extensions** and enable **Image Analysis** and **Spatial Analyst**; and 2) **View | Toolbars** and enable **Image Analysis** and **Spatial Analyst**.
2. Select the **Add Data** button and add a thematic (classified) image to the data frame.
3. From the Image Analysis toolbar select **Image Analysis | GIS Analysis | Neighborhood**. Specify the **Input** and **Output Images**, set the **Neighborhood Function** to **Majority**, the **Matrix Size** to **3 x 3**, and ensure that the **Neighborhood Shape** is **Rectangle**. Select **OK**.
4. Inspect the results from your smoothed image. *Note: the smoothed image should look more generalized than your input thematic file. Using a **Matrix Size** of **5 x 5** would produce an even more generalized result.*
5. From the Spatial Analyst toolbar, select **Spatial Analyst | Raster Calculator**.
6. The next step is to run a RegionGroup analysis on the smoothed image. In the formula area, type the **Output Image Filename** followed by an **Equals Sign** (ensure you put spaces between operators). Next, type **regiongroup**, then place a **parenthesis** in the expression, **Double-click** on

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the **Smoothed Image Filename** from the **Layers** list, and then place an **end parenthesis**. The expression should look something like this: **ClumpImage = regiongroup([SmoothImage.img])**. Click **Evaluate**.

7. From the Spatial Analyst toolbar, select **Spatial Analyst | Raster Calculator**.
8. Now you will select regions that *you do not wish to eliminate*. In the formula area, develop this equation: **IdentifyClumpImage = select([ClumpImage], 'count ge 10')**. Click **Evaluate**. *Note: this expression indicates that you will select all regions greater than or equal to 10 pixels—our minimum mapping unit for this example. Always specify an appropriate minimum mapping unit for your project.*
9. From the Spatial Analyst toolbar, select **Spatial Analyst | Raster Calculator**.
10. The last task is to eliminate regions less than 10 pixels. In the formula area, develop this expression: **EliminateImage = nibble([SmoothImage.img], [IdentifyClumpImage])**. Click **Evaluate**. *Note: when you evaluate an expression using the raster calculator, the result is produced in a GRID format even if the input image is an Imagine (.img) file. If you wish to convert from a GRID back to an .img file, use **ArcCatalog**, navigate to and **Right-click** on your final GRID, select **Export | Raster to a Different Format**, and change the **Save As Type** to **ERDAS Imagine**.*
11. Inspect the results (*Hint: compare your EliminateImage with your SmoothImage—the process should have eliminated small regions less than 10 pixels in size and replaced them with neighboring class values*).

*Note: the ArcInfo Help (found by selecting **Start | Programs | ArcGIS | ArcInfo Workstation | ArcDoc**) is the best source for help with developing expressions using the Raster Calculator.*