Introduction

Introduces the basic components of Spatial Modeler and demonstrates how to build and execute a model.

Software

- ERDAS IMAGINE

Data

- qb_05_cherokee_pan.img – Panchromatic image
- qb_05_cherokee_ms.img – Multispectral image

Transcript

0:09

Thank you for watching Creating a Spatial Model in ERDAS IMAGINE by Hexagon Geospatial eTraining. In this module you will be introduced to the Spatial Modeler, understand its basic components, and finally, build and execute a model.

The Spatial Modeler allows you to build a flow chart that contains operators strung together logically to produce output results. Real-time previews and visual indicators allow you to inspect the model as it runs, easily find and correct errors, and see the results before running the model.

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The Spatial Modeler has three main parts:

- Objects,
- Operators, and
- Connections.

Objects define the items that are acted upon or created in the model. Operators are the actions that are done to the objects. Connections tie everything together and define the flow of the model.

Objects and operators have ports that are used to define input and output values including connections to and from other operators. The number of ports seen on an object will be different if the object is used as an input object or as an output object.

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Red ports let us know that there are arguments that are not yet defined and either need a connection or a value associated to it.

If the port is gray, it’s either defined with a suitable value, or the port is used to define an optional value.
The model you’ll create today will use two input raster objects along with a matrix. You’ll run a convolution operator to create a custom pansharpened image. Before running the model, you’ll preview the results by adding a preview object to the model. Finally, we’ll run the model and generate an output image.

1. To get started, we have ERDAS IMAGINE open with two Viewers showing the QuickBird Satellite imagery that we’ll use as the inputs to our model.

   In Viewer 1, you have the higher resolution panchromatic image and in Viewer 2 you have the corresponding multispectral image. The model we will build will take these two images as inputs, and create a pansharpened output image that contains the high resolution of the panchromatic, with the band information from multispectral image.

2. Zoom in to show the difference between the images.

   As you zoom in and view finer detail, it’s easy to see the spatial resolution and band differences between the two images.

Now let’s open the Spatial Modeler and build our model.

3. For now, clear the other Viewers.

4. From the Toolbox tab, select Spatial Model Editor.

   You can see we now have a Spatial Model Editor window for building our model. Also, a new tab, Spatial Modeler, has been added along the ribbon providing tools to use as we build our model.

On the far left we see the Contents pane specific to the Spatial Modeler and on the far right we see an Operators pane. This pane gives me quick access to all predefined operators available when building a model.

To start building our model we’ll first need to add an Input Raster operator.

5. From the Operators pane, expand the Input category > Raster and drag Raster Input into the viewer.

6. Double clicking on the operator opens the Properties box.

7. For our first input raster, add qb_05_cherokee_pan.img, ensure the Interpolation is set to Bilinear, and set Read As to Float.

8. Then click OK.

   Once you click OK, the ports turn grey and a label has been assigned based on my defined criteria.
Next we'll add a matrix.


10. Double click the Operator to open and define the properties.

11. For this matrix, click From Library and select the default 7x7 Low Pass, click OK, and OK to the Matrix dialog.

Next we need to add a Convolve operator. We can use the keyword search in the Operators pane to easily find it.

12. In the text window, I'll type C-O-N. As you type, the filter is applied and you quickly see the operator you're looking for.

13. Select it and drag it to the Modeler window.

14. Clear your search by clicking the X in the upper right corner.

Now you'll connect the Inputs to the operator.

15. First, connect the RasterOut port to the RasterIn port on the Convolve operator.

16. Drag the RasterOut port and drop it onto the RasterIn of the Convolution operator.

17. Do the same with the Matrix port to the Kernel port.

Now you'll add another operator.

18. Expand the Math and Trig category, scroll down and add Divide to the model.

19. Connect the Output port from Raster Input to Input Port 1 and RasterOut from the Convolve operator to Input2.

20. Now add the last Raster Input operator and double click to open the properties and define it.

21. Add qb_05_cherokee_ms.img as the input image, set the Interpolation to Bilinear Interpolation and Read As to Float and click OK.

22. Now add a Multiply operator from the Math and Trig group.

23. You can connect the output from Divide and the RasterOut port from Raster Input 2 object.

Next let's generate a preview.

24. From the Output operators, expand View and add Preview to the model.

25. Connect the Output port from Multiply to the Preview object.

26. From the Execute group on the Spatial Model tab, click the Preview button. This runs the model, opens a preview Viewer and loads a preview of the output image.
The model can be resized to the extent of the smaller model window. You can also see green checkmarks on each object and operator indicating that the model has not encountered any syntax errors and is able to run properly each step of the way.

If there were any syntax issues with the model, a red X would appear instead of a green checkmark. This allows you to see specifically where the model has run into an error and allows you to open that operator directly and fix it.

We can use the zoom tools to take a closer look at the preview results. We started this model with a 7x7 matrix. We can make changes to the model using the matrix properties box and view the on-the-fly results in the preview window.

27. First select the Matrix object to activate the Properties box.
28. Change the KernelName to 3x3 and see the results update in the preview window.
29. Next, change 5x5 and again see the change. This is a great way to modify input values and view the results before running the model.
30. For this model, return it to the original 7x7 matrix.
31. You’re done with the preview window so go ahead and close it.

On the Spatial Modeler tab, you can use the Fit to Frame button along with your mouse wheel to resize the model to the Viewer. Now you can add the final Output object.

32. From the Output category, expand Raster and choose Raster Output.
33. Attach the RasterOut from the Multiply operator to the Raster Output object.
34. Define an output file name – in this case resmerge.img, set the Data Type to Float 64 bit, and the File Type to Continuous and click OK.

Before running the model, you’ll set the Processing Properties. There are several tabs in this dialog box with many different processing options.

35. For this model, set the Cell Size Rule to Minimum of all Inputs in Model.
36. Select Specify and define the corner coordinates used to define the subset boundary for the output image.

In this model, we will use the default options for the Projection, Area of Interest, and Operator tabs. These can all be modified based on the needs of your specific model and output criteria.

37. Once everything is defined, click OK to the Processing Properties.

Now save the model by selecting File > Save As > Save Model As, give the model a name and click OK.
Now you’ll run the model.

38. From the **Execute** group, click **Run**.

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The checkmarks indicate the model is running properly without syntax errors. In the lower right, I can see a status bar showing the model is running. I also see the Raster Output object showing the status of the image being processed.

39. Once the indicator shows 100%, close the model.

40. Open a new 2D Viewer and load your results. Here is **resmerge.img** image.

Notice that it has been subset based on the corner coordinates that were defined in the model.

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Thank you for watching this eTraining module from Hexagon Geospatial. For more eTraining please visit hexagongeospatial.com/eTraining.