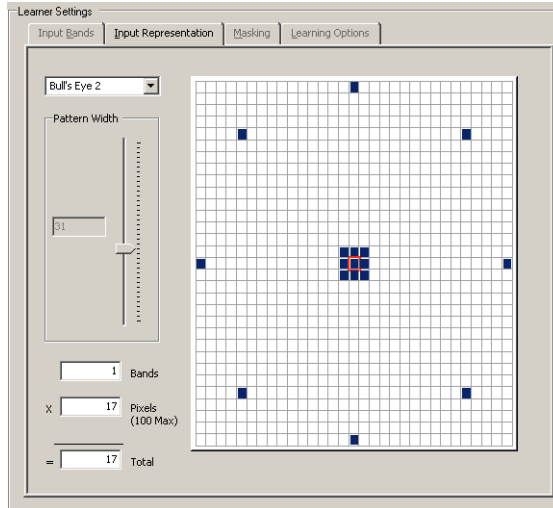


# SPECTRAL CONTEXT

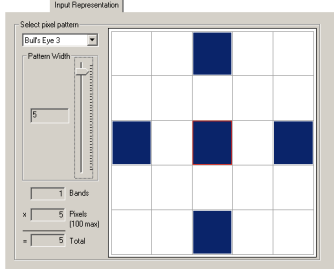
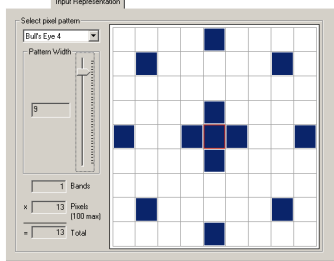
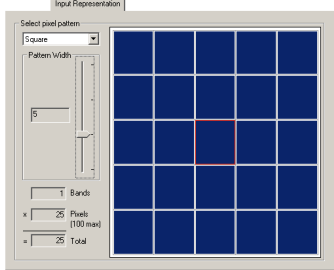
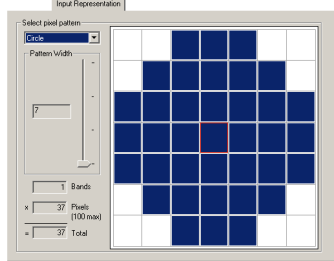
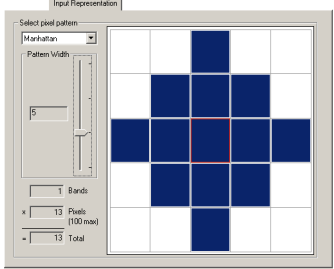
Input Representation provides spectral context in the learning process. Input Representation is the pattern that Feature Analyst uses to classify each pixel in your image to determine if it is in the target feature class you are looking for.

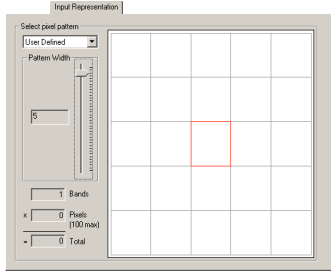
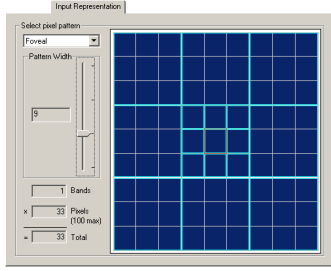
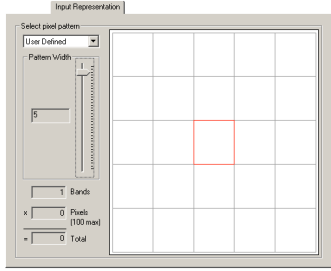


To get the best possible return, select a pattern that resembles the feature you looking for or a pattern that will give you the best search pattern. For example, if you are looking for buildings, try a squarish pattern, to pick up the roof top edges. There are eight pre-defined input patterns plus two user-defined options.

Each Pattern has a pre-determined number of available pattern widths. Select a width that will best assist in classifying your target features. Each illustration below is shown with a pattern width between 5 and 9.

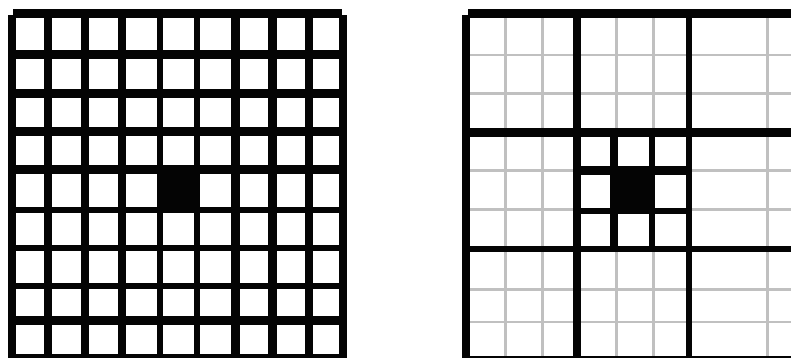
<b>Input Representation</b>	
<b>Bull's Eye 1</b>	
<b>Bull's Eye 2</b>	

<b>Bull's Eye 3</b>	
<b>Bull's Eye 4</b>	
<b>Square</b>	
<b>Circle</b>	
<b>Manhattan</b>	

<p><b>User Defined</b></p>	
<p><b>Foveal</b></p>	
<p><b>User-defined Foveal</b></p>	

**Notes:** The User-defined and User-defined Foveal allow you to create your own input patterns for extracting target features.

Visual Learning System’s patent-pending foveal vision filtering mimics the visual process of most biological species, including humans. With a foveal representation, a learning algorithm is given a region of the image with high spatial resolution at the center (where the prediction is being made) and lower spatial resolution away from the center. This representation provides contextual spatial information to the learning algorithm while not overwhelming it when it is making a decision.



**Traditional Representation Foveal Representation**

In the Foveal image above the representation provides only 17 inputs to the learner when considering a 9x9 pixel region. Each outer 3x3 region gives the average of the 9 pixels as one input to the learning algorithm. We can widen the range of foveal vision

by making the next outer layer an average of a 9x9 region and so on. Thus a 27x27 region would provide only 25 inputs to the learner. Concentrating on the center pixels while taking into account the average of outer pixels represents a great strength.