# Spatial Filters

Enhancement, Texture, Noise Reduction, Radar

The raster spatial filtering process (Interpret / Raster / Filter / Spatial) has been augmented for version 5.5 of TNTmips with the addition of a number of new spatial filters designed for image enhancement, noise reduction, radar image noise reduction, and texture analysis. The interface window has also been redeisgned to provide access to the greatly increased number of filters while reducing the overall window size.
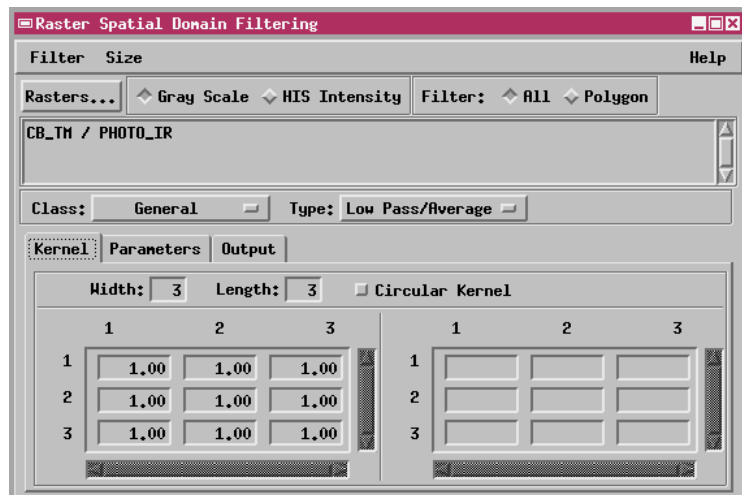
Enhancement Filters

The filters in the Enhancement class are designed to enhance the appearance of images, primarily by sharpening edges, corners, and line detail. Several of the new enhancement filters also incorporate a noise-reduction component.
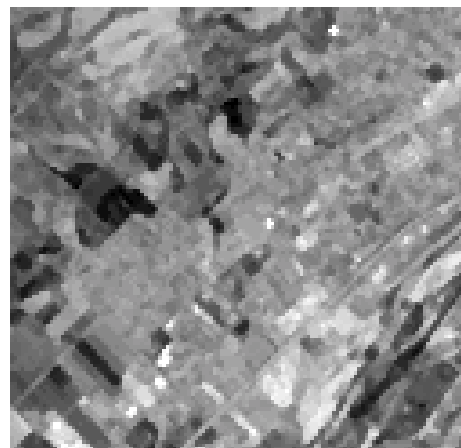
Input Image

Result of 3 x 3 Volterra/Unsharp filter

Result of 3 x 3 WMMR-MED filter

Texture Filters

The filters in the Texture class that reveal elements of the texture of the original image. The output images might be used as the basis for further image analysis, such as segmentation and analysis of shapes in the image.
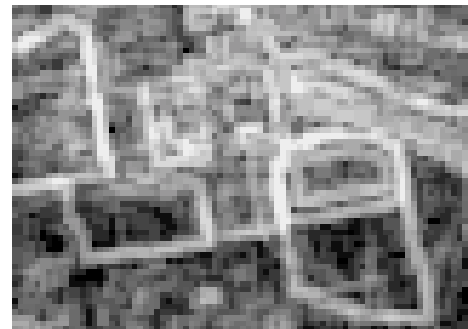
Input Image

Result of 3 x 3 Teager filter
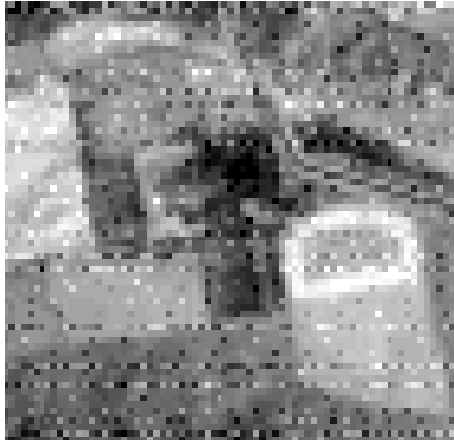
Result of 3 x 3 Range filter

Noise Reduction Filters

The filters in the Noise Reduction class are designed to remove extreme or outlier values from image areas that should have relatively uniform values. These outlier values are often the result of additive "noise" imposed on the image by the acquisition system.
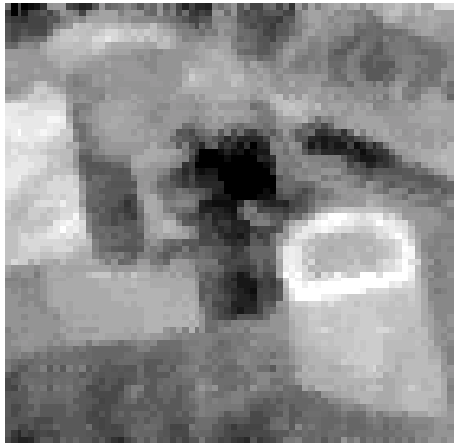
Original Image

With noise added

Result of 3 x 3 Olympic filter

Result of 7 x 7 MLM filter

Result of 5 x 5 P-Median filter

Result of 5 x 5 AMPM filter

Radar Filters

Radar images have a distinctly grainy appearance that results from a characteristic image noise known as speckle. The new filters in the Radar class incorporate standard statistical models of radar speckle, and are adaptive, varying the local filter parameters spatially on the basis of the local statistical properties of the image.

Input Radar Image

Result of 3 x 3 Frost filter