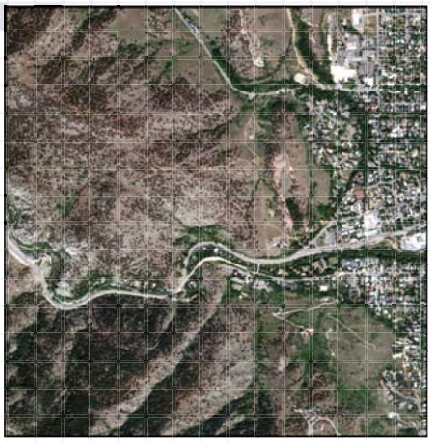
Genie Pro® Version 2.4

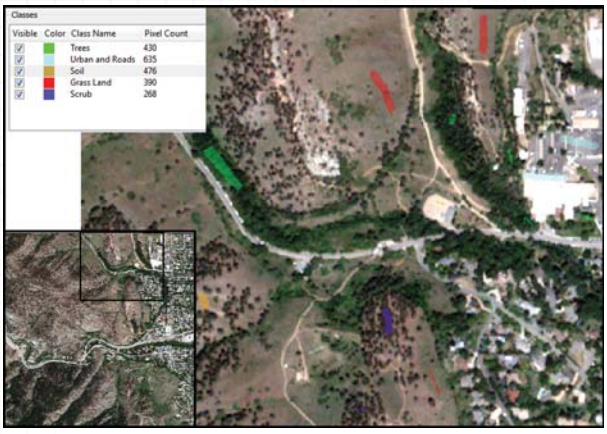
Easy to Use Automatic Feature Extraction for Multispectral, Hyperspectral, Panchromatic, and Other Imagery.

STEP 1: Load Image



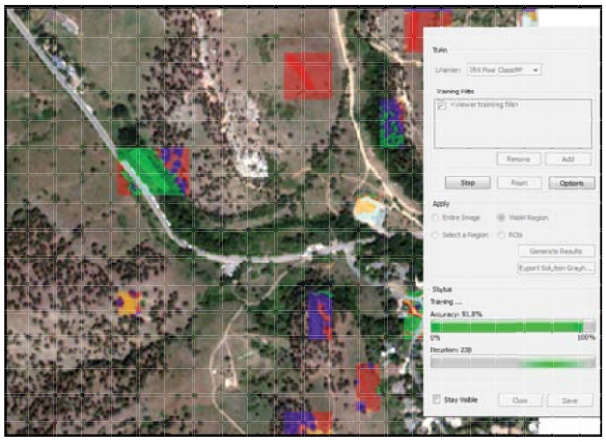
Above: *A Quickbird image of an area around Boulder, CO. Used with permission from DigitalGlobe.*

STEP 2: User Marks-Up Image



Above: *A portion of the marked-up image using 5 land-cover classes.*

STEP 3: Genie Pro® Trains Itself

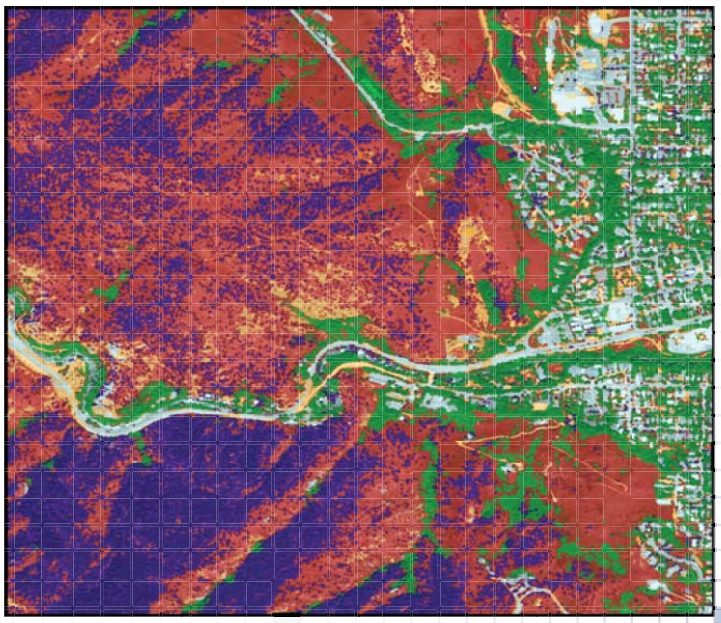


Above: *The image being trained for classification.*

Genie Pro® is an easy to use tool that uses techniques from statistical machine learning and evolutionary computation theory to perform robust and customized automatic feature extraction in multispectral, hyperspectral, panchromatic, and multi-instrument fused imagery.

All you need to do is "tell" Genie Pro® what you are looking for by "coloring" over small parts of the image. It is so simple, almost anyone can be taught to use Genie Pro® in minutes! During its training cycle, Genie Pro® builds algorithms from basic image processing building blocks, such as color detectors, edge detectors, texture analyzers, and shape filters. Genie Pro® begins its programming by building a few algorithms and testing them against your "colored-in" pixels. If an algorithm does not work well, it is eliminated. Surviving algorithms are then modified to create new ones. Genie Pro® loops through this process hundreds or thousands of times in a matter of minutes, keeping you informed of its progress by telling you how well it did on your examples. You can stop it at any time to see how it is doing and possibly adjust your training set. When you are done, you can view, manipulate and save the resulting algorithm and use it to analyze other images. You can also adjust the results or convert them to vectors. You can perform image search, image classification and image object detection using Genie Pro®. And, with our new command-line utility, you can run batch training or batch solutions on large sets of images. No programming skills are required. It's almost like having your own image processing scientist and programmer at your beck and call!

STEP 4: Genie Pro Produces Land-cover Image



Above: *The final product shows the updated map produced within a few minutes by Genie Pro®.*

Genie Pro®

Features

- An easy to use Graphical User Interface (GUI) for providing training data and inspecting results
- A supervised statistical classifier that uses training data and results to determine the decision rules for extracting the feature(s) of interest
- An adaptive spectral/textural image processing stage for learning the attributes of pixels containing the feature of interest
- An adaptive morphological image processing stage for automatic result refinement
- User control over the learning algorithm from basic to advanced levels
- An adaptive thresholding algorithm that produces a raster map of the feature(s) of interest
- A vectorization algorithm designed to smoothly delineate raster regions containing the features of interest
- Support for most common imagery formats

New for Version 2.4

Vertical Object Detection - Genie Pro can ingest anglular information such as an "up-angle" and "shadow angle". This allows the solution to "understand" collection geometry phenomenology and help identify things that stand above the terrain.

Additional Image Processing Operators – Along with new oriented operators, Genie Pro now boasts four new spectral operators and six new spatial operators.

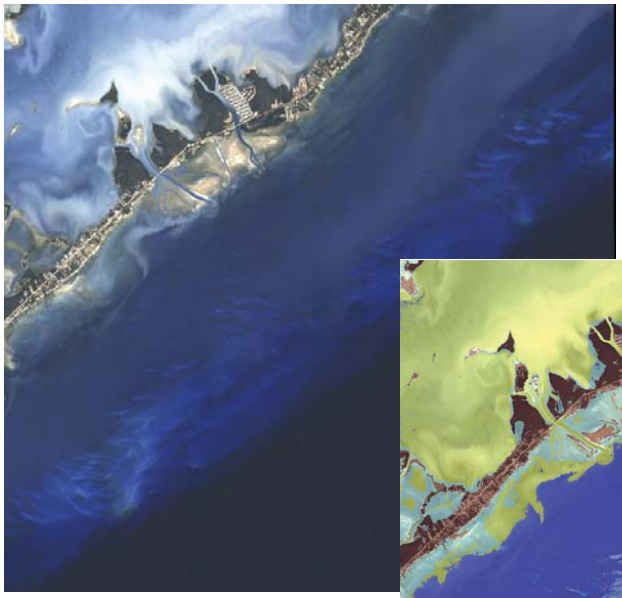
Revised Graphic User Interface - New viewing options and tools give more flexibility. Users can add shapefiles to populate a feature class, move classes up and down, break away the tools to keep them close to you as you create and revise your training and move around the image with the pan hand while zooming in and out with the mouse wheel. The work area has also been optimized so that you can see as much of your image as possible.

Pixel Counts in Results – Know the exact number of pixels that have been assigned to each class within your generated solution.

New Evolutionary Process - We have streamlined the process for our evolutionary algorithm development. This results in convergence of a better solution more rapidly.

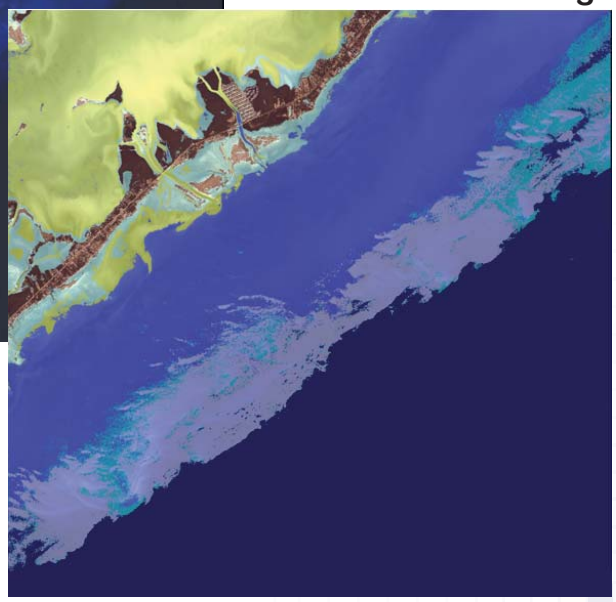
Dynamic Range – Improved handling of the input dynamic range of images facilitates even better transferability of solutions to other images.

Original Image



Above: *Worldview 2 image of the Florida Keys.*
Source: DigitalGlobe, used with permission.

Genie Pro® Results Image



Right: *A seven-class image showing the Florida Bay, Plantation Key, Hawk Channel, the shelf edge with reef development (in light blue), and the Straits of Florida.*

For More Information on Genie Pro® and its underlying technology, visit www.observera.com/Geniepro.html or call us at 800.444.6905.

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Visit us at our new website for more information:
www.geniepro.observera.com - coming soon

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