RELEASE NOTES

Trimble eCognition Suite

for Windows operating system

Version 10.3.0
Revision 1.0
November 2022

Trimble Documentation

eCognition 10.3

Release Notes

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Trimble Germany GmbH, Arnulfstrasse 126,
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Phone: +49–89–8905–710;
Fax: +49–89–8905–71411

Web: www.eCognition.com

Dear User,

Thank you for using eCognition software. We appreciate being of service to you with image analysis solutions. At Trimble we constantly strive to improve our products. We therefore appreciate all comments and suggestions for improvements concerning our software, training, and documentation. Feel free to contact us via the web form on https://support.ecognition.com. Thank you.

Legal Notes

Acknowledgments

Portions of this product are based in part on third-party software components.

Last updated: November 28, 2022

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Overview

1.1 About eCognition Suite

Trimble® eCognition® Suite is an advanced analysis software available for geospatial applications. It is designed to improve, accelerate and automate the interpretation of a variety of geospatial data and enables users to design feature extraction or change detection solutions to transform geospatial data into geo-information.

eCognition imports a variety of geospatial data, fusing them together into a rich stack of geo-data for the analysis. The analysis logic is structured into series of steps to create a computer-based representation of an expert's geospatial interpretation process a so called Rule Set. eCognition then combines the analysis logic with scalable computing power to identify changes over time or features on the earth's surface across very large sets of data.

This eCognition Suite 10.3 is a major release and includes a range of new features and bug fixes. We recommend upgrading to this new version to benefit from the new features and improvements. For an overview of the highlights and a complete list of new features and bug fixes please refer to the following chapters.

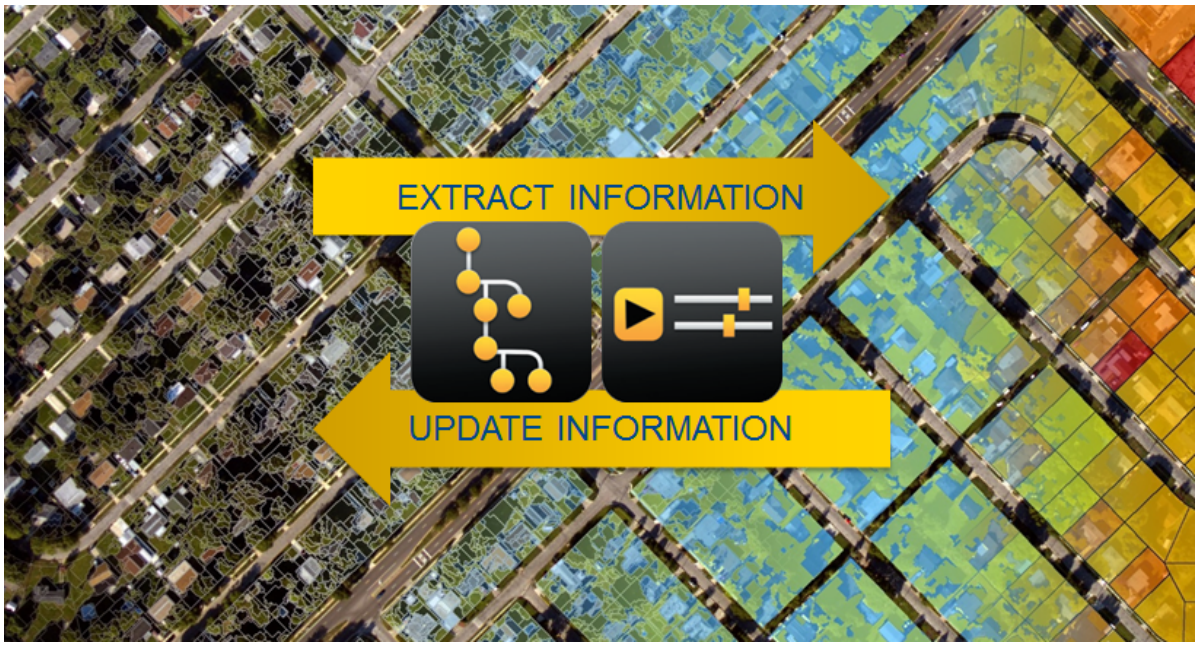
1.2 Key Features

1.2.1 Building Analysis Solutions

The eCognition technology examines image pixels not in isolation, but in context. It builds up a picture iteratively, recognizing groups of pixels as objects. Just like the human mind, it uses color, shape, texture, shape and size of objects, as well as their context and relationships, to draw the same conclusions that an experienced analyst would draw.

To build an analysis solution, it is possible to flexibly combine the image interpretation steps like object creation (segmentation), object classification (knowledge based, fuzzy logic, machine learning), object detection (template matching) and object modification (fusing, smoothing, orthogonalization, simplification) into a Rule Set or even a new application (Rule Set with UI) to solve the analysis problem.

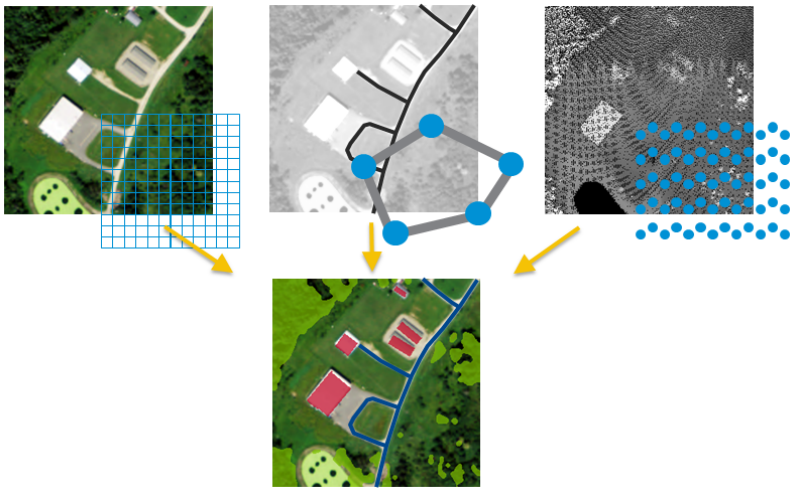
The result is a unique approach to translate mind models (why a human interpreter can see the objects, changes, or features in the geospatial data) into computer understandable code (Rule Set) or an individual/customized application.



1.2.2 Leveraging Data Synergies

eCognition can fuse a variety of geospatial data, such as spectral image data, 3D structure data from point clouds and spatial/thematic data from GIS vectors.

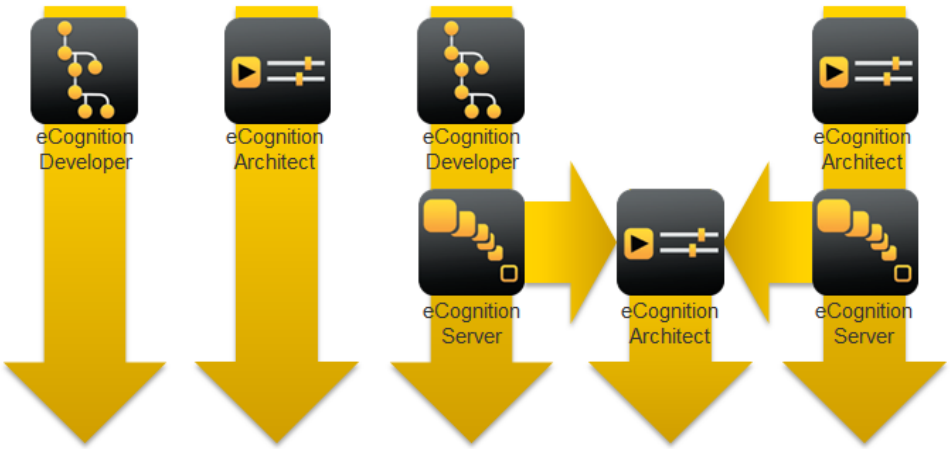
The proximity of eCognition to GIS, its ability to link and fuse the available data in an analysis - combined with the straightforward export of results to GIS layers - help eCognition users to achieve outstanding results.



1.2.3 Efficient Workflows

The eCognition Suite offers three different components which can be used stand-alone or in combination to solve even the most challenging fully automated and semi-automated production tasks:

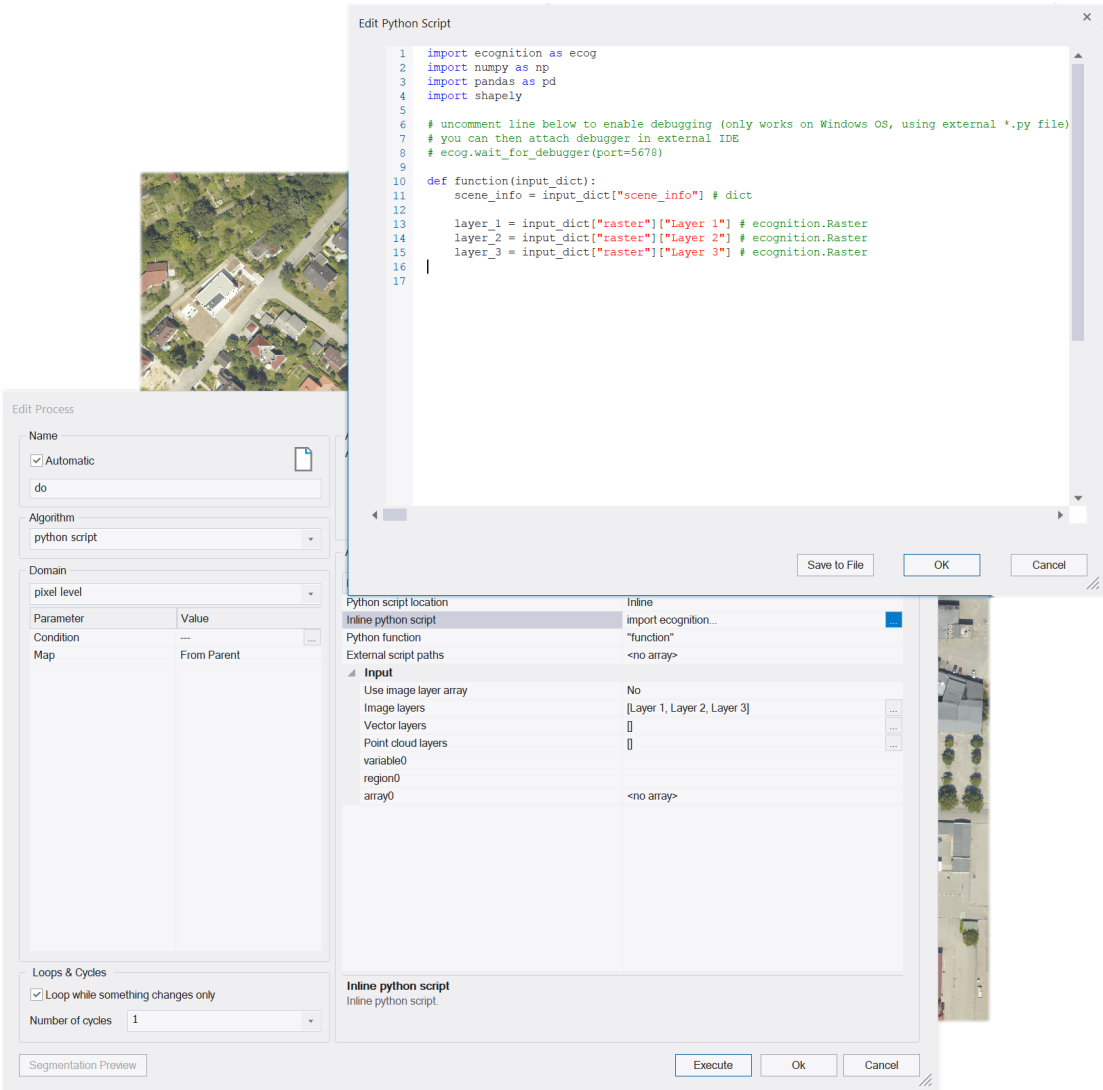
- eCognition Developer is the development environment for object-based image analysis. It is used in geospatial industry to develop Rule Sets or applications for eCognition Architect for the automatic analysis of geospatial data.
- eCognition Architect enables non-technical professionals such as vegetation mapping experts, urban planners or foresters to leverage eCognition technology. Users can easily configure, calibrate and execute analysis applications (Rule Set in combination with a UI) created in eCognition Developer.
- eCognition Server software provides a powerful processing environment for batch and parallel execution of analysis jobs, based on Rule Sets or applications.



1.3 eCognition Suite 10.3 Highlights

1.3.1 Python Integration

The new algorithm 'python script' allows python code to access and manipulate variables, vector, raster, and point cloud data loaded in eCognition using available methods described in the Python API Reference. The outputs created with python scripts are passed directly to eCognition and can be used for further analysis. Python Environment Manager allows users to create environments with custom package configuration. Debugging functionality allows users to attach any IDE that supports the 'debugpy' remote debugger python module.



Python Integration - Python Script Algorithm

1.3.2 Segmentation Preview

The Segmentation Preview is an interactive tool that allows users to test any segmentation algorithm available in eCognition and calibrate its parameters on a selected area of the scene in a time-efficient way. There is no need to create a scene subset. You can test and calibrate your segmentation using a rectangular window that can be resized and moved to any location of the scene. The segmentation results will be recalculated on the fly.

Tools - Segmentation Preview

1.3.3 Image Registration

A new 'image registration' algorithm is now available in eCognition 10.3. Image registration is an essential preprocessing step in most cases when working with remote sensing imagery. Now users can build more complete workflows in eCognition. The algorithm supports both automatic and manual registration workflows as well as a direct homography matrix as input.

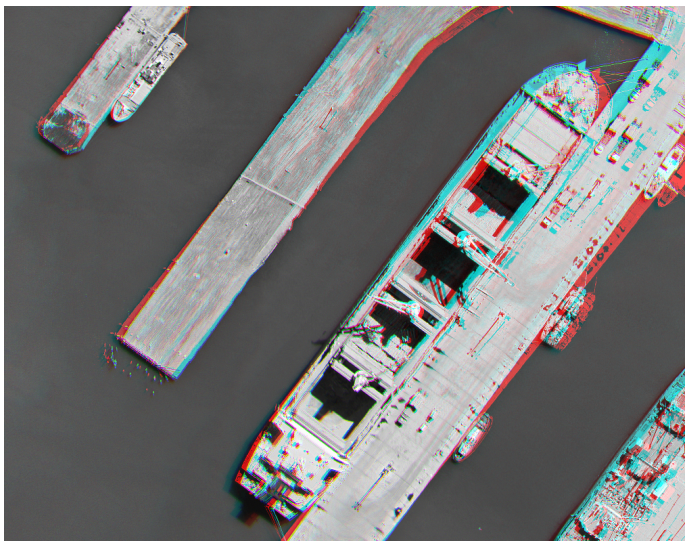
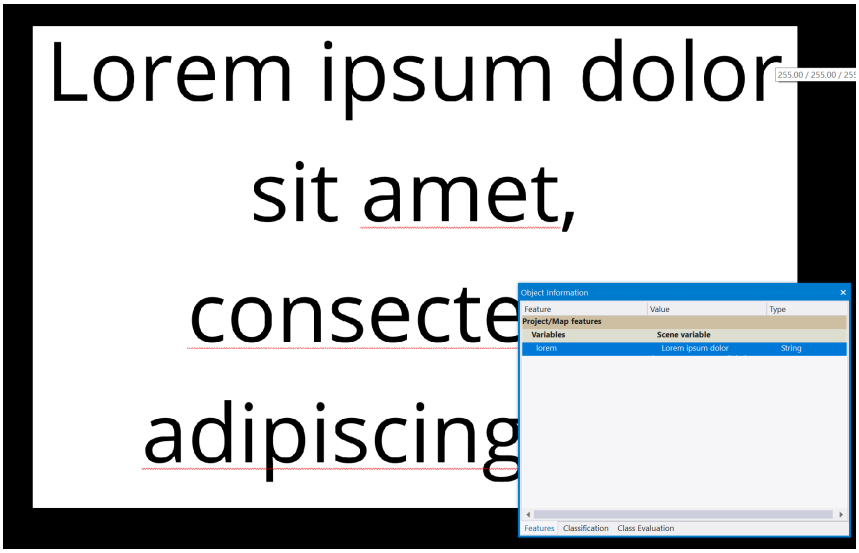


Image Registration (Image Courtesy Linz Data Service, creative commons license attribution 4.0)

Image Registration Algorithm

1.3.4 Text Recognition

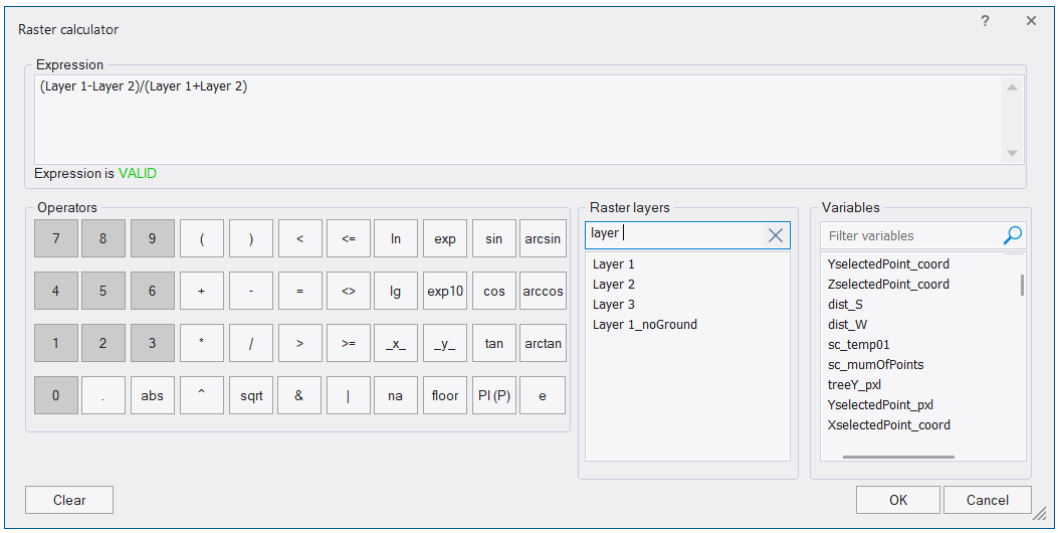
A new algorithm 'text recognition (OCR)' is now available. Based on optical character recognition technology, it recognizes English text in images and converts it to text information.



Text Recognition Algorithm - OCR

1.3.5 User Interface & User Experience

Improving the user interface and user experience is one of the main highlights of version 10.3. In this release we focused on the most frequent user requests including a Raster Calculator for the 'layer arithmetics' algorithm that simplifies the process of building arithmetic expressions, a more interactive and more functional 2D Feature Space Plot, and enabled multi-selection in the View Settings, Process Tree, and Thematic Attribute table.



Layer Arithmetics Algorithm - Raster calculator

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New Features - Bug Fixes and Limitations

2.1 New Features

New Features in eCognition 10.3:

Python Integration	
New algorithm	The new algorithm 'python script' allows python code to access and manipulate variables, vector, raster, and point cloud data loaded in eCognition using available methods described in the Python API Reference. The outputs created with python scripts are passed directly to eCognition and can be used for further analysis. Additionally, we added a debugging functionality that allows users to attach any IDE that supports the 'debugpy' remote debugger python module.
Deep learning	
New Algorithm	A new algorithm 'text recognition (OCR)' is now available. Based on optical character recognition technology, it recognizes the text in images and converts it to text information. Currently, only the English language is supported.
New Parameter	Now users can optionally augment their data with the new parameter 'Add sample augmentation' when creating labeled sample patches using the algorithm 'generate labeled sample patches'. This will enhance the neural network performance. Several augmentation techniques are supported.
New Parameter	Users can compute validation loss and training loss of their neural network during training to detect underfitting or overfitting. The parameter is available in the 'train convolutional neural network' algorithm.
New Option	The formerly 'apply instance segmentation' algorithm is now renamed to 'apply object detection/instance segmentation' and supports object detection models as well as instance segmentation models.
Tools	
Segmentation Preview	New tool Segmentation Preview to test segmentation algorithms and calibrate parameters on a selected area of the scene in a time-effective way using a window that can be resized and moved to any location. The segmentation results are recalculated on the fly.
Point Clouds	

New Algorithm	New 'rotate point cloud' algorithm allows to rotate a point cloud around a user-defined origin point in the XYZ plane. The rotated point cloud is stored in a new map.
New Feature	Coordinates of rotated point clouds produced with the 'rotate point cloud' algorithm can be accessed via the feature 'X/Y/Z - rotated'. (Point features (point cloud) > Rotation-aware fields.)
New Feature	New feature groups are available for point clouds - eigenvector and eigenvalues. They calculate respectively values based on the input point cloud, which allows getting spatial metrics the of a specified point cloud. (Map features > Point cloud layer)
New Algorithm	New 'create temporary point cloud by filter' algorithm allows to produce new point clouds by applying advanced filtering options. They offer more specialized and efficient point cloud creation.
New Parameter	The existing 'transfer point cloud classification' algorithm now supports transferring the point cloud classification between maps with the newly introduced parameter 'destination map'. The added class filter allows the user to control the classes that will be transferred.
User Interface	
Improvement	eCognition 10.3 includes an enhanced 2D Feature Space Plot that offers more functionality and interactivity for your data exploration and analysis of relationships between objects of different classes.
Improvement	Raster Calculator is available for ‘layer arithmetics’ algorithm. The new dialog makes it more convenient for users to build their arithmetic expressions using the calculator interface. All available variables and image layers are listed in the dialog.
Improvement	Multi-selection is now enabled in the View Settings window for image layers, point clouds, vector layers, and image object levels. Additionally, multi-selection is now possible in the Thematic layer attribute table and the process tree.
Improvement	'No color' option is now available for the outline color of image object levels. This option helps to improve visualization when more than one image object level is displayed.
Change	Now image layer aliases and thematic layer aliases can be modified in the same window available via Process > Edit Aliases > Manage Layer Aliases.
Change	Assign Projection and Reproject Data now can be found under Tools > Projection
Improvement	New option 'Snap 2D Vector To 3D Point ' in the context menu is available for vector layers in the View Settings window. This option improves the display of 2D vectors in the 3D window by enabling a user to snap a selected 2D vector layer to any 3D point selected in the 3D window.
Improvement	Now, when users switch back to single-pane view or they select a different split option after splitting the view into several panes, they can expect the settings of

	the last active pane to remain in the new split.
Improvement	Users have an option to hide expired licenses in the eCognition License Manager.
Improvement	Improved highlighting of the active tool in the toolbars of the main window.
Improvement	In the Feature View, the context menu for each feature 'Update Range' is renamed to 'Calculate value range' to better reflect the functionality of the option. Additionally, a new update control 'Update' is added to the feature range check box for the active feature. This new button calculates the minimum and maximum values for the active feature and can be used to reset the user-defined minimum and maximum.
Improvement	New column 'Type' is added to the 'Object information' window. It displays the calculated value type of the feature.
Improvement	Now users can expand or collapse all child processes of the selected parent process in the Process Tree using the context menu options or shortcuts.
Improvement	When creating new classes in the Class Hierarchy window, each subsequently created class receives a unique name and a new random color instead of the red default color.
Improvement	Now users can control the number of decimal points displayed in the Object Information window. The new global option is available in Tools > Options > Display > Number of digits to display after decimal place in object information.
Improvement	Algorithm search in the Edit Process window now supports keywords.
Improvement	Users can open projects in the trial version of eCognition Developer.
New Algorithms, Parameters & Features	
New Algorithm	New 'image registration' algorithm is now available. The algorithm supports both automatic and manual registration workflows as well as homography matrix as input.
New Feature	New object feature 'Pixel value range' calculates the pixel range of image objects (Object features > Image Layer > Pixel based > Pixel value range).
New Operator	Not-equal-to operator '<>' is now available for building arithmetic expressions and in the Edit Condition dialog.
New Option	New mode 'Shuffle' is available in the 'update array' algorithm. Randomly shuffles the array.
Improvement	The 'image object fusion' algorithm now supports multiple fitting functions.
New Parameter	A new group of parameters 'Vector attribute merge settings' is added to the 'vector dissolve' algorithm that allows users to select attributes for merged vectors.

2.2 Bug Fixes

Bug Fixes and Improvements in 10.3:

Bug Fixes	
Bug Fix	When working with a large image, and zoomed out in view of the entire image, using the area-zoom tool (Ctrl-U) can cause the view to zoom out to full extent.
Improvement	Improved behavior of the Nearest Neighbors Feature Space functionality and added a progress bar.
Bug Fix	Exporting thematic raster files as ERDAS IMAGINE .img file resulted in the first class turning into "unclassified".
Bug Fix	Fixed issue of Time Series tool bar staying grayed out after customized frame import.

2.3 Known Issues and Limitations

The eCognition License Server does not support the web interface on Linux distribution CentOS 6 (license server startup script needs to be modified to use *-noWeb* option for lmadmin).

Please contact support if you have further questions.

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Acknowledgments

Portions of this product are based on third-party software components. Trimble is required to include the following text, related to software and distributions. The most recent version of this document can be found in the installation folder of eCognition (C:\Program Files\Trimble\eCognition Developer 10.3\bin\third-party-acknowledgements.txt).

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GeoGram

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Version 7.0
https://www.mesa3d.org/

MrSid DSDK
Version 9.5.4

NSIS
Version 3.6.1.0
https://nsis.sourceforge.io/

OpenGL Extension Wrangler Library
Version 1.1
http://glew.sourceforge.net/

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python-dateutil (Python library)
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Version: 1.22.4

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pytz (Python library)

Version: 2022.1

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Shapely (Python library)

Version: 1.8.2

https://github.com/shapely/shapely

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six (Python library)

Version: 1.16.0

https://github.com/benjaminp/six

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debugpy (Python library)
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