DEF:NIENS®
Understanding Images

Production Applications for eCognition
Architect 8

Building Generalization and
Quality Check

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Legal Notes

Table of Contents

Introduction to this Module

In this Module you will learn how to use the Application 'Building Generalization' which also includes the new functionality of doing quality checks of classification results. In the later Part of this Module you will also learn how to create a Quality Check widget yourself.

The Application we will load has four Actions:

* Find Buildings
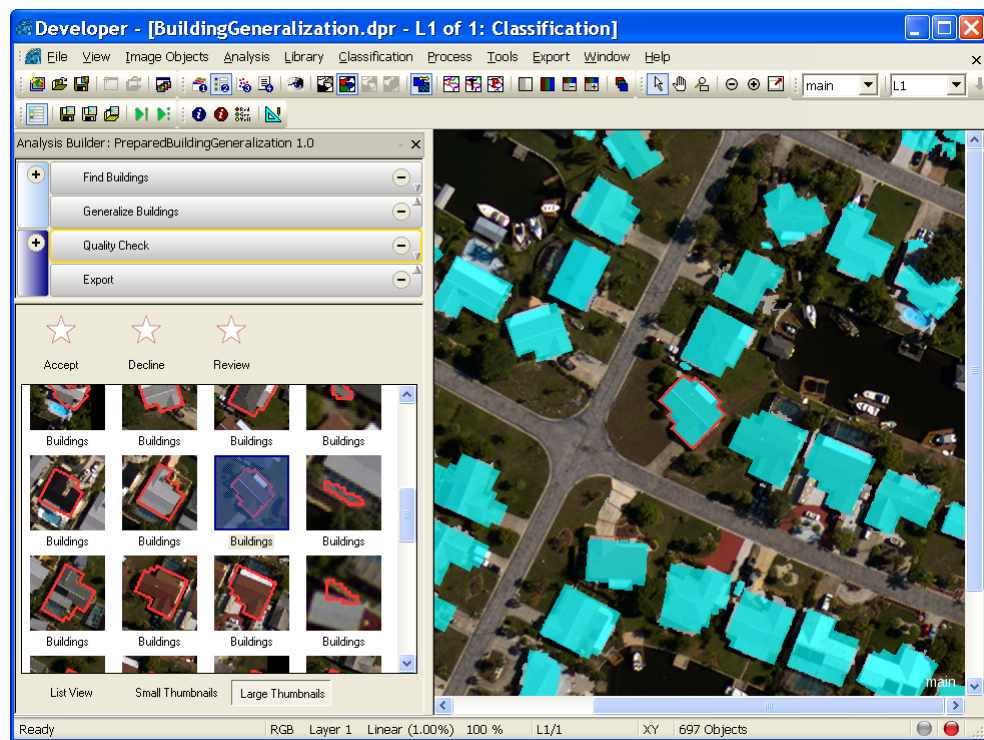
* Generalize Buildings

* Quality Check

* Export

Figure 1: Application 'Generalize Buildings' loaded. Currently the manual classification tool of the Action 'Quality Check is active.

This Module has two Lessons:

Lesson 1 Explore the ready Application

Lesson 2 Create own Quality Check and Export

Symbols at the side of the document

The symbols at the side of the document shall guide you through the exercises and help you to identify whether to read something or an action is needed or whether the screenshot is meant to be compared with settings in the software.

If the side is hachured and 'Introduction' is added, this indicates that a text is giving a general introduction or methodology about the following chapter, method or exercise.

Introduction

If the side is hachured and 'Information' is added, this indicates that a text is giving information about the following exercise.

Information

If this symbol is shown, you have to follow the numbered items in the text. If you just want to work through the exercises without reading the theory part, follow only this sign.

Action!

If this symbol is shown, compare the settings shown in the screenshot with the settings in the according dialog box in the software.

Settings Check

If this symbol is shown check the screenshot of the Process Tree with the content of the Process Tree in the software.

Rule Set Check

If this symbol is shown check the screenshot aside with the result in the software. It should look similar.

Result Check

Lesson 1 Explore the ready Application

1.1   Loading Project and Action Library

Action!

1. Open Definiens eCogniton Developer and switch to Configure Analysis view.

2. In the main menu 'File' choose '**Open Project…**' or click on the 'Open Project' button in the toolbar.

3. Open the project '**BuildingGeneralization.dpr**' in the folder '…\WhatsNew_eCog8\Projects**\Architect\Buildings_Tampa Bay**' at the location where the training data is stored.

Result Check

The project is loaded. The Analysis Builder, where the Actions will be shown later, is still empty, a message is indicating: 'No Library Loaded.

Action!

4. Go to the main menu '**Library**' and select '**Open Action Library…**'.

5. Browse to '…\WhatsNew_eCog8\Projects**\Architect\Buildings_Tampa Bay**' at the location where the training data is stored.

6. Select the folder '**PreparedBuildingGeneralization**' and confirm with OK.
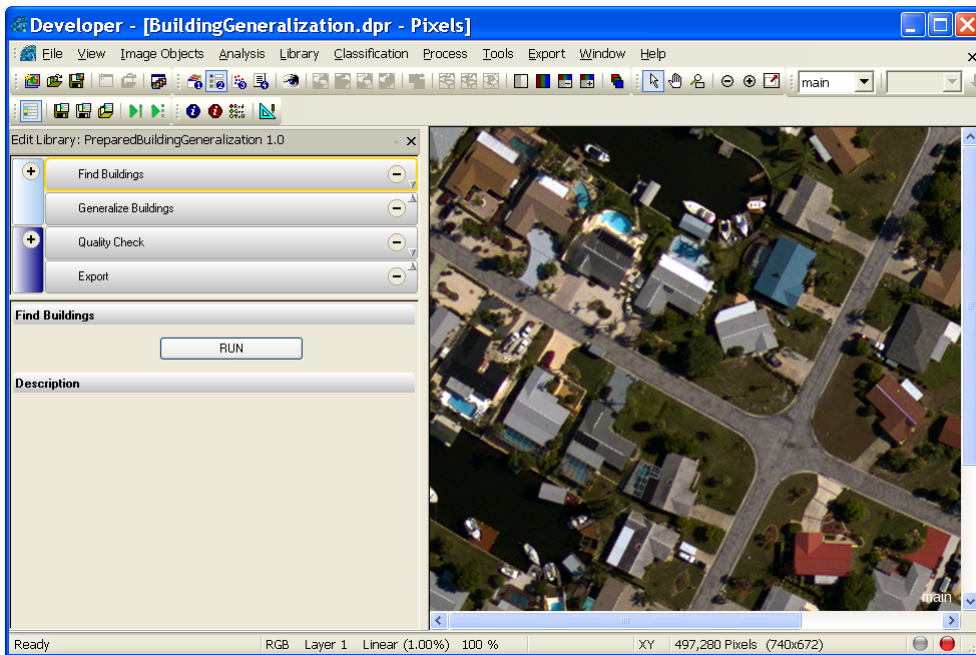
The Action Library is loaded,

Figure 2: Loaded Project and Action Library.

Result Check

1.2 Action 'Find Buildings'

The Action detects the buildings by simply evaluating a thematic layer. Theses 'Building' Objects are then the basis for the later generalization.
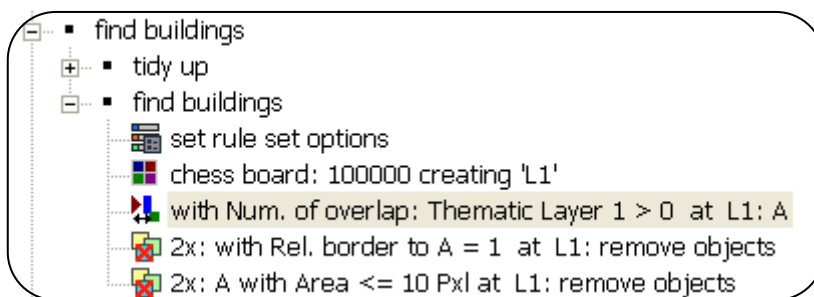
Information

1.2.1 Explore the related Rule Set Part

The actual classification of the buildings is defined in the Process 'with Num. of overlap: Thematic Layer 1 > 0 at L1: A'. The two additional Processes remove too small Objects.

1. Open the Process Tree window.

2. Expand 'do' ,the sequence 'find buildings' and the sequence 'find buildings'..

Information

Rule Set Check

Figure 3: Processes to find 'Building' Objects from thematic layer.

1.2.2 Execute the Action

1. In the Analysis Builder select the Action 'Find Buildings'.

2. Hit the 'RUN' button.

The buildings are classified as 'A' according to the thematic layer.

Action!
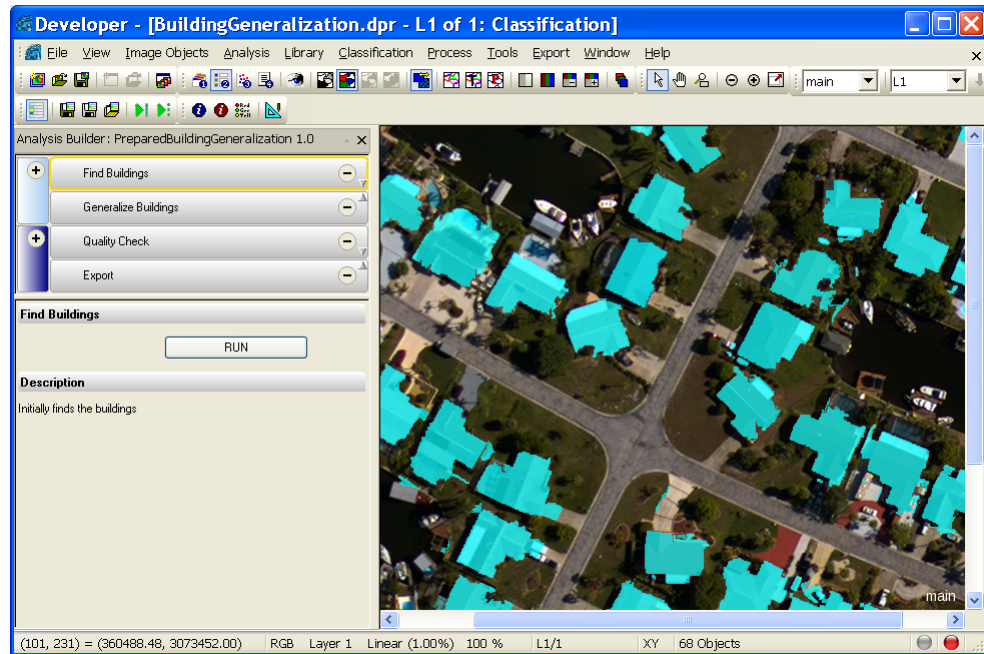
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Result Check

Figure 4: Classification view of initially classified 'Building' Objects.

1.3   The Action 'Generalize Buildings'

Information

This Action is based on a Customized Algorithm 'Buildings Generalization Example', which you can download on the Community Platform.

1.3.1   Explore the related Rule Set

Information

A Customized Algorithm can be created from every Rule Set sequence by right-clicking on it and selecting 'Create Customized Algorithm'. It is then added to the Algorithms list, as any other Algorithm.

Action!

1.   In the Process Tree expand 'do' ,the sequence 'generalize buildings' and the sequence 'find buildings'.

The last Process of this sequence is the Customized Algorithm 'Building Generalization'.
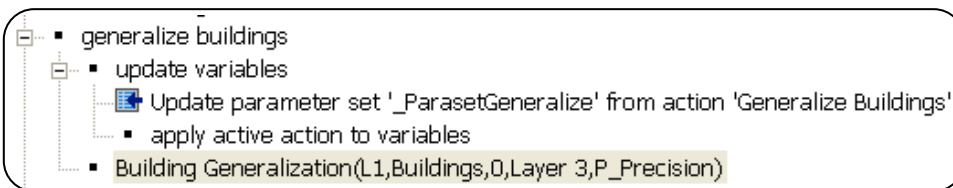
Rule Set Check

Figure 5: Processes to generalize 'Buildings'.

Action!

2.   Double-click on the Process 'Building Generalization(L1,Buildings,0,Layer 3,P_Precision)'.

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With this Customized Algorithm, you can set the input Level and the input class. In the field 'Orientation mode' you can define whether the orientation of the building is calculated from the shape of the Object or from spectral features.

You can also select the Layer, if orientation mode is set to spectral.

Very important is the field Precision, here it can be define whether the buildings are generalized strongly of stay more detailed.
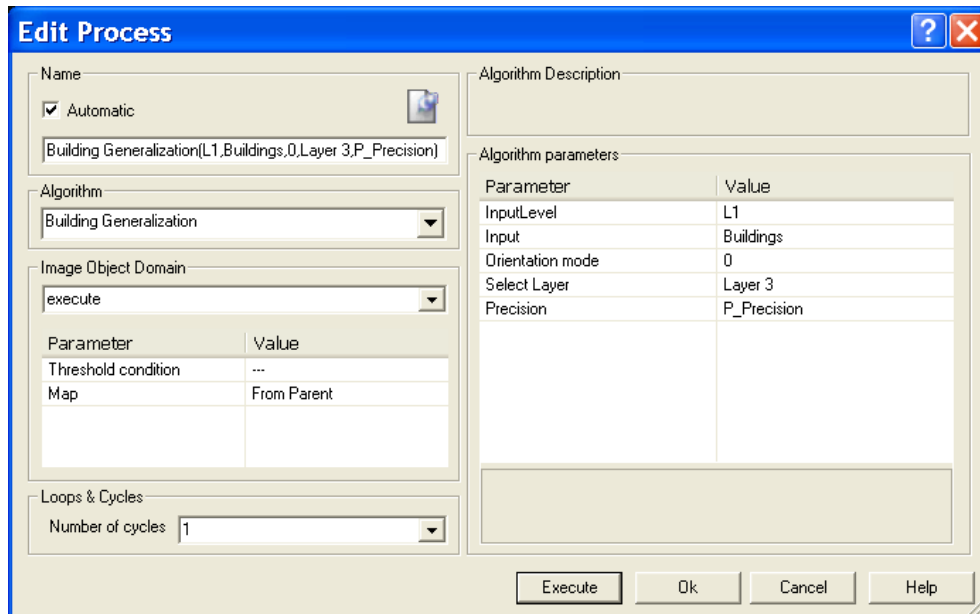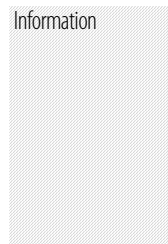
Information

✓

Settings Check

Figure 6: Customized Algorithm 'Building Generalization'.

1.3.2   Execute the Action

1.   In the Analysis Builder select the Action 'Generalize Buildings'.

2.   Insert a Precision value, high values means the buildings stay detailed, low values means the buildings are generalized strongly.

3.   Hit the 'RUN' button to execute the generalization.

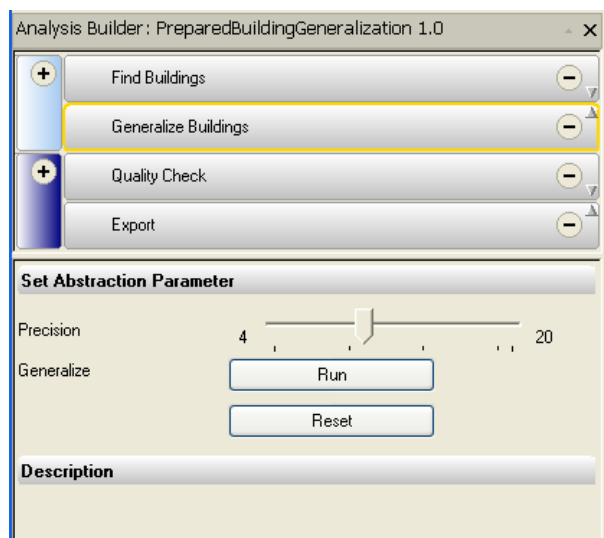4.   Hit the 'Reset' button to recreate the initial building Objects.

Action!

✓

Result Check

Figure 7: Action 'Generalize Buildings'.

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Figure 8: Buildings after generalization.

1.4   The Action 'Quality Check'

In this Action you can manually **accept** or **decline** Objects or assign them to a '**review**' ❶ class using the buttons in the upper part. All Objects are stored in a list, which can also be displayed in a thumbnails view. If one thumbnail is selected ❷, the viewer automatically zooms to it. If the object is assigned to 'Accept', 'Reject' or 'Review' the widget automatically jumps to the next one.
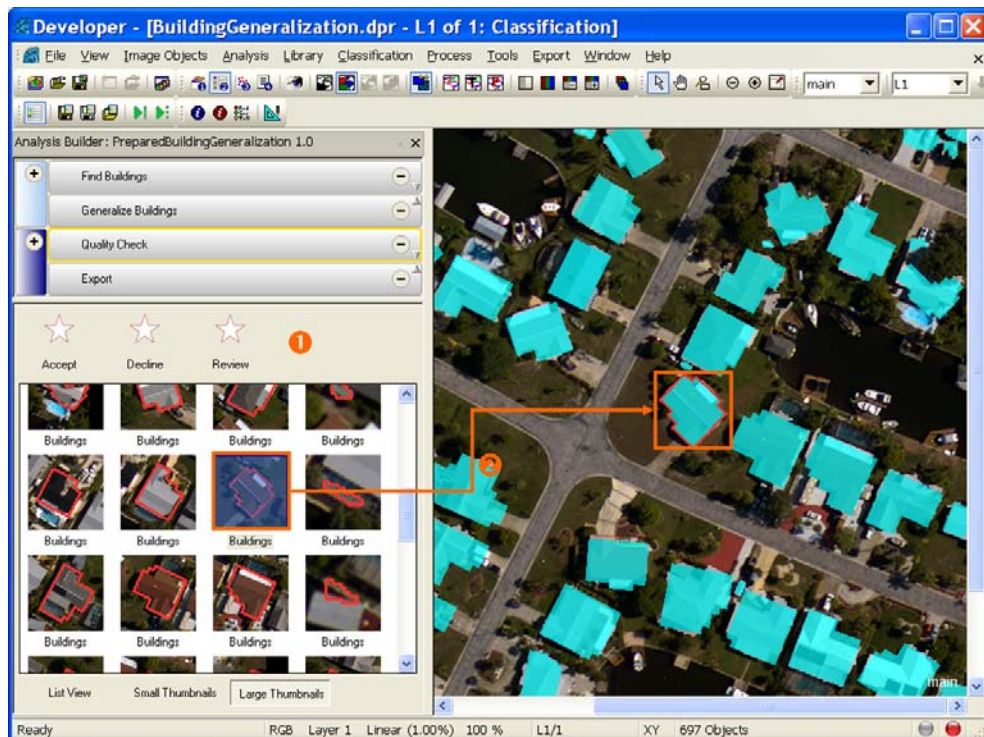

Figure 9: Action 'Quality Check'.

1.4.1   Explore the related Rule Set

Whenever a button is hit in the Action it executes a Process to either assign the selected Object to the class. The algorithm assign class' together with a special Image Object Domain item 'image object list' is used to force the Process to use the currently selected Object as domain.
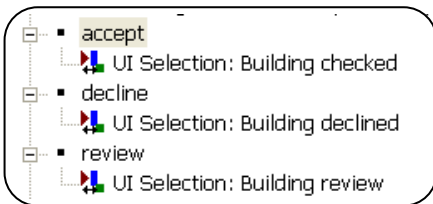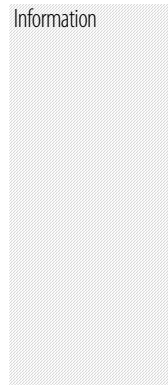
Figure 10: Processes to utilize the Action 'Quality Check'.

1.4.2   Execute the Action

1.   Select the Action '**Quality Check**'.

2.   Choose the '**Large Thumbnails**' view by pressing the button in the lower right.

3.   Zoom into the viewer, so that the buildings are represented in detail.

Action!

4.   Click either the 'Accept', 'Decline' or 'Review' button until all buildings are assigned to one of the classes. Alternatively you can use the numbers on your number pad. **1=accept, 2=decline and 3= review**.

Result Check

Figure 11: Buildings after 'Quality Check'.

1.5   The Action 'Export'

The Action has no setting possibilities, a vector shape file is exported together with the class name and size of the Object.

1.   Select the Action 'Export'.

2.   Hit the 'Export' button.

A shape file together with the attributes is exported.

Action!

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Lesson 2 Create own Quality Check and Export

This Lesson has the following chapters

➔ *Preparation*

➔ *Create the Processes for the Action*

➔ *Add Action Definition 'Quality Check*

➔ *Insert and configure widget 'Manual Classification Tool'*

➔ *Action 'Export'*

2.1   Preparation

Action!

1. Open a new Definiens eCogniton Developer and switch to Configure Analysis view.

2. In the main menu 'File' choose '**Open Project...**' or click on the 'Open Project' button in the toolbar.

3. Open the project '**TampaBay.dpr**' in the folder '…\WhatsNew_eCog8\Projects**\Architect\Buildings_Tampa Bay**' at the location where the training data is stored.

The project is loaded. The Analysis Builder, where the Actions will be shown later, is still empty, a message is indicating: 'No Library Loaded.

4. Go to the main menu '**Library**' and select '**Open Action Library...**'.

5. Browse to '…\WhatsNew_eCog8\Projects**\Architect\Buildings_Tampa Bay**' at the location where the training data is stored.

6. Select the folder '**BuildingGeneralization**' and confirm with OK.

Result Check

The Action Library is loaded, it contains only the first two Actions 'Find Buildings' and 'Generalize Buildings'. Additionally a new Group 'Quality Check and Export' is already added.
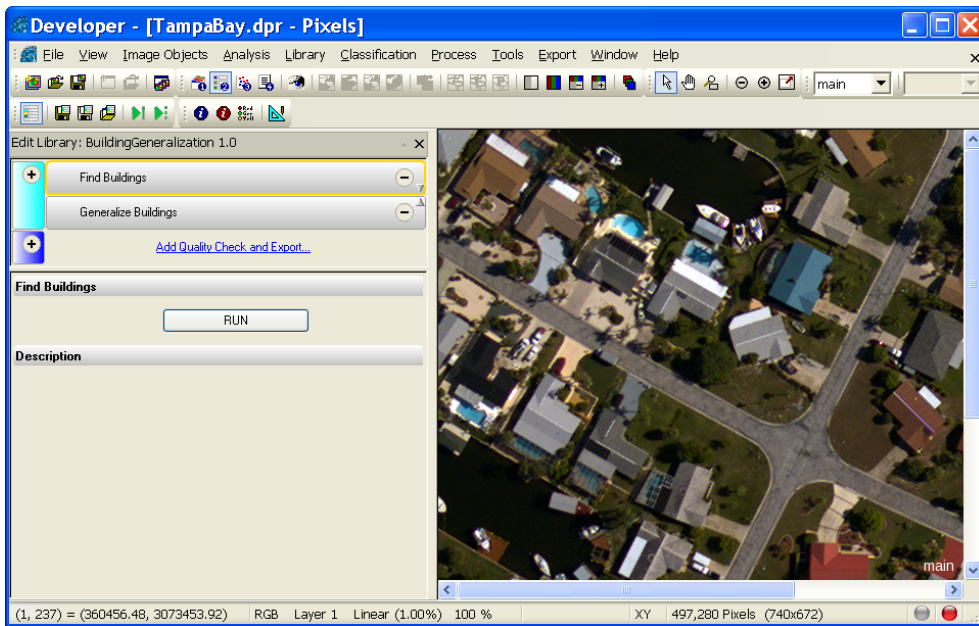
Figure 12: Loaded Project with Action Library.

**Result
Check**

1.   Execute Action 'Find Buildings'.

2.   Execute Action 'Generalize Buildings'.
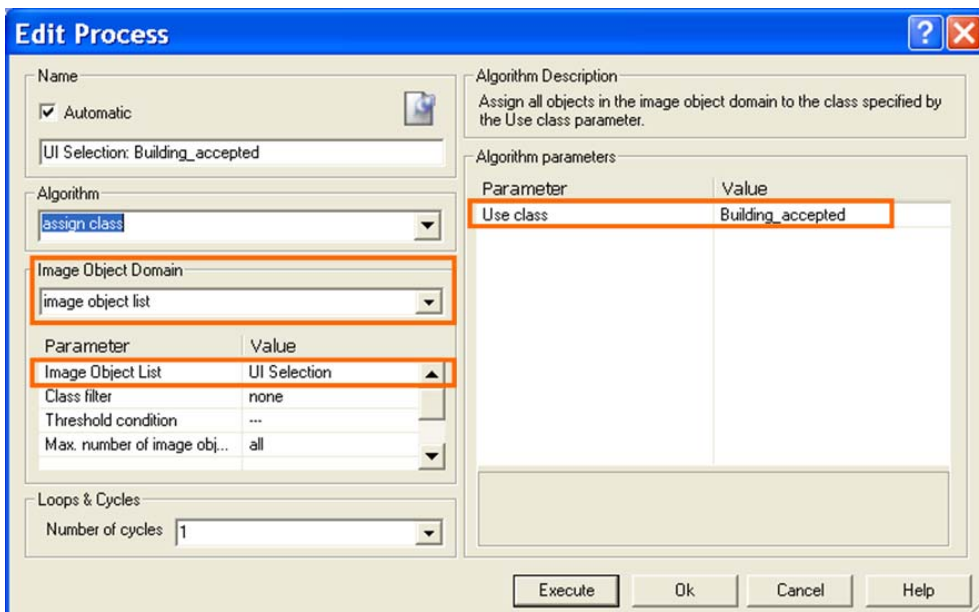
Action!

2.2   Create the Processes for the Action

The Rule Set must have Processes which point to the Object list of the Manual
Classification Tool. This can be set via the Image Object Domain type 'image object list'

Information

1.   Insert a **Parent Process** and name it '**accept**'.

2.   Insert a **Child Process** and select '**assign class**' as algorithm.

3.   From the **Image Object Domain** drop-down list, select '**image object list**'

Action!

4.   In the new field '**Image Object List**' select '**UI Selection**'.

5.   In the field '**Use Class**' insert '**Building_accepted**' to create the new class.

**Settings
Check**

Figure 13: Process settings to activate the manual classification to 'Building_acceppted'.
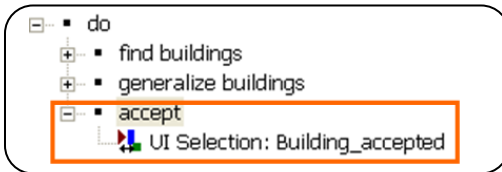
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Rule Set Check

Figure 14: Process Tree for later Button 'Accept'.

Action!

6. Repeat the same for 'decline' and 'review'. You can copy, paste and modify the Processes.
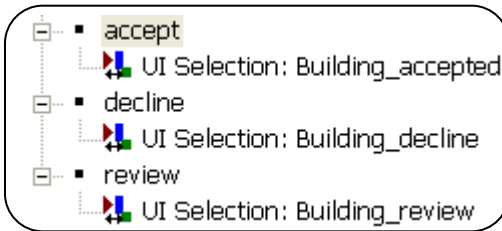
Rule Set Check

Figure 15: Process Tree with all Processes for the three Buttons 'Accept', 'Decline' and 'Review'..'

2.3   Add Action Definition 'Quality Check'

Action!

1. Make sure that in the menu 'Library' '**Edit Action Library'** is switched on.

2. Right-click Action Group 'Quality Check and Export' and select '**Add Action Definition**'.

3. Name it '**Quality Check**'

4. Define the Rule Set '**buildinggeneralization_quality.dcp**'.

5. Keep all other fields clear, confirm with 'OK', ignore the warning message.

Settings Check

Figure 16: Action Definition for 'Quality Check'.

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2.4   Insert and configure widget 'Manual Classification Tool'

In opposite to other widgets, the Manual Classification Tool does not need a Widget Group. It can be directly inserted.

2.4.1   Insert the widget

1. Right-click in the lower pane of the Analysis Builder and select 'Add Manual Classification Tool'.
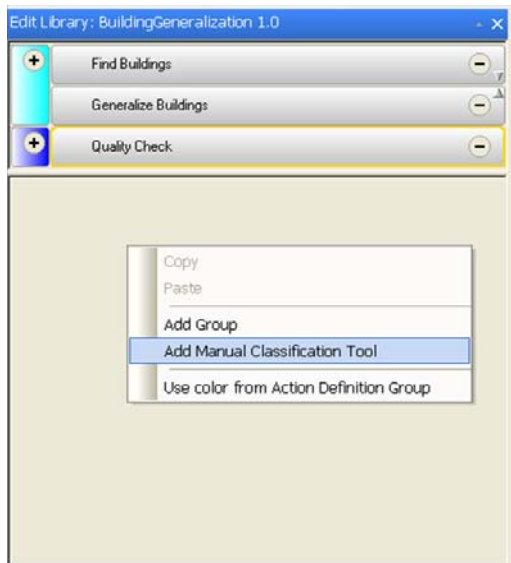

Action!

Figure 17: Selecting the 'Manual Classification Tool' to be added.

The 'Widget Configuration' dialog box opens.

2.4.2   Configure general settings

1. In the field 'Rule Set' define '**buildinggeneralization_quality.dcp**'.

2. Keep the thumbnail settings as they are

3. In the field 'Class Filter' select: only the class '**Building**'.

Action!

This has the effect that the Object list will be updated and already reviewed Objects are disappearing from the list.

4. In the field '**Feature**' define '**Area**'. This feature helps later sorting the Objects after size.
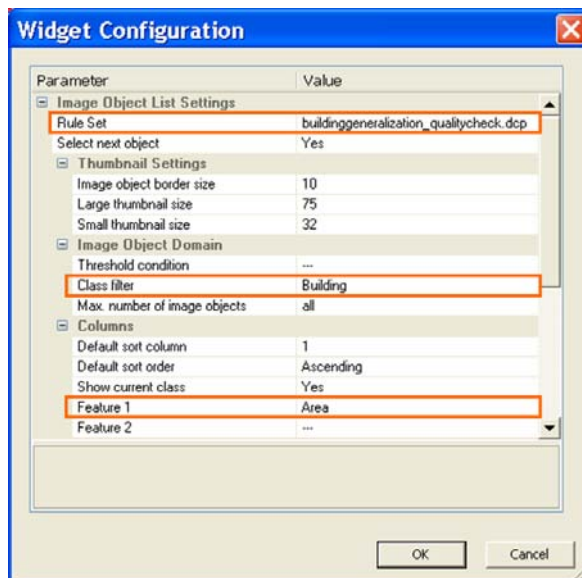
**Settings
Check**

Figure 18: Configuration of the general settings for the Manual Classification Tool.

2.4.3   Configure the Buttons

Button 1 'Accept'

Action!

1. Insert in the field 'text': '**Accept**'

2. Define the Process Path: **do/accept**.

3. Select from the drop-down list of field '**Update after Action**': '**Update all objects**'

4. Click on the '…' next to the field '**Hot key**'. Press the **1 on the number pad**.

Automatically the hot key is entered, here **1(ZEHNERTASTATUR)**.

5. In the field '**Image file**' you can select an image for the button, if you like, here '**accept.tif**'.

Button 2 'Decline'

1. Insert in the field 'text': '**Decline**'

2. Define the Process Path: **do/decline**.

3. Select from the drop-down list of field '**Update after Action**': '**Update all objects**'

4. Click on the '…' next to the field '**Hot key**'. Press the **2 on the number pad**.

Automatically the hot key is entered, here **2(ZEHNERTASTATUR)**.

5. In the field '**Image file**' you can select an image for the button, if you like, here '**decline.tif**'.

Button 3 'Review'

1. Insert in the field 'text': '**Review**'

2. Define the Process Path: **do/Review**.

3. Select from the drop-down list of field '**Update after Action**': '**Update all objects**'

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4.   Click on the '…' next to the field '**Hot key**'. Press the **3 on the number pad**.

Automatically the hot key is entered, here **3(ZEHNERTASTATUR)**.

5.   In the field '**Image file**' you can select an image for the button, if you like, here '**review.tif**'.
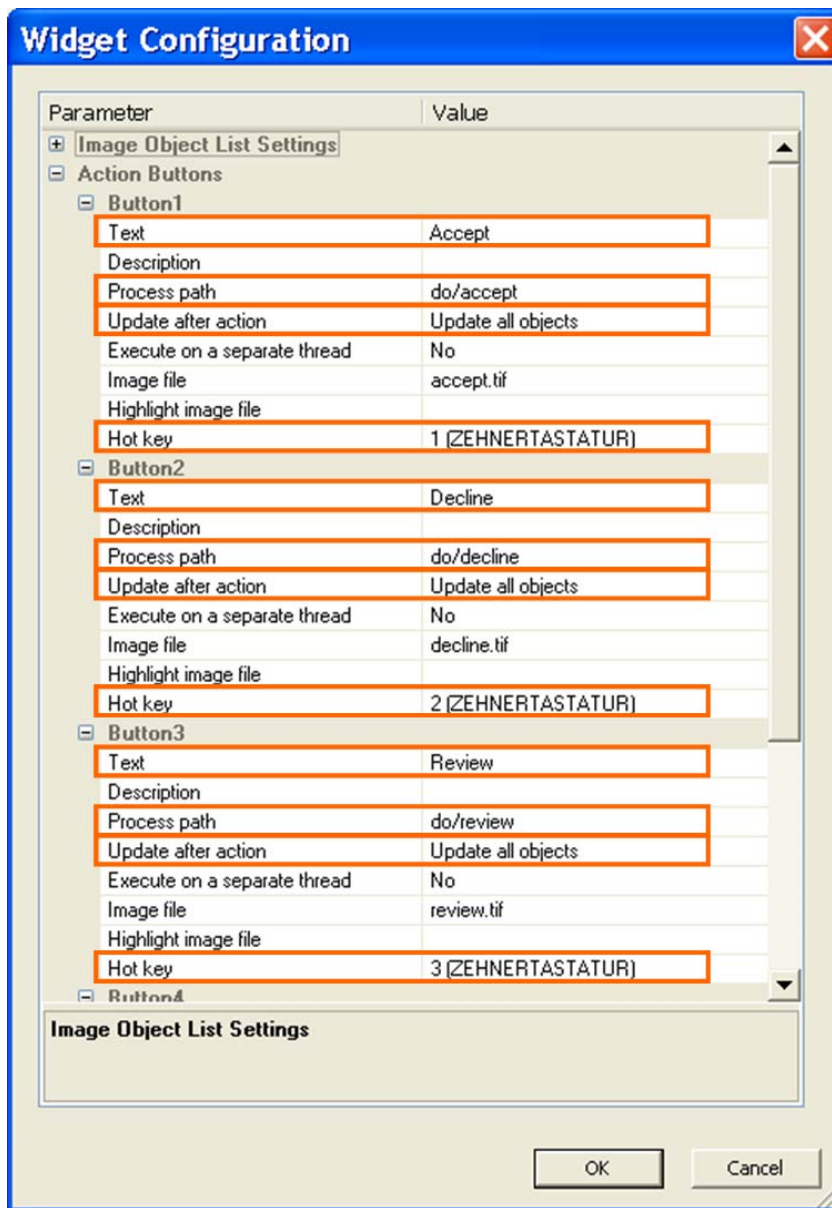
✔
Settings Check

Figure 19: Configuration of the buttons of the Manual Classification Tool.

6.   Confirm the settings with '**OK**'.

7.   Switch **off the editing mode** of the Action Library

The Manual Editing Tool is added to the Action Library.

Action!

8.   **Sort** the 'Area' column descending and switch to '**Large Thumbnail' view**.

9.   **Multi-select** the thumbnails of the small Objects in the object list and click on the 'Decline' button.
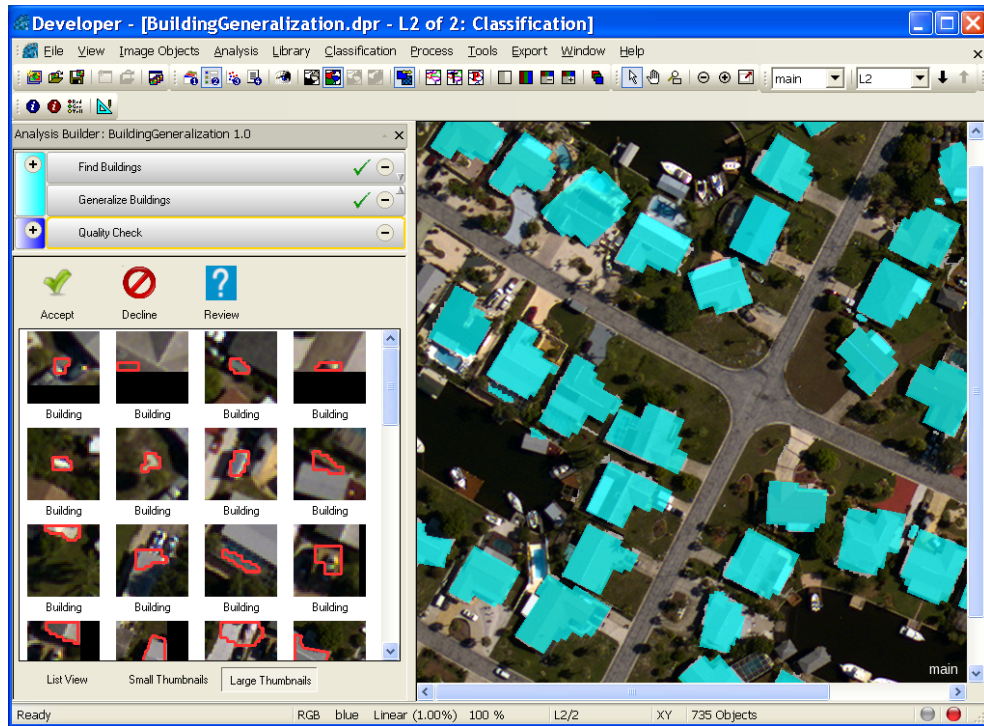
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Result Check

Figure 20: The Manual Classification Tool added to the Action Library.

2.5   Action 'Export'

2.5.1   Add Process to Export

Action!

1.   Add a new Process under 'do' and name it '**export**'.

2.   Choose '**export vector layers**' as algorithm.

3.   In the field '**Export item name**' insert '**Buildings**'.

4.   As Attributes choose '**Area**' and '**Class name**'

5.   As '**Shape Type**' select '**Polygons**'.
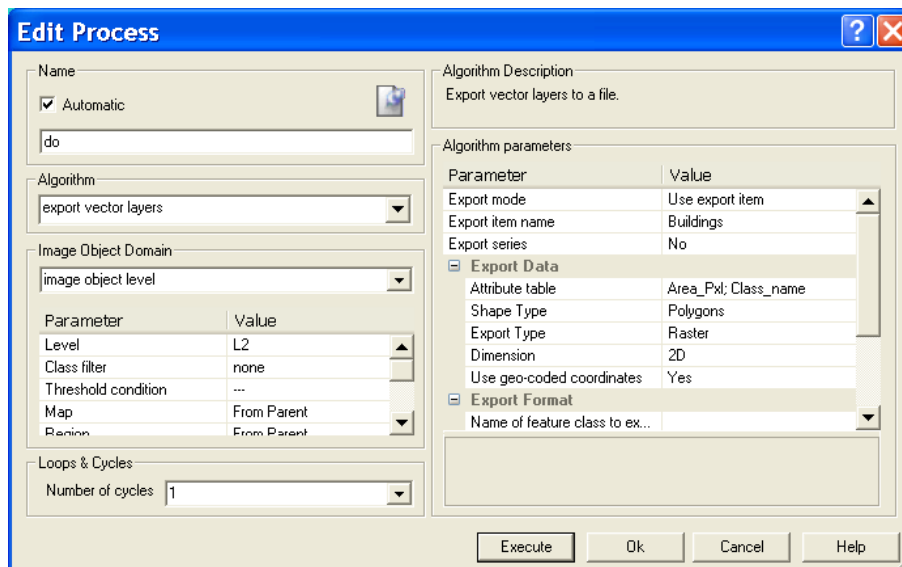
Settings Check
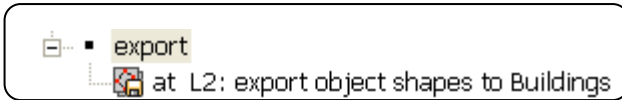
Figure 21:Process to export vector layer.

Figure 22: Process structure for Action 'Export'.

**Rule Set
Check**

2.5.2   Add the Action 'Export

Add the Action Definition

1.   Activate the **editing mode** for the Action Library

2.   Add a **new Action Definition**.

3.   Name it '**Export**'.

4.   Create the Parameter set 'Export' by simply typin it in.

5.   Define the Rule Set file 'buildinggeneralization_qualitycheck.dcp'

6.   Define the Process Path 'do/export'

Action!

Figure 23: Action Definition for Action 'Export'.

**Settings
 Check**

Add Widget Group and Button

1.   Add a Widget Group and name it '**Export**'.

2.   Add a Button and define the Process Path '**do/export**' and button text '**Export**'.

3.   Confirm the Settings with '**OK**':

The buttons is added to the Action Library.
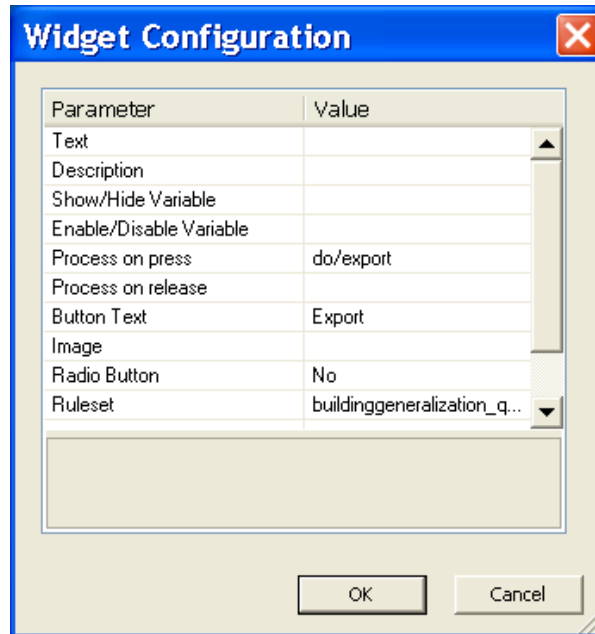
Action!

Settings Check

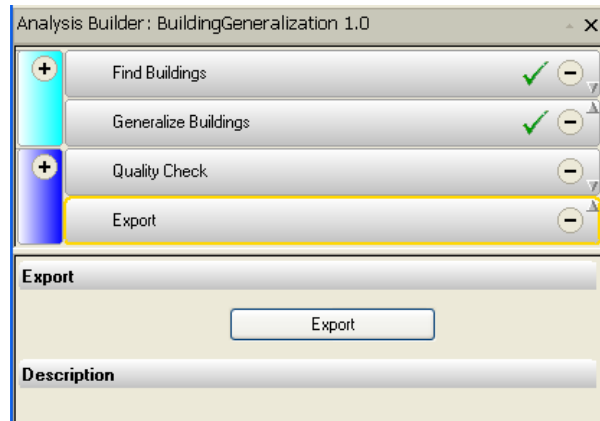Figure 24: Configuration for the 'Export' button.

Result Check

Figure 25: The Action 'Export' with button added to the Action Library.

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