

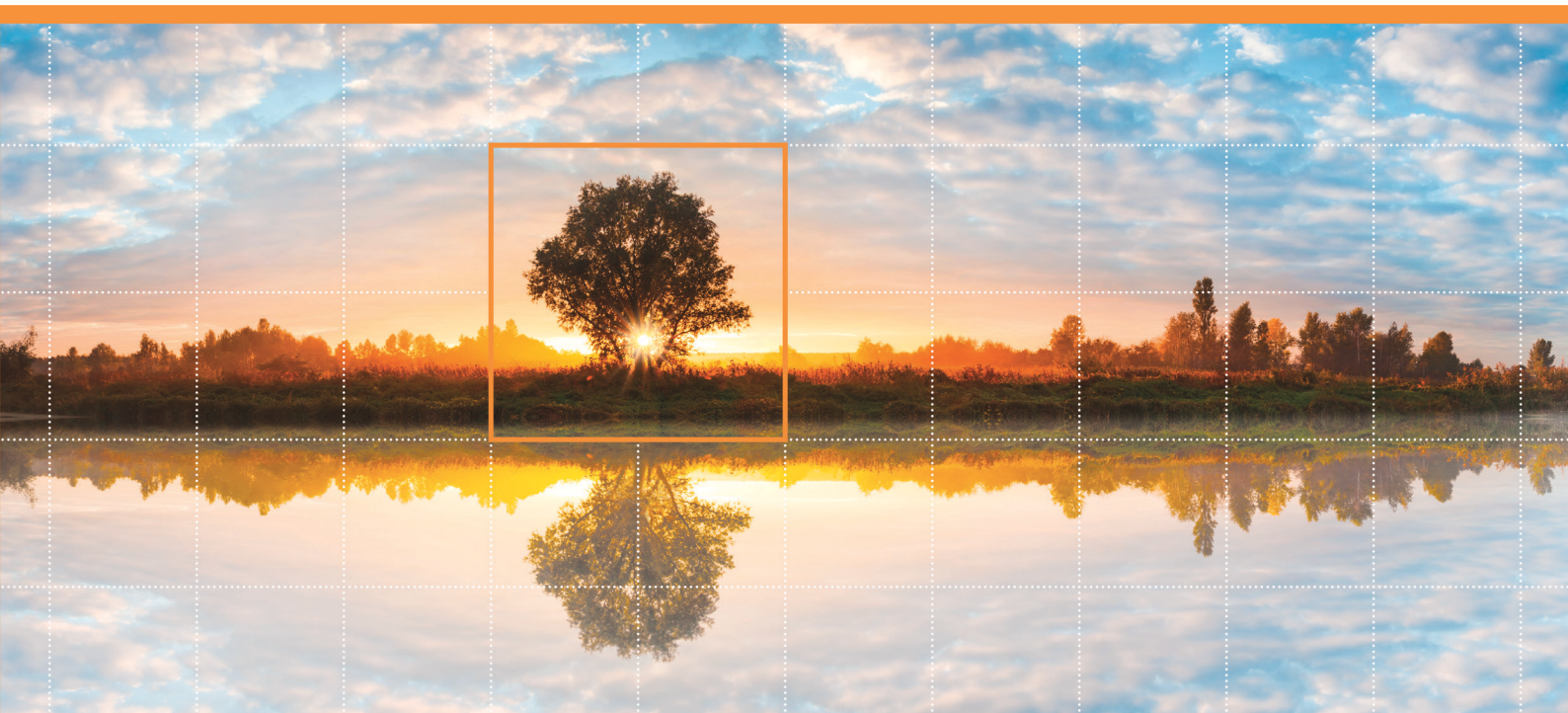


HALCON

a product of MVTec

HDevelop Edge Label Tool

Quick Guide



Version 1.0

About This Quick Guide

This is a quickstart guide for the prototypic edge label tool which can be used to create label images for HALCON's deep learning edge extraction. The tool runs in HDevelop. As HDevelop is not built for the purpose of programming GUI-applications, unexpected behavior or failure cases may occur.

This guide shows some exemplary usages of the label tool for an easy start. It does not contain details on script parameters nor an overview of functionalities. Please refer to the documentation in the script for further information.

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More information about HALCON can be found at: <http://www.halcon.com/>

Introduction

For retraining the deep learning edge extraction model provided by HALCON, labeled images are required. This can be done with the help of this prototypic label tool in the form of a HDevelop script. Run the script `mvtec_edge_label_tool_<version>.hdev` and go through the the following main steps:

- Step 1: Edge Pregeneration (optional)
- Step 2: Manual Labeling
- Step 3: Class Assignment
- Step 4: File Creation

Also note the preparatory [Step 0](#) before starting the script. During [Step 1](#) and [Step 2](#), labels are created as HALCON regions while in [Step 3](#) a class label (gray value) can be assigned to to the labeled edge regions. The resulting label image is saved to disk in [Step 4](#).

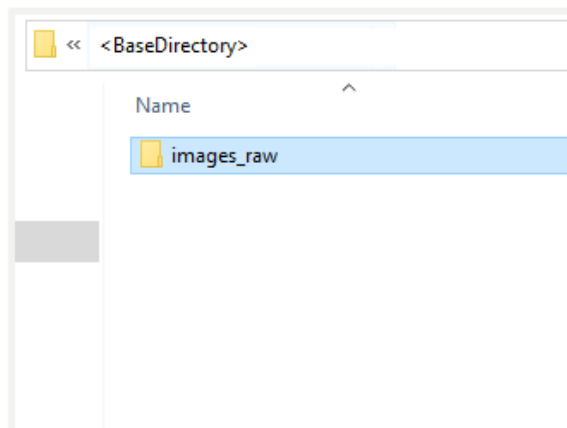
Step 0: Preparation

Before starting the script, set the following parameters at the beginning:

- BaseDirectory: Directory path for input and output data.
- Mode: Script mode 'new' or 'edit'.
- ImageWidth and ImageHeight: Size of the labeled images.

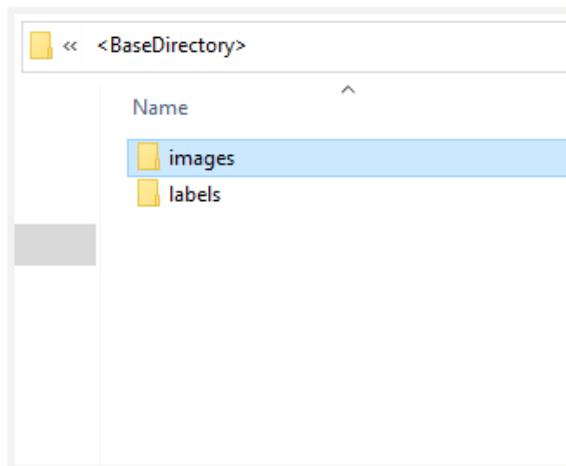
Depending on the mode, certain input directories are expected to exist and to contain the input images.

- Mode: 'new'



Note that names of input image files need to be unique.

- Mode: 'edit'



Note that both directories should not contain any subdirectories. Additionally, label images need to have the same name as the corresponding image with a suffix '_gt' since they are matched by their names.

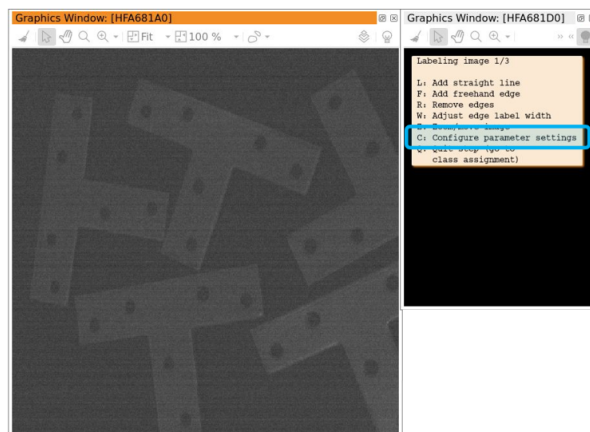
Step 1: Edge Pregeneration (optional)

The labeling process can be simplified by pregenerating edges using specific edge extraction techniques. To do so, the following edge extraction methods are implemented:

- 'dl'
- 'canny'.

You can select such a method by configuring the parameter settings as follows.

Enter parameter settings configuration:

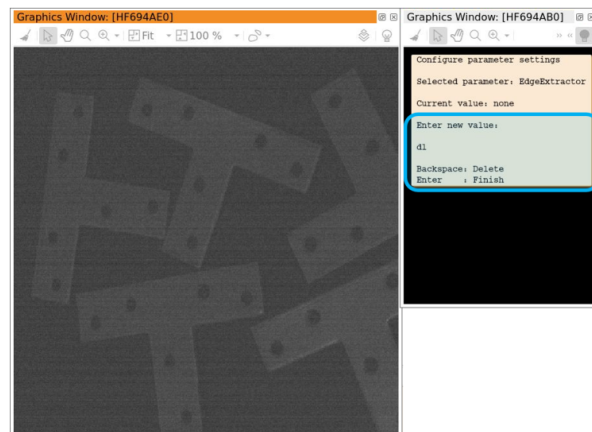


Choose parameter EdgeExtractor to set a new value:

1

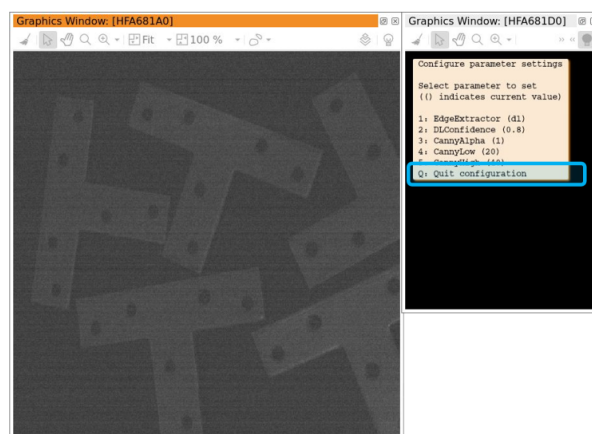


Set a new edge extractor for example by typing 'd1', followed by Enter:



Quit the configuration menu:

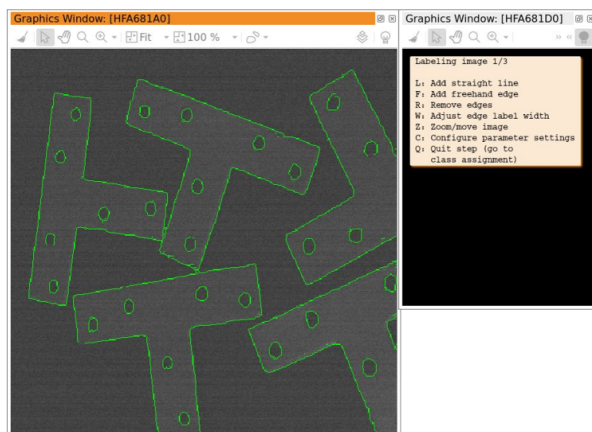
Q



Since the edge extractor has changed, the program asks whether to regenerate edges. Do so:



Resulting edges are now displayed:



Step 2: Manual Labeling

Edge labels can be added and removed manually on the image window.

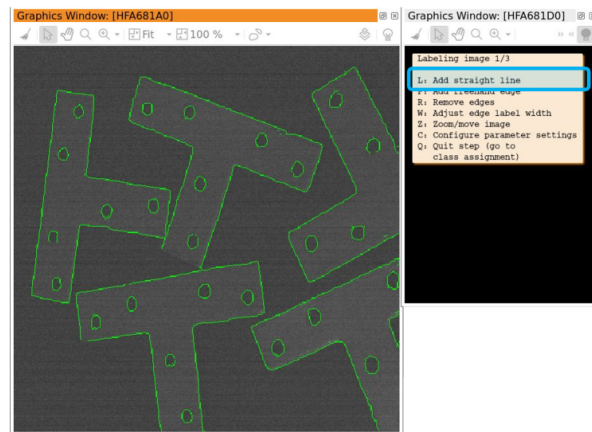
Add Edge

There are two options to add an edge:

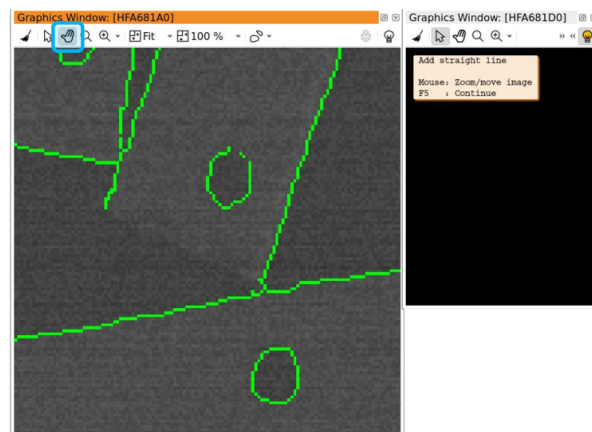
- Add straight line: Draw line through two points.
- Add freehand edge: Draw polygon.

For example a straight line can be added with the following steps.

Choose this option:



Zoom into the image for more precise labeling:



Left mouse click to draw the first point and right click to finish:



Left mouse click to draw the second point and right click to finish:



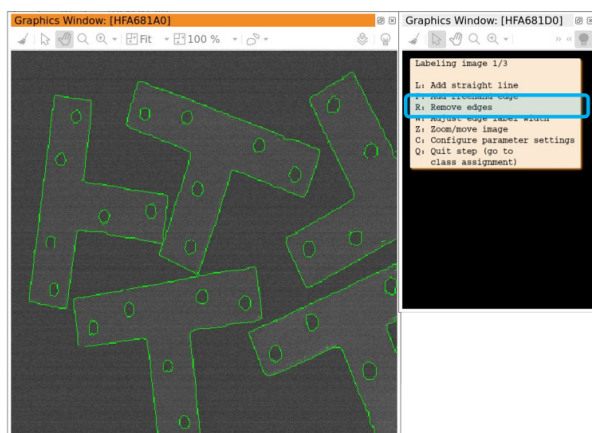
Confirm to save the added edge:



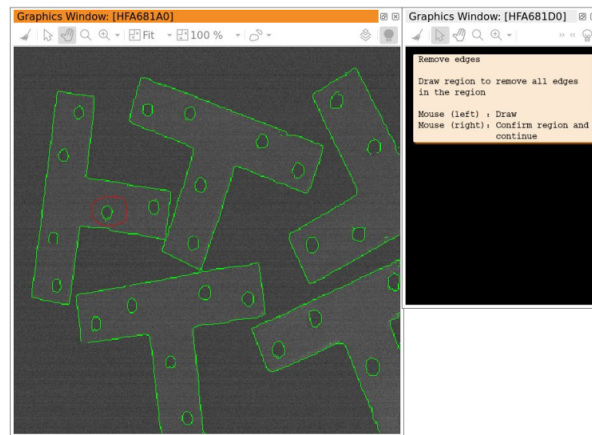
Remove Edges

Edges can be removed by specifying a region where all edges within will be removed. This can be done as follows.

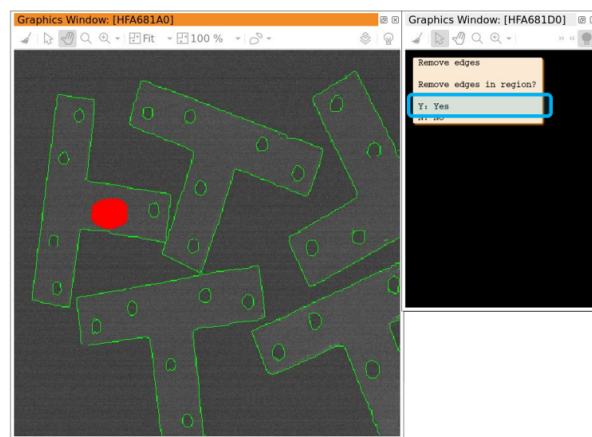
Choose this option:



Draw a region free handed with pressed left mouse click and finish it with a right hand click:



Confirm to remove all edges in the region:



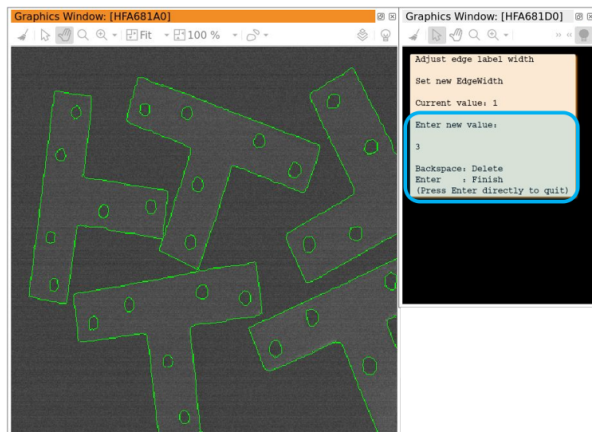
Adjust Label Width

The width of the edge labels can be adapted to a specified value. Note that edge labels should be as precise as possible, hence it is the best to have edges of 1 pixel width. However, in case there is a high uncertainty in the location of the edge, a greater edge width can be a better choice. In order to resize all edge labels of the current image, proceed as described below.

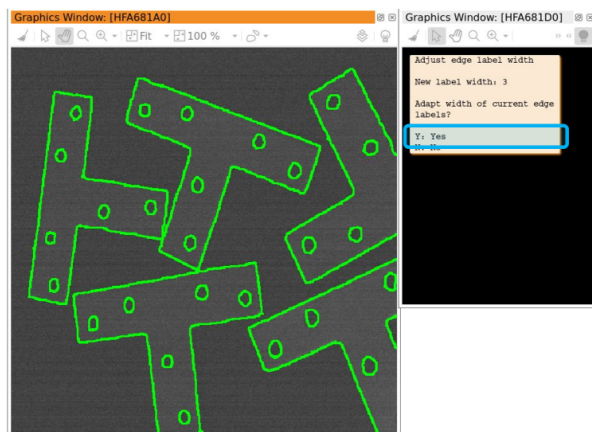
Choose this option:



Set a new value by typing the corresponding number, e.g., '3', followed by Enter:



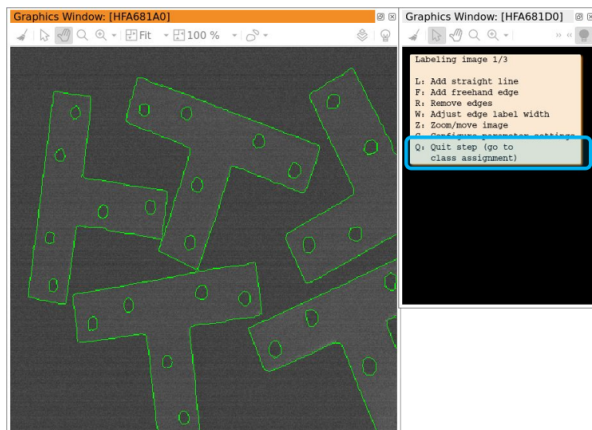
Confirm to save the new edge label width:



However, since a label width of 1 pixel is a better choice here, we do not save the changes in this case.

Finish Labeling of Current Image

Quit this step, when done with the manual labeling:



Step 3: Class Assignment

After creating the edge label regions, a class ID (gray value) is assigned to these regions. By default, a class ID of 255 (value of the parameter `EdgeGrayVal`) is assigned to all edge regions and a class ID of 0 is assigned to the background (all pixels that are not in an edge region). During this step, there is the option to select edge regions and change the class ID assignment of these selected regions. Note that edges of the same class should have the same class ID. In order to assign new class IDs, proceed as follows.

Choose to change class assignment:



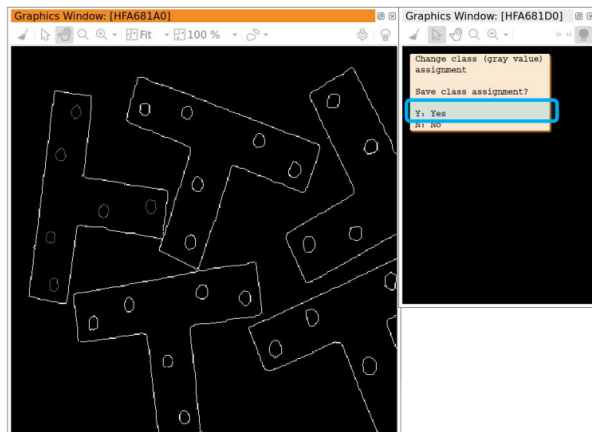
Set new class (gray value), for example '100', followed by Enter:



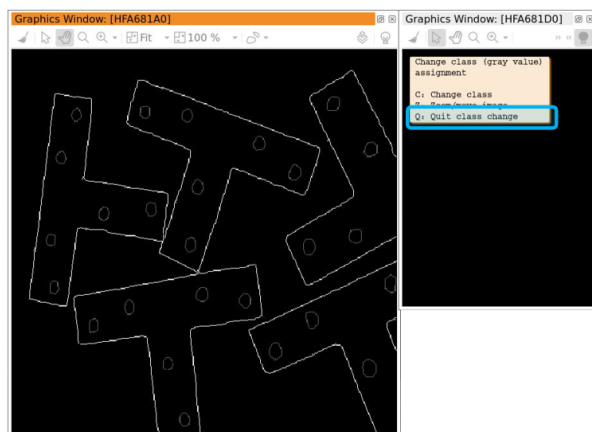
Select edges by drawing a region with left and right mouse click:



Confirm to save the new class assignment:



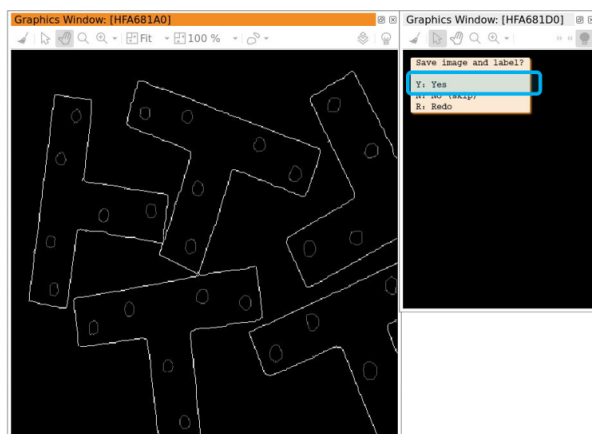
Quit step when all edges have the correct class:



Step 4: File Creation

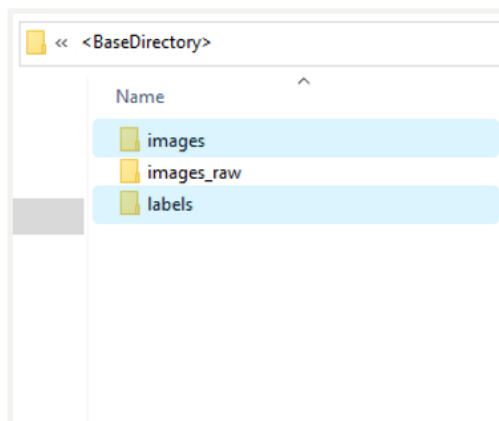
In the last step, the resized image (for Mode 'new') and the label image are written to files.

Confirm to write the images:



The output directories the images are written to depend on the mode.

- Mode: 'new'



- Mode: 'edit'

