

## PRINT QUALITY INSPECTION WITH SCORPION VISION SOFTWARE®

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Scorpion Vision Software is an advanced configurable PC-based Machine Vision System. The major features of Scorpion are:

- Hardware independent with regards to IO and Cameras
- Superior multi camera support
- Complete support for Firewire Cameras and DirectX

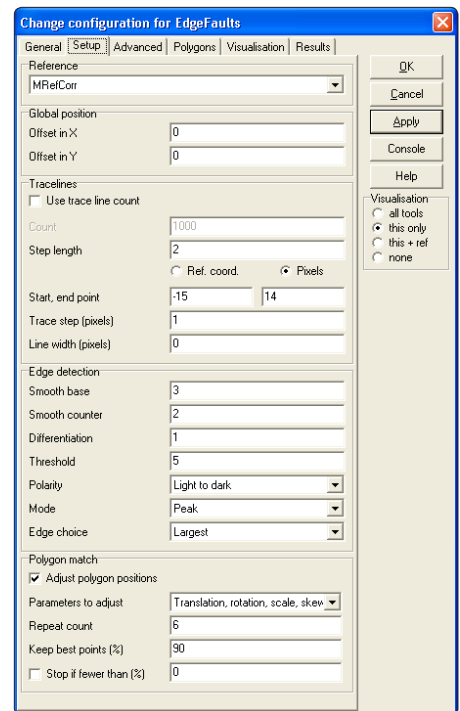
In this article we will focus only on the enhanced PolyLineEdgeFaults tool available in version 3.0 of Scorpion Vision Software.

This tool is a part of a large group of tools that handle multiple polygons as roi – region of interest. Other tools in this group are Blob3, MultiBlob, PolyLineGap-Finder and PolygonMatch.

The edge tools in this group work with sub-pixel precision when using a lens-calibrated reference and can thus be used for high precision gauging. To the right the edge of a print is checked for defects.



*Print checked for defects*



### PolyLineEdgeFaults

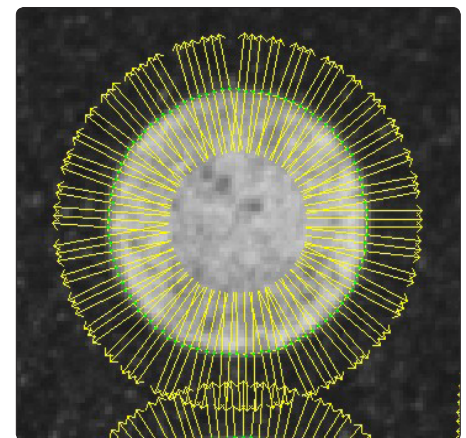
PolyLineEdgeFaults finds edge faults and missing points along the lines of multiple polygons and is well suited for print quality inspection. The Region of Interest can be read from file, copied from another tool or created manually by mouse clicks. All polygons can be edited and adjusted - the following polygon operations are available: add / remove points, smooth, simplify and translate. The model can be given in physical dimension making them independent of the actual image capture configuration.

### Configuration

A Scorpion tool is configured using tool property pages – here one of the property pages of PolyLineEdgeFaults is shown. In the property pages the trace line roi and edge detection properties are set.

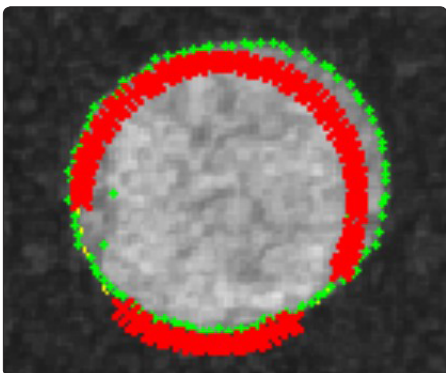
### Trace lines

All Scorpion edge tools are based on a trace line concept. The trace lines are perpendicular to the polygons and locate the edges with sub-pixel accuracy.

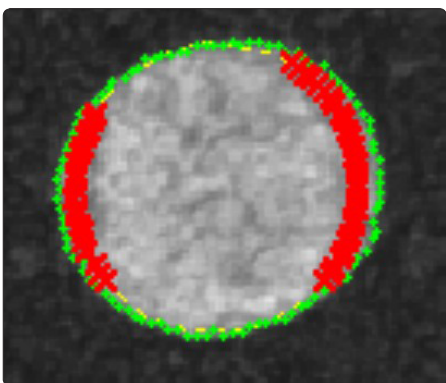


*Edge tool trace lines*

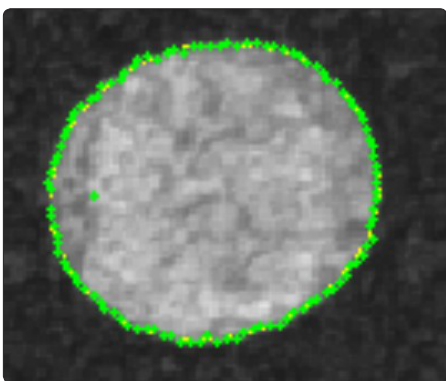




*No Polygon match*



*Polygon match – Rotation and Translation*



*Polygon match – Rotation, Scale, Skew and Translation*

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### Fitting polygon before Fault Detection

In print quality verification it is important to fit the polygon before searching for errors. Scorpion's Polygon Match technology can be activated to fit each polygon to each object. The Polygon Match offers three fitting options:

1. Translation and Rotation
2. Translation and Scale
3. Translation, Skew, Scale and Rotation

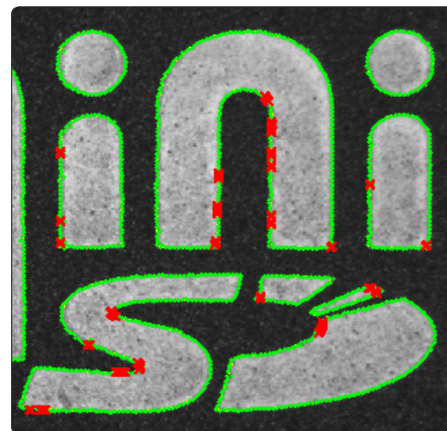
To the left you see three images where the importance and power of Polygon Match is demonstrated. The yellow line is the polygon model. The green dots are the actual edge points and the red crosses are missing edge points.

When no Polygon Match is applied the model is offset and a large number of faults are detected. When rotation and translation is applied model is positioned correctly, but there is still a smaller number of faults detected. The dot is larger and skewed compared to the polygon model. In the last example when all four degrees of freedom is applied, the model is fitted to the object and correctly no edge errors are detected.



*No Polygon match*

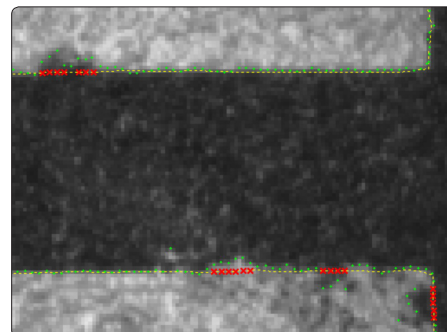
Working on a number of letters we see that when applying full Polygon Match fitting, the tool has the ability to describe faults even when the print varies in size, rotation and position.



*Polygon match*

### Edge Error Detection

In the example even small faults are reliably detected. Faults can be defined as missing points, gaps or area with a minimum length and area. Measurements are performed in physical dimensions – mm2.



*Small faults detected*

### Conclusion

Scorpion Vision Software is excellent for advanced print quality inspection with its complete range of polygon roi tools working with sub-pixel accuracy in physical dimensions. This creates new opportunities for engineers working in manufacturing.

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