

Surface Contour Matching User Manual

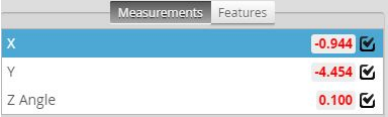
1. General introduction

“Surface contour matching” tool is mainly used for locating object with a closed contour. Before matching, a contour master created from a target object located in a standard position should be saved. During the matching phase, this saved master is loaded to compare with the contour extracted from the object in a different position. 2D Transform, including X, Y and Z angle between the two objects is calculated and output as measurements.

The measurement output is usually served as anchor input into “Surface planar transformation” tool so that the entire surface can be transformed to align with the pose of master.

A current limitation is that it can only apply to **closed contour of convex shape**.

2. Parameters and outputs

Master File	Master file name to select. The file is located in C:\LMI\SurfaceContourMatching folder	
Master Operation	Normal: Normal condition to run the contour matching algorithm. Save: Save current object contour as master into a file. Delete: Delete the current selected master file.	
Angle Range	Allowed total angular transformation range. If set to e.g. 10 deg., allowed rotation will be +-5 degrees away from the master orientation.	
Angle Resolution	When matching contour, the tool needs to specify a minimal distinguishable angle when comparing with master. A larger value indicates a coarser matching but an improved speed. Too small value may not make too much sense due to sensor resolution.	
Smoothing Kernel	Smoothing filter is applied after extracting the contour to reduce the impact of noise along contour. Note that the unit is in pts.	
Display Contour	Display the contour in red dots	
Measurement	X, Y: Center position of the object with respect to sensor origin. Z Angle: Rotation with respect to master's orientation.	

Feature	Object Center: Center point of the object with respect to sensor origin.	Measurements Features Object Center ☒
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3. Application Example

Here is an example showing alignment an oval-shape earphone. It will be quite difficult / slow to align such a shape with very irregular contour by a traditional template matching method. This task can be performed very fast with current tool, see Fig.1.

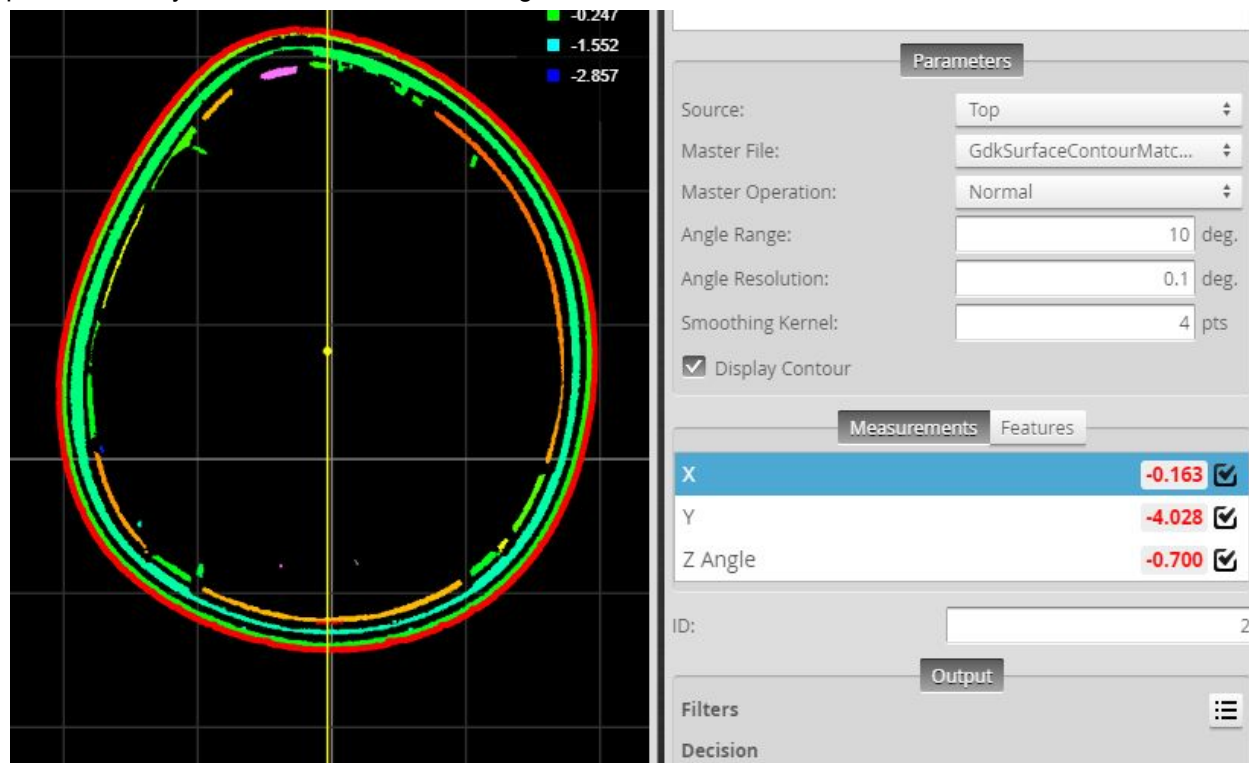


Fig.1 Contour matching of an oval-shape earphone. Red outline represents the closed convex contour of the objects.

After the X, Y and Z angle are calculated, these values are passed into "Surface Planar Transform" tool as anchor values in order to correct the 2D pose of the object to align with the master's pose, see Fig.2.

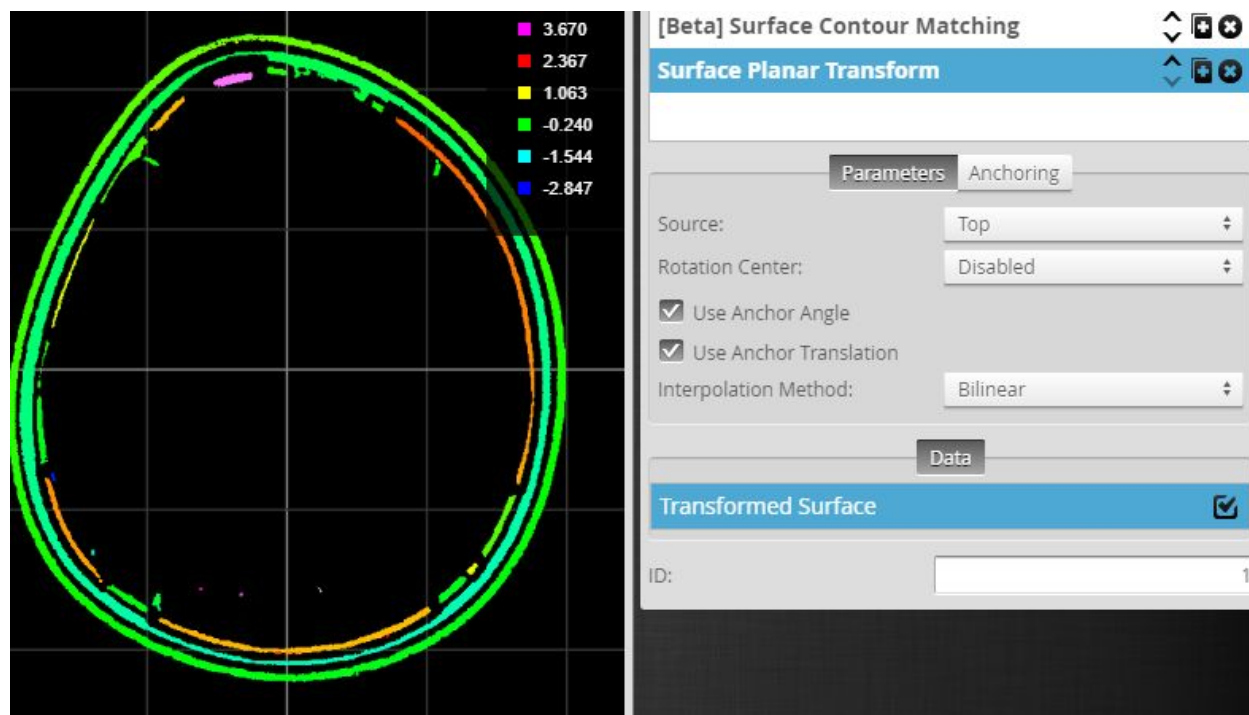


Fig.2 Surface planar transform tool uses measurement values from Surface contour matching tool to correct pose of the current object for the entire surface.