The Match3D Tool

The AQSENSE SAL3D Match3D Tool is a sophisticated piece of software that allows the extremely fast alignment and comparison of 3D point clouds with their respective models. Based on a "best-fit" approach, the patent-pending alignment procedure is used as a tool for very fast determination of the position and orientation of objects, and combined with the SAL3D Core for an optimized surface subtraction for surface comparison.

Features

- Alignment time ~ 100ms*
- New parameters to control alignment accuracy
- Alignment quality factor (to quickly identify bad alignments
- Automatic prealignment (Match3D Coarse extra option tool)
- Comparison with CAD (by using the CAD Import tool)

*Our Benchmark: 1 Million point surfaces. Initial misalignment of 10 degrees and 10 mm in the three axis XYZ. CPU Intel Pentium IV Core Duo 2 1.8GHz 2 GiB DDR2 (667MHz) RAM. Comparison time according to ROI size

Benefits

- 100% inline parts dimensional inspection and analysis available
- Complex shape 3D surface inspection
- Simple mechanical set-up for parts positioning
- Easy model change with no machine re-engineering
- Few overlapping required that allows alignment of several views to get a full reconstruction
- No prealignment restrictions using the extra Match3D Coarse tool*
- Easy to implement code

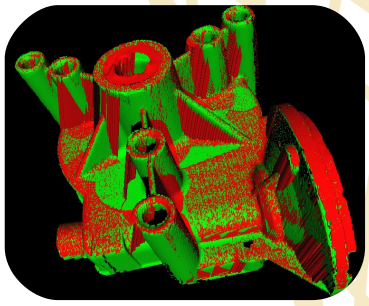
* In case of non symmetric objects with high overlapping area

Match3D Sample Code

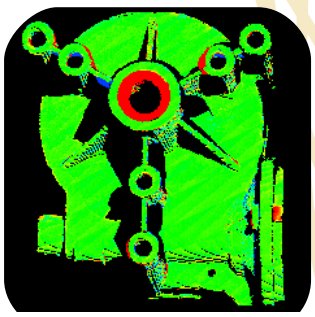
```
void
acquireAndCheckParts (const std::string &modelFileName)
{
   sal3d::COP model(modelFileName);
   sal3d::ZMapFactors zFactors(model.getZMapFactors());
   sal3d::ZMap zModel(model, zFactors);
   sal3d::Match3D match(model);

   while ( !endProcess() )
   {
      sal3d::COP part(getCOP());
      sal3d::Movement3D alignMatrix(match(part));
      sal3d::ZMap disparityMap(
                  zModel.getDistanceToMovedCOP(part,
alignMatrix));
      // Enqueue the disparity map so another thread can
process it.
      enqueueDisparityMap(disparityMap);
   }
}
```

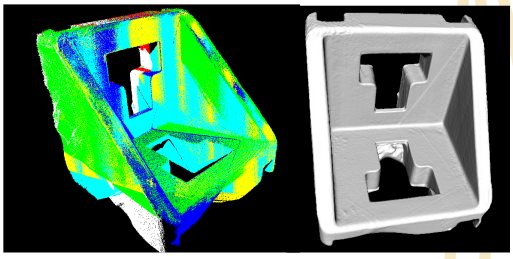
Before Match3D



After Match3D



Disparity Map for Quality Control



3D Model obtained after the alignment of several views using Match3D

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