



In order to reconstruct cylindrical surfaces from digital point clouds, the point clouds have to be segmented at first; but interactive segmentations are time-consuming and error-prone. Using the innovative software module **Cylinder Detection**, cylindrical full and partial surfaces can be extracted either fully or semi-automatically from unstructured and/or meshed point clouds.

Applications

- Measuring and inspection of cylindrical surfaces, particularly using point clouds from volumetric measuring devices, e.g. computed tomography
- Extraction of geometric entities in order to align a measured point cloud with a nominal CAD-model (registration)
- Automated segmentation of point clouds for reverse engineering applications

Features

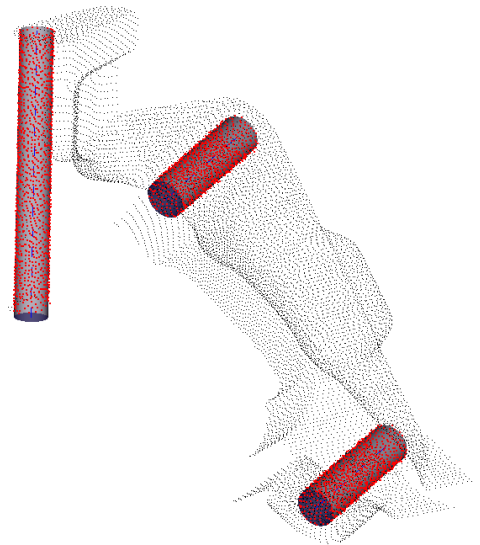
- Extraction based on unstructured or meshed point clouds, therefore independent from scanning devices
- Expandable to the extraction of planar and spherical surfaces
- *Method 1*: Fully automated extraction of all cylindrical surfaces in the point cloud without any user interaction
- *Method 2*: Extraction of a single cylinder using a picked point
- *Method 3*: Extraction of cylindrical surfaces using nominal cylinders, e.g. from a CAD model, optional: Automated inspection of nominal and extracted cylindrical surfaces

Algorithms

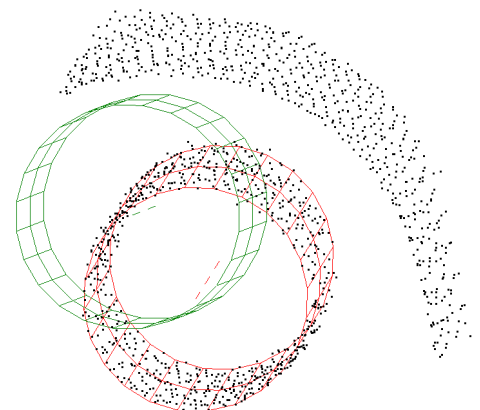
- Approximation of the tensor of curvature and region growing
- Minimization of orthogonal distances to the cylindrical surface using Gaussian least squares

Implementation

- Programming language C++
- Modular design either for the integration in existing software systems or as stand-alone application including visualization (OpenGL) and reporting of the deviations
- Support of multi-core architectures and 64-bit platforms



Automated cylinder extraction



*Extraction of a **cylinder** using a **nominal cylinder***