SCAN technology
Feature recognition in 3D-scanning

A 3D-scanner measures distances from a plane or cylinder to points on 3D-objects.

The raw data is organized as measurements of a height function $z = f(x, y)$. The height-function is measured at 'scan-points' (x_{ij}, y_i) situated on 'scan-lines' where y is constant, see figure 1. Neither the scan-points nor the scanlines needs

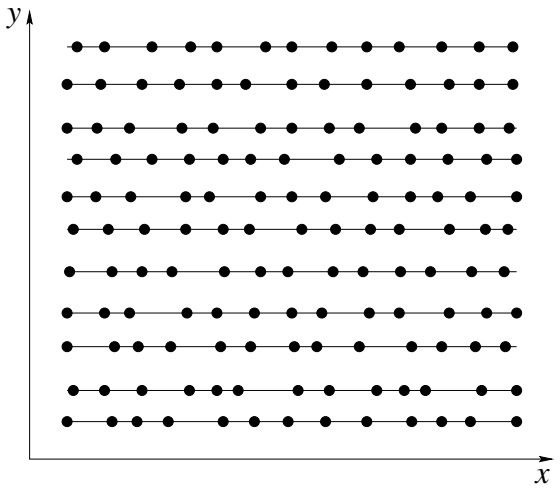

Figure 1: Distribution of scan-lines and scan-points on the reference plane

to be equidistant, and the number of scan-points on a scan-line needs not to be constant. In a scan-image we have the following typical values:

- Number of scan-lines 100-10 000.
- Number of scan-points on a scan-line 100-10 000.
- Precision of y-measurements ± 0.01mm.
- Precision of x-measurements ± 0.1mm.
- Precision of z-measurements ± 0.1mm.
- Distance between scan-lines $0.2 - 5.00$mm.
- Distance between scan-points $0.2 - 2.00$mm.

At the moment data reductions is performed on each scan-line based on a curvature analysis of the height function on this line and this leads to a data-reduction of 40-80%. After the data-reduction the scan-points are triangulated and an approximation of the height function is obtained, which defines a surface. It is this triangulated surface which is used later in the process, which typical consists of the calculation of tool-paths for a milling machine, in order to make a copy of the original object.

It would be advantages if it was possible to automatically find features in the picture, such as the centerline of ridges and valleys, and peaks and holes.

The task of the study group is to

Automatically recognize features in the image which should be preserved during the data-reduction.

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