



3D laser scanning



The laser scanning technique is a light striping technique which is used for 3D measurements of object surfaces. To acquire the 3D information, the object is moved relative to a laser line, while it is observed by a camera. The camera must be positioned outside the laser plane. Due to the different heights of the object, the camera will see a shifted laser line according to the height of the object. From this shifted laser line, the height of the object can be back-calculated.

In contrast to stereo image processing, the laser scanning technique only needs a single camera, but the 3D information will be acquired line-by-line. The accuracy of the measurement depends upon the thickness of the laser line, the resolution and the distance of the camera and the reflectivity of the scanned surface. Under ideal conditions, a spatial resolution of 100 μm is possible.

Due to the fact that the object must be moved relative to the camera, the laser scanning technique for example is suitable for the quality control of work pieces on conveyor belts. It's also possible to measure "unknown" objects.

A concrete example is the measurement of packages, which is used in combination with a scale for automated postage calculation. With VGA camera resolution and an object height of 100 mm, a spatial resolution of 1 mm is achieved.

The laser scanning technique can also be used in car-wash plants to measure the incoming cars. With the exact 3D information, the car can be washed optimally. With an assumed height of 1.6 m and a relative low camera resolution, it's already possible to archive a spatial resolution of 10 mm. Higher spatial resolution can be achieved by increasing the camera resolution.

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