3D Surface Scanner Using Structured Light & Industrial Robot

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Introduction

Having a detailed surface reconstruction of an object is very valuable in for example geometric modeling, to store an art piece for the future or to scan real objects to use in computer graphics such as 3D drawings, computer games etc. The 3D surface scanner is build by mounting a structured light scanner (STL Scanner) on the arm of an Industrial Robot. The robot is controlled by a special designed interface.

Imaging Robot

The imaging robot is an industrial robot from ABB Robotics with an interface designed for performing imaging tasks. A camera, laser or STL scanner can be mounted on the robot.

Structured Light Scanner

The Structured Light Scanner consists of two cameras and a projector. The setup uses two Point Grey cameras, and a pico projector which makes it so small that it is mountable on the Imaging Robot arm.

3D Surface Scanner

Mounting the STL scanner on the robot gives the potential for approximately full surface scan of complex objects.

**How it works**

The projector projects a binary coded pattern on to the object. The cameras captures the result for every projected pattern, and by using triangulation, its possible to construct a point cloud representing the scanned object.

Capturing datasets and generating point clouds from multiple angles. Recording all the positions and rotations of the scanner.

Rotating, moving and combining point clouds.