

Ein Vergleich von zwei 3D Modellscanner A comparison of two 3D model-scanners

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Introduction

One of our projects needs to digitize moldings of jaws. Especially the surface of the teeth, the area of occlusion of the mandible and maxilla and the neck of the teeth are the regions of interest. For this the two commercial scanners Micromasure M70 and the Willytec Laserscan 3d Pro were tested.. The comparison describes the difference of the scanners concerning the resolution, the used applications and other aspects. The Willytec scanner is the one which is faster, has a higher potential of usability, and is more comfortable and precise than the M70.

Methods & Results

The Micromasure M70 is a 3D model scanner which has three degrees of freedom. It has a rotating table which is placed onto an arm. The table can be moved in the z-direction on this arm, which also can be rotated along the x-axis. Through these two axes which can be rotated and the table which can be moved by the controlling software, the scanner gets the opportunity to scan the object from several views without changing the position of the fixed object. Furthermore the software has the ability to match the different taken views. The field of view of the scanner is about 70mm. The upper limit of the resolution, which is calculated by a 95% confidential interval, is about 160µm in x-, 140µm in y- and 0.005mm in z-direction. The lower limit is 154µm in x-, 139µm in y- and 0.0049mm in z-direction.

The Laserscan 3D Pro comes within a box. The table, which carries the object, is situated in the middle of the box onto a manually fixed table. This table can only be moved in the z- and the x-axes. The field of view is 16mm wide (single scan). Through the ability take several single scans, it is possible to scan an object which is up to 150mm wide. These

scans can also be matched to each other to create a whole model of the object. The resolution of the scanner is between 26µm and 33µm in x-, 29µm and 30µm in y- and 0.0049mm and 0.0051mm in z-direction. The scanning software has a lot of different functionalities, for instance distance measuring or filtering.

Discussion

The visual quality of the resulting 3d models shows quite good results. But there are still areas which the scanners cannot map. The model created by the M70 has more holes than the other one. But they can be reduced by scanning the object from different angles. One of the major disadvantages of the M70 is the time it takes to process one scan. Others are the noise and the fact that the room must be completely shaded. The object in the Laserscan 3D Pro is automatically in a dark box, so there are no requirements to the room itself. This scanner is also faster and generates less noise than the M70.

Although the Laserscan 3D has major advantages versus the M70, the M70 is still accurate enough for our purposes.