

Development of Low Cost 3D Scanner for Surface Registration of Simple Objects

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Three-dimensional scanning has been widely used for many years for reverse engineering, quality control and part inspection applications. Use of the technique has recently expanded into the entertainment industry for character animation, toys, computer games, and feature films. Other applications include archaeological applications and forensic assessment.

3D laser scanners are high tech devices that have the ability to accurately capture the surface of objects and provide real 3D data back to the user. It analyzes a real-world object or environment to collect data on its shape and possibly its appearance. The collected data can then be used to construct digital, 3D models useful for a wide variety of applications. However, they can only obtain a partial representation of the scene while the human mind is able to imagine and extrapolate all the information from the object.

The goal of this research is to study the different techniques used and propose convenient and fast mechanism to register 3D acquisitions. This study detects the complexity of the existing techniques and presents a new classification in 3D real time registration.

Historically, devices that could be used in 3D scanning have been prohibitively expensive. Large scale devices can cost in excess of \$20,000 with desktop units, with limited capability costing more than \$1,500.

Therefore this research focused on acquiring 3D models for computer graphics and animation applications using low-cost 3D laser scanning' system. The primary advantage of laser scanning is that the process is non-contact, fast and generates coordinate locations that lie directly on the surface of the scanned object.

This research describes a low-cost hardware and software system for construction of digital, three dimensional, computer aided model of simple real-world objects, that will be useful for a wide variety of applications.

Key words: 3D laser scanners, Computer graphics, Animation applications