PhotoModeler® Newsletter

Measuring & Modeling the Real World.

November 2008

We hope you find this issue of the PhotoModeler® newsletter useful and informative. We encourage you to suggest topics that you would like us to address in future issues. Please forward this to a friend or see back issues by visiting this link.

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3D Scanning Doesn't Need to be Expensive

3D Scanning is the process of capturing a large number of 3D XYZ point measurements, called a point cloud, from a surface of an object or a scene. 3D Scanning technologies often include post-capture processing for data clean up, and conversion (such as conversion to triangulated meshes).

There are a number of 3D scanning technologies with different capabilities and different price points. If your object is less than 3 feet/1m across there are white-light scanners, close-range laser scanners, striped-light probes for mechanical digitizers, and PhotoModeler Scanner. These types of products are available from: NextEngine, Minolta, MicroScribe, Faro, Romer, Exascan, Inspeck, and FlexScan3D, to name a few.

If your object or scene is larger you can use a full laser scanner or PhotoModeler Scanner. Example laser products are available from: Leica, and Riegel.

You can see there is some choice of technology - so what are some of the advantages PhotoModeler Scanner has over laser scanners in general? These are:

1. Low cost.
2. The broad range of object sizes that can be handled.
3. Portability and ease-of-use when in the field.
4. Speed of data capture.
5. Photographic RGB data tied one-to-one to the 3D XYZ data.

Cost Effective
If you are doing high-density scans of only smaller objects (2 inches to 3 feet / 5 cm to 100cm), esp. ones that fits well on a turn table, then a scanner such as the FlexScan3D or the NextEngine is a good choice at a reasonable cost. If you scan these objects as well as bigger objects then PhotoModeler Scanner fits as well.

For all other applications, PhotoModeler Scanner is your best option if you want a cost effective solution. If you have a good quality digital camera already, your total cost to get scanning, point editing and triangulation, is $2695usd with PhotoModeler Scanner. This is a fraction of the cost of most alternatives! In fact for the cost of renting a large laser scanner for a few days for your next architectural or engineering project you could buy PhotoModeler Scanner and use it forever!

Size Independence

FROM THIS TO THIS
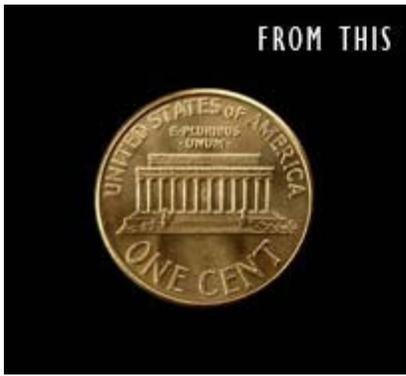
A camera can capture a penny as easily as it can capture a glacier or a mountain range. Photography is size-independent, where a laser scanner is designed to handle only a certain size of surface. As long as the surface has a visible texture it may be scanned by PhotoModeler Scanner, regardless of size.

Portability and Ease of Setup

THIS VS THIS

Laser scanners that are used for capturing larger objects and scenes are cumbersome and sensitive instruments. They require a large tripod and need careful setup at the site on a stable platform. On the other hand, the camera that is your field instrument for PhotoModeler Scanner is very portable and you can simply start snapping your pictures when you arrive on site. See the article below by Steve Chapman of Gentle Giant Studios where this gives him a critical business advantage.

Capture Speed
A laser scanner sweeps a laser beam over the surface and times the return at each spot. This can still take anywhere from tens of seconds, up to some minutes. If the subject is moving, this scan time can cause errors or outright invalidate the results. Because PhotoModeler Scanner uses photographs, which can be taken in fractions of a second, this is not a problem. If the object is vibrating but mostly still, a single camera can be used, or if the object has large movements then multiple synchronized cameras can be used to snap the object at one instant in time.

Tied Photographic Data
A few laser scanners have the ability to tie image data or extract rgb values and tie them to the 3D point cloud. This is great for visualization and for performing quality checks. Because PhotoModeler Scanner uses the same photograph to extract RGB and textures as it does to extract the 3D surface model, you get an exact 1 to 1 correspondence of color to 3D point. See the image in article below by Steve Chapman where we see a point cloud with each point's RGB value automatically extracted from the photography used to create the scan data.

Applications
PhotoModeler Scanner has already built up a large following of users since its recent release, including some of these applications:
- stock pile volume measurements
- rock faces - shape, character and volume
- visual fx - movie animation input
- archaeological digs

PhotoModeler Scanner in Visual FX

Guest article by Steve Chapman, Gentle Giant Studios

PM Scanner Point Cloud w/ RGB
by Gentle Giant Studios

We travel the world capturing 3d reference data of movie sets for use in visual effects, video games, and licensed toy products. You can imagine the costs involved in shipping gear, as well as the damage that can occur when shipping a laser scanner that weighs several hundred pounds. Because laser scanners are usually designed around a particular type of object or "envelope" to be scanned, we've had to invest in more than a dozen different scanning technologies … human head scanners, lidar scanners, small object wand scanners, and vehicle scanners. When we arrive on set we can never really predict what will be thrown at us. We spent a month on the set of Star Wars, for example, where every day a bevy of props, costumes, actors, and set pieces were laser scanned by whichever scanner seemed appropriate to the particular object. We had to bring so much gear that it felt like a moon mission.

You can understand our excitement to learn that PhotoModeler Scanner might allow us to do the job faster and cheaper by packing a well calibrated camera instead of hundreds of pounds of gear, and that we can pass the savings along to our customers while also being able to jump on a plane to a film set thousands of miles away without having to plan shipping weeks ahead of time, and not tie up our gear if we are needed in two places at once. After a few short days of testing, we were certain we needed to purchase PhotoModeler Scanner right away.

Imagine the logistics of scanning a statue in a public setting, for example. We 3D scanned the Lincoln Memorial in Washington using a $100,000 lidar scanner after weeks of obtaining permits, and having to work around tourist crowds as well as having to explain what we were doing and show our permits to every law enforcement official, while dealing with a light rain and having to run power off of a battery system augmented by a portable generator! When we arrived we were told that we could not place equipment on grass areas and we ended up having to use photogrammetry to determine the depth of the sides of the structure where we were not allowed to scan.

Using PhotoModeler Scanner, we scanned a statue of President Lincoln in a local park with a simple DSLR camera, without onlookers raising an eyebrow!

Read more at www.GentleGiantStudios.com.

PhotoModeler Scanner in Geological Engineering

Daniel St. Gelais of Trow Associates Inc. describes his project using PhotoModeler Scanner that involves several government organizations and private companies;


"We are comparing the technique currently used in the field to map a rock face (LIDAR survey from ground level) with a new method using a Remote Controlled (RC) helicopter to photograph the rock face at different altitudes with 60% overlap to allow high definition 3D modeling of the entire rock face. The results will be used to create a high definition 3D model using the new PhotoModeler Scanner software.

The RC helicopter technique (provided by Altitude Imaging Technologies) should give a better resolution of the upper part of the rock slide which is difficult to obtain from the ground level with a LIDAR due to the presence of upper benches not visible from the ground. In addition, the new technique will provide geological information and presence of seeps in the upper area of a rock slide difficult to access by field experts in a safe manner.

The increased safety of this method, plus the opportunity to model areas of rock slides that are not visible to the ground-based LIDAR equipment are both compelling advantages of PhotoModeler Scanner in this application. The images here are visualizations straight from PhotoModeler Scanner representing some of our data capture."

Daniel St-Gelais, M.Sc., P.Eng.
Environmental Regional Manager, BC
Trow Associates Inc.
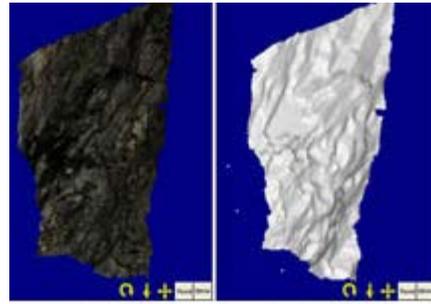
Rock face - textured and shaded views

Upcoming Upgrade of PhotoModeler Coded Targets

Eos is completing major enhancements to PhotoModeler's Coded Target Module. The enhanced module will automatically mark and reference targets on photos significantly faster, includes new features, and has more robust error detection to prevent misidentified targets.

The improvements include a new coded target type called the "Ultra Target" which greatly reduces coding errors and makes robust, fully-automated projects possible even in an uncontrolled naturally-lit environment. The Ultra Target set has 999 different codes opening up new project possibilities. There are also new target printing capabilities. When this upgrade is released the price of the Coded Target module will increase but it will be a no cost upgrade to all current owners of the module. So order your PhotoModeler and Coded Target Add-on today to take advantage of the great improvements at the current price! The enhanced Coded Targets module with Ultra Targets will be included in an upcoming upgrade of PhotoModeler Scanner as well.

visit the PhotoModeler web site »
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