

Remarks of Mark Mudge at the Computer History Museum Panel:

“From Guttenberg to Galaxy: Accessing Cultural Assets Online” Part of the Odyssey’s in Technology lecture series.

February 23, 2005

The slides that accompany these remarks can be found at the CHI website:
www.c-h-i.org/events/events.html

The demos referred to in the remarks and slides are available on the CHI website in the examples area. The final demo, 3D models with PTMs is a work in progress and is not yet available.

Good evening,

I’d like to suggest a vision of the future where all significant cultural heritage objects and sites are digitally documented in a way that captures their relevant features and presents this information in a manner that is searchable and accessible to everyone everywhere.

It is important to move in this direction.

Let me offer two examples:

A Tlingit Native American living in South East Alaska who wants to explore his or her cultural legacy is essentially out of luck.

Most of their patrimony has either been destroyed or dispersed around the globe.

It resides in the museum of Anthropology and Ethnology in St. Petersburg Russia, in Switzerland, Germany, France, England, New York, Washington DC and a host of other locations.

To most Tlingits, this material might as well be on the dark side of the moon.

Sometimes the access problem is reversed with scholarly expertise scattered around the world, unable to bring their collective efforts to bear on a single project.

There are only a small number of people in the world who can fluently read ancient cuneiform tablets.

Over 120,000 cuneiform tablets have been in the British Museum for over 100 years. Only about 15% have been read.

Without digital representations, much of humanity's legacy will remain locked away, isolated in disparate collections and stored in institutional basements.

Effective online access to cultural heritage material requires that the user’s experience of a digital representation capture the relevant information present in its ‘real world’ source material.

New two and three dimensional digital techniques can 'virtually' document and communicate far more information about cultural heritage material than is currently provided through traditional sources such as drawings, printed reports, motion pictures, and photographs.

When an Assyriologist wants to read a cuneiform tablet, they pick it up, put it under a desk lamp or take it to a window, and rotate it to disclose its markings.

A virtual cuneiform tablet can provide the Assyriologist the same opportunity.

It is time to see some examples of these new, user controlled documentary methods.

This is a spherical panoramic environment.

It shows the interior of a stone 'shelter' built and occupied by St. Bernard atop a high alpine pass 1000 years ago. This structure, seven feet long, three feet wide, and five feet tall, began a tradition of refuge and welcome for travelers that continues today.

It has not been open to the public for over nine hundred years.

Here are two very cost effective 'object movies' of roman artifacts excavated by the monks of St. Bernard's order.

The first is a sculpture of Jupiter.

It is on display at the monastery's small museum that is open to the public during the three months of the year when the roads are passable.

The second is a tiny engraving of Nike presenting a wreath of victory to a roman soldier. Prior to its digital documentation, it was locked away in the monastery treasury and known only to a handful of church archivists.

This is true 3D textured geometry of a silver Athenian Tetrachma coin.

It was captured with a 3D scanning technique, and output for online use as an object movie.

It was minted in 449 BCE by Pericles to help pay for the construction of the parthenon.

It's 22 mm in diameter and the scan contains 38 scanned 3D position points per square mm.

Here we see a graphic illustration of the 3D shape information it contains.

These are two Polynomial Texture Maps or PTMs

PTMs, developed at Hewlett-Packard Labs, display 3D shape information disclosed by the changing reflection of a user controlled light.

The first example, from the Roman Republic at 116 BCE shows a quadriga, a four horse chariot, with Nike flying above.

The second example shows a danish flint axe, from 3000 BCE.

Under mathematical enhancement, the PTM discloses fine knapping and use details not readily seen in a simple photograph.

And finally, here is a work in progress that integrates scanned 3D geometry and polynomial texture mapping.

This is a neo-sumerian Cuneiform tablet from 2200 BCE

It is two inches across and is made of fired clay.

Here's a clear example for the assyriologist that these techniques can enhance their ability to decipher this material.

I'd like to acknowledge our collaboration with Tom Malzbender and Dan Gelb of Hewlett Packard Labs and the assistance of Marc Proesmans of Eyetronics NV.

The idea of online access to our cultural legacy is meaningful only if we have a way to evaluate the quality of these digital representations.

Unlike the entertainment business where a good looking image is the goal, cultural documentation requires that the material is represented accurately.

If an archeologist is relying on virtual 3D models to study paleolithic stone tools, he or she must be able to judge the likelihood that a feature on the model will also be on the original and vice versa.

Just as 'real world' cultural material requires a provenance identifying what it is and establishing its ownership history, digital representations require an 'empirical provenance' that records the path of image generation from initial data capture through the process pipeline to its final digital representation.

The importance of empirical provenance increases as the complexity of the technical process involved in building a digital representation increases.

CHI's conversations with cultural heritage professionals emphasize that this evidential reliability is key to the widespread acceptance of online digital representations in research and education.

I want to close with a note about Cultural Heritage Imaging:

We are a 501 C 3 non-profit corporation, that does digital documentation and consulting in the cultural heritage field.

I'd like to thank Carla Schroer the co-founder of CHI, for running the demos today.

If you want more info, here's our website and my email address.

THANK YOU.

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