Digitisation: A strategic approach

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The Atlas of Living Australia (Atlas) is a cooperative, national project to produce a website that aggregates information on all species found in Australia, and provide a range of spatial tools to analyse the information. Data for the Atlas comes from a wide variety of providers including museums, herbaria, community groups, government agencies and natural resource managers. One body of work within the project is to support and enhance the digitisation activities of our partners: imaging, databasing and transcribing items?specimens, note books, photographs etc?in their collections for sharing through the Atlas.
This talk describes the framework developed by the Atlas for creating a strategic digitisation program within a collection or institution. It begins with a short overview of the Atlas, moves on to outline the constraints confronting digitisation programs and then introduces the two main approaches to implementing a strategic digitisation program.
Next, it defines the six core digitisation activities or processes, then presents a framework for implementing a digitisation program, followed by an overview of the Digitisation Maturity Model developed to assess an institution?s digitisation performance. It concludes with a brief statement of the key lessons learned by the Atlas when implementing a digitisation program.

REFERENCES

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Slicing into the past: using CT scanning as a basis for 3D modeling and functional analysis

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A cost-effective 3D laser scanning technique for paleontological research

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Despite its increasing use and utility, 3D scanning techniques are still considered quite expensive for the great majority of research institutions. As such, a cost effective technique to acquire and produce 3D data as accurate as possible would be a very valuable tool to paleontologists. We achieved excellent scanning results with a low-cost system that starts at 400 ?. It consists of a standard PC, the Windows software DAVID-Laserscanner, a camera, and a line laser module. The laser line can be swept manually over the object during scanning, which allows an interactive avoidance of laser shadow problems and outliers. The preconditions are two plain boards in the background, which serve as laser calibration target. Despite this simple hardware setup one can achieve accuracies of less than 0.2 mm. It is also possible to grab a texture of the object that is used to colorize the 3D scan. To get a 360 degree 3D model the object has to be scanned from multiple viewing directions. After that the software can align and fuse these digital surfaces automatically. The results can be saved in various standard 3D file formats (OBJ, STL, PLY).

We used DAVID-Laserscanner in multiple projects for scanning bones of several dinosaur species. The largest project was a newly discovered sauropod, which was scanned completely by the Museum of Natural History in Braunschweig, Germany, for further processing. Some missing parts were added and the deformations, which resulted from the sediment load over millions of years, where digitally corrected. Afterwards, the digitally restored bones were printed with a 3-D printer (laser sintering) and finally mounted as a skeleton reconstruction in an anatomically correct configuration using reinforcement steel.

Furthermore, we scanned several diplodocid vertebrae, including one complete neck and two tails from two specimens from the Sauriermuseum Aathal collection in Aathal, Switzerland. Comparing the results we got with 3D models of a second sauropod neck obtained by means of a high-class Structured Light scanner, the quality of the scans with DAVID was the same if not better. Whereas the high-class scanner was considerably faster especially for scanning the cervical vertebrae, the cost of the scanning device exceeds DAVID largely. Regarding the material DAVID has similar restrictions as all light-based scanning techniques: The surface should not be too glossy, because this would cause light reflections and scanning outliers, and it should not be too dark or transparent. In these cases a wipeable coating spray can solve the problem.

In the meantime, DAVID-Laserscanner also supports Structured Light scanning using a standard video projector instead of a line laser. Structured Light is much faster than laser scanning, since the camera only needs to capture about 10-20 images for a 3D scan. You only need one click to get 3D data. Furthermore Structured Light scanning works without calibration panels in the background. Another advantage is that one can use commercial digital photo cameras in the future, which have a very high resolution for a low price.

Our conclusions show that in fact this technique is a reliable, and more importantly, cost effective solution in 3D imaging technologies.

Mapping history from the air ? Combining low-altitude camera platforms and computer vision