Conference Abstract for Demo at The 5th DH Benelux Conference – Amsterdam 2018
scheduled on Friday 8 June

Pixel+: Visualising our Heritage – *Vincent Vanweddingen, Chris Vastenhoud, Marc Proesmans, Hendrik Hameeuw, Bruno Vandermeulen, Athena Van Der Perre, Lieve Watteeuw and Luc Van Gool*

As published on conference website @ http://2018.dhbenelux.org/wp-content/uploads/sites/8/2018/05/Vanweddingen-pixel-DHB2018.pdf

Pixel+: Visualising our Heritage

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In recent years more advanced imaging techniques have been introduced to study, document, curate and preserve our heritage. Pixel+ focuses on two of them: Reflectance Transformation Imaging/Polynomial Texture Mapping[1] and the Portable Light Dome[2].

Both methods capture multiple images of an artifact under varying lighting conditions (fig. 1 and 2) and output an interactive image model that can be re-lit from any direction or used to study the shape and reflection characteristics of the artifact's surface. Various filters have been developed to cater specific needs. Sometimes, scholars are more interested in the surface shape (e.g. cuneiform tablets[2]), other times in the reflective properties (e.g. to investigate pigments[3,4]) Some museums want to have interactive photo-realistic virtual models of some of their collections[5]. Technology wise, RTI/PTM and PLD have reached maturity, with many diverse applications. However, to be valorised more by the visual arts some steps still need to be taken.

RTI/PTM and PLD have been developed by different research labs, resulting in 2 similar but different approaches and incompatible output files, which have to be viewed with separate, proprietary software. Pixel+ will merge both technologies by developing a Windows/Mac OS X/Linux viewer and a web viewer which will be capable of displaying all file formats with their respective shaders and metadata and have the ability to illuminate the virtual model. The OS based viewer is targeted to the professional user (researcher, curator, scientist) which already has work experience with PLDViewer (fig. 3) and RTIViewer (fig. 4) and will include more CPU heavy algorithms like calculating depth profiles. The web viewer will focus on a more general audience and will facilitate sharing these file types and allow content providers like museums to open up their interactive pixel based collections to the public, as a modern browser is the only software that the end user needs to view these virtual artifacts.

Figure 1. Example of a scanning session with a multispectral PLD at the Royal Museum for Arts and History (© KMKG-MRAH)

Figure 2. Example of an RTI scanning session (photo by Marlin Lum, Cultural Heritage Imaging)

Figure 3. A PLD file of a cuneiform tablet, opened in PLDViewer

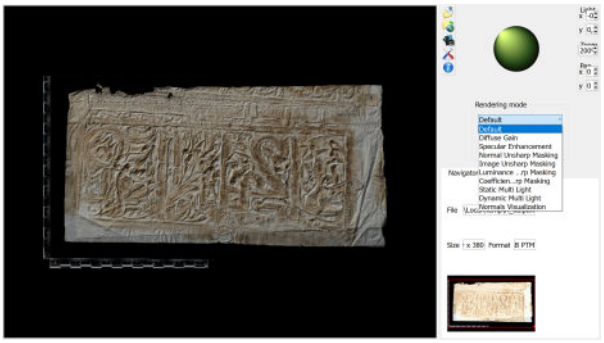

Figure 4. A RTI file of a Squeeze opened in RTIViewer (Smithsonian Institution)

One of the goals of Pixel+ is future proofing RTI and PLD technology, as long term digital preservation is of paramount importance. Therefore, the software will be written in modern languages (C++, OpenGL/GLSL, HTML5, JavaScript, WebGL), will be open sourced and well documented.

Another goal of this project is dissemination. Because RTI and PLD are still new technologies, knowledge of their existence and possible benefits is still sub par. A new website will be launched which will explain both technologies, contain best practices and use cases and share community updates. As it's in the interest of the whole community, the website won't shy away from discussing other computational photography techniques as well. To conclude, Pixel+ will bring RTI/PTM and PLD, both proven computational imaging technologies, to a new level by merging them into an open source OS and a web viewer. One viewer which can open all interactive pixel-based files with their respective shaders will allow anyone that is interested to view, study or admire our artifacts in great detail.

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