This is not a painting – scanning and printing a painting’s appearance

The appearance of a painting cannot solely be described by the depiction that it presents to the viewer. When viewing a painting in real life, you can see that the painted surface is in effect a three-dimensional landscape of paint.

In the context of her PhD, Willemijn Elkhuizen has developed an integrated approach using 3D scanning, digital image processing and 3D printing, for the reproduction of a painting’s appearance. This includes the reproduction of colour, topography and, in particular, spatially-varying gloss. More specifically, the aim was to create a perceptually matching appearance, by using a digital capturing and digital fabrication process, the latter based on a limited set of inks, namely cyan, magenta, yellow, black, white and transparent ink. Five case studies were carried out, involving several world-famous paintings, including works by Vincent van Gogh, Rembrandt van Rijn and Johannes Vermeer.

Additionally, various applications were explored of these reproductions, including the possibilities to create reconstructions of a painting’s original size and appearance. Reproductions and reconstructions featured in several of exhibitions, Dutch media and design fairs, including the exhibition Rembrandt? The Case of Saul and David? at the Mauritshuis (2015), Lowlands Science (2015), Dutch Design Week (2016), Universiteit van Nederland (2017), Het geheim van de meester (2017), and BNR techniektour (2019).

With the capability to capture the fine surface details of a painting for purposes of creating a reproduction, another application for this scan data was also envisioned, namely the documentation and monitoring of paintings, for the purpose of conservation. As part of Girl in the Spotlight research project, initiated by the Mauritshuis, two 3D scans were made at different resolutions, of Johannes Vermeer’s ‘Girl with a Pearl Earring’ (c.1665). These scans were part of a case study to compare three 3D scanning techniques, and their suitability to measure and visualize the three-dimensional structure of a painting’s surface.

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