Modeling the Anisotropic Reflectance of a Surface with Microstructure Engineered to Obtain Visible Contrast after Rotation

Engineering of surface structure to obtain specific anisotropic reflectance properties has interesting applications in large scale production of plastic items. In recent work, surface structure has been engineered to obtain visible reflectance contrast when observing a surface before and after rotating it 90 degrees around its normal axis. We build an analytic anisotropic reflectance model based on the microstructure engineered to obtain such contrast. Using our model to render synthetic images, we predict the above mentioned contrasts and compare our predictions with the measurements reported in previous work. The benefit of an analytical model like the one we provide is its potential to be used in computer vision for estimating the quality of a surface sample. The quality of a sample is indicated by the resemblance of camera-based contrast measurements with contrasts predicted for an idealized surface structure. Our predictive model is also useful in optimization of the microstructure configuration, where the objective for example could be to maximize reflectance contrast.

Virtual reality inspection and painting with measured BRDFs

Virtual reality inspection and painting with measured BRDFs
Designing for Color in Additive Manufacturing
In this paper we present a color design pipeline for 3D printed or additively manufactured parts. We demonstrate how to characterize and calibrate a commercial printer and how to obtain its forward and backward color transformation models. We present results from our assistive color design tool, allowing for colorimetric accurate prints and visualization of the printed outcome, prior to print. Lastly, we demonstrate our pipeline by accurately reproducing a real physical object.

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Luongo, Andrea (Intern)
Supervisor:
Aanæs, Henrik (Intern)
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