

Realistic Materials in Computer Graphics

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Abstract

Realistic modeling of the interaction of light with objects is one important challenge in photorealistic or predictive rendering. Since the modeling of a desired appearance using parametric reflection models can be rather tedious task one way to obtain realistic reflection properties are measurements of real world surfaces. For arbitrary (non-fluorescent, non-phosphorescent) materials, the reflection properties can be described by the 8D reflectance field of the surface, also called BSSRDF. Since densely sampling an 8D function is currently not practical various acquisition methods have been proposed which reduce the number of dimensions by restricting the acquisition to specific classes of materials. A subsequent data modeling step is performed to interpolate missing values and compress the measured data further. In the first part of this talk we will give a brief overview over the different measurement techniques and algorithms used to capture reflection properties of different classes of objects targeted to the specific needs of computer graphics applications. Special emphasis will be given to surfaces with complex meso-structure. In the second part we will discuss some techniques we used for the validation of the measurements and the resulting renderings. Strength and limitations of different acquisition and validation techniques will be discussed and future challenges will be identified.