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Physically inspired technique for modeling wet absorbent materials

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The visual appearance of materials depends on their intrinsic light transfer properties, the illumination and camera conditions, and other environmental factors. This is in particular the case of porous, rough, or absorbent materials, where the presence of liquid on the surface alters significantly their BRDF, which in turn results in considerable changes in their visual appearance. For this reason, rendering materials change their appearance when wet continues to be a relevant topic in computer graphics. This is especially true when real-time photo-realistic rendering is required in scenes involving this kind of materials in interaction with water or other liquids. In this paper, we introduce a physically inspired technique to model and render appearance changes of absorbent materials when their surface is wet. First, we develop a new method to solve the interaction between the liquid and the object surface using its own underlying texture coordinates. Then, we propose an algorithm to model the diffusion phenomenon that occurs in the interface between a solid porous object and a liquid. Finally, we extend a model that explains the change of appearance of materials under wet conditions, and we implement it achieving real-time performance. The complete model is developed using GPU acceleration.

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