

Easy Appearance Manipulation of Image-Based Textured Models

Postdoctoral Fellowship

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Rendering of textured image-based models is a challenging task, since it involves accurately portraying and computing effects such as shading, shadows, highlights, interreflections etc. Simple display of the textures present in the original photographs used for capturing is not sufficient, since these encode only a single illumination condition at the time the picture was taken.

We want to be able to change illumination, which requires the removal of the captured illumination and addition of novel shadows and lighting. Most previous approaches try to acquire as much data as possible in order to accurately relight objects, e.g., by capturing accurate material descriptions, often using very expensive and complex capture setups. However, in this postdoctoral fellowship we aim at creating easy-to-capture objects with appearance that can be easily manipulated, and as such complex data-driven relighting is not appropriate.

Our objective is to explore and develop relighting and rendering algorithms that are able to extract the necessary information about the object's material appearance from input photographs, subsequently manipulate and control this information, and finally to generate novel images containing new camera views and new illumination conditions.

We will be investigating several possible directions to achieve this goal. One approach will involve using large (typically internet-based) image-collections, while another approach will involve inverse global illumination techniques. Combined with advanced machine learning approaches, and appropriate user intervention we hope to develop efficient solutions to our goals. In addition to the above, we will also investigate perceptual criteria to simplify these tasks.

Requirements

The successful candidate should have a Ph.D. degree in Computer Science, and preferably be knowledgeable both in computer graphics and computer vision. Machine learning skills will be greatly appreciated.