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Interactive Glare Visualization Model for an Architectural Space

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Abstract : Lighting design and its impact on indoor comfort conditions are an integral part of good interior design. Impact of lighting in an interior space is manifold and it involves many sub components like glare, color, tone, luminance, control, energy efficiency, flexibility etc. While other components have been researched and discussed multiple times, this paper discusses the research done to understand the glare component from an artificial lighting source in an indoor space. Consequently, the paper discusses a parametric model to convey real time glare level in an interior space to the designer/ architect. Our end users are architects and likewise for them it is of utmost importance to know what impression the proposed lighting arrangement and proposed furniture layout will have on indoor comfort quality. This involves specially those furniture elements (or surfaces) which strongly reflect light around the space. Essentially, the designer needs to know the ramification of the 'discomfortable glare' at the early stage of design cycle, when he still can afford to make changes to his proposed design and consider different routes of solution for his client. Unfortunately, most of the lighting analysis tools that are present, offer rigorous computation and analysis on the back end eventually making it challenging for the designer to analyze and know the glare from interior light quickly. Moreover, many of them do not focus on glare aspect of the artificial light. That is why, in this paper, we explain a novel approach to approximate interior glare data. Adding to that we visualize this data in a color coded format, expressing the implications of their proposed interior design layout. We focus on making this analysis process very fluid and fast computationally, enabling complete user interaction with the capability to vary different ranges of user inputs adding more degrees of freedom for the user. We test our proposed parametric model on a case study, a Computer Lab space in our college facility.

Keywords : computational geometry, glare impact in interior space, info visualization, parametric lighting analysis
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