

Perceptual Graphics: The symbiosis between and formal similarity of perceptual psychology and computer graphics.

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The environment of each person is overflowing with information, much of which is relevant to some aspect of our perception or behavior. The field of perceptual psychology has spent over 150 years investigating how different sensory systems extract, process, and represent such information. One primary difficulty in this work has been the fact that it is not possible – in principle – to view inside the functional work of any perceptual system. We can at best control the input and observe the output of these dynamic, non-linear, adaptive systems. Computer graphics research has focused over the last 50 years on the effective and efficient visual simulation of such information, traditionally emphasizing a high degree of realism. Trying to re-produce all possible information in any given scene requires nearly infinite resources in processing power and memory. Fortunately, not all the physically present information needs to be synthesized, only the perceptually relevant information.

Although, these two fields have developed independently, they address similar fundamental problems and provide complementary methods for their solution. Furthermore, it is becoming increasingly apparent that specific research questions in either discipline cannot be solved without methods from the other. The fusion of these two complementary approaches not only helps to overcome the inherent limits of each approach, but also opens up entire new realms of scientific inquiry. This integrated approach is referred to as Perceptual Graphics.

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