

Vision Models for High Dynamic Range and Wide Colour Gamut Imaging

Gain understanding and insight into state-of-the-art tone and colour gamut mapping methods, in HDR and WCG imaging, within a framework of vision science.

“Dr. Bertalmío has written a very useful text that connects key perceptual phenomena to image reproduction. His text nicely explains the scientific and engineering foundations for many image computations, including gamut mapping, tone mapping, and image quality metrics. The material is a thoughtful reference for people who wish to understand how analyses of human visual perception have been transformed into applications that measure image quality. I am particularly enthusiastic about his call for new vision models to guide the future generation of displays and rendering!”

Professor Brian A. Wandell, Director of the Center for Cognitive and Neurobiological Imaging, Stanford University, USA.

“A lot of our colour science relies on experiments done decades ago, in viewing conditions that have very little to do with how we consume dramatic content today. Marcelo Bertalmío’s book manages to move the discussion forward into the 21st century - by describing in detail how we see and process visual content, and the huge role that adaptation and efficient encoding of the visual signal play within it. But also by directly relating this knowledge to modern high dynamic range display technology. This book is essential reading for anyone who is interested in colour science for visual media, and I will keep bugging my colleagues at FilmLight to read it and to apply the wealth of knowledge contained in it towards our advancement of visual storytelling technology.”

Wolfgang Lempp, founder and director, FilmLight Ltd, UK.

“A comprehensive and rare synthesis of vision science and imaging technology. This book is the go-to source for those wishing to learn more about the neuroscience and psychophysics of vision and its implications for the design of imaging and display pipelines to achieve highest quality for the human observer. Such a book is long overdue.”

Professor Bruno Olshausen, Helen Wills Neuroscience Institute and School of Optometry, UC Berkeley, USA.

To enhance the overall viewing experience (for cinema, TV, games, AR/VR) the media industry is continuously striving to improve image quality. Currently the emphasis is on High Dynamic Range (HDR) and Wide Colour Gamut (WCG) technologies, which yield images with greater contrast and more vivid colours. The uptake of these technologies, however, has been hampered by the significant challenge of understanding the science behind visual perception. This book provides university researchers and graduate students in computer science, computer engineering, vision science, as well as industry R&D engineers, an insight into the science and methods for HDR and WCG. It presents the underlying principles and latest practical methods in a detailed and accessible way, highlighting how the use of vision models is a key element of all state-of-the-art methods for these emerging technologies.

Key Features

- Presents the underlying vision science principles and models that are essential to the emerging technologies of HDR and WCG.
- Reviews state-of-the-art techniques for tone mapping and gamut mapping.
- Discusses open challenges and future directions of HDR and WCG research.

About the Author

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Techniques and Applications



Marcelo Bertalmío

