ICC Color Management

William Li
Kodak Graphic Communications Group
Burnaby, B.C., Canada

Abstract

The goal of digital color management is to facilitate the unambiguous interpretation of color content via the application of color data conversions as required – in other words, to always obtain the intended color in reproduction. The challenge of color management lies in determining what the intended color is for the actors in the digital color workflow, in the face of occasionally-conflicting color requirements and capabilities. Meeting this challenge requires both a communication of color expectations as well as the definition of how to act upon this communication. The International Color Consortium (ICC) profile format has evolved into an open, vendor-neutral, international standard [1] for communicating color reproduction intent. This paper reviews how ICC profiles can be used in various digital color workflows and discusses some of the challenges facing ICC-based color management.

ICC profiles provide a container to define coordinate transformations from one color space to another, and in so doing capturing a relationship between the two spaces. Such transformations can be used to relate device coordinates to measured colorimetry or to define particular color re-renderings for appearance preservation, among other usages. In the most commonly-used ICC-based workflows, ICC profiles which capture source device-to-colorimetry relationships are connected with an ICC profile which captures the destination colorimetry-to-device relationship via the use of a CMM (color management module). For some workflows and situations, this type of connection yields excellent results which are consistent in nature across a large number of different implementations and in fact could be considered the preferred approach. In other situations, some more care is required in order to obtain good results.

References

1. ISO 15076-1. 2005. Image technology colour management – Architecture, profile format, and data structure – Part 1: Based on ICC.1:2004-10. ISO, Geneva, Switzerland.
2. International Color Consortium. *Color management – conceptual overview, evolution, structure & color rendering* [online]. [cited 1 March 2007]. Portable Document Format. Available from: http://www.color.org/ICC_white_paper4color_management.pdf.
3. International Color Consortium. *ICC profiles in a colour reproduction system* [online]. [cited 1 March 2007]. Portable Document Format. Available from: http://www.color.org/ICC_white_paper_7_role_of_ICC_profiles.pdf.

4. International Color Consortium. *Common color management workflows & rendering intent usage* [online]. [cited 1 March 2007]. Portable Document Format. Available from: http://www.color.org/ICC_white_paper_9_workflow.pdf.
5. International Color Consortium. *Using ICC profiles with digital camera images* [online]. [cited 1 March 2007]. Portable Document Format. Available from: http://www.color.org/ICC_white_paper_17_ICC_profiles_with_camera_images.pdf.
6. International Color Consortium. *Reasons to use ICC version 4 in PDF/X* [online]. [cited 1 March 2007]. Portable Document Format. Available from: http://www.color.org/ICC_white_paper19_Reasons_to_use_V4.pdf.
7. International Color Consortium. *ICC profiles, color appearance modeling, and the Microsoft Windows™ color system* [online]. [cited 1 March 2007]. Portable Document Format. Available from: http://www.color.org/ICC_white_paper_24_ICCandWCS.pdf.

Author Biography

William Li received his MASc in Systems Engineering from Simon Fraser University in 1997, at which time he joined Creo Products working on halftone screening and calibration within the Prinergy PDF prepress workflow system. He has since gone on to lead color technology development within Kodak Graphic Communications Group. He has been active within the ICC, including chairing the ICC Specification Editing Working Group. He is currently serving his second term as chair of the ICC.