
CIE TC8-01: Color Appearance Models for Color Management Applications

Sunburst Resort, Scottsdale, AZ
1pm to 5pm, Monday, November 26, 2000

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Attendees

- Alan Kravetz - Minolta
- Kazuhiko Takemura - Fujifilm
- Hideto Motomura – Matsushita Research Institute
- Mark Fairchild – RIT-MCSL
- Stefan Livens – Agfa-Gevaert N.V.
- Hirohisa Yaguchi – Chiba University
- Todd Newman – Canon
- M.R. Luo – Derby CII
- Nathan Moroney – HP
- Tony Johnson – London College of Printing
- Nenad Vujovic – OKIDATA
- Sharon Henley – Canon
- John Dalrymple – Sharp Labs of America
- Ellen C. Carter – Minolta



Overview

- Conference call
 - Number, code & phone provided by Dave McDowell. Thanks Dave
- Initial agenda
 - Overview: Nathan – CAT & chroma
 - CII Results: Ronnie – CAT & others
- Discussion & Additional topics

Initial Agenda Items

- Linear Chromatic Adaptation Transforms
- Revised Chroma Scale
 - Precision approaching zero chroma?
- Revised Saturation Scale
 - Application for gamut mapping?
- Clarification of Surround, ie large enough field of view will supercede actual ambient illumination?
- Background masking – see CIC 8 proc.

Chromatic Adaptation Transform

- Linear is a significant simplification
- Understand impact on accuracy
- Existence proofs available
 - CMCCAT2000
 - Fairchild
 - Finlayson & Susstrunk
- Which criterion to use for decision? Which data sets are most important? Will this process converge?

Chroma Scaling

- Sample DeskJet 970Cxi prints for CIELAB vs CAM97s2 – sRGB to print
- No significant distortion for darker colors
- But, slight chroma for white: phantom dots
 - Sufficient precision even when $D=1$?
- Noticeable overall chroma expansion
- Which is “better”?



Field Trials of Revisions

- Systematic comparison of revisions
- Assessment criterion
 - Fit data sets
 - Computational complexity
- Bound revisions for consideration
 - Upper bound CIECAM97c
 - Lower bound CIECAM97s
 - Bias towards simplification

Additional Topics

- Paula Alessi's TC working on new experiment
 - Compare CAT's using hardcopy to softcopy
- Adopted vs adapted white point redux
- Web site & listserver
 - Commands that can be used to get digests
 - Reference code for revisions
- Time and place for next meeting?

Ronnie's Presentations

- CMCCAT2000
- Saturation scaling
- Refined lightness scale
- Color difference research
- Summary of work in TC1-52
- Ronnie provide electronic slides for reference?
 - See Ronnie's slides
- Otherwise refer to CIC 8 proc.



Discussion - One

- Linear CAT
 - CMCCAT2000: optimize for all databases, w/ McCann
 - Fairchild: maximum CIECAM97s compatibility
 - Finlayson & Susstrunk: sharp-based optimization
 - Don't expect significant differences
- D Factor – Keep existing D Factor
- Using D Factor: Dr Hunt Note
 - $D = 1.0$ to maintain device white
 - $D \neq 1.0$ for absolute matching
 - $D \neq 1.0$ for multiple white points: See CIC 8 proc.

Discussion - Two

- Chroma Scaling – how large is the first step
 - Opponent axes plot for CRT grayscale
 - “Achromatic” trajectories for CIELAB
 - Same for CIECAM97s but ~3x as large
 - Expansion as approach zero chroma, precision requirements?
 - Fairchild chroma revision
 - Fit to the Munsell data, more appropriate for complex images?
 - Modify the exponent for chroma
 - Also will change colourfulness scale
 - Need to look at how lightness modification will impact chroma scale

Discussion - Three

- Saturation scaling
 - Limited data, but should look for more
 - Ronnie look at saturation data fit
 - Saturation as constant chromaticity
 - Compare versus other scales
- Lightness scaling
 - Provide improved fit for changes in size & Y_b
 - New one same as old for $Y_b=20$ & small size?
- Surround dependencies
 - Assume a default of average
 - Large field of view may override surround
 - Border may also override surround

Discussion – Four

- Adopted vs Adapted White Points: working definitions
 - **Adopted White Point** – computational white point used in a chromatic adaptation transform or color appearance model.
 - **Adapted White Point** – physiological white point as determined via psychophysics or other technique.
 - The adopted and adapted white points may or may not be the same.
 - The adopted white point could be used set to the device white point for a perceptual rendering. For example, the adopted white point could be set to the media white point to ensure that no colorants are printed for a white.
 - The same adapted white point could be used as the adopted white point for multiple devices for a colorimetric rendering. For example, if D65 was used as the adopted white point the middle lightness gray would be the same for all media, regardless of the media white points.

Action Items

- Next meeting – Nathan, coordinate with Paula.
 - Saturday morning after AIC 2001, June 30th
 - conference call?
- Todd, Mark & Ellen
 - Can this committee make a new CAM?
 - Otherwise Mark communicate revisions to Div 1
- TR covering revisions
 - We: Nathan, Mark & Ronnie
 - Capture proposed revisions in one CAM
 - Match or exceed CIECAM97s
- TC will review draft TR
- More details about Paula's planned testing?
- Tony & Nathan – compile meeting minutes

