Consistent Color Appearance

Psychophysical experiment design

Shining Ma

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Outline

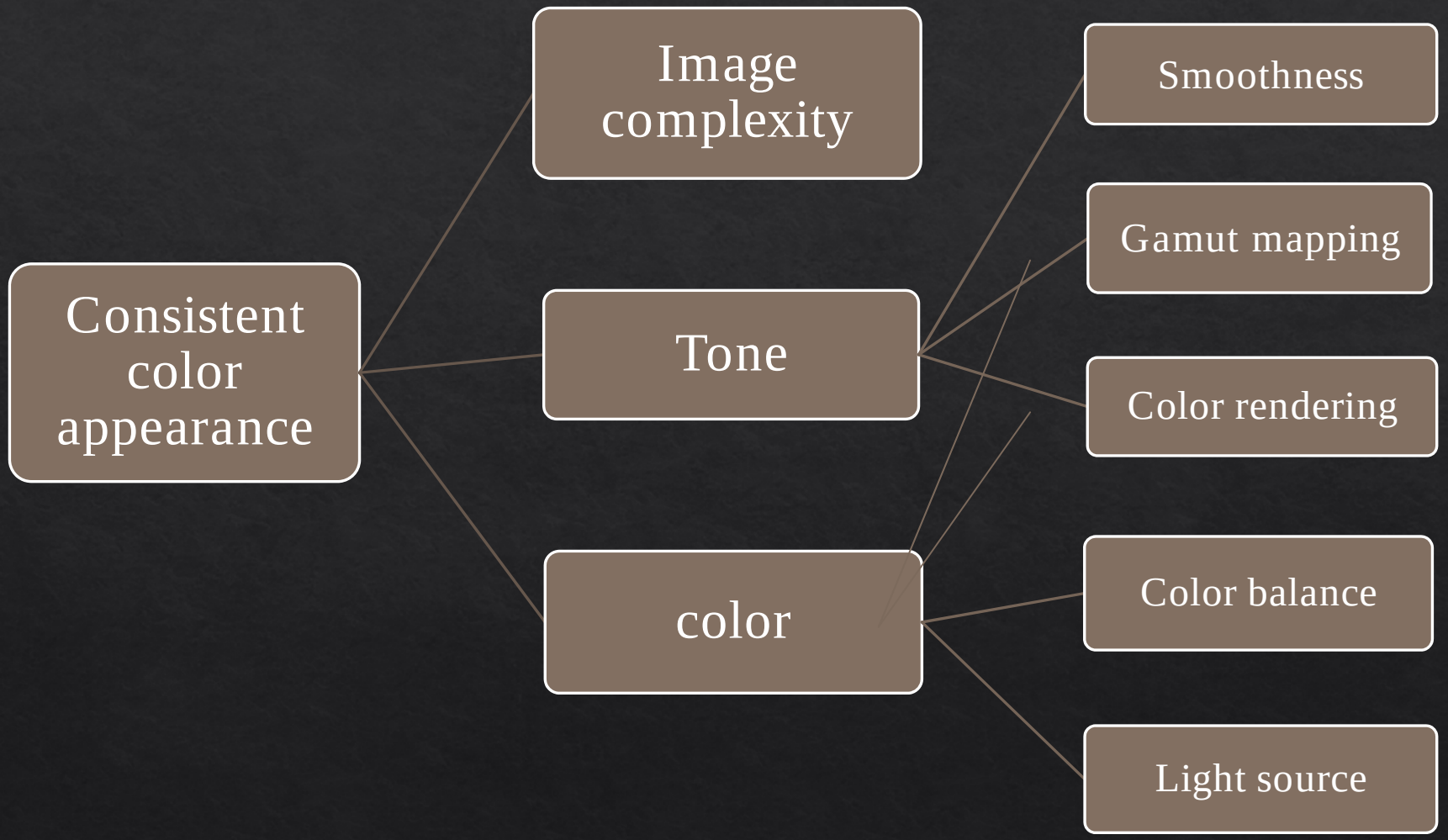
1. Background
2. Research Goal
3. Experiment design
   - Experiment 1
   - Experiment 2

Background

Consistent color appearance

- Subject evaluation
- Object measurement

Background


Consistent color appearance
Image complexity
Tone
color
Smoothness
Gamut mapping
Color rendering
Color balance
Light source

Goal

1. Collect visual data for metrics evaluation
2. Investigate gamut mapping's influence on different image's CCA (or other attribute's)
3. Find the visual boundary for the CCA

Experiment Design Exp1

Fixed conditions:

- Viewing geometry : 0°:45°
- Light source: D65 in LED lighting booth
- Substrate: white paper
- .....

Variables:

- Gamut mapping method
- Images

  (skin tone, fruits and vegetables, natural scene, neutral image and so on)

Experiment Design Exp1

Samples (hardcopy)

4 images

6 printers → one set

5 gamut mapping method

5 sets

Pair comparison

10 pairs

40 pairs

Experiment Design

Exp1

Procedure

Adaptation 1 min in lighting booth

Compare two sets from one image,
which one looks more consistent?

Repeat 10 pairs

Repeat 4 images

Experiment Design Exp2

Fixed conditions:

- Viewing geometry : 0°:45°
- Light source: D65 in LED lighting booth
- Substrate: white paper
- .....

Variables:

- Gamut mapping method
- Images

  (skin tone, fruits and vegetables, natural scene, neutral image and so on)

Experiment Design

Exp2

Samples (hardcopy)

4 images

6 printers

5 gamut mapping method

4*6*5=120

120 samples

Compare with reference sample

120 pairs

Reference sample:

Display the target image in iPad

Experiment Design

Exp2

Procedure

Adaptation to lighting environment for 1 min

Judge the difference between reference and samples (scale shown below)

Change sample, rating again

Rating	0	1	2	3	4	5	6
meaning	No difference at all	Just perceptible difference	Perceptible difference	Just acceptable difference	Unacceptable difference	Just intolerable difference	intolerable difference

Thank you!