Media Types

Data Structures + Methods

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Objects

Media Objects

- *data structure -*
  - *represent media type*
- *methods -*
  - *operations that **capture***
  - *operations that **modify***
  - *operations that **present***

Media Type template

Media type <name>

Representation

<aspects of representation>

Operations

<categories of operations>

Text - 1

- **Media type** Text
  - **Representation**
    - ASCII
    - ISO character sets
    - Marked-up text
    - Structured text
    - Hypertext

Text - 2

Operations

- Character operations
- String operations
- Editing
- Formatting
- Pattern-matching and searching
- Sorting
- Compression
- Encryption
- Language-specific operations

Image - 1

- **Media type** Image
  - **Representation**
    - Color model
    - Alpha channels
    - Number of channels
    - Channel depth
    - Interlacing
    - Indexing
    - Pixel aspect ratio
    - Compression

Image - Color model (or color space)

- *RGB -*
  - *a numeric triple specifying red (R), green (G), and blue (B) intensities*
  - *Easily mapped to voltages for the red, green, and blue guns in color CRTs*

Image - Color model (or color space)

- *HSB -*
  - *Colors are represented by a triple representing*
    - *–hue (the dominant color - represented by an angular value varying from red to green to blue at 120° intervals)*
    - *–saturation (the intensity of the color)*
    - *–brightness (the amount of gray in a color; brighter colors have less gray)*

Image - Color model (or color space)

- *CMYK*
  - *subtractive primaries*
    - *–cyan*
    - *–magenta*
    - *–yellow*
    - *–black*
  - *used in inkjet printer*

Image - Color model (or color space)

YUV

- *used in television industry*
- *Y = luminance (black and white portion)*
- *UV = chrominance (color portion)*

$$Y = 0.3 * R + 0.59 * G + 0.11 * B$$
$$U = (B - Y) * 0.493$$
$$V = (R - Y) * 0.877$$

Image

- *Alpha channel -*
  used to define regions of full or partial transparency for the creation of masks and blends
- *Number of channels -*
  the dimensionality of the color model (4 for CMYK, 3 for RGB)
- *Channel depth -*
  the number of bits per channel

Image

- *Interlacing*
  the order in which the values of a multi-channel image are stored
- *Indexing -*
  color lookup table (CLUT)
- *Pixel aspect ratio -*
  ratio of pixel width to height
- *Compression -*
  lossy vs. lossless

Image - 2

Operations

- Editing
- Point operations
- Filtering
- Compositing
- Geometric transformations
- Conversion

Image - Editing

- *changing individual pixels*
  - *paintbrush operations*
    - *–airbrushing*
    - *–texturing*
  - *cutting, copying and pasting of groups of pixels*

Image - Point Operations

Applying a function to every pixel in an image (or selection).

- *Thresholding - A pixel is set to 1 or 0 depending on whether it is above or below a threshold value. Used to create masks.*
- *Color correction - An image is modified to increase or decrease*
  - *–color*
  - *–brightness*
  - *–contrast*

Image

- *Filtering - used to blur, sharpen, introduce distortions, and add special effects based on its current value and that of neighboring pixels*
- *Compositing - Combining two or more images to produce a new image*
- *Geometric transformations - displacing, rotating, mirroring, scaling, skewing and warping.*
- *Conversions - from one format to another*