Motivation

• Color Balancing
  • Humans have color constancy – cameras do not!
  • Involved problem of restoring unknown surfaces and illuminants to “look right”.
  • Needs surfaces, lights, and cameras data to serve as test cases.
Motivation

- Online database for surface reflectances, illuminants, and camera sensors.
  - What’s currently out there?
  - How can we improve upon what exists?
The Data

Spectral Data

The spectra in the table below is data I used while at Cornell’s Program of Computer Graphics. I do not know its origin or its accuracy, however it seems to have been gathered from a variety of sources. Other spectra are available at the following sites:

**Cornell Measurement Data**
Lappeenranta University of Technology
MGP Image Libraries
Columbia-Universiteit Reflectance and Texture Database
Principles of Digital Image Synthesis

**FTP directory /pub/eos/pub/spectra/ at ftp.eos.ncsu.edu**

To view this FTP site in Windows Explorer, click File, then click Open FTP Site in Windows Explorer.

<table>
<thead>
<tr>
<th>ACOUSTICAL PLASTER</th>
<th>LIGHT BUFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASPHALT FLOOR TILES</td>
<td>DARK-BLUE-31</td>
</tr>
<tr>
<td>TOLEDO-RED</td>
<td>DARK-BLUE FLEXACR</td>
</tr>
<tr>
<td>ASPHALT WALL TILES</td>
<td>LIGHT-GRAY 164</td>
</tr>
<tr>
<td>LIGHT-GREY 190</td>
<td>BARE AREAS AND SOIL</td>
</tr>
<tr>
<td>BLACK-ART</td>
<td>DRY SOIL 8</td>
</tr>
<tr>
<td>DRY-ROCK</td>
<td>DRY SOIL C</td>
</tr>
<tr>
<td>SAND</td>
<td>WET SOIL A</td>
</tr>
<tr>
<td>WET SOIL C</td>
<td>BRICK</td>
</tr>
</tbody>
</table>

Welcome anonymous user from rescomp-08-127157 Stanford.EDU!
Current anonymous users: 1 Maximum anonymous users: 25
Objectives:

- **Data transparency:**
  - Users can access (or even make their own) datasets
  - Aids in color balancing algorithm testing

- **Interaction with the data:**
  - Choose the data you want.
  - Display RGB representation of scenes.
  - Provide resultant RGB data.
Data and Data Parsing

Dataset format:

# starting comments
# this is a dataset for surfaces
dataset_type
SURFACES
#items, nm_step, nm_start, nm_end
10, 4, 380, 784
item_name
BananaPeel
item_description
A yellow peel of banana
reflectance_data
0.001
0.021
0.032
...
next_item_name
0.00
Apple
item_description
A Red Delicious apple
reflectance data
0.72
Methodology

- User creates dataset
- Parse data and build matrices
- User selects camera, light, and up to 50 surfaces
- ColorLoader calculates RGB data:
  - Uncorrected: [Surfaces] * [Light] * [Camera]
  - “Ideal”: [Surfaces] * [D65] * [XYZ matching] * [sRGB]
- Display scenes, output numerical RGB
Methodology - Color Loader

- Java web applet
- Cross platform
- web-accessible
- A demo!
Practical Value

- Compare Lights

- Compare Cameras
Practical Value

- Create Scenes
  - MacBeth
  - Paint
  - Forest Scene
  - People and clothes
Future Work

- Gamma correction.
- Automatic script generation of data .txt files.
- Expanded Databases.
- Plot the raw spectral data.
- Illuminant estimation?
Acknowledgments

- Data available from
  - Imageval’s ISET utility

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