Design Considerations for Digital Image Libraries

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Issues in constructing digitized photographic collections

Design criteria based on image characteristics and usage

Modelling information content using importance maps

Apply modelling to Morija Museum and Archives example
Issues

- Emphasis on “fixed choice” for physical image properties
- Variety of usage and viewer situations and purposes
- Control of access efficiency and scalability (e.g., mobile)
Resolving Issues

- Vary image physical properties according to content
- Tune library implementation to suit usage/viewer needs
- Provide hierarchy of library content representation
Digital Image Library Design

Printed Image → Digital Scanning → Process Image → Index/tag Image → Store Image

Stored Image → Image retrieve → Image adjust → Image display → Displayed Image
DIL Management - Usage Stages

- **Input/Scan**: spatial resolution, greyscale/colour gamut
- **Processing**: noise, blur, contrast, crop, warp
- **Storage**: compression, purpose, content, multiple
- **Display/Print**: map to screen/page size and characteristics
DIL Data - Perceptual Factors

- **Spatial**: pixel density, spacing, aspect ratio, shape, size
- **Intensity**: pixel brightness, contrast, colour values, gamut
- **Quality**: visual appearance, sharpness, clarity, aliasing
- **Information**: visual content density, localization, spread
Human Visual Perception

1 Sensations in Eyes

2 Processing in Brain

3 Models in Mind
Eye tracking

Successive eye positions and saccades. Positions of fixation of gaze.
Fig. 2. Constructing an importance map.
Importance Mapping

(a) Locations of high importance.

(b) Positions of fixation of gaze.
DIL Hierarchy – Image Versions

- Low-res Image
  - Browse
  - Search
  - Organise

- Mid-res Image
  - Inspect
  - Assess
  - Copy

- High-res Image
  - Analyse
  - Publish
  - Exhibit
Morija Mission
Morija Museum and Archives
MMA User Group Needs

- **Citizens and Tourists**: curiosity and browsing
- **School Students**: education and awareness
- **Scholars and Researchers**: content analysis
- **Sponsors and Agencies**: aggregation and publicity
MMA Collections

- **Missionary history**: buildings, people, scenery
- **Sotho culture**: clothing, household, hunting
- **Geological items**: dinosaur bones, fossils, samples
- **Other materials**: maps, drawings, rock paintings
Example: Missionary History

- Prints range from 3x4 inch to 6x8 inch monochrome
- Digitize on flatbed scanner 400dpi x 8bpp (4-5MB raw)
- Reduce in software to 200dpi and 100dpi JPEG versions
Example: Missionary History

- Store with text and tags in Microsoft Access database

- Browsing software “eMuse” to retrieve thumbnails first

- Screen quality versions obtained by clickthrough

- Reproduction quality versions held for access on request
Conclusion

- The project is still in an “investigation” phase
- The design principles have been useful for decisions
- Applicability needs to be tested on some other cases
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