Digitisation of Text and Images

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From an original document by Claire Warwick

This document is part of a collection of presentations with a focus on Electronic Publishing. For full details of this and the rest of the collection see the cover sheet at: http://humbox.ac.uk/3078/

How do Resources become Digital?

- Digitisation
- Introduction to the digital image
  - History
  - Files and formats
- Scanning Techniques
- Digitising Text
- Digitisation Issues

What is digital?

- "Of or pertaining to a finger, or to the fingers or digits." OED (sv1) online

- "Of, pertaining to, or using digits; *spec.* applied to a computer which operates on data in the form of digits or similar discrete elements." OED (sv2) online.

What is digitisation?

- The process of creating a binary representation of an object that can be stored, manipulated, transmitted, and displayed, using electronic technologies.
  - 01010101010101010101000111010
- Usually used to refer to the process of sampling an object to create a digital image.
- Not a perfect copy, but a translation
  - Information can be lost and inserted

Why Digitise?

- High information content
- Significant proven public and educational benefit
  - increase resource accessibility
  - enhances ways in which contents can be studied, manipulated, or accessed
- where material is at risk
  - conservation of heavily used material?
  - existing storage medium is deteriorating?
  - possibly measure that deterioration

What to Digitise

- Printed books & journals
- Manuscripts
- Maps
- Photographs
- Transparencies
- Music manuscripts
- Woodcuts
- Line drawings
- Archaeological site plans
- Blueprints/Architectural illustrations/plans
- Medical illustrations
- Documents
- Newspapers
- Papyri and Ostraca

Resolution

- Number of horizontal & vertical pixels underlying an image
- Determined by Dots Per Inch (dpi)
- The more pixels captured, the higher the detail

Image Quality

- The higher the resolution, the higher the quality of image.
- But do you need high resolution?

What Resolution?

- 72 dpi - internet
- 96 dpi - PowerPoint/digital projection
- 150 dpi - colour lithographic printing (roughly)
- 175-225 – inkjet printing (roughly)
- 300 dpi - professional photographic print quality (roughly)
- 600 dpi - archival quality
- Best to scan at a higher resolution, then manipulate image in package
- Always save your first scan, and work from copies
- "Scan once for all purposes" – process afterwards

Formats

- Basic Data files
  - BMP - Bitmap - Windows (*.bmp)
  - PICT - Picture - Mac (*.pct, *.pic)
- Standard Format
  - TIFF - Tagged Image (*.tif)
    - standard for archival purposes
    - large file sizes but no loss of data
    - 600 dpi uncompressed tiff - desirable
    - 300 dpi uncompressed tiff – minimum

Additional Formats

- JPEG - Joint Picture Expert Group (*.jpg or *.jpeg)
  - Good for Photographs
  - Loses lots of data (lossy)
  - can specify quality of image
- GIF - Graphic Interchange Format (*.gif)
  - Good for blocks of colour
  - can specify particular colours you want to use (lossy)
- Both commonly used on the internet

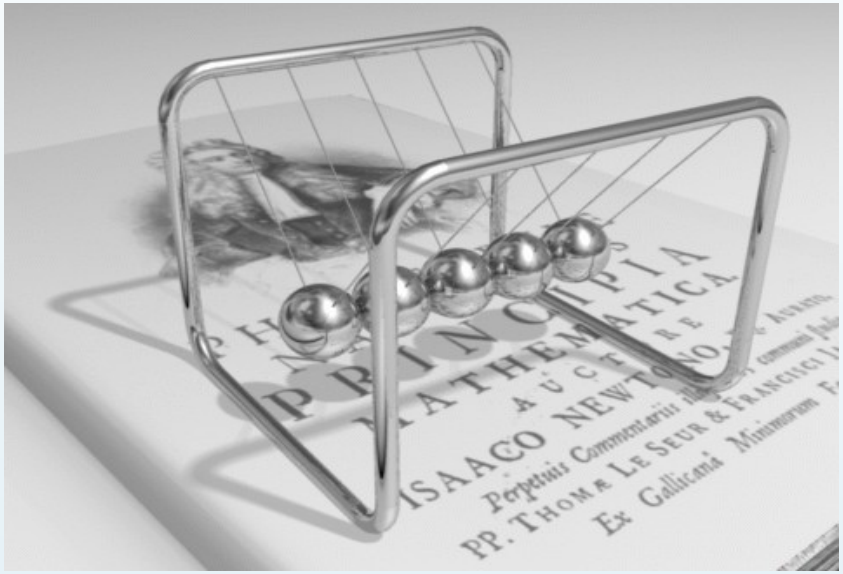
jpg / jpeg images

Images: Simon Mahony

Gif images

Simple GIF

Source:
Wikimedia Commons



Animated GIF

Source: Wikimedia Commons

Scanning devices

Microfilm Scanner

Flatbed Scanner

Drum Scanner

Microfiche Scanner

Transparency Scanner

Open Book Scanner

Scanback camera

Image: Simon Mahony

Scanback camera

Image: Simon Mahony

Instant capture camera

Image: Simon Mahony

Devices- Digital Cameras

- Digital Cameras
  - Digital Cameras
  - SLR cameras with digitising backs

Post Processing

- Image optimisation vs enhancement
- Enhance the image: looks good to the eye
  - cropping / levels / colour etc
- Optimise the image: take account of the environment in which it is delivered
  - format / file size / resolution etc

Post Processing

- No general theory about image enhancement
- viewer is ultimate judge of how well a method works
- evaluation of image quality is highly subjective
- cannot control how it is viewed
- trial and error approach
- => keep a record of processes used!
- Keep a copy of your original files without processing them
- Keep a copy of metadata about original image

But...

- Time consuming and costly operation
- Does proliferation of data mean that it is harder to find information?
- Where (and who) are the users?
- Usability studies (what do users want/need)?
- Costs of maintenance?
  - Should we just re-digitise every few years as it gets cheaper? (measure deterioration of source material)

Why Digitise Text?

- Edit it
- Manipulate it
- Reproduce it
- Print it
- Search it
- Text Analysis

The Digitisation of Textual Sources

3 ways to acquire electronic text

- 1. Acquiring in electronic form (e.g. from the Internet or from an archive of electronic text)
- 2. Scanning
- 3. Keying

How Keying Works

- In-house or outsource?
  - In-house: small project; rare material that should not travel; manuscript material
- Outsourcing text
  - Can send page images rather than originals
- High accuracy levels (Up to 99.995%)
  - About one error every 20 pages
- Basic markup can be added

Advantages of Keying

- High (Up to 99.995%) rates of accuracy
  - About one error every 20 pages
- Typically, keyed by two different typists and compared by machine
- Basic textual encoding – XML or SGML – can be added, costing around 25% more
- But cost also high

When to use Keying

- If the source material is
  - Rare
  - Fragile
  - Oversized or awkward
  - Full of images, special symbols, scientific or mathematical data, or oddly formatted text
  - Handwritten or early printed book text

OCR: Optical Character Recognition

- Image of page scanned then converted into text
- Used for material that
  - Uses a clear modern typeface
  - Is clean and complete
    - No smudges or tears
  - Can be fed through a sheet-feeder
  - Is formatted consistently….

OCR Limitations

- Can be a time saver, but is not perfect
- still a lot of work to convert the text to electronic form (e.g. remove page numbers, spell-check)
- Rarely more than 99.9% level of accuracy (1 error per 1,000 characters, about 10-12 lines)
- Problems with early printed books, mss, newspapers, microfilm

Text? Images? Or Both?

- Images enable use to get a sense of the original
- Often quite readable
- Often contain non linguistic information
- Appropriate for online exhibitions
- Handle special characters and illustrations

Decisions Decisions…

- Evaluate source material and format project goals
  - Who are your users? What are their needs?
- Why is the text being digitised
  - To create a copy?
  - To facilitate linguistic analysis?
- What resources are available?
  - Software, hardware, time, money
- Determine what method would be best
  - OCR or Keyboarding
- Decide how the text should be made available electronically to users
  - ASCII? HTML? PDF? SGML? XML?

Management aspects

- Assessing institutional strengths and weaknesses, timetable, and budget (Management)
- Select items from the collection to be digitised (Everything? Most Used? Cherry Picking?)
- Determining quality requirements based on document attributes (Benchmarking)
- Understanding user needs (Presentation, Delivery, Medium, Upkeep)
- Assessing long-term plans (Digital Preservation, Costs, Maintenance, Updates)

Useful links

- Library Preservation at Harvard
  - http://preserve.harvard.edu/resources/digital.html
- Cornell University Library: Moving Theory Intro Practice: Digital Imaging Tutorial
  - http://www.library.cornell.edu/preservation/tutorial/
- Technical Advisory Service for Images
  - www.tasi.ac.uk
- Now: JISC Digital Media
  - http://www.jiscdigitalmedia.ac.uk/

The National Archives

Image: Simon Mahony

The Doomsday Disc

Image: Simon Mahony

BBC Television Centre

Image: Simon Mahony

Assorted legacy videotape at the BBC Archive

Image: Simon Mahony