

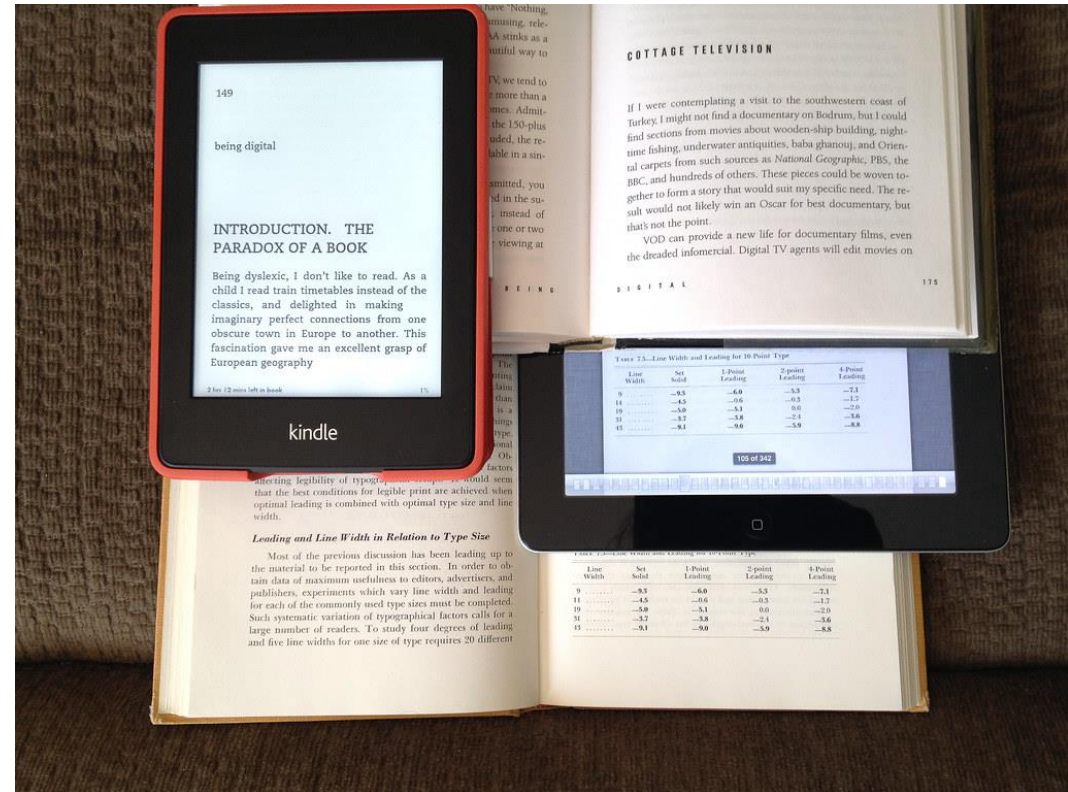
Transformation of manuscript to digital and virtual libraries

Presented by

Angel T

Digital Library

A digital library is a collection of documents in organized electronic form, available on the Internet or on CD-ROM disks. (Binary Code 0s & 1s)



Virtual Library

A virtual library can be simply defined as the internet-based digital library or a library without walls. Virtual library means, there is no physical existence of books on shelves.



Michael S. Hart(1947-2011)

First E-book : 1971

Project Gutenberg :

- library of over 60,000 free eBooks
- one of the earliest and longest-lasting online literary projects

Mission statements:

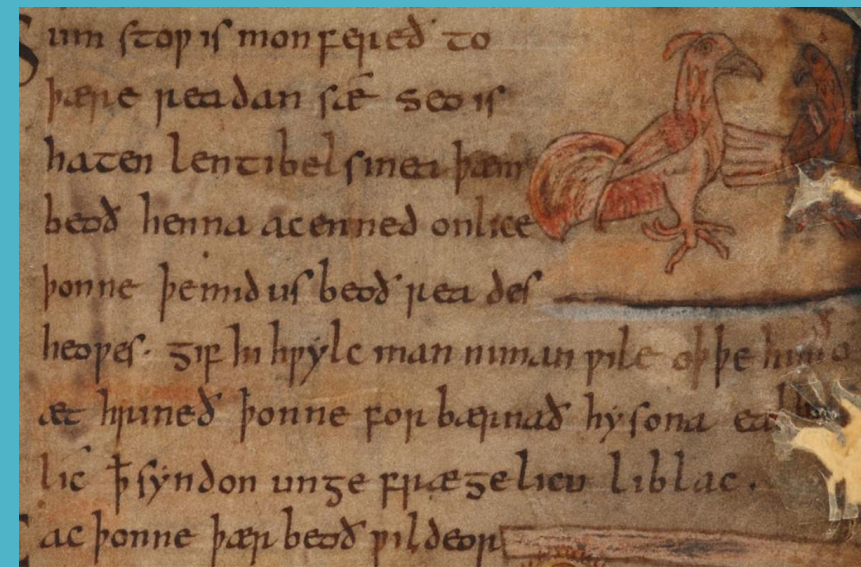
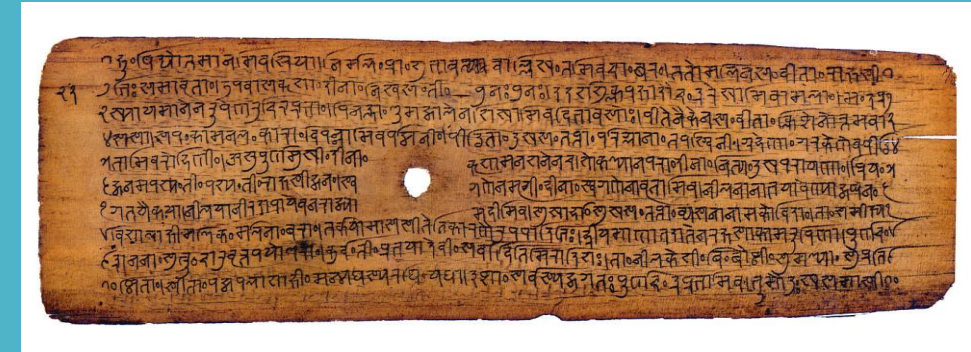
"Encourage the Creation and Distribution of eBooks"

"Give As Many eBooks to As Many People As Possible"



Manuscript

A manuscript was, traditionally, any document that is written by hand. Before the arrival of printing, all documents and books were manuscripts.



Voynich Manuscript



Nearly 2000 years Torah



Beinecke Rare Book & Manuscript Library





National Mission for Manuscript (NMM)

<i>Formation</i>	7 February 2003
<i>Headquarters</i>	New Delhi
<i>Parent Organization</i>	Ministry of Tourism and Culture, Government of India and Indira Gandhi National Centre for the Arts
<i>Motto</i>	Conserving the past for the future
<i>Aim</i>	to survey, locate and conserve Indian manuscripts for enhancing their access, awareness and use for educational purposes
<i>Kritisampada</i>	National Database of Manuscripts
<i>Manuscript Conservation Centres (MCCs)</i>	The Mission runs a network of 32 conservation units across the India, known as Manuscript Conservation Centres (MCCs), divided according to geographical zones.

Transformation of Libraries

❖ Libraries are transformed from the manuscript libraries to virtual and cloud libraries.

Revolution of Libraries

- temple libraries (oral communications)
- manuscript Libraries (primitive libraries)
- Paper / Print Libraries (Traditional libraries)
- microform libraries
- electronic libraries
- digital libraries
- virtual libraries
- networked libraries and cloud libraries

Transformation of Libraries

Halдар

“innovation and development of Information and Communication Technologies (ICTs) and different library software’s and its application in the field of Library and Information Science (LIS) brought transformation in library management system”.

Developments in Libraries: Past to Present Scenario



During 1990 the computers came into existence in India.



Reasons for availability of e-books:

- Globalization
- impact of information communication technology
- information explosion
- growth of internet technology which changed the role of library from traditional to digital era.



The libraries and the librarians have to face new challenges for digitization.

Causes of Transformation



The applications of ICT and other techniques in different activities of libraries are the basic causes of transforming traditional libraries.



The analysis, synthesis, and packaging processes are going to increase dramatically due to use of digital technologies

The need for transformation

- ✓ Information explosion
- ✓ information overload
- ✓ Increased R and D in all sectors
- ✓ Readers varied demands and needs
- ✓ Limited budget
- ✓ Applications of ICT in all fields
- ✓ Availability of free information resources on internet and digital media

Components of Transformation:



Computer and communication technology



Library automation



Networking of libraries and information resources



Bar code, RFID and Smart card technology



Web and Internet technology



Social networking (Blogs, Facebook, Twitter, Apps, Skype, Wikipedia) etc.

Different Eras of Books: Different Solutions

- ✓ Digitized 2.5 million older books
- ✓ digitize books for the blind and dyslexic: **Marrakesh Treaty** (2013)
- ✓ signatory countries can share these books with other signatories legally.

Collaborating to Build a Digital Collection

Three functions to avoid duplication:

- ❖ *Co-ordinate*
- ❖ *Collection*
- ❖ *Development*

- Need curators or curatorial approaches for selecting the most useful books.
- Process to determine which books we already have digitized.
- Need institutions or vendors able to source the missing physical books to be digitized,
- The participating organizations would need to have the funding to staff these functions, based either on their internal budgets or on funds.

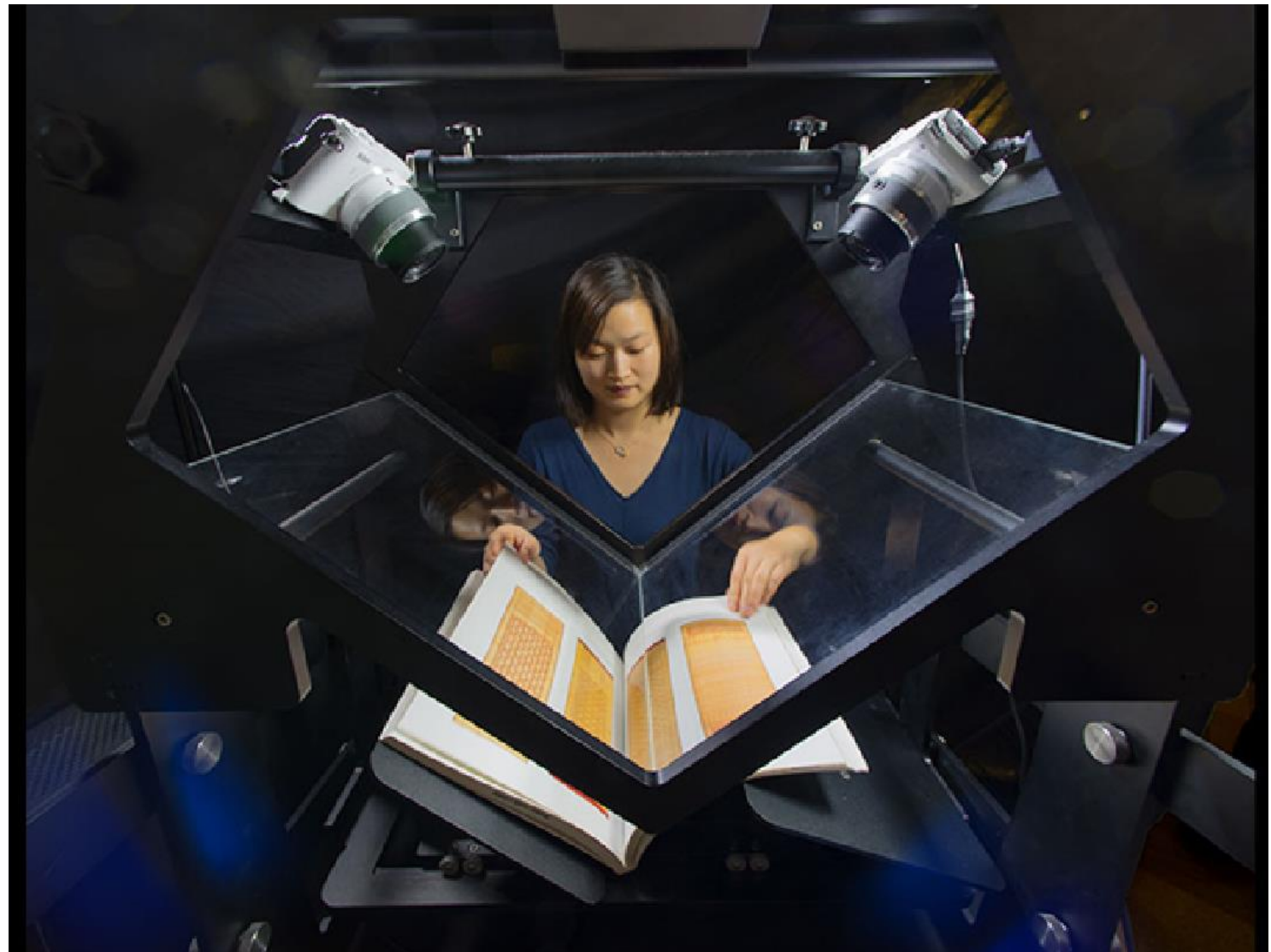
Costs of Digitization

- ❖ Cost of digitization varies between \$10 and \$30 per book, depending on where the scanning occurs: offshore or in a library.
- ❖ Additional costs include acquisition, storage, and lifetime digital file management
- ❖ Current in-print books are often available in e-book form, but there are few publishers willing to allow libraries to buy eBooks with similar rights to the physical books they purchase.

Digital Restoration of Erased and Damaged Manuscripts



Scanner



Digitization sheds light on 500-year-old Book



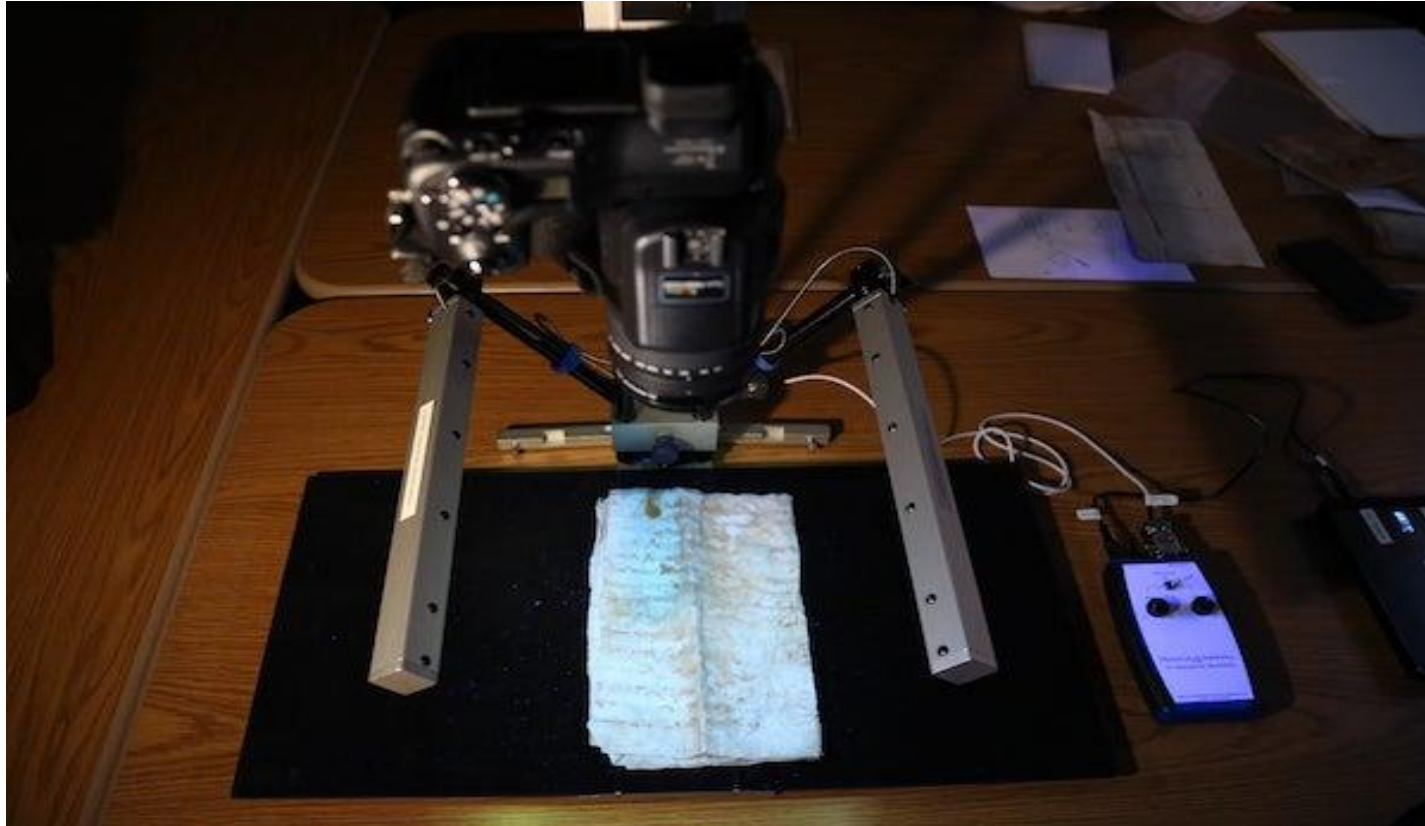
© Gwen Jones

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Ultraviolet illumination

1. Reading "missing" text in manuscripts
 - *Archimedes Palimpsest*
 - *Florentine prayer book.*
2. The parchment absorbs the "short" ultraviolet light and re-emits longer-wavelengths, often in the visible region of the spectrum.
3. The "bluish" visible fluorescence is generated from within the parchment.
4. The faded original text attenuates both the incoming ultraviolet light and the exiting visible light(double pass)

Ultraviolet illumination



The Manuscript Illuminator is far more portable and less expensive than comparable devices.

Archimedes Palimpsest

Ultraviolet illumination

The manuscript survived in its original form for only about 200 years, and suffered greatly because of its location.

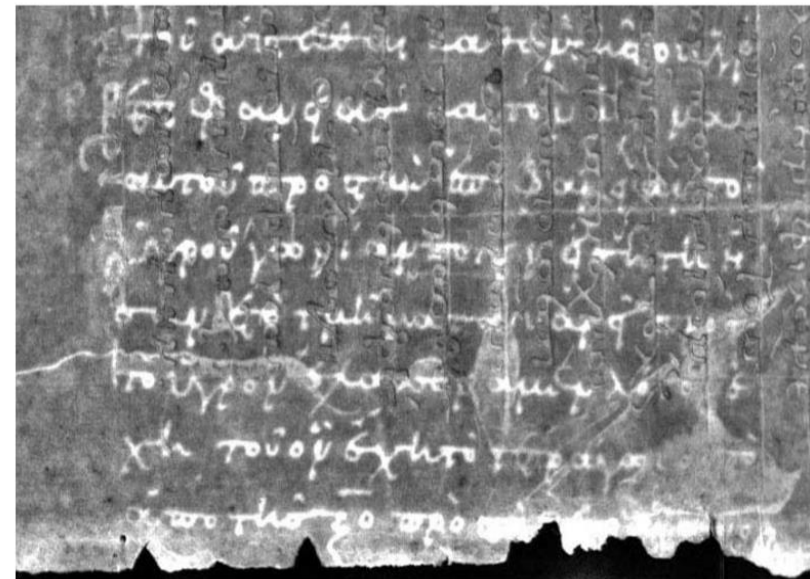
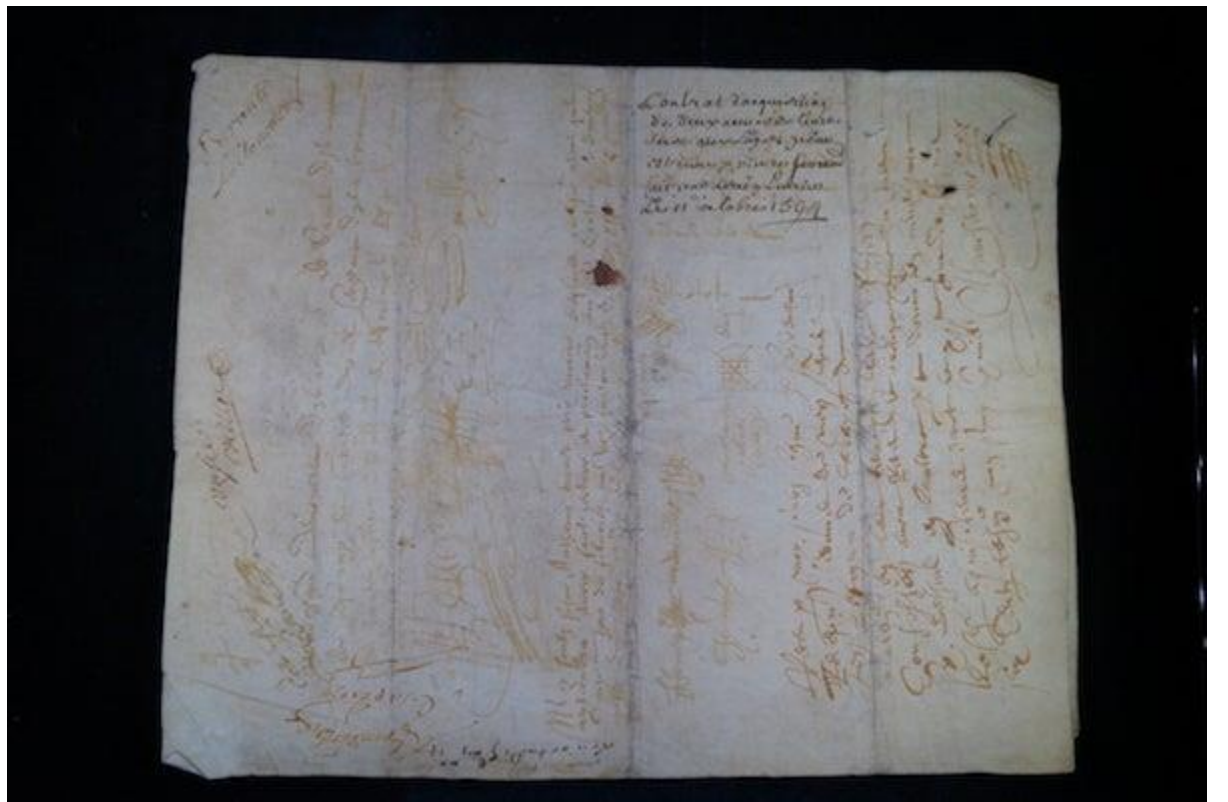


Figure 4: Section of one folio of the Archimedes Palimpsest after image processing to segment the original text

Ultraviolet illumination



Infra-red Processing

- ③ Manuscripts of historic importance are difficult to read because the text has been defaced by accident or even deliberately erased.
- ③ Information about the content may still exist even if it is invisible to the human eye.
- ③ Depending on the condition of the manuscript and the type of information to be recovered, the imaging systems may work in reflection, transmission, or fluorescence...

Appearance of Infra-red region



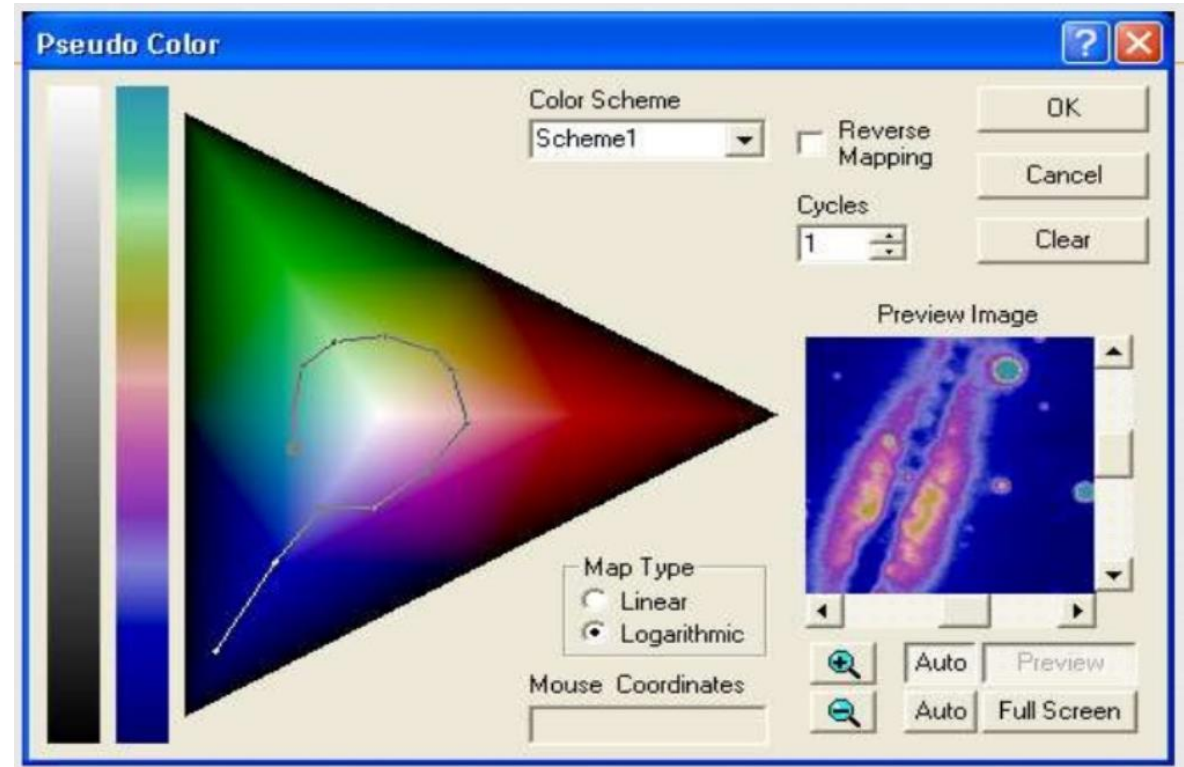
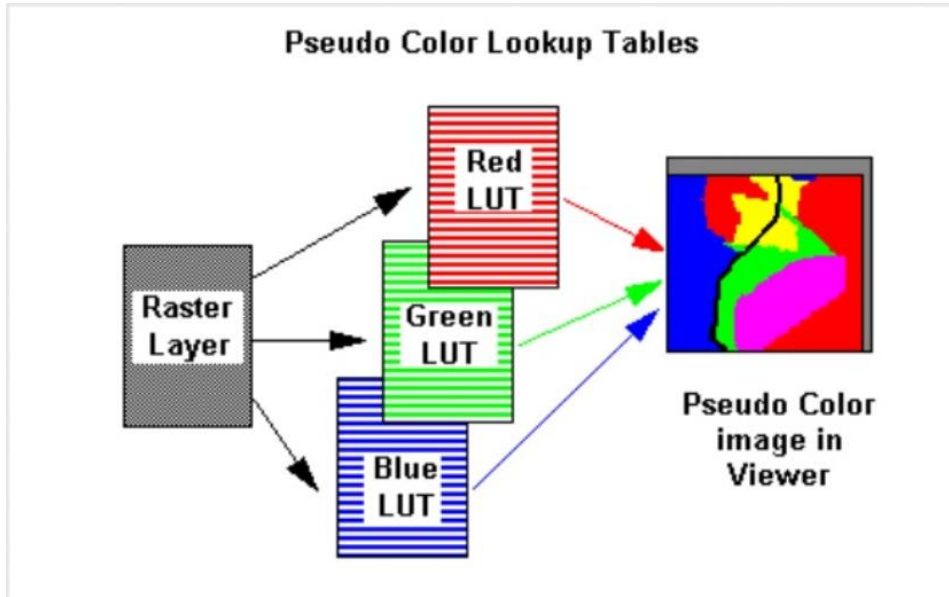
Dead Sea Scrolls



Pseudo-color image processing

- ✿ Convert a grayscale image to color.
- ✿ Coloured image, when displayed can make the identification of certain features easier for the observer.
- ✿ Pseudo-color image processing is simple and fast.

Pseudo-color image processing



Pseudo-color image processing



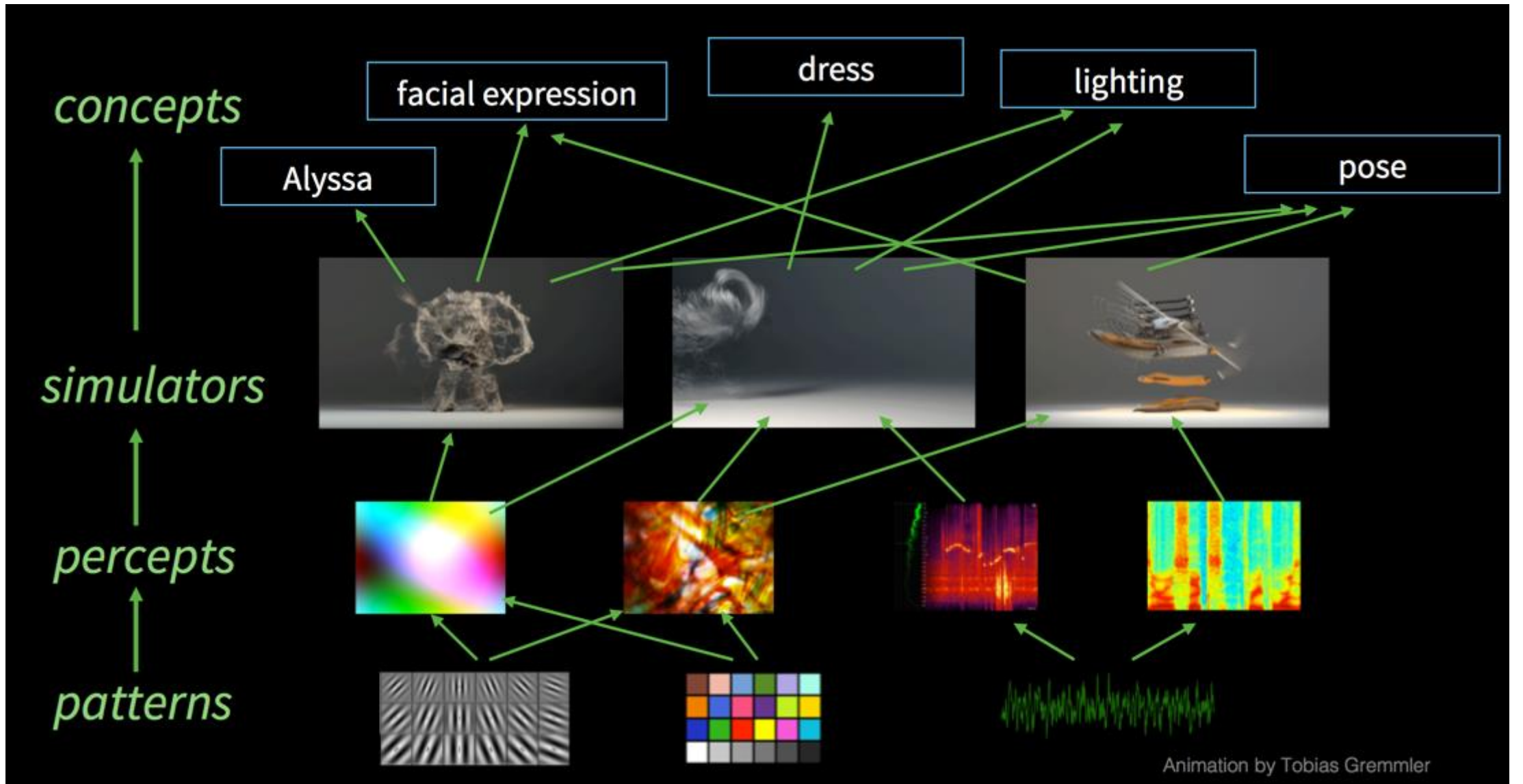
Capturing Manuscript Images with an AI Eye in Mind

Three levels of extraction of catalog data from digital images of the fragments

- ✦ Images should be captured in a way that permits standardized automatic processing.
- ✦ The images can be processed to detect elements such as image-foreground, regions of written text, and lines of the text, thereby allowing for the automatic assignment of conventional catalog measurements.
- ✦ Modern computer-vision tools and statistical inference techniques may be used to identify fragments that might originate from the same original codex.

Capturing Manuscript Images with an AI Eye in Mind





Manuscript image processing: Pandulipi Samshodhaka

- ✧ Pandulipi Samshodhaka is a manuscript processing software
- ✧ Useful to scholars in preserving, processing and analysing the manuscripts.
- ✧ This software can be used to create catalogue of manuscripts, and also content creation for manuscript images.

Salient features of Pandulipi Samshodhaka

- ✓ Text can be entered in all Indian languages including Grantha and Vedic.
- ✓ Tool to compare multiple versions of the same text.
- ✓ Search word/Phrase in selected/all texts in database.
- ✓ Tool to adjust image for readability.
- ✓ Transliteration of text
- ✓ Once manuscript data is entered for one version of a manuscript, the same version can be browsed, loaded or searched for entering data for different version of other manuscripts of the same text.
- ✓ Multilingual support
- ✓ Search Facility

Pandulipi Samshodhaka

Manuscript Editor.

The screenshot displays the Manuscript Editor software interface. The top window shows a scanned manuscript image with handwritten text in Devanagari script. The text is numbered 1 through 4, corresponding to the entries in the data form below. The manuscript text is:
1. श्रीगणेशाय नमः सपयोगे हि मात्रस्याडनयोईस्वपूर्वयोः ॥ व्यञ्जनोत्तरहोर्ध्वे
च ज्ञप्रयोगे तु मस्य च ॥ 1 मकारान्तं पदं पूर्वं जेति त्रेत्युत्तरे यदि ॥ जेयो मकारान्तं
स्वारो मात्रिको धर्मवर्जितः ॥ 2 ज्ञप्रशातिसरूपार्धे मस्योपप्रेदहं पुनः ॥
इम्यवाहाः परे नस्याप्यनुस्वारोत्र केवलः ॥ 3 अध्याये तैत्तिरीयाणाम
नुस्वारो यदा भवेत् ॥ तदाद्यर्थो गकारः स्यादपरस्वननासिकः ॥ 4
अनुस्वारो यजुष्येव मध्याये पियदा भवेत् ॥ तदागकारः संयुक्तो नशां
तिः स्यात्स रूपरे ५ द्विमात्राकाल उच्यते अन्यधर्मविवर्जितः ॥ ॥ संक्रो
रेय भूतचरेपः पूर्वो गता भवेत् ॥ स्वर्गतेस्मात्सरोरेपो दीर्घस्वारो भवे
दा ॥ ५

The bottom window, titled "Manuscript Data", contains a form with the following fields and values:

Manuscript Name	Library Abbreviation	Manuscript Version	Leaf Number
SHADVIMSATI SUTRA	WRI	5040	2

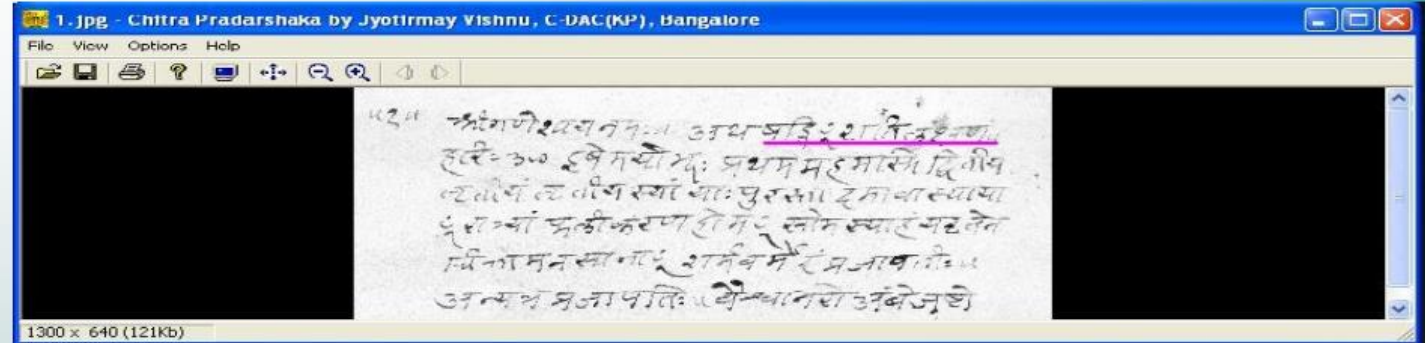
Additional fields include:

- Scribe Name/Org: [Empty]
- Manuscript Data: [Empty]
- Multi Lingual: Devanagari
- Script Translitter: Devanagari

Buttons at the bottom include: Add, Update, Search, Exit, Save Selected part, Write To File.

Pandulipi Samshodhaka

Search Facility



1300 x 640 (121Kb)

Search

Search Word
पद्धितिलक्षणं

Manuscript Name Library Abbreviation Manuscript Version

SHADVIMSATI SUTRA KUML 2938 8
SHADVIMSATI SUTRA OIMYS 2262 13
SHADVIMSATI SUTRA DCPUNE 9387 1

श्रीगणेशाय नमः । अथ पद्धितिलक्षणं ।
हरिः ॐ ह्रपे मयोभूः प्रथममहमस्मि द्वितीय
तृतीयं तृतीयस्यां याः पुरस्तादमावास्याया
श्रुत्यां फलीकरणहोमं सोमस्याहं यदनेन

Problems in Digitization

- ❖ Cost of both time and funds.
- ❖ At the simplest level, this need teams of two experts, the one being a humanities scholar and the other a technician or a developer.
- ❖ And when the technology becomes more advanced, it becomes more likely that the scholar will fail to understand how it can be improved to meet their requirements.
- ❖ If we scale back our ambitions towards using and modifying the existing technology, it is possible to have scholars operate on their own.
- ❖ If something does not have a name, we literally cannot speak or think clearly about it, hence working out a conceptual framework is essential.
- ❖ Similarly, without discussing what we can do with digital tools at the beginner and intermediate level, we cannot properly determine the skills we must develop as a normal part of our methodological toolbox.

Conclusion

Each of our organizations has a role to play in building this collaborative digital library collection and circulation system. Today's learners seek knowledge online, we must enable all library financial supporter to borrow e-books via their portable devices, by searching the web or by browsing online library catalogs. By working together, thousands of libraries can unlock analog collections for a new generation of learners, enabling digital access to millions of books now beyond their reach. The central goal for future learners to have access to all books without physical constraints.

Thank You