

## **Digital Documentation of Manuscripts: Prospects and Constrains**

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### **Abstract:**

Many new institutions are coming up as digital museums, digital libraries, digital archives and it is supposed to be increased many fold in future. It provides an easier and quick access to public without any limitations of time, space and boundaries of the world. Digital Preservation of our heritage materials perhaps the manuscripts and the fragile objects have very significant role in the conservation. Thus the digital heritage pool gather for off- site storage in order to protect them from natural disaster , natural ageing and other causes of physical and biological deterioration. But as compare to conventional methods of preservation the digital preservation has the following constrains and challenges. The safe storage of digital materials to prevented from damages and enables them to alive as long as possible. Therefore preventive measures to be taken to ensure the safety of the digital materials from all types of damages and problems such as hardware failure, software problems, care and storage of digital materials, Obsolesce technology etc.

### **Introduction**

Organic materials like manuscripts, palm leaf, paper, leather, parchments textiles etc. are very susceptible to the physical chemical biological factors of deterioration. It is the duty of all the custodians to preserve and conserve our cultural and natural heritage by all possible methods, including the digital preservation. Protecting data is multifaceted problems that require the creators and custodians of data to be proactive.

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The data should back up for swift recovery after computer failure. If it does not plan for the future with disaster response and preservation program, may loss the past materials for ever. Despite the events of September 11, 2011 the power blackout even in many countries like USA, Canada etc where hurricanes, tsunami, earthquake, flood and other disasters had took place and no disaster response plans were exist which results heavy damage to the primary data resources. Recently the Asian tsunami, the Orleans disaster accompanying hurricane and south Asia earthquake have destroyed many collections of museums, archives and libraries.

Manuscripts, books, museum collection are at constant risk from theft, robberies, human mediated destructions and natural disasters like tsunami, hurricane, earthquake, flood etc. Moreover politics and war have always been the mortal enemies of cultural heritage from centuries. Many archives such as Catholic University of louvian, Belgium, which burned down in both 1914 and 1940 due to war time bombing destroyed 230,000 books and 900 manuscripts (Marilyn et. al.2006).

Cultural heritage are most important for preserve the legacy of a country but often neglected in many countries. Manuscripts are one of the most important cultural and intellectual heritage and it should be safeguarded the past for the preservation of historical records, cultural legacy traditional and Divine knowledge. Hence all the apprehenses and prejudices against the digitization fail to answer while the natural desaster occurs unexpectedly and all the important documents, manuscripts and other valuable heritage materials become perished.

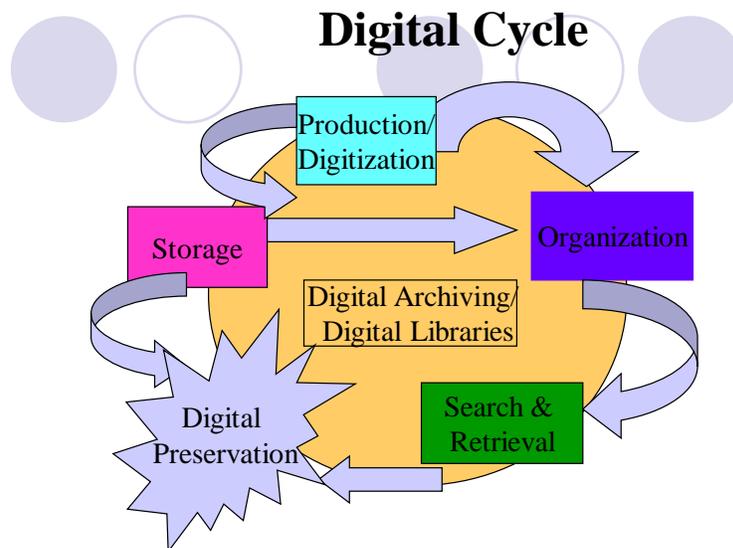
### **Digital Preservation**

Preservation is the continuous process of creating and maintaining the best environment possible for the storage or display artifact to prevent from all sorts of damage and enable it to live as long as possible. It is the prime duty of all custodians of museums, libraries, archives to preserve and conserve their collection not only in their physical forms but also by their digital images. It is essential to support the very

foundation of our civilization which is depend up on our ability to pass information, tradition, tangible and intangible heritage.

The advancement in technology will undoubtedly spawn never thought of before. Technology has expanded like never before in the past few years and its speed is increasing at a scorching pace beyond our imagination. As a result many new institutions were originated such as Digital Museums, Digital Libraries, Digital Archives and it is supposed to be increased many fold in future. It enable virtual access to public without any limitations of time, space and boundaries of the world devoid of touching, mishandling and damaging the fragile materials.

Recently digitization become a buzz word including in the developing countries like India in which more and more institutions digitizing their collection particularly archives and libraries as the part of modernization projects.



But museums are lag behind in this process due to the prejudices, apprehensions and possessive nature of the custodians who were misunderstood the concept of digitization. Whereas there is a growing demand for digital data for information services in countries like India having rich and diverse natural and cultural heritage.

Since computer were invented in the 1940 the impact of digital technology has grown tremendously including in the heritage sector. The rapid growth of the Information Technology, Internet facilities, which enhance the means of communicating the Text and Images of both the past and present. The greatly increased ability of modern machines enables with the enhanced capacities of Hardware and Software packages have increased the magnitude of storage many folds result the quality and quantity of rapidly capturing digital forms. For instance 500 GB and Terra bites external hard disc are available now which can store large amount of data in pocket size device and transport to any remote area.

### **Preservation of digital materials**

Digital preservation is a complex issue which required various ways and means to resolve various problems and challenges. The digital versions of cultural heritage by the conversion of analogue originals into bits and bytes has opened new vistas and extended new horizons in every direction providing access and opportunities for consumers in an unimaginable way since last two decades. Digital data derived from different sources required proper storage devices. Electronic text even with complex encoding is compact but images require much more space while file sizes can be reduced to some degree by compression of the data. These electronic recording devices include hard drives, external hard disc, CD-ROMs, DVDs etc.

### **Challenges & Constrains of digitization:**

As compare to conventional methods of preservation the digital preservation has the following constrains and challenges. The safe storage of digital materials to be prevented from damages and enables them to alive as long as possible. Therefore

preventive measures are to be taken to ensure the safety of the digital materials from all types of damages and problems such as hardware failure, software problems, care and storage of digital materials, from physical and biodeterioration, overcoming technologies from obsolescence etc. Technological obsolescence is not a major problem because many remedies and methods are available to overcome the problems.

### **Causes of Deterioration**

- The following causes of deterioration and problems often encounter in the safe storage of the digital materials
- Biological agents
- High temperature and Humidity
- Air pollution (Dust & Dirt)
- Computer virus
- Hardware & Software Failure
- Damage due to short –circuit
- Magnetic- stray field
- Lightning
- Poor storage condition
- Mishandling of devices
- Unauthorized exposure to dust and dirt
- Technological Obsolescence

## **BIODETERIORATION:**

Biodeterioration of cultural property may occur by naturally and accidentally due to many reasons including high Temperature, Humidity, Heavy rain, Flood, Earthquake, Tsunami etc. Some time these problems cause un repairable damage. Hence digitization of cultural objects is essential to save at least the content of manuscripts or the images of our cultural heritage that can be used for future purpose. Because many deteriorating agents such as physical and biological factors particularly microbes, fungus and insects are responsible for the serious damage. In high humid condition ( $RH < 70\%$ ) usually fungal growth starts almost in every materials including the digital Images preserved in CD ROM, Floppy, Hard disk etc. The lens of CD player usually damage due to the fungal growth present on the surface of the CD and vice-versa while CD player are exposed to an infected CD. Therefore both the CD player and CD should be kept in sterile condition of optimum temperature and humidity and periodical cleaning is essential to prevent from such problems.



Deterioration of manuscripts due to various agents

### **Computer Virus:**

Computer viruses and worms invade computer through unprotected computers via-email diskettes and CDs where the unwitting or unsuspecting receiver opens an attachment. Some computer viruses are also called worms. They corrupt hard drive by copying their files over and over again until there is no space left. Once there is no space left on hard drive any computer programs would not function.

As creation of digital collections becomes prevalent, museum personnel need to learn about the issues of conserving digital materials that are in fact digital substitutes of objects in their collections, Project planning for digitization should not only encompass the pre-digitization phases, but should also put in place plans for preserving these digital collections, once they are created. Various international organizations have looked at the issues of digital preservation in the last few years.

### **Strategies of Digital Preservation**

- Technological Preservation
- Migration of Digital Data
- Change Media
- Change Format
- Emulation (Imitation)
- Adherence to standard
- Backwards Compatibilities
- Encapsulation
- Converting to stable analogue format
- Digital Archives

- Encryption (password protection)
- Multiple Storage system
- Offsite Storage System
- Cloud storage
- *Technological Preservation* are means of overcoming technologies obsolescence by retaining hardware and software used to access the digital resources.
- *Migration of Digital Information* :Refreshing digital information by copying it from one medium to another medium and possibility a complex set of emulators describe two distinct points on a continuum of approach to preserving digital Information. The purpose of migration is to preserve the integrity of digital objects and to retain the ability for client for retrieve, display otherwise use them in the face of constantly changing technologies may be difficult.
- *Change media*: Transfer digital materials from less stable to more stable media. For instance migrate data from CD to more stable external hard disc because CD easily become corrupt due to scratches, and fungus attack.
- *Change format*: The migration strategy for digital archives will large, complex and diverse collection of digital materials is to migrate from the great multiplicity of formats used to create digital materials to a smaller, more manageable number of standards that can still encode the complexity of structure and form of the original.
- *Emulation*: Emulation refers to creating new software that mimics the operation of older hardware or software in order to reproduce its performance. Thus, not only physical presence and content preserved, but digital object

could display original features and functionality available with the older software. (Marilyn, 2006)

- *Adherence to standard:* Adhering to stable and widely adopted open standards when creating and archiving digital resources. These are not tied to specific hardware or software platforms and thus can defer inaccessibility of digital resource due to technological obsolescence.
- *Backwards Compatibilities:* Being able to retain accessibility to a digital resource following upgrade to new software and operating system.
- *Encapsulation:* Grouping together a digital resource and whatever is necessary to maintain access to it. This can conclude metadata, software viewer, and discrete files forming the digital resource.
- *Converting to stable analogue format:* Converting certain valuable digital resources to a stable analogue medium such as permanent paper or preservation microfilm or, more recently, nickel disk readable by electron microscope. This cannot be recommended as more than a pragmatic interim strategy for a small category of digital materials, pending the development of more appropriate digital preservation strategies.
- *Disaster preparedness:* Once the natural disaster happened, it is very difficult to save our valuable heritage materials from all type of damages. Therefore disaster preparedness is the only way to safeguard our heritage materials

### **Back up Methods**

Regular backup methods are imperative to protect the data from any kind of loss. It also prevent loss of data from the computer even the network system or server crashes. The most common back up method for individual to use is the incremental backup (Kahn Miriam B, 2004). Only the files that have changed are copied into some type of

removable storage medium or a remote data storage site (Off sites). Some automated backup programs also back up only what has been changed since the last time.

### **Data mirroring**

Data mirroring or replication includes synchronizing two or more data server with exactly the same information. There are several types of replication that can be employed at a time. The first is to back up or replicate on a second drive in the same cabinet. This would ensure against the physical loss of data or damage to the original drive. The second type of replication would be to have another drive or server in a different machine. .

The third and highest level of replication of digital data would be store across the geographical areas i.e. Regional level, National level or International level repositories. The remote back up service providers like web storage, cloud storage, optical lines would be stored data at remote locations save the data from natural disasters. Thus the digital images of museum objects and manuscripts saved would be useful for reconstruction of past by remodeling the objects if the original objects damage or perished by natural disaster in one region or any other country.

### **Haptic technology**

The concept of touch and feel in museum exhibits enabled in digital materials through haptic technology. New technologies now allow computer users to use their sense of touch to feel virtual object for virtual reality state of the art haptic (force feedback) device allow users to touch and feel virtual objects with a high degree of realism (Giachritis C.et.al.2008) Artifacts surface properties can be modeled so that someone using a haptic device could feel it as a solid, 3-dimentional object with different textures, hardness or softness. For instance very fragile objects like manuscripts make available to visitors, allowing on line visitors for away from museum to feel touch and feel objects at a distance, let visually impaired and blind people touch and feel exhibits that are normally displayed inside the show cases are possible by haptic technology.

## **Conclusion:**

It will be a pioneer attempt to bring all the primary sources of the traditional materials lying scattered, fragmented which are under the danger of extinctions. Therefore it is necessitate urgently to preserve our valuable heritage materials by all possible methods which are essential for reconstruction of past. As compare to conventional methods of preservation the digital preservation have many constrains and challenges. The safe storage of digital materials to be prevented from damages and enables them to alive as long as possible. Therefore preventive measures are to be taken to ensure the safety of the digital materials from all types of damages and problems such as hardware failure, software problems, care and storage of digital materials, from physical and biodeterioration, overcoming technologies from obsolescence etc. Technological obsolescence is not a major problem because many remedies and methods are available to overcome the problems.

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