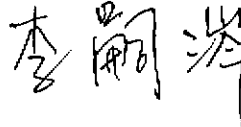# 結案報告

計畫名稱：數位博物館工作小組計畫辦公室

計畫編號：NSC89-2750-P-002-111

執行期間：民國 89 年 10 月 1 日至民國 89 年 12 月 31 日

在計畫執行期間，本辦公室達成下列事項：

1. 於民國 89 年 11 月 4 日舉辦『數位博物館第二年計畫第四次進度討論會』。

2. 於民國 89 年 12 月 8-9 日配合國科會國合處，舉辦『APEC Digital Museum Initiative: Information Technology for Sharing Humanistic Content』之國際會議，此會議主要目的為促進 APEC 各經濟體間對文化資產數位化及網路資源分享的交流與合作。

3. 於民國 12 月 1 日至民國 89 年 12 月 31 日期間徵求數位博物館第三年主題計畫。

4. 定期更新網站 http://dm.ee.ntu.edu.tw/

Ps. 各事項詳細內容請參見附件。

數位博物館計畫第四次主題計劃經驗分享

及進度討論會議記錄

開會時間　：中華民國 89 年 11 月 4 日星期六 9：30～17：00
開會地點　：台大圖書館 4 樓多媒體服務中心大團體使用室
會議主持人：李教務長嗣涔 (鍾教授及吳館長代)
出席者　　：工作小組成員及各主題計畫主持人
紀錄　　　：楊雅惠

一、報告事項：
1. 12 月 8,9 日，在中研院舉行 APEC Workshop 國際會議，請大家踴躍參加。
2. 這次是今年度最後一次成果報告，計畫邁入第二年尾聲相信大家做得一定比第一年來得好，也更有心得。

二、問題討論
1. 遭遇之困難：主題計畫結束後應有經費來支援維護的工作。
   提出計劃：臺灣原住民---平埔族群數位圖書館與博物館專案先導計畫
   解決方案：請計畫工作小組向國科會建議。
2. 遭遇之困難：大陸地圖目前所能取得的比例尺有限，因此呈現上不夠詳細。
   提出計劃：玄奘西域行
   解決方案：Ⅰ.可向國防部請求協助。
   　　　　　Ⅱ.中研院資訊所、史語所有做大批大陸歷史地圖資料，可參考。

二、討論事項及決議：
1. 各主題計畫這次皆已針對上一次進度討論會中提出的不足部份做了修正，但有些網站的維護上似乎不夠完整，即第一年做的內容沒有完全上站，應持續維持。
2. 建議國科會提供經費來支援主題計畫結束後的維護工作，讓主題網站資料能日益精進，內容更豐富，否則沒有實質的意義。
3. 希望未來數位博物館計劃能往永續經營的方向前進，且是真正有內容的博物館，而不單單只是電子書或僅網頁的功能。
3. 建議國科會往後能考慮將計畫申請分為二類：第一類為新計畫的提出，第二類為舊計畫的評估。有些主題的內容資料龐大繁雜，需要長時間不斷的補充，若只有新計畫的提出，則舊計畫的內容難以維持水準。希望國科會能在接受計畫申請時，將舊計畫列為評估對象，若評估優良則給予經費支援維護工作。
4. 有些主題計畫網址連結不上，請各計畫小組人員檢查。

December 8-9, 2000
Institute of Information Science
Academic Sinica
Taipei, Taiwan

TAIPEI

Hsinchu

Tanshui

T'aichung

Choshui

Huahen

IPEG Digital Museum
Initiative: Information
Technology for sharing
Humanistic Content

T'ainan

Kaop'ing

Lu I.

Kaohsiung

P'ingtung

Lan I.

Hengch'un

n Strait

APEC Digital Museum Initiative:
Information Technology for Sharing Humanistic Content

Invitation from the Project Leader

Dear friends:

On behalf of the National Science Council of Chinese Taipei it is my great honor to welcome all of you to attend the APEC 2000 workshop on digital museums. This workshop intends to be a forum for researchers and content providers to exchange their ideas and share their experience on the activities related to digitization of our cultural assets and development of technologies for digital libraries and digital museums. We hope that APEC member economies can take turns to hold this kind of workshops to improve the technologies for Digital Museums / Libraries. Chinese Taipei will host the workshop in the first round on December 8-9, 2000 in Academic Sinica, Taipei, Taiwan. The main theme of this workshop is "APEC Digital Museum Initiative : Information Technology for Sharing Humanistic Content".

This workshop was initiated to enhance the action proposed in the 3rd APEC Minister's conference on Regional Science and Technology Cooperation (MEXICO Declaration), it encouraged APEC members to foster the pursuit of new knowledge and the development of technologies for humanistic concerns. such as the better health, well-being and enriched culture of all segments of the population. "APEC Digital Museum Initiative: Information Technology for Sharing Humanistic Content" is the product of this conference.

As the coming of the Internet age, digital collections will be widely using for cultural dissemination and preservation. Digitization of cultural collections will play a very important rule for keeping the continuity of heritage of a Nation and also for sharing. The forms of digital collections of digital museums will greatly enrich materials for all kinds of education. Also, the knowledge carried and embodied by digital collections will greatly improve the range and the depth of the content of all kinds of education. I hope you all enjoy the workshop and take sometime touring the Taipei city after the meeting. Finally, I wish this workshop a success.

Sincerely,

Prof. Si-Chen Lee
Dean of Academic Affairs
National Taiwan University
E-mail address: selee@cc.ee.ntu.edu.tw

Morning Sessions, Friday, December 8, 2000

The APEC 2000 Workshop on Digital Museums	
08:40 - 09:10	Registration
09:10 – 09:20	Opening Speech Prof. Si-Chen Lee Dean of Academic Affairs, National Taiwan University Welcoming Remarks Opening Ceremony
Session Chair: Der Tsai Lee **Director of Institute of Information Science, Academic Sinica**	
09:20 - 10:00	**Speaker :** Ching Chun Hsieh Research Fellow, Institute of Information Science Academia Sinica, Taiwan **Topic :** An Introduction to the National Digital Achieve Project
10:00 - 10:40	**Speaker :** Jieh Hsiang Dean of College of Science and Technology, National Chi-Nan University, Taiwan **Topic :** Image Retrieval of Butterflies
10:40 - 10:50	Coffee Break
Hyung-Seon Park **Researcher, Korea Research & Development Information Center, Korea**	
10:50 - 11:15	**Speaker :** Shirley Leung University Librarian of the Hong Kong Baptist University, Hongkong **Topic :** Building Blocks for Hongkong's Digital Museum/Library Initiatives
11:15 - 11:40	**Speaker :** Howard Wactlar Vice Provost for Research Computing, Carnegie Mellon University, USA **Topic :** Capturing the Record of Human Experience in Video
11:40 - 12:05	**Speaker :** Chung-Sheng Li Manager at IBM TJ Watson Research, USA **Topic :** Model-Based Information Retrieval and Information Marketplace
12:05 - 13:30	Luncheon

Afternoon Sessions, Friday, December 8, 2000

Session Chair: Manop Issaree **Director of National Science Museum, Thailand**	
13:30 - 13:55	**Speaker** : Geoff Crane National Science and Technology Center (Questacon), Australia **Topic** : Interactive Science on the Web
13:55 - 14:20	**Speaker** : Kwang-Tsao Shao Research Fellow, Institute of Zoology, Academia Sinica, Taiwan **Topic** : Recover Native Freshwater Fishes in Taiwan

14:20 - 14:45	**Speaker** : Jen-Shin Hong
	       Associate Professor, Dept. of Computer Science and Information
	       Engineering, National ChiNan University, Taiwan
	 Topic : The Lanyu Digital Museum

14:45 - 15:10	**Speaker** : Bih-Cheng Chen Director of Post Bachelor Department of Chinese Medicine, Taiwan **Topic** : Digitized Museum of Chinese Medicine, Herbal and Acupuncture
15:10 - 15:30	Coffee Break
Session Chair: Larry A. Alba **Archeology Division National Museum, Philippines**	
15:30 - 15:55	**Speaker** : Inghai Pan Research Fellow, Academia Sinica, Taiwan **Topic** : Introduction to the Pingpu Project

15:55 - 16:20	**Speaker** : Yen-Jen Oyang
	       Prof. of Computer Science and Information Engineering. National Taiwan
	       University, Taiwan
	 Topic : Discovery of the Tamsui River

16:20 - 16:45	**Speaker** : Chu-Ren Huang
	       Research Fellow, Academia Sinica, Taiwan
	 Topic : Adventures in Wen-Land: A Linguistic and Literary Knowledge Net for Primary
	       Education

16:45 - 17:10	**Speaker** : Jen-Fen Huang
	       Assistant Prof., Department of Electronic Engineering, Wu-Feng Institute of
	       Technology, Taiwan
	 Topic : A History of Taiwan Architecture

18:00 - 20:00	Banquet at Howard Plaza Hotel

Morning Sessions, Saturday, December 9, 2000

|	**Session Chair: Sarah Edwards** **Coordinator Public Programs, Outreach Services, Museum Victoria,**
09:00 - 09:25	**Speaker :** Shun-Tzu Tsai Head of Information Center, National Palace Museum, Taiwan **Topic :** The Beauty of Chinese Art - Enamels from the Ming and Ch'ing Dynasties, Famous Album Leaves of the Sung Dynasty, and Illustrations in Buddhist Scriptures with Relative Drawings.
09:25 - 09:50	**Speaker :** Hao-Ren Ke Associate Prof. of National Chiao-Tung University, Taiwan **Topic :** Taiwan Folk Artist Digital Museum – The YuYu Yang Digital Art Museum
09:50 - 10:15	**Speaker :** Aming Tu Head of Buddhist Studies Information Netwrok Center, Chung-Hwa Institute of Buddhist Studies, Taiwan **Topic :** The World of Xuanzang and Silk Road
10:15 - 10:40	**Speaker :** Simon C. Lin Director of Computing Centre, Academia Sinica, Taiwan **Topic :** Taiwan Memory – Digital Photo Museum
10:40 - 11:00	Coffee Break
	Chair: Ir. Alexander Barus, **Technology Assessment Ministry of Industry and Trade, Indonesia**
11:00 - 11:25	**Speaker :** Rita Wong Head of Dep. Systems & Communications, Chinese University of Hongkong Libraries, Hongkong **Topic :** The Digital Library Initiatives at Chinese University of Hongkong Libraries
11:25 - 11:50	**Speaker :** Larry A. Alba Researcher II, Archeology Division, National Museum, Philippines **Topic :** National Museum Initiatives on Information Technology
11:50 - 12:15	**Speaker :** Yu-Chuan Li Prof. of Institute of Medical Informatics, Taipei Medical University, Taiwan **Topic :** Digital Museum for Human Body
12:15 - 13:30	Luncheon

Afternoon Sessions, Saturday, December 9, 2000

	Session Chair: Nang Toan Do **Researcher of the Institute of Information and Technology, Vietnam**
13:30 - 13:55	**Speaker :** Sarah Edwards 　　　Coordinator Public Programs, Outreach Services, Museum Victoria, Australia **Topic :** Museum Victoria: sharing information with the internet generation
13:55 - 14:20	**Speaker :** Ming-der Wu 　　　Prof. & Director, National Taiwan University Library, Taiwan **Topic :** National Science Council Digital Museum Project—Extension and Education 　　　Office
14:20 - 14:45	**Speaker :** Ir. Alexander Barus 　　　Director for Technology Assessment, Ministry of Industry and Trade, Indonesia **Topic :** The Development of IT Industries in Indonesia
14:45 - 15:10	**Speaker :** Manop Issaree 　　　Director of National Science Museum, Thailand **Topic :** Virtual Museum Dev. Concept of NSM
15:10 - 15:30	Coffee Break
15:30 - 16:30	**Topic :** Future Perspective on Digital Museums **Moderator :** Charlie T. C. Hsu 　　　Director General, Dep. Of International Programs, National Science Counsel **Panelists :** -- Ganigar Chen, Scientist of National Science Museum, Thailand -- Geoff Crane, National Science and Technology Center (Questacon), Australia -- Hyung-Seon Park, Senior Researcher, Korea Research & Development Information 　　Center, Korea -- Ir. Alexander Barus, Director for Technology Assessment, Ministry of Industry and 　　Trade, Indonesia -- Larry A. Alba, Researcher II, Archeology Division, National Museum, Philippines -- Manop Issaree, Director of National Science Museum, Thailand -- Nang Toan Do, Researcher of the Institute of Information and Technology, Vietnam -- Rita Wong, Head of Dep. Systems & Communications, Chinese University of 　　Hongkong Libraries, Hongkong -- Sarah Edwards, Coordinator Public Programs, Outreach Services, Museum Victoria, 　　Australia -- Shirley Leung, University Librarian of the Hongkong Baptist University, Hongkong
16:30 - 17:00	Closing Ceremony

Sunday, December 10, 2000

HALF DAY TAIPEI CITY TOUR	
08:20 - 08:30	Gather in Howard Plaza Hotel Lobby
08:30 - 12:30	National Palace Museum Tour
12:30 - 14:00	Luncheon (Buffet at Howard Plaza Hotel)
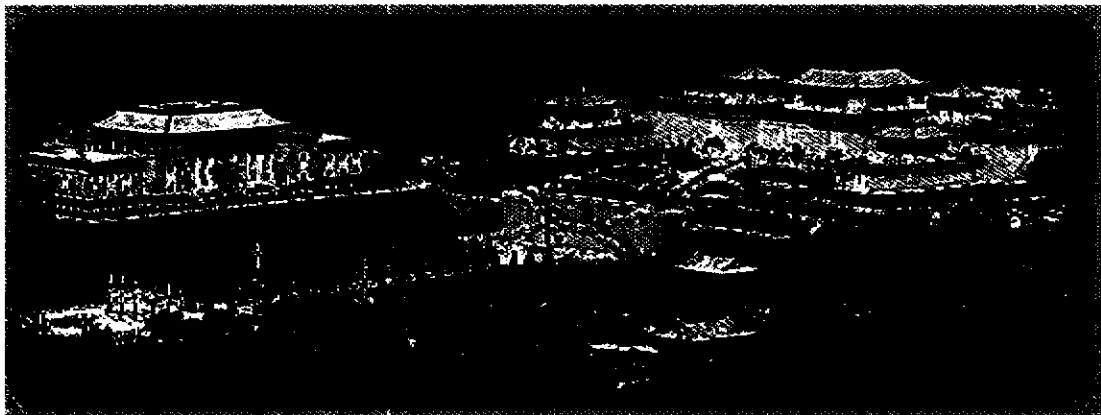
National Palace Museum

On October 10, 1925, the Palace Museum was inaugurated, as an effort of the Committee for Administering the Care of the Ch'ing Palace to enlist the attention of the public in support of their work, on the premises of the former Ch'ing court in the Forbidden City. Since the collection has had a very long history traceable back through many dynasties, the new institution was rightfully referred to as the Palace Museum. At the same time, it also bore a far greater responsibility and mission as a national museum for China, which had just become a republic.

The Palace Museum devotes to protecting and preserving the 7000-year cultural legacy of China with advanced technologies; cooperating with private connoisseurs and ushering in exhibitions from the Mainland; bringing the Museum's collection to the global ⌐rts of the world to the Museum.

Presentation Abstracts

An Introduction to the National Digital Achieve Project
『國家典藏數位化計畫』簡介

Ching Chun Hsieh
Research Fellow
Institute of Information Science Academia Sinica

依據

去年(88 年)七月行政院的第九次『電子、通訊、資訊策略會議』通過了『國家典藏數位化計畫』。會後,行政院將此案分由國科會協調執行。依據該策略會議的提案,本計畫預計在八十九年七月一日正式展開,內定參與此計畫的機構有:故宮博物院、國家圖書館、國立歷史博物館、臺灣省文獻委員會、自然科學博物館(台中)、臺灣大學和中央研究院等七個單位。依據國科會之規劃,本計畫將以專案的方式進行,並委請中央研究院主持此專案計畫。本「計畫辦公室」工作計畫即據此規劃。

前言

自從資訊科技普遍應用以來,對社會的影響日益深遠。以往,資訊科技對工作的影響是局部的。典型的改變如:書目資料的電腦化、研究文獻全文資料庫的建制、和一些行政工作的自動化等等。這些建樹僅在局部的事務範圍內,幫助我們做一些例行的計算或是文字處理工作,直接或間接,溫和地改善我們的社會環境與生產力。然而,自從 1995 網際網路盛行以來,資訊科技對我們整個社會的影響程度急遽昇高,無論是在生活、工作、學習、休閒娛樂等等方面,都已經讓人們感覺到這一波『變』的壓力。資訊科技已然帶來了社會變遷。

資訊科技與社會變遷

資訊科技帶來的變遷可以從兩方面觀察:其一是溝通,其二是對知識的處理。網際網路改變了人們彼此溝通的行為和成效,如:電子郵件、電子辦公室、視訊會議;改變了蒐集資料的方式和效果,如:上網下載論文、蒐集以往極不容

易獲得的技術報告或專案報告；數位化資訊也從數字、文字擴展到圖表、圖繪、影像、聲音、動畫，以至於非文字形式的數位資訊大量湧現。此影響所及不僅提供了新的寫作的方式和新的多媒體資料庫，也改變了基本的知識表達和呈現，進而影響到學習和研究的態度和方法。多媒體技術使得研究有關的器物，皆可數位化。這個功能突破了以往資訊科技只擅長處理數字和文字的刻版印象，使一切文物（尤其是極希有的）都可以以數位化的形式廣為流傳、運用。以往，學者研究所能取得的文物無不深受時空環境的限制，於是有「富有」的學者，他們比其他「貧窮」的學者較容易取得研究必需的素材；一旦希有文物大量數位化之後，每個學者都可將變得極其「富有」，研究素材取得的時空環境限制將逐漸消融。

1.資訊科技與新文明

我們發現：在網際網路之下『團隊合作』變得的非常重要。它可以使我們能力的質和量明顯地增強。這觀念業已獲得許多人的認同。換言之，網際網路已經開始逐漸地改變了我們做事的基本態度、觀念和方法。其次，在網際網路的協助下，『跨領域的』或大型的『綜合計畫』不再是難不可及的事。原因之一是因為此類研究常常因溝通困難且成本甚高而滯礙難行，但網際網路使溝通的成本降低、效果反而倍增，消解了這個難題。處此情境，我們有機會設法解決許多以往無望解決的複雜問題。再者，在良好的溝通和規劃之下，往往可以節省許許多多的研究資源，如：時間、經費、人力、物資等，網際網路正可以在這個論點上一展長才。網際網路造成的組織重組(organization re-engineering)、教育體系的革新等，就是最好的例子。

上面所說的，並不能盡網際網路帶來的種種變遷。事實上，網際網路所主導的溝通革命和知識處理革命，使得今後的變化實將有無盡的創意與可能。雖然我們對溝通和知識處理的改變還待觀察、研究和分析，可是，溝通是肇造文明的源頭，知識處理是文明演進的動力，這兩項因果卻是無可否認的。資訊科技和網際網路帶來的種種變遷實不能等閒視之。

數位媒介的發展，帶給人類文明史無前例的巨大改變；其影響之大，較紙和印刷術之發明尤甚。許多學者都已同意：人類文明的記錄和傳承，已經開始從紙上轉變到網路上（數位化）。這可以從聯合國推動 Memory of the World 計畫以挽救瀕臨滅絕的人類文明，從列強無不積極推動數位圖書館、數位博物館、或數位典藏這類的計畫以強化他們的文化功能和影響力等，得到佐證。在這劇變的時刻，我們主動地改善環境，似乎是我們主導此變局唯一可以信賴的指針。

2.資訊科技與經濟發展

資訊科技對產業和經濟的影響，則是另一端。自從 1977 年資訊經濟的理論和架構由美國商業部(Department of Commerce)提出以來，資訊業的就業人口在先

進國家早已超過了所有就業人口的 50%（美國的在 1998 年已超過 60%）。『「知識」將成為產業最重要的資源』的理論，早在 1960 年代即已提出，至 1970 年代已經廣為人知。以資訊科技改善組織的一切溝通和一切知識處理早已成為一切產業、商業發展必要的看家本事。至 1994 年網際網路急速普遍以來，資訊經濟或「知識經濟」的理論亦隨之蔚為顯學，而電子商務的風潮席捲全球。產業和經濟的發展實在是建築在知識和文化的基礎之上的，試問：沒有知識那來的經濟發展呢？文化即知識的累積和傳承（此所指的知識並不限於科學知識）。以此觀之，資訊科技對產業和經濟的影響是全面的，而且既深遠且無所不至。

我國的文化博大精深，淵遠流長，是世界人類共同的無價寶藏。若能將之數位化廣為流傳應用，其在文化和經濟兩方面的價值是無可限量的。對文化而言，這是精緻文化的普及化、教育的普遍化和終身化、是讓文化精髓人人共享、更是創造新文明和新社區文化的絕佳契機。從產業和經濟的層面來看：在基礎上，新文明將提供嶄新的環境；在應用上，數位化的精緻文物檔案資料，正是軟體產業、加值產業、內容產業、文化產業等等的極佳原料。如果這樣的極佳原料能充分供應，未嘗不是我們發展上述這些產業的大好機會。這些產業的產出，不僅可以提昇我們所有產業的生產力、競爭力，並且可用於外交、國防、學術研究、教育、民生等等方面。

『國家典藏數位化計畫』即在以上信念下所作的規劃。

Image Retrieval of Butterflies

Jieh Hsiang
Dean of College of Science and Technology,
National Chi-Nan University, Taiwan

In this talk we present a content-based image retrieval system for butterflies. We present a method for data formulation, and a new query model based on the notions of query-by-feature and query-by-example. A demonstration of how the method works on a digital museum of Taiwanese butterflies will also be given.

Building Blocks for Hong Kong's Digital Museum/Library Initiatives

Shirley W. Leung
Chair of the Joint University Librarian,
Hong Kong Baptist University, Hongkong

This report will give an overview of projects and activities related to digital information initiatives in Hong Kong's academic and cultural community: academic programs and libraries in the universities, the Public Library, and museums. These efforts – in place and underway – will serve as building blocks for future digital museum/library collaborations.

Capturing the Record of Human Experience in Video

Howard D. Wactlar
Vice Provost for Research Computing
Carnegie Mellon University, USA

The Informedia Digital Video Library system provides full-content search and retrieval from within video content. It implements a fully automated process to enable content capture, information extraction and storage in on-line archives by applying artificial intelligence and advanced systems technology. The Informedia approach uniquely combines speech recognition, image understanding and natural language processing technology to automatically transcribe, segment and index the linear video. The current library consists of 2,000 hours (1.5 terabytes) of daily news and documentaries. This prototype database allows for rapid retrieval of individual video paragraphs which satisfy an arbitrary spoken or typed subject area query based on the words in the soundtrack and images in the video. There is also a capability for matching of similar faces and images. Multilingual versions of the system enable cross-lingual video information retrieval.

The newest phase of this work is developing tools, techniques, and systems that allow users to capture complete records of personal experience and to share them in collaborative settings. The project is also developing techniques for managing vast quantities of multimedia data and for searching, summarizing, and visualizing content from multiple perspectives. Indexed and summarized experience will enable "remembering" analogous past events and "projecting" future, simulated ones.

Model-Based Information Retrieval for Information Marketplace

Chung-Sheng Li

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Most existing information retrieval applications are based on similarity retrieval of templates or examples, such as similarity retrieval of text and image documents. In such retrievals, the query usually consists of a number of keywords or phrase (for text retrieval), or features of an image (for image retrieval). Each of the documents (text or image) in the database is usually represented as one or more vector(s) in a multi-dimensional feature space. The query processing of such similarity retrieval usually involves identifying in the feature space those vectors that have the smallest Euclidean distance to the vector that corresponds to the query target. This similarity retrieval paradigm, however, is not entirely suitable for many scientific and business decision support applications, which are mostly based on models.

In this talk, we describe a new paradigm for information retrieval in which the retrieval target is based on a model. Three types of models, linear, finite state, and knowledge models are discussed. These information retrieval scenarios often arise from applications such as environmental epidemiology, oil/gas production and exploration, and precision agriculture/forestry. Traditional model-based data and information processing usually requires the processing of each and every data points. The proposed new framework, in contrast, will process the data progressively using a set of progressive models and utilize indexing techniques specialized for the model to facilitate retrieval, thus achieving a dramatic speedup.

We also examine the problem of dynamically determining competitive prices of information goods. The Internet provides a platform where consumers can spell-out

their information needs and have providers create a possible web of relationships to competitively meet these consumer needs. We call such webs a "food chain" of information providers. We examine methods to determine competitive prices where time constraints, the short shelf-time of information goods, and the uncertainty of the information are all factors of concern. The complex interactions of producer and consumer decisions together with the inherent chance variables are represented by an influence diagram.

Interactive Science on the Web

Geoff Crane,
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Questacon – The National Science and Technology Centre, Canberra Australia

Questacon is Australia's leading interactive science museum. Based in the parliamentary precinct in Canberra, the Centre is home base for a suite of nationally and internationally touring education programs and exhibitions.

Questacon has had a popular, educational and informative website since May 1995. Our website has won several international awards, and offers interactive science experiences and a virtual tour, as well as access to program itineraries, general corporate information and online bookings for Questacon's various programs.

The interactive component of the website is the focus of the Digital Museums Workshop presentation. The major categories of interactive experiences are puzzles, illusions and physics based exhibits. The QuickTime VR virtual tour experiences of the Centre's galleries are also somewhat interactive.

1. Puzzles

These activities are based on hands-on maths puzzles from the Questacon Maths Centre, which has about 500 puzzles in plastic 'lunchboxes'. The puzzles' virtual counterparts make use of Shockwave, and in some ways they are better than the original activities.

For example, with the real puzzle, if an error is made, often the visitor has to start from scratch. With the electronic version however, steps taken can often be undone one by one, without the need to restart. The internet puzzles also allow younger children to succeed at some of the harder tasks, as there is feedback and clues available for each activity.

There are currently about 10 of these puzzles on the website, and we are looking at ways of economically replicating the majority of the Questacon Maths Centre's 500 puzzles.

2. Illusions

The 10 or so interactive illusions on the site again, are more useful, illustrative and powerful than their paper based predecessors. Take the example of the Titchener Illusion. This illusion consists of two equivalent circles next to each other, separated by about two diameters. One of the circles is surrounded by five more equivalent circles, and the other circle is surrounded by 10 circles of about one third if its diameter. The illusion is that the second circle looks bigger, when in fact it is not. Shockwave allows users to press a button and remove the surrounding circles temporarily, at which point it becomes obvious that the two circles are equivalent.

Illusions are a powerful way of exploring human physiology and psychology, and each illusion on the website has explanations as to the insights gained from them. Visitors are also directed to many other internet based resources around the world.

3. Exhibits

This is an area that Questacon has just started exploring, and our first three simulated exhibits are now on-line. They replicate the classic 'cartesian diver' exhibit, and allow visitors to manipulate wave superpositions and lissajous figures, activities that are common experiences in many science centres, including Questacon.

Into the future, Questacon intends to add more direct 'human' interaction on the site, and areas we are looking into include web casts of lectures, on line interviews with young science graduates, and a science question and answer service. We would also like to add to our collection of virtual exhibits, and produce a version of the site more suited to the low bandwidth internet connections available throughout much of the remote areas of Australia.

RECOVER NATIVE FRESHWATER FISHES IN TAIWAN

http://fishdb.sinica.edu.tw/~fhfresh/index.html

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The title of this website is "Recover native freshwater fishes in Taiwan". It is hope that this website can let elementary and high school students can browse, enquire and download some freshwater fish information they need. These information not only can compensate the insufficient knowledge of native organisms in current textbooks or reference books, it can also educate people how to protect our freshwater environment. The environment actually is still degradation seriously under the continuous pressure of overcatch, introduce alien species, destroy nature habitat and pollute waters etc. It is hope that this website can call people attention how important and urgent to conserve the freshwater ecology in Taiwan. This project will detaily introduce the common knowledge on morphology, distribution, ecology, behavior, life history and conservation of all 80 primary freshwater fish species in Taiwan. Among them, 30 species are endemic, i.e. they are only occurred in Taiwan. The purpose of this website will be focused on the education and propaganda, not academic research or archives so the content will be prepared as more popular and fun as possible to attract users visit.

This project is a continuity of the past year project of digital museum which a website entitled "Fish World of Taiwan" was established. Those experience, manpower and good collaboration with several technique supporting projects including database management, QBIC, GIS and metadata etc left from 1st year project can be kept and extend to promote this 2nd year project of this year. The main items of this new website will include: 1. Introduction; 2. Get to know the freshwater fishes; 3. Basic information of each species; 4. Distribution; 5. Conservation; 6. Monitoring; 7. Bibliography; 8. Announcement; 9. Question and Answers; 10. Other related websites.

The Lanyu Digital Museum

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In this project, we built a digital museum for the Lanyu Island and its inhabitants, the Yami people. Lanyu is an island off the coast of southeastern Taiwan, and the Yami are a part of the Austronesian group. The project is jointly developed by the National Chi-Nan University and the National Museum of Natural Science. Our goal is to provide an integrated presentation of the cultural, geological, and biological collections about Lanyu. We provide an interactive educational environment for the general public on the Lanyu and Yami, as well as a modern research environment for academic institutions. Our digital museum emphasizes on the ease to use, and provides a number of innovative features to help the user fully utilize the information provided by the system. The digital museum is accessible through the Web at http://dlm.ncnu.edu.tw. Our work is sponsored by the National Science Council of Taiwan under grant number NSC89-2750-P-260-001.

In this presentation we shall briefly outline the content and technical contributions of the digital museum of the Lanyu. Lanyu is the largest island off the coast of Taiwan, and has many unique species of plants and animals not found anywhere in the world. Unlike the other indigenous groups of Taiwan, the Yami people, also called Dao, were originated from the Batan Islands of the Philippines. By providing a digital museum incorporating the cultural, geographical, and biological aspects of Lanyu, we hope to present Lanyu in its entirety.

The Lanyu digital museum contains four major modules: (1) the Lanyu Virtual Exhibition Hall: for introducing the essential cultural, geographical, and biological issues regarding the Lanyu Island and Yami. (2) Digital Collections Archives- for organizing the digital objects of Lanyu in a systematical and efficient manner. (3) Information Discovery System- for providing multi-facet query interfaces to meet the need of different users of the digital museum. (4) Personalization Mechanism- for recording and users' behavior to provide/present user-dependent contents.

The diversity of the digital subjects presented a challenge to the design of the system. The most unique technical feature in our digital museum framework is the XML/XSL-based Virtual Exhibition Hall. Conventionally, the virtual exhibitions in a digital museum are constructed using massive cross-linked HTML documents or graphic-intensive animations to present the content, and are extremely time-consuming to construct and maintenance. Furthermore, using this conventional approach, it is not probable to present the contents differently, to accommodate the users' personal preferences and different network bandwidths. In this project, we have designed an XML-based script management system to manage and present the content of the Virtual Exhibition Hall of the digital museum. The script of a virtual exhibition, provided by the content expert, is first partitioned into a sequence of "scenes", then organized and encoded into various individual XML documents representing the respective scenes. The cross-linkage between associated XML documents acts as the hyperlinks in the resulting webpages presented to the user. To present the XML documents in different fashion, several groups of artistically designed XSL documents are used with the associate XML documents to for the presentation. Currently, the Lanyu Virtual Exhibition Hall offers numerous versions of vivid narrated multimedia online slide shows for vivid/versatile presentations to the users. We plan to incorporate various web-based scripting techniques to design further XSL documents for providing more vivid presentation of the XML documents.

Digitized Museum of Chinese Medicine, Herbal and Acupuncture

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Digitized Museum of Chinese Medicine, herbal and Acupuncture is a project sponsorship by National Sciences Committee of R.O.C. This project had been sponsorship to the Herbal Museum of China Medical College. This museum set up in Oct. 1991,. in which containing rich and valuable Chinese Medical collections. Due to the easily broken and destroying of the collecting material, this museum is planned to be digitalized. It is the only first privately museum to demonstrate Chinese Medicine in our the world before China.

To let the people understand the Chinese Medicine, this assuming digital museum divided into four sections, such as herbal museum, the mineral and animal medicine museum, the herbal expanding educational museum and the acupuncture material museum, each gets staffs to in charge the collecting, studying and explaining. Beside our effort, we also got technique support from the National Scientific Museum and Shan-Lin-Hsi herbal garden to set up an across field and organization program.

This assuming digital herbal and acupuncture museum uses the VR-visual reality technique to handle the materials in it, to make it more attractive and mutual. We use the terms of VRML coordinate with Light Wave, Flash, Dreamer, Bryce, Ray Dream and Dimension 3D software to produce the pieces. This program also utilize the

VRML Technique to produce 360 degree whole view environment coordinate 3D pieces and Magic 3D and 2D technique to make it more real and transformer.

Our staffs had planned many "unsimultaneously multimedia distant teaching program" and well experienced to conquer the problems of plain vision and audio-video technique, so far we cooperate with the overseas universities to set up the distant teaching programs of acupuncture and done well.

This digitalized museum project was almost finished and begin to offer world wide people a reliable and academic knowledge of Chinese Medicine and well reserve the historical material of Chinese Medicine and offer the researcher deeply and more information for the pharmaceutical factories.

Digitized Museum of Chinese Medicine Educational Lab.

The knowledge of herbs of Chinese people is from their ancestor. Every family members knows some of it, many herbs play as herbal dishes in families, accompanied with the pass of laws of foods people get many wishes about herbs, but unfortunately many herbs though as foods but wrong usage will bring side effect ions. Though there are many books or magazines offers many herbal reports which can support the shortage of information, but most of them were not written by experts or ignore the details so the innocent people will be harmed by the poor information.

Our herbal extension educational museum is the only one which offers the complete herbal information for our people in Taiwan by motion pictures and computer digitalized techniques to describe the origin, name, using methods and prohibition of herbs. We choose 10 herbs, which now used as foods first to undergo wishing to teach every age of people and to protect our traditional culture.To let people know the magic of herbs, our museums setup three special systems to demonstrate, 1. The herbal history and tales, 2. The Video in demand of Chinese Medicine Teaching Program. 3.The Q &A of using Chinese herb.

Digitized Museum of Acupuncture

Acupuncture is one of the main branch of medicine globally, in 1997 Medical Association of U.S. reported, two third of medical college in U.S. offer elective courses of Oriental Medicine. In Taiwan one third of medical college also offer elective courses of Acupuncture. Unfortunately, there is no class to tell us the origin of literature if acupuncture, the discovery of meridian, the usage of tools for acupuncture etc. all these above are treasures of traditional medicine culture. For example, why

moxibution prescribed as "灸", why acupuncture prescribed as "鍼", so through the understanding of literature of acupuncture, our people know more about how great our ancestor were, and more about the effect of acupuncture.

We get plentiful and precious literature of acupuncture in our museum and some of them are efflorescence or erosion easily to be tore so they are the most ideal literature to be digitalized. Besides the mystery of loss of the Bronze Statue of Acupuncture been found in Japan also get detailly described. So our museum is an educational, society beneficial, culture particular museum.

For people to know the acupuncture museum, we plan to demonstrate three kinds of field of acupuncture, as: 1. Literature of Acupuncture Science, 2. The discovery of Meridian, 3. The Show of Ancient Acupuncture Literature. All these above will incharged, collected, studied and explained by experts of every field.

Digitized Museum of Animal and Mineral

The animal and mineral medicine are often used in the past but gradually reduced today. The trend of the world is the nature plant medicine so the above will the subrogated. Nevertheless the substitute for mineral medicine is hard to be found and the effect is far from each other, so it is necessary to know more about the animal and mineral medicine. From the history of traditional medicine, the mineral medicine is necessary for the ancestor for it is the main source of mineral. Because the dosage of mineral is very important, a little bit overdose will induce a lethal side-effection, so the understanding for mineral medicine is a good material for basic education for our people.

Many animal medicine now are protected some are prohibited to be used. Many substitutes are investigated, for the protection of the rare animal and the concept of it we proposed many plants which can substitute the animal medicine, and solve the misunderstanding of animal medicine about the magic effect, to spread the concept for protection of the rare animals.

For changing the impression of killing the rare animal of us from the world, our museum will play an important role in it, to let the whole world know our effort in study and protection of the rare animals. For the world it is a goat for study the substitutes, for our people it is a educational, social beneficial, culture special museum.

For the people to know more about the animal and mineral medicine museum, our digital museum demonstrate in three ways as follow. 1. Common used animal medicine, 2. The rare and protected animal medicine, 3. Mineral medicine. We co-operate with the expert and professors of other universities to profile the museum, beside we also arrange some staffs to incharge, collect, study and explain the demonstrations.

Digitized Museum of herbal

The herbal medicine is the source of nature treatment traced by the world in the past, today and future, but the knowledge of herbal medicine becoming blur due to the invading of chemical medicine. It is difficult to distinguish herbal medicine only by oral description without the base and picture of botany. Though Taiwan is not the main area to grow herbal plants, but they are often used among the people due to poor knowledge of them, unproper usage of herbal plants is often seen that brings a lot of regretful issues.

So to know about the herbal plants is very important for the safety of people. Our museum is the only one to offer the complete Chinese medicine, herbal plants that often used and poisonous plants, which is valuable of education, study and literature protection museum, besides also offers many information for study which rich of public benefit and local culture, also the only one virtual digitalized museum master in traditional Chinese Medicine.

For people to know more about herbal plants, we divide the demonstration into two parts, 1. The area of the herbal plants that often used, and 2. The area of the poisonous herbal plants. We also cooperated with the "Sun-Link-Sea" herbal garden and other universities professors to built up our museum, besides, every area all arranged with staffs to incharge the collecting, making, and explaining.

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Introduction to the Pingpu Project

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The Pingpu means literally the aborigines who have lived on the plains. It concerns with nine or ten groups of tribal people who have been considered to be sinicized during the past four hundred years of Taiwanese history. Yet, for the last ten years, local people have seen the culture and history of the Pinpu as a way of searching for a new sense of Taiwanese identity. Local people demand the research results to be accessible and readable.

In 1992, a group of researchers and professors who have been studying the Pingpu since the early 80s formed a Research Work Task aiming at advanced Pingpu study and have accumulated quite a bit of research results since then. In September of 1998, the mentioned Research Work Task launched into the Digital Pingpu Project in order: (1) to provide basic academic service for promoting further Pingpu studies; (2) to re-present the research results for the public in terms of social education.

As the Pingpu content experts comes from different fields, such as: anthropology, archaeology, linguistics, geography, history, religion, literature, ethnomusicology and etc. the re-organization of Work Task become essential. After a long period of communication, a group of ten scholars and seven groups of local culture workers have been put together. An office for this digital project was set up in the July of 1998. This digital project also gains the technical support from the Computing Center of Academia Sinica. In short, the total member of manpower gets involved in this project is more than 50 persons if we also take the part-time research asistants into account.

Without doubt, the Pingpu Project must have encountered many problems. Due to the limit of time of this conference, I shall only introduce you the framework of

whole design and mention you three main problems here.

The framework of the Pingpu Project consists of seven parts. The first part is a digital museum, sponsored by the National Science Council, which intends to give the public a complete picture of the Pingpu culture and history. The scripts are rewritten from the research results into plain words or written originally by each corresponding researcher or content expert.

The second part deals with the digital library, sponsored technically and financially by the Academia Sinica. It aims to set up 8 to 10 different inter-related databases that include an up-dated research bibliography, a database of historical and contemporary maps that related to the Pingpu studies, a database of the ancient land contracts related to the Pingpu, a database of the official documents and historical documents in Dutch, Spanish and Ching dynasty, a datavase of the photos from the books and from the fieldwork, a database of the ethnomusical data from the fieldwork, a database of the Pingpu language, a database of the Pingpu settlements and a database of first-hand interview data from the fieldwork.

The third part is the Cultural Park, sponsored by the Department of Culture of Taiwan Province. For the time being, seven groups of local culture workers are invited. The design of this part is basically another form of digital museum. It echoes the mentioned scholarly form of the digital museum.

The fourth part is Cultral Altas of Taipei Area. It emphasizes upon the settlements of the Plain Aborigines and tries to integrate GIS, database and web as a whole.

The fifth part is the Learning Garden that will be divided into two sections One is designed for the students of university and graduate school. The other is designed for the elementary and secondary school teachers. We intend to apply for the finance from the Department of Education in the coming year.

The sixth part is a BBS station. It aims to provide an interactive and educational channel for an intermediate communication between the public and the academic.

The sseventh part is a virtual office for integrating and maintaining the Pingpu Project. It included a section for announcing the meeting and other related activities, a section of email box for all the project participants, a section for the records of all kinds of project meetings, a section of reference area for consulting, related

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information, such as DL/M, GIS, HTML, Y2K and other related wed sites of Taiwan history and culture, and a section of reference area for participants to browse through other international web sites.

The main problems we have encountered are threefold. The first one is how to build up a multi-lingual platform in order to include the information written in Chinese, Japanese, English, Spanish, Dutch, French and German. The second problem is how to set up an interactive interface for integrating the Digital museum and the Digital library. At the moment, we are trying the IBM MARS solution. Yet, we are not satisfied as compared with what we expected. Another problem is how to digitize systematically and efficiently different types of data (text, image, sound, map, etc.) and to relate them to one another as an integrated whole. Though we have developed two tools for collecting and organizing all the data, we are still far from the end.

Besides, in the future, we will encounter many other problems as we try to develop GIS, language knowledge database, and searching machines. Yet, the digital project will worth all our efforts as we start thinking of the changing worldview brought out by the Internet.

Discovery of the Tamsui River

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Discovery of the Tamsui River is a digital museum project currently executed by National Taiwan University and sponsored by the National Science Council of ROC. This project is a joint effort of the University library and several departments from different colleges, including history, anthropology, geography, library & information science, and computer science & information engineering. The research team distinguishes itself mostly by including scientists and experts from three main areas: (1) contents, (2) information organization, and (3) information technology. This project serves two main purposes:

1. Investigate the essential methodologies for building a digital museum.
2. Create an authoritative digital museum about the Tamsui River that serves educational and cultural purposes.

The methodologies investigated in this project include:

1. digitization and archiving.
2. metadata.
3. information presentation and visualization.
4. information technology.
5. user interaction and education.

Adventures in *Wen-Land:*
A Linguistic and Literary KnowledgeNet
for Primary Education

http://www.sinica.edu.tw/wen/

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This continuation of the 搜 文 解 字 *SouWenJieZi* (http://www.dmpo.sinica.edu.tw/~words) project aims to provide an interactive learning environment of linguistic and literary knowledge for elementary school children. It will also be easily accessible for overseas learners of Chinese. The focus of this project will be on the construction of attractive and user-friendly web-based teaching and learning interfaces, as well as on the synergy between information technology and humanities scholarship.

Wen-land (文國 http://www.sinica.edu.tw/wen/) is a structured and landscaped virtual theme park, not unlike Disneyland. Visitors can choose visit any or all of the following attractions: the Castle of the Knight of Black and White 黑白宮, the Da-Guan Estate 大觀園, the Falls of Streaming Dragons 接龍瀑布, the Halls of Learning 學堂, the Lake of Reflections 倒影湖, Liang Mountain 梁山, and Xi Garden 西園.

The Halls of Learning provides the knowledge infrastructure of *Wen-Land.* It inherits the structure and some content of the Linguistics and Literary KnowledgeNet of *SouWenJieZi.* It offers a convenient search engine for users to access our rich lexical and textual databases. Search keys can be either words 詞, Chinese characters

字, components of Chinese characters 部件, national alphabet symbols (bpmf) 注音符號, or Pinyin 拼音. The search target can be a character, a word, word usage in a sentence, as well as citations. Most crucially, the search can be tailored to reflect the user's linguistic skill or learning progress. Each character or word is carefully annotated with the information of when it is first introduced, as well as for every instance of its use, in a textbook (all three main textbook publishers' versions are annotated). Thus learners can easily figure out if a word is new for him/her. And a teacher can easily check to see which linguistic expressions should s/he expect the students to know. In addition to textbooks, citations also link to important literary works.

There are three locations in *Wen-Land* that deal specifically with Chinese literature. The Da-Guan Estate is the site of the *Dream of the Red Chamber* 紅樓夢. Liang Mountain is the stronghold where the heroes of *On the Water Margin* 水滸傳 are based. And the Xi Garden is a venue for popular songs in Song dynasty, where the singable 300 Song sonnets (ci2 詞) will be performed. These three sites offer literary and cultural information of the literary works. They also provide rich literary and cultural backgrounds for the language learners.

In addition to the Halls of Learning, two locations deal with linguistic skills. The Castle of the Knight of Black and White focuses on Noun-Classifier uses. This is a characteristic of Chinese that is not only cognitively interesting, but also critical in language learning. The Falls of Streaming Dragons deals with how linguistic expressions are linked in Chinese. The contents include how components are composed to make Chinese characters, homonyms, reversable words, and Chinese idioms. In both locations, linguistic information is provided through text explanation as well as access to a special dictionary. The core of learning, however, is centered around specially designed interactive games.

Lastly, the Lake of Reflections offers the collection of all language games in *Wen-Land*. It is where learners can come and reflect on how much s/he has learned by testing the skills with the games. By offering rich content and stimulating interaction, we hope to show that it is fun and rewarding to learn Chinese language and literature.

A History of Taiwan Architecture

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In the past three centuries, there are abundant results of Taiwan architecture fulfilled by the immigrants from Fukien Province and Kwangtung Province. It doesn't only record the cultural background of the society at that time, but keeps track of the information about politics and skill development, etc. These include:

(1) The living examples of traditional buildings of Taiwan architectural history.
(2) The living examples of Taiwan developmental history.
(3) The living examples of the historical and academic civilization.
(4) The living technological examples full of the characteristic style information about geography, construction activities, and building structures.

This project results show on the web displayed by multimedia, which presents "The Digital Reservation Data of Taiwan Classical Architecture" with cultural and educational values. It illustrates the characteristics and styles of building in the Dutch-Spanish colonial period, the Ming loyalist Cheng Cheng-Kung period, the Ching Dynasty, the Japanese occupation period and after. It also contains digital photos, important documents database and the searching system of Taiwan buildings in every period. This project reserves information as following:

1. The Taiwan architecture in Dutch-Spanish colonial period(1624-1661):
    * The historical and cultural background in Dutch-Spanish colonial period.
    * The architecture and villages in Dutch-Spanish colonial period.
    * The living building examples in Dutch-Spanish colonial period.

2. The Taiwan architecture in the Ming loyalist Cheng Cheng-Kung period (1662-1682):

- The historical and cultural background in the Ming loyalist Cheng Cheng-Kung period.
- The architecture and cities in the Ming loyalist Cheng Cheng-Kung period.
- The houses and gardens in the Ming loyalist Cheng Cheng-Kung period.
- The government official residence buildings and the cultural and educational temples in the Ming loyalist Cheng Cheng-Kung period.

The Taiwan architecture in the Ching Dynasty:
The initial stage (1683-1820)

- The historical and cultural background in the initial stage of the Ching Dynasty.
- The cities in the initial stage of the Ching Dynasty.
- The houses and gardens in the initial stage of the Ching Dynasty.
- The government official residence buildings in the initial stage of the Ching Dynasty.
- The cultural and educational buildings in the initial stage of the Ching Dynasty.
- The temples in the initial stage of the Ching Dynasty.
- The tablet, bridges in the initial stage of the Ching Dynasty.

The middle stage (1821-1874)

- The historical and cultural background in the middle stage of the Ching Dynasty.
- The cities in the middle stage of the Ching Dynasty.
- The houses and gardens in the middle stage of the Ching Dynasty.
- The government official residence buildings in the middle stage of the Ching Dynasty.
- The cultural and educational buildings in the middle stage of the Ching Dynasty.
- The temples in the middle stage of the Ching Dynasty.
- The tablet, bridges in the middle stage of the Ching Dynasty.

The last phase (1875-1895)

- The historical and cultural background in the last phase of the Ching Dynasty.
- The cities in the last phase of the Ching Dynasty.
- The houses and gardens in the last phase of the Ching Dynasty.

- The government official residence buildings in the last phase of the Ching Dynasty.
- The cultural and educational buildings in the last phase of the Ching Dynasty.
- The temples in the last phase of the Ching Dynasty.
- The tablet, bridges in the last phase of the Ching Dynasty.

3. The Taiwan architecture in the Japanese occupation period (1896-1945):
   - The historical and cultural background in the Japanese occupation period.
   - The buildings and cities in the Japanese occupation period.
   - The houses and gardens in the Japanese occupation period.
   - The government official residence buildings, the cultural and educational buildings and the temples in the Japanese occupation period.

4. The Taiwan architecture after restoration (after The Japanese occupation period) (1946-)
   - The historical and cultural background after restoration.
   - The internationalization buildings and cities after restoration.
   - The houses and gardens after restoration.
   - The commercial muiti-storey buildings after restoration.
   - The internationalization cultural and educational buildings and the temples after restoration.

It is very difficult to preserve the cultural heritage of Taiwan classic buildings, because the old buildings through time ruining always change their original style and features. Even more the natural and man-made calamities (for examples: the earthquake, the improper urban developed plan and users have no intent to preserve.), many graceful and grand old buildings will be pulled down in final.

If things go on like this, the place lacks of historic interest will reduce the witnesses of culture, the explanations of history is also weaker. Recent years, our government warmly puts in manpower and materials to preserve these cultural properties. For preserving these culture properties, this project -"Taiwan classical architecture web" is provided with important documents, data and pictures all digitized reservation permanently.

The Beauty of Chinese Art - Enamels from the Ming and Ch'ing Dynasties, Famous Album Leaves of the Sung Dynasty, and Illustrations in Buddhist Scriptures with Relative Drawings.

http://www.npm.gov.tw/dm/index.htm

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Keywords: digital museum, enamel, calligraphy, painting, and Buddhist Scripture

As the National Palace Museum's collection consists entirely of rare treasures, a digital museum featuring some of these objets d'art will certainly attract viewers from both Taiwan and abroad and serve to promote Chinese culture. Presently, three groups of popular art works from the collection have been selected for the digital museum to allow the public to study them thoroughly in a user-friendly environment. Each with a different objective, the three groups are: *Enamels from the Ming and Ch'ing Dynasties*; *Famous Album Leaves of the Sung Dynasty*; and *Illustrations in Buddhist Scriptures with Relative Drawings*.

The purpose of *Enamels from the Ming and Ch'ing Dynasties* is to introduce in detail the characteristics, origins, production methods, and differences of various kinds of enamel wares from the Ming and Ch'ing periods. Not only can people view these enamels via an enlightening guided tour without the limitations of time and space nor actually visiting the National Palace Museum, they can also search for additional relevant information from a databank.

Famous Album Leaves of the Sung Dynasty aims to show the remarkable achievements of calligraphy and painting in the Sung period. Since the beginning of the Sung Dynasty, the Hanlin Imperial Painting Academy had been established, attracting famous painters throughout China and awarding them with official ranks according to their level of skill. Types of painting were myriad, and significant accomplishments, which profoundly influenced later Chinese paintings, were made especially in the development of landscape and bird-and-flower paintings. Calligraphic masterpieces of the Sung Dynasty included those by Emperors Hui-tsung and Kao-tsung and such prominent calligraphers as Ts'ai Hsiang, Su Shih, Huang T'ing-chien, and Mi Fu who created new styles by modifying old ones and set up an important milestone in the development of calligraphy. In short, the Sung period was a golden era in the history of Chinese calligraphy and painting. The National Palace Museum contains a great number of exquisite calligraphic works and paintings from the Sung Dynasty, whose beauty can be easily perceived from the digital museum.

The mission of *Illustrations in Buddhist Scriptures with Relative Drawings* is to arrange, catalog, and research such illustrations in the National Palace Museum's collection, including 400 volumes of Chinese scriptures and 154 leaves of Manchurian and Tibetan sutras since the Sung Dynasty, and to collect information on such illustrations from other local and foreign institutions. One of the most prevalent religions in Taiwan, Buddhism can be understood on a deeper level owing to the digital museum, which provides explanations of sutras and displays exquisite Buddhist drawings.

Taiwan Folk Artist Digital Museum –
The YuYu Yang Digital Art Museum

http://folkartist.e-lib.nctu.edu.tw – http://yuyuyang.e-lib.nctu.edu.tw

Wei-Pang Yang
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The arts created by folk artists significantly reflect the culture and heritage of a country. These arts should be cherished by any country. In Taiwan, due to the limited resources that folk artists can obtain, nearly no digital museums in Taiwan are focused on making the work of folk artists available on Internet. In order to arouse the attention of the public on folk artists, in 1999 National Chiao-Tung University (NCTU) started a project to acquire original manuscripts of Taiwan folk artists. The eligible material types to be acquired include painting, dancing, movie, music, comic, sculpture, etc. Additionally, NCTU takes actions to establish a digital museum called the Taiwan Folk Artist Digital Museum (http://folkartist.e-lib.nctu.edu.tw) in this project.

The first collection of the aforementioned project is the masterpieces of an internationally well-known sculptor, _YuYu Yang_. YuYu Yang (pronounced YoYo Yang) was trained at the Tokyo Art Academy, where he primarily studied architecture, and at FuJen Catholic University in Beijing. From the early fifties into the seventies, Yang's work evolved from traditional expressions to abstract, spiritual and simple forms. The materials employed by Yang include paper, cloth, wood, clay, bronze, stone, marble, iron and stainless steel. The thematic symbols of dragon and phoenix – emblems of male and female, sky and earth, and other essential pairings in Chinese philosophy – appear frequently. Fusing environment and sculpture is the central philosophy in Yang's work. Yang's masterpieces have been shown in many exhibitions and can be seen in many places around the world. Yang also received many international awards.

In addition to collect the masterpieces of YuYu Yang, NCTU builds the YuYu Yang Digital Art Museum (http://yuyuyang.e-lib.nctu.edu.tw) for exhibiting the work of YuYu Yang on Internet. The working group is interdisciplinary, including professionals from Yang's work, computer, multimedia, and library and information organization. The esthetic design of this digital museum reflects the style of Yang, a natural integration of tradition and innovation, of the East and the West. We choose Dublin Core (DC), an international metadata standard, to catalog the digitalized work

of Yang. A Web-page generator then utilizes the metadata to produce the descriptive Web pages of Yang's work. A search engine is also included to search the metadata. In order to provide users an immersive view of Yang's work, we employ the IMVR (Image-Based Virtual Reality) technique to create a VR navigation system. Currently, the YuYu Yang Digital Art Museum has included the basic information of nearly 500 Yang's work and the environment-surrounding VR scenes of more than 30 Yang's sculptures. This digital museum also contains educative materials, such as articles elaborating the philosophy of Yang's arts, and interactive ingredients, such as screen savers, games, and bulletin board.

In the future, we will go deep into each work of Yang: more detailed descriptive information of each work will be created, the original manuscripts and engineering drawings of each work will be digitalized and cataloged, and the object-surrounding VR scenes of each work will be generated. Additionally, more educative and interactive materials will be put into the YuYu Yang Digital Art Museum.

Regarding the Taiwan Folk Artist Digital Museum, the second collection is the musical work of Sen-Yong Su, who is a very famous composer in Taiwan. Su has composed many songs for vocal solos, ensembles, and chorus. With more collections to be acquired into the Taiwan Folk Artist Digital Museum, we believe people in Taiwan will definitely cherish the value and beauty of culture more than ever.

The World of Xuanzang and Silk Road

玄奘 西域行

http://mars.csie.ntu.edu.tw/silk

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The main goal of this project is to develop digital museum bases for China's rich cultural heritage, priceless treasures, and superb artifacts. The plan is to take advantage of the Internet's influence on the population to actively promote the "Digital Museum Plan." This is an attempt to raise content quality on the Internet, using this valuable tool to elevate popular standards of culture, art, and science.

The project displays Chinese culture. This rich culture reached a peak in the Tang dynasty (618-907 AD), so this era has been selected as the background for the digital museum. One of best model of the culture interchange of Eastern and Western regions in Tang dynasty is the master Xuanzang's *A Record of the Tang's Western Regions*. There is a kind of similarities of the information interchange between the ancient Silk Road and today's World Wide Web. Through the comparison of the history and today, we can understand the universal necessary of culture interchange and enhance the international horizons and admirable courage of Master Xuanzang.

Another important content of the project is to use the popular novel *Wukong Monkey Travels to the West* as a reference to stimulate users' interest. In other words, the project plans to use the historical Record of the *Tang's Western Regions* as a base,

contrasted to the popular *Wukong Monkey*. Using this beloved story will take advantage of the Internet's influence to actively promote the digital museum plan. This is different from traditional scholarly research projects, because it is available to both educational organizations and society at large.
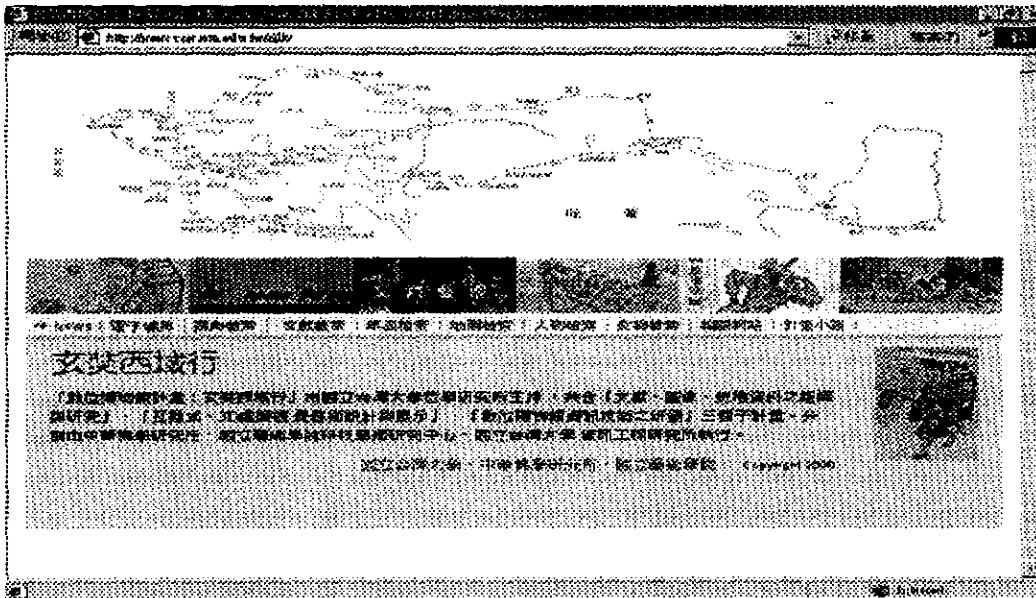
The World of Xuanzang and Silk Road consists of three sub-projects sponsored by different academic groups:

1.) *The Study and Organization of Documents, Images, Geographical and Historical Records*, by Chung-Hwa Institute of Buddhist Studies

2.) *Visual Art Design of an Interactive, 3D Virtual Web Site*, by National Institute of the Arts

3.) *Study of Information Technologies for a Digital Museum*, by Department of Computer Science and Information Engineering, National Taiwan University

In short, the project bases on the organization of documents and historical records of the first sub-project. Establishing an interactive 3D virtual digital museum for *The World of Xuanzang and Silk Road* of the second sub-project.
And the 3D virtual reality technology, GIS, and database retrieval system of the third sub-project.

The Digital Museum has eight themes:

1.) The Great Tang Dynasty Record of the Western Regions (Da Tan Xi Yu Ji)

2.) A Journey to the West (Xi You Ji)

3.) The Silk Road

4.) Historic Collection (art/music)

5.) Interactive Learning

6.) Database Search

7.) Reference Web Links

8.) Buddhist Electronic Dictionaries

(1)and (2) reflect literary and historical viewpoints;

(3) reflects geographical perspectives and includes video and 3D GIS virtual tours of the Silk Road;

(4) reflects artistic and cultural perspectives;

(5) supports distance learning; and

(6), (7), and (8) are reference and search tools.
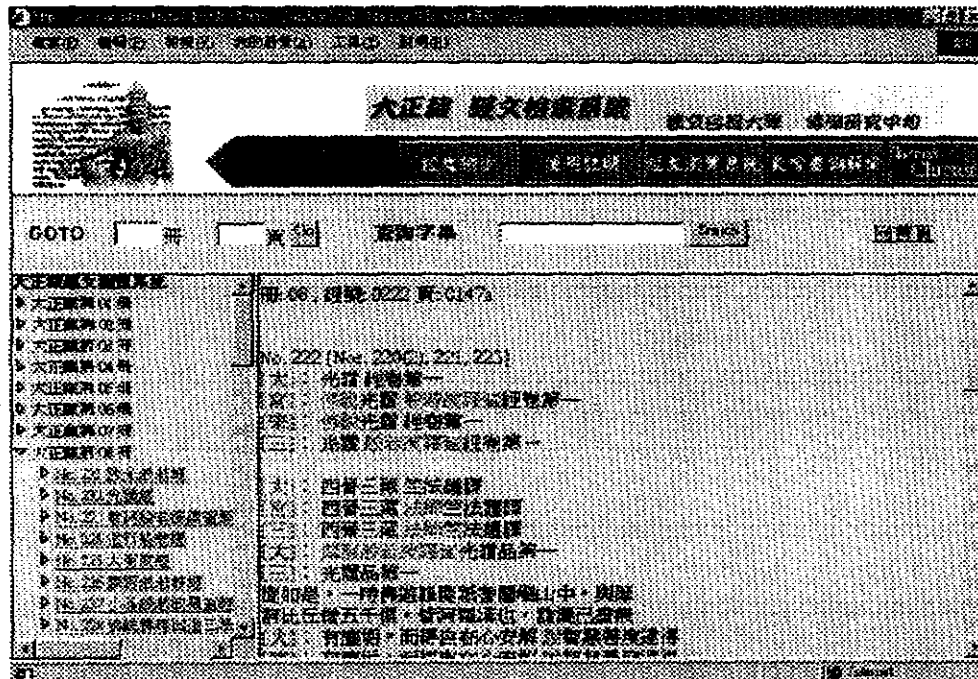
Simply put, the project has these goals.

First, to establish a multimedia information digital social science museum based on Xuanzang's Record of the Tang's Western Reaches. Multimedia digital information includes three dimensional geographical models, information concerning geographical changes, historical materials, multimedia data, relics, and literature.

Second, using the Tang and Central Asia, Chinese and Indian cultures as background, the site will cover educational and research functions to link social science research and information technology in a social science digital museum.

Third, based on the popular appeal of *Wukong Monkey*, a lively multimedia shows attract a wide variety of viewers to the digital museum. People may use the Internet to travel across time and space as they learn. The great variety of the contents of the digital museum provides good supplementary material for grade school and high school students' history, geography, and social sciences. This lively presentation will arouse students' interest in learning.

Fourth, the geography and relics of Central Asia will help to establish information technology for other social science digital museums, such as knowledge banks, geographical information systems, and information retrieval, display and dissemination.
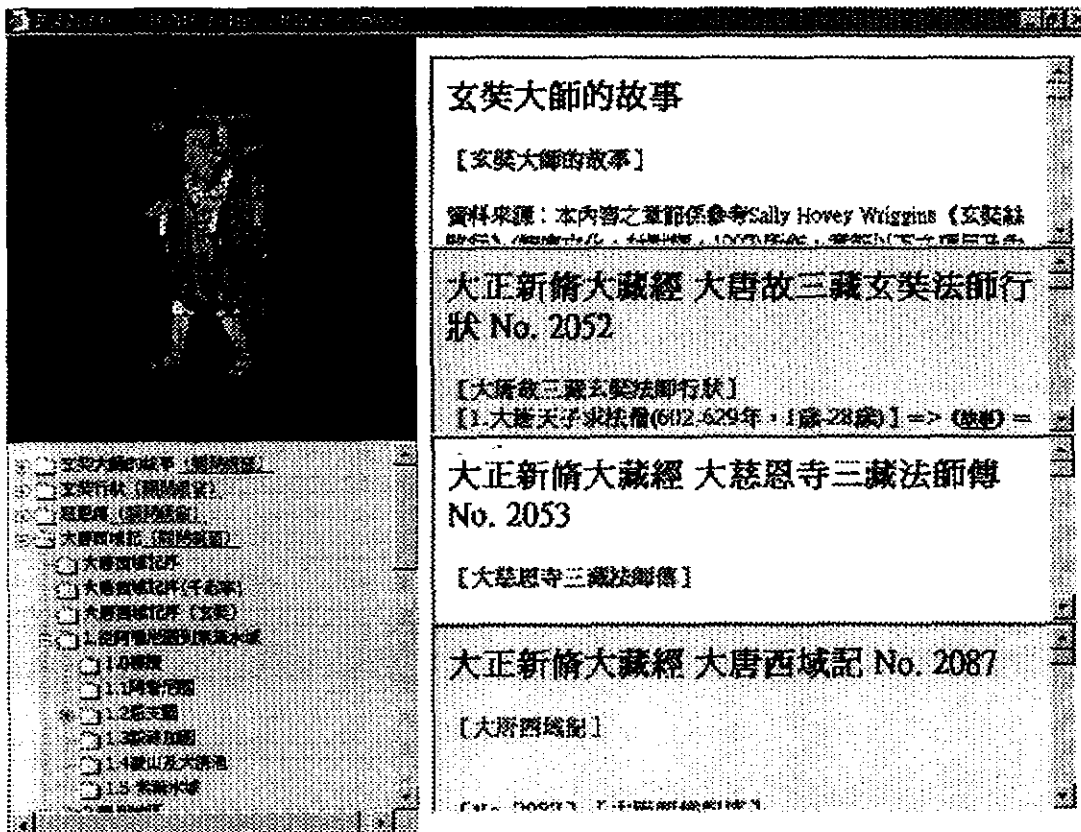
Taiwan Memory – Digital Photo Museum

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As interest in Taiwanese culture grows, it has become increasingly important to protect and distribute historical documents and artifacts. In the wake of the worst earthquake of the century, we realize the importance of protecting those historical items that have survived the disaster, for study in the next century and beyond.

In 1996, the Center of the Study of Traditional Arts at the National Institute of the Arts began the project *The Collection and Study of Taiwan Historical Photos* at the request of the Council of Culture Construction. In the past three years, we have collected 30,000 Taiwan historical photos, classified them, and digitized them onto 950 Photo compact disks. Last year, the National Science Council initiated a special program for developing a digital library and museum in culture, art, and science. We propose to establish *Taiwan Memory – the Digital Photo Museum"* to share our collection of Taiwanese historical photos to the people in Taiwan and throughout the world.

A successful digital library and museum project requires a compelling, meaningful topic; effective writing and professional Web design; fast database

retrieval and management; and strict, effective copyright protection and rights management. Accordingly, *Taiwan Memory – the Digital Photo Museum* has four themes:

1. Study and classification of Taiwanese historical photographs
2. Visual art and Web design for the Taiwan Digital Photo Museum
3. Design and implementation of retrieval, browsing and data mining mechanisms for the Taiwan Digital Photo Museum.
4. Design and implementation of storage, management and GIS mechanisms for the Taiwan Digital Photo Museum.

Our goals include:

1. After the project is finished, the Taiwan Digital Photo Museum will be the largest   collection of Taiwan photos, comparing favorably with the US *American Memory* repository.   The Museum will provide advanced applications for academic and commercial use.
2. The Museum will be a model for watermarking and rights management in Taiwanese Web sites.
3. The Museum will provide efficient retrieval and an innovative dynamic data mining technique allowing inference of user interests to suggest thematically related pictures. The Museum will provide a "journey of discovery" experience.

The Museum will support distance learning and interactive learning; an exemplar and be the best Web site for studying Taiwanese historical remains and documents.

Digital Library Initiatives Digital Library Initiatives at the Chinese University of Hong Kong Libraries

Rita Wong

Head, Systems & Communications

Chinese University of Hong Kong, HongKong

The talk will describe the number of Digital Library Initiatives Projects conducted at the Chinese University of Hong Kong.

Hong Kong Newspaper Image Database- an image database started in 1995 for Hong Kong major Chinese & English newspapers. Keyword searching is available. Hong Kong Newsbot – a combination of image, newspaper internet edition, text and graphic data download from newspaper publishers. Full text searching capabilities is available.

Hong Kong Index of Chinese Periodicals - The database includes over 100 Chinese periodicals published in Hong Kong. There are links to internet version and copyright has been obtained for several publishers to scan their periodicals.

Hong Kong Literature Database – The database includes over 30,000 citations from books, journal articles, newspaper articles sourced from Hong Kong Index of Periodicals, Index to Chinese Periodical Literature (Taiwan) , Chinese Journal Network. Copyright has been obtained from some publishers to scan their work CUHK Doctoral Dissertation – CUHK co-publishes with Bell & Howell of all CUHK dissertations since 1999. Full text in PDF format are available via Current Research.

Manuscript Digitalization Project- some of the manuscript dated back to Ch'ing dynasty.Rare Book Digialization Project – some of the works dated back to Yuan Dynasty. Studies is conducted how to offer the scan images to public to view without the capability to download or print.

National Museum (Philippines) Initiatives on Information Technology

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National Museum, Philippines

This paper briefly describes the history and organization of the National Museum of the Philippines and elaborates on its initiatives for local and global accessibility.

Like other institutions, the Museum is not spared from the imposing trends of the new information era. Starting with simple usage of PCs in the early 80's, it is now undertaking development and production of multimedia CD-ROMs in the various museum disciplines such as ethnology, archaeology, arts and zoology. Steps are also undertaken to forge partnership with the private sector in order to disseminate information on museum knowledge through the use of digital technology.

The paper likewise identifies problems on the implementation of strategies relative to the development and enhancement of the Museum's information system such as lack of computer literacy among museum workers, facilities, and system development program, among other things. Recommendations to assist museums in similar stage of IT development are also presented.

Digital Museum for Human Body

http://dlm.tmu.edu.tw

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This project is to build a multimedia Digital Museum for Human Body (DMHB). The project was initiated in January 2000 and was supported by the National Science Council and conducted by the medical informatics center of Taipei Medical University in Taiwan. We have been intending to build a system that is different from the ordinary web sites and can provide the knowledge of human body in a way just like the exhibition in a real science museum.

A lot of multimedia data related to human body has been collected and arranged by carefully defined metadata structure. The metadata structure was designed to be compatible with the standard of Dublin Core. All kinds of objects in the DMHB such as video, audio, picture and text were described by metadata and then transformed to XML. The FlashPix technology developed by Kodak and Adobe were used for 2D images. Real server from RealNetwotk was used in video distribution. Video on Demand, searchable video and other related technologies have been investigated in this study.

The DMBH system adopts the latest technology of web-based interface. The "Story-Telling Platform"(STP) is the principal designing concept in this project, which provides friendly and intuitive interface for the visitors to access the information in the digital museum. For the purpose of building up DMBH, medical specialists and computer technicians cooperated to make this work successfully. It has become a good example for building up the foundation of medical science education via high quality networks.

Museum Victoria - Providing Access for the Internet Generation

Sarah Edwards,
Coordinator Public Programs, Outreach Services,
Museum Victoria, Australia

Museum Victoria has positioned itself as a museum for the internet generation. Museum Victoria comprises three campuses that are located in Melbourne, Australia. The museum's exhibitions draw on Museum Victoria's extensive collection of 16 million artefacts and over a century of scholarship and research. This rich store house of knowledge and collections is currently in the process of being made available in an on-line environment to enable global audiences to access the museum from anywhere in the world using Digital Technologies. Museum Victoria is the world's first major museum of the new millenium to have been conceived, planned and developed in the midst of the Digital Revolution. Museum Victoria uses the latest digital technologies and multimedia to create on-line access to Australia's flora, fauna, culture, heritage and way of life.

Audience
Recent IT developments have provided new tools for museums to use to enable them to dramatically alter their approach and interaction with audiences including on-line accessiblity to museum information.

Infrastructure
Museum Victoria has installed one of the most sophisticated information technology infrastructure systems used by a museum in the world. The Big Picture Project is a multi-layered system that provides broadband Wide Area Network, Local Area Network, multimedia streaming and a digital telephony system that enables Museum Victoria to position itself as a museum for the internet generation. The technology is being used to expand public information services and forge alliances with organisations worldwide.

The development and implementation of a new website has been a challenge for Museum Victoria. Providing the on-line visitor with access to the information they're looking for is a key to the success of the on-line visit.

Marketing
Having a great website and all the information anybody would be searching for is essential. But this is only part of working with on-line technologies. If no-one knows the site exists, no-one will visit, and the benefits of accessing the museum's resources will go unknown.

National Science Council Digital Museum Project
— Extension and Education Office —

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National Science Council Digital Museum Project--Extension and Education Office is a sub-project of "The Digital Museum Project" which is sponsored by the National Science Council. The Extension and Education Office started in August of 1998. The goals of the Office are: 1. To provide training courses for people in the digital museum community to acquire the skills and knowledge needed in developing a digital museum; 2. Promote the results of the System Technology Projects and the Subject Content Projects of the Digital Museum Project; 3. Help libraries and museums to understand the digital museum; 4. Facilitate experience exchange between institutions of the digital museum community; 5. Disseminate the experiences and technology needed in developing a digital museum; 6. Stimulate public interests in the digital museum; 7. Strengthen the elementary and high school teachers' abilities of using and introducing digital museums resources in their teaching program; 8. Promote using digital museum resources to enrich the teaching materials of the elementary and high schools; 9. Provide the opportunity for people in the digital museum community in Taiwan to acquire the experience and technology of digital museum experts from other countries.

In order to achieve these goals, the Extension and Education Office initiated a variety of activities in last two years. The Office held eight tutorials on digital museum covering user interaction, information organization, image/audio/video processing, watermark, information retrieval, system and infrastructure and issue on copyright as well as three workshops including Workshop on Building a User-Oriented Digital Library, Workshop on Dublin Core for Museums, and

Workshop of Presentation of Theses & Dissertations on Digital Museum. The Office held ten Digital Museum Learning Courses for school teachers in several cities in Taiwan. The course introduced web sites of Subject Content Projects of the Digital Museums Project and instructs teachers the way of integrating digital museums resources into their teaching programs. To provide the public a easier way of access the digital museum, the Office cooperated with the Ministry of Education to produce CD-ROM of four digital museums of the first-year Digital Museum Project and distributed to every libraries and schools in Taiwan. In order to promote using digital museum resources to develop teaching materials, the Office also held the Digital Museum Instructional Design Contest.

Besides the activities held for the digital museum community and teachers, the Office also initiated activities for the public through a variety of media. The Office attended the Taipei International Book Exhibition in 1999 and 2000 to present and promote web sites of Subject Content Projects of the Digital Museums Project. A three-month promotion program "Museum In My Home" in cooperation with the media was held from 1999 to 2000. Activities of the program included articles introducing the digital museum web sites on the newspapers, quiz game, composition contest, and the Digital Museum voting game. A monthly electronic newsletter is issued and sent to more than one thousand subscribers. A web site of the Office is set up which includes report of activities held by the Office, the instructional materials of courses and papers of workshops held by the Office, bibliography of digital museum related articles in Taiwan, digital library/museum linking, etc.

Since all the activities have gained very positive results and have drawn peoples' attention to the digital museum, the Extension and Education Office will continue to do its best to initiate more activities to achieve the goals of the Office in the third year.

Virtual Museum Dev. Concept of NSM

Manop Issaree
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The National Science Museum (NSM) of Thailand is a new initiative of the state under the Ministry of Science, Technology and Environment. The NSM project was first established in 1995 by Royal Decree to commemorate Her Majestry Queen Sirikit's 60th birthday.

NSM aims to be recognized in the near future as one of Asia's leading science and technology museums. Our mission is to enhance public understanding of science, technology and the environment by developing a range of museums both in Technopolis complex and other regions in Thailand.

In the past few years, Thai government has set a policy of using new technology to promote education. A budget has been allocated to provide computers and education software for schools nation wide. Information technology has become a powerful tool supporting this movement.

Based on NSM's mission, NSM museums are designed to be a lifelong learning center for people of all ages and groups. It is our vision to establish a new image of museums that provide information through modern technology. This will not only help to stimulate visitors' interests but also provide a better way to communicate science to visitors. Computer monitor, for example, can display transformation of three dimensional picture of one substance to another. For this reason, we have focused our priority on developing exhibitions, using high technology exhibits and communication tools making us different from other science museums where high proportion of capital is put on scientific collection.

The capital used for developing and producing interactive and fun exhibitions is considerably large. NSM realizes that this investment will be more worthwhile if the exhibitions can be reached by more people Therefore, in addition to its website, NSM has set up three projects for an on-line service. These projects are 1) Virtual Msueum : an on-line visit to our museum exhibition. This service is provided for people who might not be able to travel to the museums. Visitors can view exhibition and interact with hands-on exhibit as if they are walking in the museum themselves. 2) Asksci.com : an interactive website offering scientific and technological database with Q&A service for the public. People can send in questions and concerns regarding scientific issues and NSM will act as core center to answer these questions from its network of scientists. 3) Thai Invention : Informative website collecting and providing data about Thai invention. This website is created in order to make known of local intellects and to stimulate and facilitate the development of scientific

invention in Thai society. These three websites will be developed in Thai and English to encourage their use among Thai people. There is a plan in the future, to link these websites with the on-line education network which is now being developed by the Thai government.

These projects are our long term vision which require an investment of time and capital on the Museums part. Its success and effectiveness also depends on the availability of computer equipment and internet access in schools and household nation wide. It is also very important that the government continues its effort to promote the new education policy and to increase computer literacy among Thai people to strengthen the usefulness of these services.

As a part of APEC, NSM sees a great opportunity for all members to gain a mutual benefit by sharing our views and experiences in a digital museum development. A support either technically or financially among members will quicken the process and therefore, economize resources needed. The by product of this collaboration is also a good standard of museum quality. Once the network of digital museums is established, it will undoubtedly help in widening public knowledge and in creating a better understanding of science and its significance among the people. This will consequently lead to economic and social development of our region.

國科會「數位博物館專案」九十年度徵求主題計畫通告

目錄

壹、主題計畫申請須知

一、提要

　　「數位博物館」專案之目的在於網際網路上建立具有大眾科學或文化教育價值之多媒體資料呈現機制，包括網站及其後所屬之各項模組。(詳下節「貳、背景說明」)

　　專案下分為不同之主題計畫，各計畫應選擇具有價值而適量的主題文物或標本，加以整理、數位化，建立一般使用者資料查詢與互動之方法，並透過親和性之方式顯現。成果應為一具有整體之完整架構、具有擴充彈性的示範系統。

　　本節摘述申請主題計畫之主要事項。各事項於「參、規劃內容」內均有詳細闡述，請仔細對照參閱。

(一) 計畫組成

　　本專案鼓勵跨領域、跨機構的合作。專案下每一主題計畫應自行組合適當專業之人員，形成一個獨立的研發群，由主持人負計畫成敗之責。主題計畫可為單一計畫，或為總計畫及數個子計畫之組合。如為數個計畫所組成之主題計畫，各計畫間必須具有密切之相關性與整合性。

　　計畫內之專業人員至少應涵蓋下述類別：

　1. 原始資料與文物所屬領域之專業

　2. 技術支援（圖書、資訊、系統檢索）

　　關於數位博物館資源組織與檢索之相關規範，請參考附件一；

　　數位博物館資訊規格建議，請見附件二。

　3. 網站美工設計及文案呈現

(二) 主題計畫規劃書

　　主題計畫規劃書可採用國科會標準之計畫申請書為藍本，並應詳細列妥下一節「二、數位化資（料）訊主題之內容說明」中本專案所需求之重點項目。

(三) 網站內容之企劃

　　本專案之目的是在網際網路上建立具有大眾科學或文化教育價

1

值之網站及相關模組。主持人應在主題計畫中提列網站內容之企劃，如劇本等，以明白地顯示其欲呈現的內容，與其易用性、親和性。關於文案之呈現、編排、和網頁之設計。

（四）智慧財產權注意事項

目前，國內有關網際網路方面的智慧財產權，共識與法規尚不足，因此，於申請加入本專案時，至少應考慮下列各點：

1. 各網站引用他人資料時，應事先獲得授權，並於計劃申請時附上相關授權書。。網站之資料亦應考慮被引用時，對方應遵守的規定和方法。

2. 由於多媒體之呈現與書本形式之表示不同，往往需要一群人才能完成，應該仿同錄影帶、電影之製作，除了提供內容與文字的專家學者外，應標注視覺藝術設計、網站撰寫、音樂設計、資料提供、數位化人員、電腦工程師、經費來源等等方面之資訊，以尊重各方面人員的貢獻。

二、數位化資（料）訊主題之內容說明

由於本專案與一般研究計畫不同，故應於計畫書中強調下述項目之規劃。

（一）原始收藏資（料）訊概述

1. 主題名稱

2. 收藏之資（料）訊主題之文化特色與價值

3. 目前收藏之資（料）訊內容概述：請說明其文物之品質、數量、來源、結構和

　組織、歷史背景和相關文件、文獻等。

4. 收藏之資（料）訊文物之所在地、管理維護單位。

5. 收藏之資（料）訊機構之同意書，和對智慧財產權的要求。

（二）建構之數位化資（料）訊說明

1. 欲數位化之文物清單。

2. 各種文物數位化之方式和規格（請註明理由）。

2

3.數位化資（料）訊主題之內容與其結構、功能。

4.請說明數位化資（料）訊之呈現方式、劇本構想、導覽結構（圖）、參照、

注釋解說、檢索系統、和使用者界面等。

5.請逐項說明對此數位化資（料）訊智慧財產權的要求。

(三) 資訊技術之運用

1.說明整理文物所援用的主要技術，以及整理工作的內容。

2.說明收藏之文物之資訊，如何在電腦中表達（representation）。

3.說明收藏之文物之資訊，包括資料之檢索及在際網路上傳遞與在用戶端上呈現之構想。

4.逐項說明所引用之標準和規範，並說明理由。

(四) 計畫之產出

請列出申請計畫成果中下列各項目重要的欄位、項目、和對智慧財產權的要求。

1.各個原始的數位檔案（原數位檔）。

2.各個已加標誌的原數位檔（標誌檔）。

3.各個屬性或背景資料的檔案。

4.各個已有主題且已結構化的屬性或背景資料檔案，如主題詞表、索引詞表、索引典、破音字表、近（同）義詞表、詞網（word net）等等。

5.各個資料庫。

6.根據使用者需求考量設計的檢索系統。

7.各個可供參考或共用之工作流程，包括行政面和技術面。

8.各個可供參考或共用之程式和系統。

9.各個其他申請人認為有價值的產出。

三、申請計畫之審查

申請計畫之審查項目、內容包括：

1.計畫原始資料題材的價值。

2.計畫團隊。

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3.數位化資（料）訊之建構。

4.資訊技術應用。

5.網站架構、易用性及親和性。

6.計畫經費、人力與時程之合理度。

四、延續性計畫

　　本年度徵求之計畫爲本專案第三年度之計畫。獲補助而執行中之主題計畫亦可提出本年度延續計畫之申請，審查作業與本年度新提計畫相同。唯延續性計畫除計畫書須通過審查與競爭外，前一年之成果亦須經過評估，並作爲審查時之參考。。

貳、背景說明

　　網際網路（Internet）的普及，逐漸改變了人們溝通和處理信息與知識的方式。對社會來說，在此變遷下，知識的取得、擁有和利用也隨之改變；對學術界而言，新的工具引導了研究環境的改變，也擴展了知識領域的範疇，新知獲得的速率是前人所料未及的。這些變化雖已驚人，但僅是巨大變化中的幾個例子罷了。真正重要的變化，是資訊科技與網際網路引起的文化變遷。這文化變遷，無疑的，將巨幅改變人類的生活形態、社會結構和文明的內涵；而且，此變遷已經開始，勢之所趨無可規避。

　　處此變局，不可避免地，我們要面對從舊到新的轉化過程，「如何把重要的文化資產數位化」就成了目前國家的重要課題。數位化的目的是多重的，要言之：一是利於長久保存；其次是數位化後，幾乎取之不盡、用之不竭，可供全民共享；再次是可以大量匯集知識，以發前人所未見，產生相輔相成（synergy）的效果。其實，文化資產數位化的好處並不止這些，以上不過舉其大者而已。這就是為什麼聯合國要推動 Memory of the World 計畫，以及美國推動 American Memory，加拿大做 Canadian Heritage 等等計畫的原因。我國累積有豐富的文化資產，是世界的瑰寶，然而，我們有能力這麼做嗎？我們的環境適合這麼做嗎？時機對嗎？這麼做有什麼社會效益？有什麼前景？本專案，就是想探一探這些問題，這個企圖心也正是促成本專案的思考背景。

　　要落實上述的企圖，必需找一個「標的」作為研究和測試的對象，這個標的就是「博物館」。博物館中所收藏的資（料）訊是人類的文明，從原始到現代、從科學到生活、從藝術到工程、………，無所不包。博物館中收藏的資（料）訊也包含了有史以來所有記錄知識和感覺的媒介，這正是研究的理想對象。

　　要將優良的文化資產數位化，是一個極鉅大艱難的過程，不是少

數人能做到的，也不是某一個專業可以做成的。這需要各界參與、進行跨領域的合作，並作長期的奮鬥，才能成功。因此，本專案鼓勵的是跨領域，尤其是跨人文社會和科技的合作；重視子計畫之間的溝通協調、工具與規格的共享、標準之設立和資訊的透通無阻；更重視整體發展機制之建立和社會效益的評估。只有建立了整體發展之機制，才能讓各界廣泛參與；只有能獲得良好的社會效益，才能說明本專案的執行正是時機。

為了落實以上構思，因此有下述之規劃。本專案和一般學術研究計畫有明顯的不同，一是本計畫有極明顯的任務導向色彩，二是各計畫間的協調溝通占很高的比重。只有對此前提有相同的認知，願意在所規劃的架構環境下參與時，方宜申請本專案的計畫。而未來專案推動時，也將會維持動態調適的彈性機制，在公開運作的體制下不斷檢討、修正。

參、規劃內容

一、目標

　　「數位博物館專案」之目標，在於在網際網路上建立有社會效益、有文化特色、有博物館屬性的數位化資（料）訊。

　　此所指之社會效益，如：能促進各種教育（制式、科學普及、社區、素養、成人、終身等）以及產業和經濟發展等的效用均是。為求「社會效益」之易於發揮，所發展之數位化資（料）訊在使用時應注重其易用性、親和性。所謂「文化特色」，是指收藏之資（料）訊內容具有文化方面的價值。限於經費，在專案初期只能挑選文化價值高，且與其他子計畫重複性低的來優先進行，不可能全面大規模資助。而有「博物館屬性」的，是指收藏之資（料）訊的內容應有明顯的文化或科學教育主題，且包含多種記錄事實和知識的媒介（換言之，是多媒體的形式）。適合這些條件的計畫，稱為「主題計畫」。

　　為建立上述主題計畫的數位化資（料）訊，在主題上，必須研究該領域中專門知識在電腦中如何表達，和如何應用、推廣；在資訊技術上，要選擇適當的技術配合，作創意性的應用。是故所申請之計畫中應含有相關的技術內涵，而此技術內涵應具有通用性、相容性和規範性。

　　在主題的表達方面，則強調對既有資料和知識的整理，以及它們在計算機內部的表達，而不在對主題資料的收集，也不在對主題新知的追求；雖然本計畫執行的效果，一定會導致獲得相當程度的新知識和新技術。

　　至於資訊技術方面，本專案強調採用已發展成熟的技術，來建構數位博物館，而不是對計算機科學新理論的探求或新技術的研發。建構數位博物館的重點之一，在於資訊技術應用於主題上的意義和創新。換言之，本計畫應用資訊技術的重點，在探究如何將適當的資訊技術用於「數位博物館」的建構（是 "know how"，而不在 "know why"）。

　　最後，為使所發展之數位化資（料）訊具有易用性、親和性，以達

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成社會效益，申請計畫應注意人機使用介面的發展、人機互動模式的設計、簡便的瀏覽與查詢方式，以及畫面的美感等因素。

二、性質與定位

（一）本計畫和其他相關計畫的關係

本專案的性質和其他學術性計畫或綜合型計畫的關係，可用圖一說明。在圖之左，是傳統學術界、文化界所累積的知識或文物，其研究工作之推動多由國科會各學術處主辦。居中的是本專案。圖之右表示本專案產出的應用面。由此圖可知，本專案主題計畫的內涵，是具有學術性，且嚴謹、高品質的文化或科學教育的數位化資（料）訊。此要求（或特性）不僅關係到收藏之資（料）訊內涵的價值以及資訊的深度、廣度、正確性與精密性，也涉及以後的增長和擴充性、適用性等。這是將重要的典藏資財數位化的必要條件。茲將本專案中的主題計畫和技術支援的定位，說明如下。
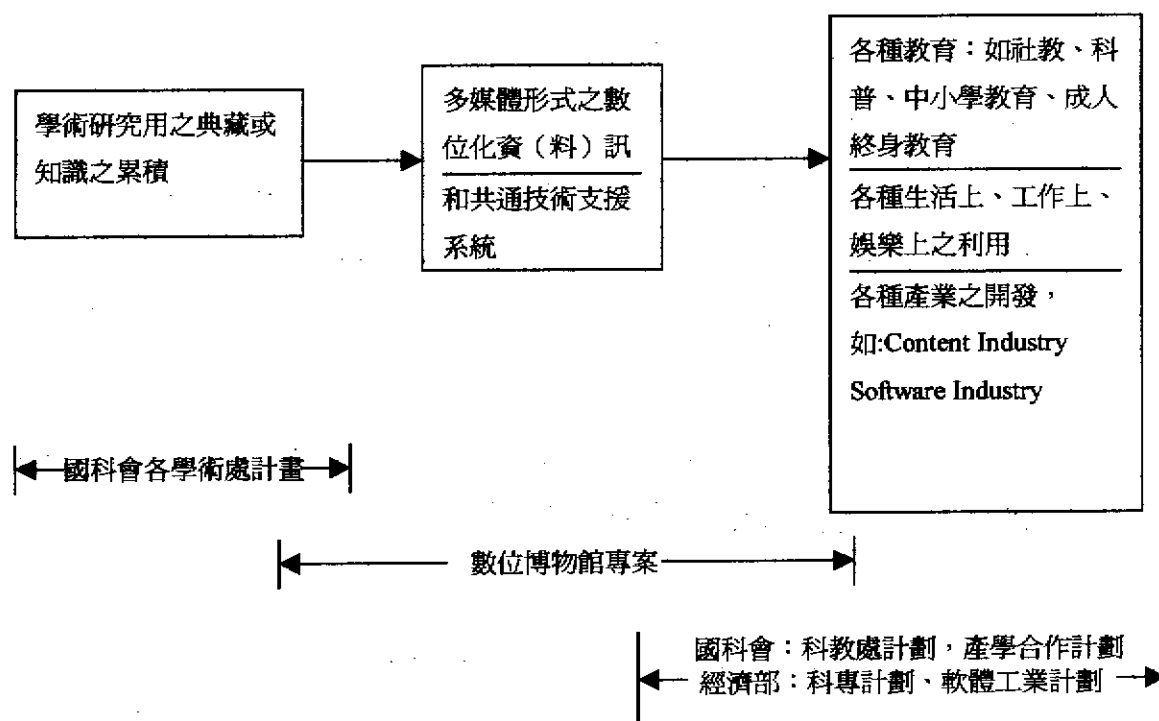
圖一：本專案之定位關係

（二）主題計畫說明

本專案主題計畫所欲建構的數位化資（料）訊主題，是多媒

體形式的「知識結構」。所謂「知識結構」包括：知識的基本表達，即在計算機中的資料結構、知識的屬性與背景資料的整理、以及其內容的「外化（形式化）」等等。所謂屬性資料，如書目資料之於書。至於背景資料之一例，即為某專業領域共同之後設資料（metadata）。所謂內容之「外化」，最常用的方法是，採用國際標準（或相容）的標誌語言，將人可理解而機器無法理解的內容，用標誌語言表達，以便於機器處理。此類的標誌語言如 SGML、XML、HTML 等是。除標誌內容外，標誌語言還可以建立外化內容之間的聯繫關係，因而構成一知識結構體。

（三）技術支援說明

在共通的技術支援上，本計畫辦公室已於第一年及第二年著手建立關於時間、空間、語言文字、系統效益與檢索、使用者評估的基本技術，以及一些共同的資訊技術等，例如目前有浮水印及 Metadata 技術套件，可作為本年度新主題計畫的支援系統基礎，也鼓勵新主題計畫盡量加以採用。

如具有充份的理由，亦可在新申請之主題計畫下設置技術支援的子計畫，以自行開發相關的技術（know how），但是應盡量和已有的共通支援系統相容，甚至能進一步與之相輔相成、相得益彰，以避免與既有成果的重複。

關於既有的主題計畫和技術支援之內容如圖二。詳情可參考數位博物館計畫辦公室網站網站：http://dm.ee.ntu.edu.tw/。

（四）計畫之產出

本專案的主題計畫，必須要有在網際網路上的資料庫作為其產出；換言之，能夠產出供社會大眾自由讀取的資料庫，是主題計畫的必要條件。於此，本專案優先鼓勵建構「公共資料庫」之計畫。此所謂「公共」，是指其使用權是公開屬於大眾的、全體納稅人所共有的。換言之，在「正當使用」範圍內，大眾可自由使用的。引此，著作權和所有權必需清楚，使任何使用者依清晰合理且公平的條件，作二次

加值開發。是故,申請人有描述其相關智慧財產權,與其所謂『正當使用』細節的必要。

對於計畫所需資料庫和網路的相關工具(如搜尋、瀏覽之工具等)及各種建構工具,本專案不容許使用取得管道不易或取得成本過高的軟體,以避免未來可能的壟斷,並且確保資料庫和資料能共享、可攜(portable)、和永續使用。

本專案各計畫的產出,約可歸納爲下列數類別:

以「資料」爲主的產出包括:

1. 原始文獻或器物數位化之檔案,稱爲「原數位檔」。

2. 經加標誌(markup)或加標示(tag)的原數位檔,稱爲「標誌檔」或「標示檔」。

3. 上述各種檔案相關的背景資料檔案,如屬性、書目、後設資料(metadata)等是。

以「資料系統」爲主的產出包括:

4. 經加工加值成爲有組織之資料者,如索引典(thesaurus)、詞網(word net)、單機資料庫等是。

5. 在前項中之產出,再經加工上網際網路者,如前述之公共資料庫,或分散式資料庫等是。

就資訊技術與電腦系統作共通的技術支援而言,則包括:

6. 規範或標準的建立。

7. 程序知識(procedure knowledge)的獲得和實作,如軟體、技術工作流程、業務工作流程等是,以及

8. 爲解決某特定問題所開發的完整系統,如檢索系統、登錄系統、輔助教學系統等。

9. 建議加上以光碟形式產出,以利各教育單位教學使用。

| 【技術支援】	Metadata技術開發與套件之製作	浮水印技術開發與套件之製作
【主題計畫】 故宮文物之美		
玄奘西域行		
淡水河溯源數位博物館(二)		
台灣民間藝術家數位博物館之建置---以楊英風數位藝術博物館為例		
台灣老照片數位博物館		
台灣建築史		
生命科學數位博物館---人體與秘展覽館		
臺灣原住民---平埔族群數位圖書館與博物館專案先導計畫		
中小學語言文學知識網路（搜文解字二）		
尋回台灣本土的淡水魚類		
中醫藥、針灸虛擬數位博物館		
蘭嶼生物/文化多樣性數位博物館		

圖二：八十九年度主題計畫及技術支援關係圖

　　由於本專案強調「社會效益」，是故本專案與下游之應用必須有密切的聯繫，因而本專案計畫的產出應該要有易用且親和的使用者介面，以凸顯大眾科學、文化教育的價值。例如：在主題計畫中開發出一套機制和程序，能夠使中小學生及老師獲益等，而這套機制和程序越通用越好，以便能惠及更多的群眾。又如對產業而言，本計畫的產出不只是一個網際網路上的多媒體資料庫（如本節第一段所示），舉凡上述１至８之產出，皆可視為產業界後續加值之資源。此所指之產業界，包括軟體產業、加值產業（value-added industry）、內容產業（content industry）等。這些產業的例子雖然都是以資訊業為主，

然而其影響與應用擴及文化、藝術、社會等等各行各業的應用，應是可預見的。申請者於此應作社會效益詳細的自我評估。

由上的說明，本專案的性質可縱述如下：本專案不專門從事學術研究，但含有學術研究的內涵；本專案有濃厚的工程意味（要有具體的產出），但成果卻非終端產品，而是文化產業和資訊產業的上游。本專案試圖建立自學術、文化乃至產業、生活、教育等一貫之體系；除強調人文與科技之結合外，也強調人文與產業之結合，是一個典型跨多領域的綜合規劃。

三、組織

本專案目前之推動組織如圖三所示，諮議委員會由國科會召集，決定專案執行之政策與重要決策。在諮議委員會下設有工作小組與評估小組。工作小組之計畫辦公室負責本專案之管理及內部一切事宜，推廣辦公室則負責本專案之教育訓練與成果推廣工作。本專案新的工作計畫（如主題計畫）將由工作小組初審，通過後報請諮議小組議決。
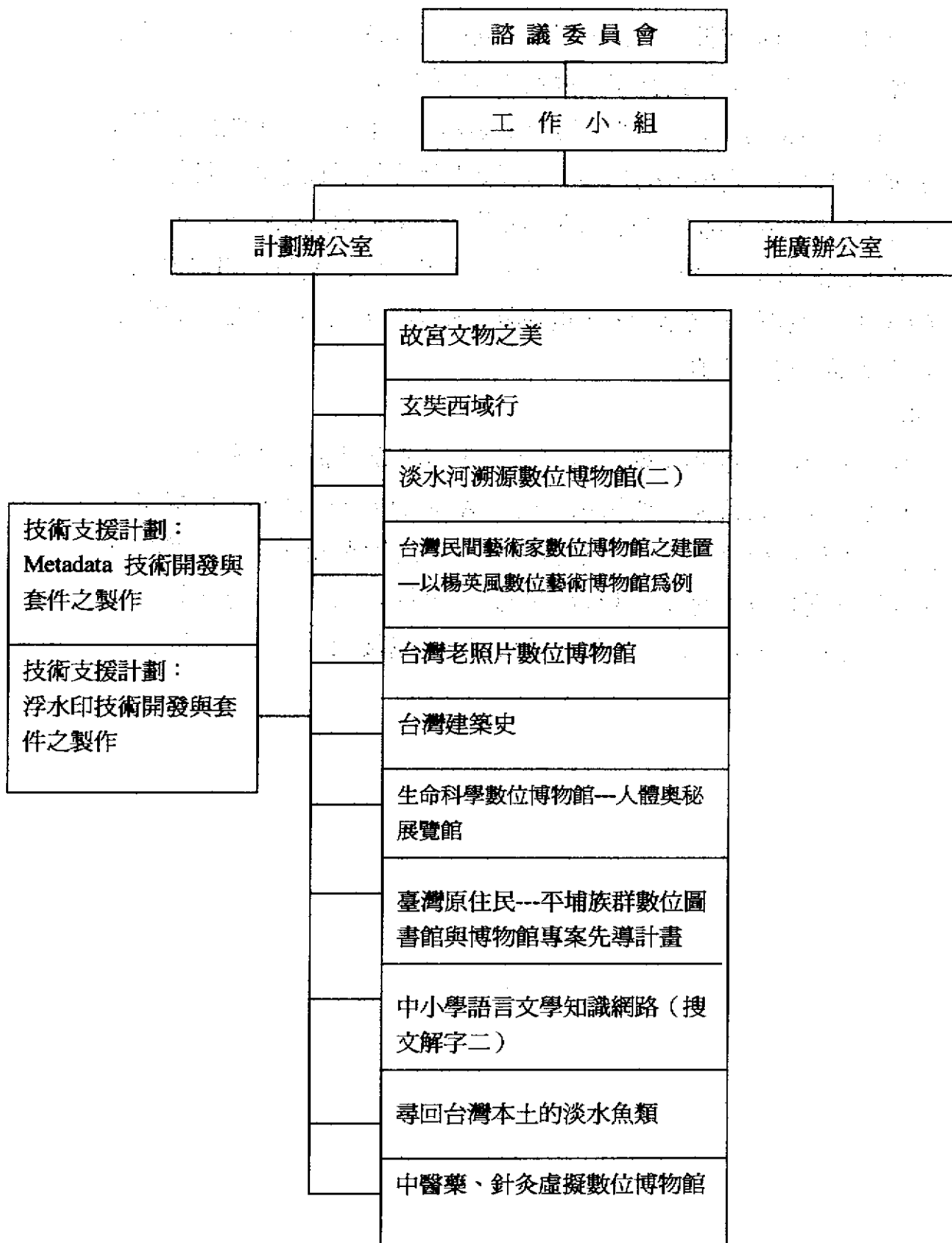
圖三:「數位博物館計畫」 組織圖

四、執行方式

　　參與本專案的各主題計畫應了解認同本專案的執行方式。本專案中的各個計畫無分彼此，都是專案中之一員。換言之，在計畫執行的方式上，本專案與一般的研究計畫是很不一樣的。以往一般計畫多是獨立研究，而本專案卻是開放、協力式的。也就是說，在主題計畫執行過程中，一切資料、文獻、規劃、和資源的使用等等，對專案中的每一個成員都是公開的。但於計畫中自行開發之研究技術之智慧財產權，應給予適度尊重。

　　計畫辦公室是本專案管理和協調的中心。計畫辦公室負責定期召開討論會以了解各計畫進度、整合各方意見、以及作自我評估等工作。各主題計畫和各技術支援項目彼此間的溝通、協調、合作等機制亦由計畫辦公室推動。是故計畫辦公室之重要任務之一，即在建立本專案內之溝通機制。溝通的管道除包括人員的接觸、會議、與小組討論等項目外，還須建立完整的文獻資料。是故本計畫就這方面作了特殊的要求，茲分述如：

1. 計畫辦公室將主動與主題計畫聯繫，並形成合作關係。同時，各技術支援項目將召集定期之會議，與相關之主題計畫共同研議合作之事宜。

2. 各主題計畫有義務採用已發展出的技術規格與標準，並參與新規範與標準之訂定工作。

3. 為了確實執行以上之溝通，鼓勵各計畫指定專人參加其他計畫之有關會議，會後應有責任將相關信息向計畫內其他同仁報告。此聯絡員（liaison）制度是必要的合作機制，各計畫均必需建立。

4. 各計畫應將計畫所有書面文件，以電子檔形式交計畫辦公室。此所指書面文件包括計畫書、人事資料、會議記錄（會議不可

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無記錄）、技術文件、行事曆（所有活動規劃）等。

5. 計畫辦公室將各子計畫文件匯整、分類，製作為電子辦公室，由此單一窗口，希望專案內之任何一位成員，皆可取得欲得之信息，皆可與任何其他成員直接在網路上聯絡、溝通。

6. 由於人文與科技之間本屬性質相異的領域，各計畫成員有必要養成良好之溝通、合作素養。若有溝通、合作不良情形，計畫辦公室有責任協調並解決之。

7. 在計畫執行期間，計畫辦公室將安排計畫間之相互訪問、參觀、會商，以增進彼此之了解，促進彼此之合作。

五、評估

在本專案諮議委員會下，另設有評估小組，以評估本計畫執行之成效。要言之，本節以上所談之各重點，如第二節第（四）小節中第 1 至 8 等之產出，皆在評估之列。這些評估項目與重點，也和一般的學術研究計畫不同，申請者應特別注意。

計畫的評估，可以分下列數要點說明：

1. 產出之價值與品質。此項可分為：資料類，如原始數位化檔案、加標誌之數位化檔案、檔案資料所產生的屬性資料、後設資料等。在系統方面則可能有單機資料庫和網際網路資料庫等。這些產出各有其產業應用之價值。若能提供公共領域之產出，則優先鼓勵，然而亦不排除有智慧財產權之產出。產出可能有技術規範和標準、可共用之程式、可再用之程式、數位化製作之流程、資料庫製作之流程（這些流程都是 know how）以及所製作的系統品質，包含知識表達的結構、資料檢索技術等。

2. 執行過程之參與、溝通、合作和團隊精神。

3. 計畫文獻之管理。此項應含有對下列文件之考量：與計畫相關的各類會議記錄、工作日誌、參考文獻之彙整。

4. 產出之易用性與親和性。主題計畫應提列網站內容之企劃，如

劇本等，以明白地顯示其欲呈現的內容與其易用性和親和性。

關於文案之呈現、編排、和網頁之設計、製作等皆屬可評之範圍。

以上說明的是數位博物館專案現在執行的環境，也就是計畫審查通過後參與本專案所必須面對的工作環境。此環境和一般學術研究計畫極不相同，在申請前請仔細確認。

肆、附件

附件一：

數位博物館資源組織與檢索相關規範

國科會數位博物館專案計劃 —
資源組織與檢索之規範工作小組 (ROSS)
起草人：陳雪華、陳昭珍、陳光華
89.09.20

申請國科會數位博物館專案計劃者，其資料庫架構宜需參考下列規範，使分散式的數位博物館系統具有取用互通性（access interoperability）。

一、書目資料著錄 (Semantic and Syntax of Bibliographic Records)
  * （一）DC-Based MICI：數位博物館資訊組織與檢索宜遵照以都柏林核心集為基本架構的中文詮釋資料交換格式。
    (http://ross.lis.ntu.edu.tw/document/metadata/)
  （二）CIMI-DC Testbed Project
    (http://www.cimi.org/documents/meta_bestprac_v031.html)
  （三）Dublin Core
    (http://purl.org/DC/index.htm)
  （四）XML and RDF
    (http://www.w3c.org)

二、內容標誌 (Contents Markup)
  （一）CIMI DTD
    (http://www.cimi.org/downloads/CIMI_SGML/CIMI4.DTN)
  （二）TEI
    (http://etext.virginia.edu/TEI.html)
  （三）American Memory DTD
    (http://lcweb2.loc.gov/ammem/amdtd.html)

三、索引典 (Thesaurus)
  （一）AAT (Art and Architecture Thesaurus)
    (http://www.gii.getty.edu/aat_browser/titles.html)
  （二）LCSH (Library of Congress Subject Headings)
    (http://lcweb.loc.gov/cds/lcsh.html)
  （三）中文圖書標題表

(http://datas.ncl.edu.tw/catweb/2-1-4.htm)

四、資訊互通檢索標準 (Standards for Information Retrieval over Digital Networks)

　*（一）MICI Z39.50 profile
　　　　(http://ross.lis.ntu.edu.tw/document/z3950/)
　　（二）CIMI Z39.50 profile
　　　　(http://lcweb.loc.gov/z3950/agency/profiles/cimi2.html)
　　（三）Aquarelle Z39.50 profile
　　　　(http://www.cimi.org/documents/aqua_profile_0598.html)

註：*由國科會數位博物館專案計劃—資源組織與檢索之規範工作小組(ROSS)所發展
　　之參考規範。

附件二：

Specification for Digitization

歐陽彥正，葉建華

本規格參考 American Memory，所建議者為數位化規格之最低標準。申請國科會數位
博物館專案之計畫應儘可能採用本規格。

一、Metadata(詮釋資料)
　　請參見 "數位博物館專案計畫:資源組織與檢索之規範"
二、Image(影像)
　　影像分成三種品質，Archive、Reference、Thumbnail。
　　　　（一）Archive Image: (提供保存及重製用途)
　　　　　　1.解析度: 一般藏品資料至少為 300dpi，剪貼資料至少為 600dpi。
　　　　　　2.顏色深度: 全彩 (true color，24 bits/pixel)
　　　　　　3.檔案格式: TIFF、JPEG（壓縮比 25：1 以下）
　　　　　　4.壓縮法: 不壓縮
　　　　　　5.其他: 掃描後刪除不必要的四邊。
　　　　　　（註：剪貼資料是指報紙等字體較小形態之資料。）
　　　　（二）Reference Image: (提供線上展示用途)
　　　　　　1.解析度: 一般藏品與剪貼資料均為 150dpi。
　　　　　　2.顏色深度: 全彩 (true color，24 bits/pixel)
　　　　　　3.檔案格式: JPEG
　　　　　　4.壓縮法: JPEG 壓縮
　　　　（三）Thumbnail Image: (提供線上展示前之參考用途)
　　　　　　1.解析度: 72x72 ~ 200x200。
　　　　　　2.顏色深度: 256 色(8 bits/pixel)
　　　　　　3.檔案格式: GIF（87 or 89a 皆可）
　　　　　　4.壓縮法: GIF 壓縮

三、Map(地圖資料)
　　（一）格式一
　　　　1.Archival 地圖影像: 彩色 – 24bit/pixel
　　　　2.檔案格式: TIFF
　　　　3.壓縮法: 不壓縮
　　　　4.解析度: 300 dpi
　　（二）格式二

1.Archival 地圖影像: 彩色 - 24bit/pixel

2.檔案格式: SID

3.瀏覽器: 可在 LizardTech 網站取得

4.壓縮法: MrSID wavelet （壓縮比可達 30：1）

5.解析度: 300 dpi

（註：價格高昂）

（三）格式三

1.Archival 地圖文件: 彩色 – 16/24 bit/pixel

2.檔案格式: TIFF / GIF

3.壓縮法: 不壓縮

4.解析度: 300 dpi

（註：GIF 只有 256 色，壓縮製作時必須特別留意，以保持圖像品質）

四、Audio(錄音資料)

（一）可供下載的檔案

1.屬性:採樣頻率爲 22.05 kHz, 16 位元, 單聲道

2.檔案格式: WAVE (Microsoft 格式)

（二）Streaming 檔案

1.提供 28.8Kbps 以上的數據機使用

2.典藏音樂的採樣率爲 44.1kHz

3.參考用音樂的採樣率視情況而定可以降低爲 22.5kHz 或 16kHz 取樣率，人聲則可以使用 8kHz

4.RA (Progressive Networks 的 RealAudio 格式)、MP3

5.Quick Time Audio

6.人聲可以採用 ITU G-系列格式以提高壓縮比

五、Video(動態影像資料)

（一）高等解析度檔案

1.影像尺寸: QCIF or CIF

2.播放速率: 30 fps

3.資料速率: ca. 3 Mbit/sec 以上

4.壓縮法: MPEG-2

（二）中等解析度檔案

1.影像尺寸: 320x240

2.播放速率: 30 fps

3.資料速率: ca. 1.2 Mbit/sec (ca. 150 Kbyte/sec)

4.壓縮法: MPEG-1

（三）低解析度檔案

1.影像尺寸: 160x120 以上

2.顏色深度: 24 bits/pixel

3.資料速率: ca. 100 Kbit/sec

4.檔案格式: QuickTime (Apple Computer 格式), H.261, H.263 （配合 G.721,

G.722, 或 G.729 等 ITU 標準音訊格式使用）, MPEG1/2 video, RealMedia, AVI

5.檔案類型: mov 或其他相關格式