

Development of a Spatial Database on the Remains of Ancient Villages in Northeast Thailand

NAGATA Yoshikatsu
Graduate School for Creative Cities, Osaka City University
3-3-138 Sugimoto, Sumiyoshi, Osaka 558-8585, Japan
nagata@media.osaka-cu.ac.jp

Walailak Songsiri
Lek-Prapai Viriyapant Foundation
78/1 Democracy Monument, Ratchadamnoen Avenue, Bangkok 10200, Thailand

Srisakra Vallibhotama
Lek-Prapai Viriyapant Foundation
78/1 Democracy Monument, Ratchadamnoen Avenue, Bangkok 10200, Thailand

Abstract: Remote sensing allows automatic and continual spatial data acquisition. However, it is powerless to accumulate spatial data from the past. On the other hand, social and human scientists have already created rich academic descriptions of the past with fragmentary images, but without accurate geo-references. Such a legacy of information will eventually become useless, regardless of its importance or the researcher's passion. There is thus an urgent need to help assemble the lifetime research results of social scientists, so that future generations can easily access them.

Keywords: Social Archaeology, Northeast Thailand, Spatial Information System

1. Introduction

Social and human scientists have created rich academic descriptions of the past with fragmentary images, such as aerial photographs, sketches, and scenic photographs, but without accurate geo-references. Many senior scientists in these fields, especially leading scientists, are not sufficiently familiar with rapidly improving information technology, and the major medium through which they may publish their academic findings is print.

Thus published findings are so far accessible by junior scientists and the public, but other, unpublished findings and related materials for study are left fragmentary and without a universal reference. They will eventually become useless, regardless of their importance or researchers' passion, and this represents an immeasurable loss to society. There is thus an urgent need to help assemble the lifetime research results and sometimes fragmentary findings of social scientists.

A sense of crisis motivated us to start our present project, which aims to develop a spatial database on the remains of ancient rural villages in Northeast Thailand. Srisakra's findings and related materials are the major contents of the database.

2. EcoNETVIS

1) Background

Srisakra's academic activity covers the whole of Thailand and extends to neighboring countries. But we had to narrow our target area down to smaller region to develop a practical system for both users and collaborators. On the other hand, Nagata has been developing a spatial information system, the NETVIS, which covers whole of Northeast Thailand [1]. Thus, we started our collaboration with the first priority of concentrating on Northeast Thailand [2]. Our project for the Northeast Thailand Village Information System: Ecohistory is abbreviated as EcoNETVIS.

2) Materials

The major materials we have been integrating into the spatial database are aerial photographs, topographic maps, and academic descriptions. Compared with the state-of-the-art satellite imagery, these are quite imprecise, since accurate geo-references are included only in topographic maps. It is a very time-consuming activity to check up geo-references.

As of August 2003, the approximate numbers of integrated materials are: a) 1,000 sites with descriptions; b) 740 aerial photographs mostly of the 1950s; c) 70 topographic maps of the 1950s; and d) 200 topographic maps of the 1980s or later.

In addition, about 500 aerial photographs of the 1950s, tens of topographic maps, and thousands of scenic photographs are being prepared for integration. As well as incorporating image files, we are continuing to make site descriptions richer.

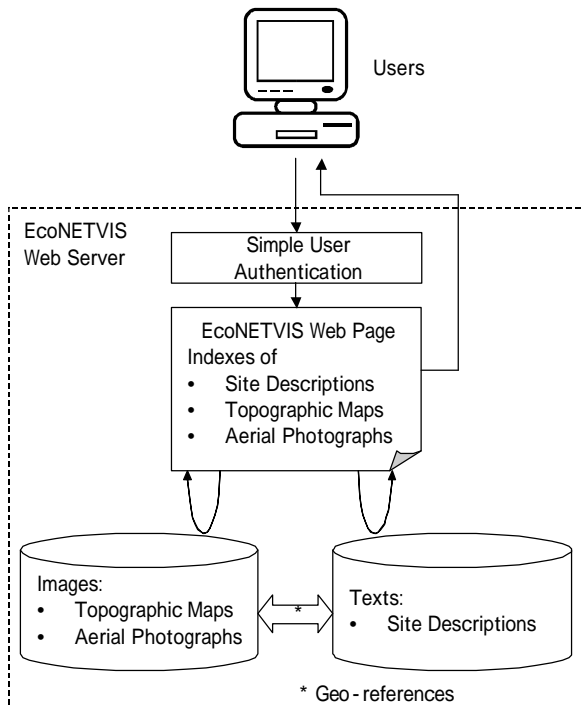


Fig. 1. Diagram of the Current EcoNETVIS

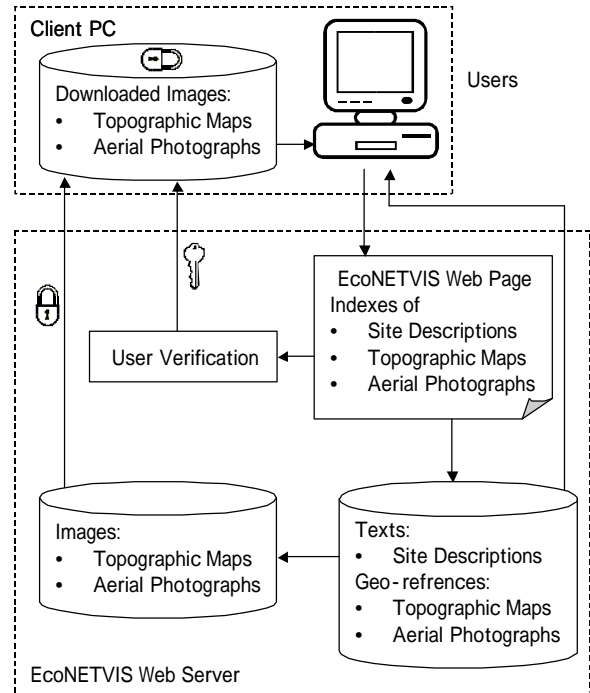


Fig. 2. Diagram of the New System under Consideration

3) Outline of the Current System

An important goal of the project is to allow public access to the database through the Internet. A rough diagram of the current system is shown in Fig. 1. Major contents, *i.e.*, site descriptions and image files are linked together by geo-references in the web server.

Access to the top page is gained via a unit of user authentication. This is because we should respect the original copyright of topographic maps and aerial photographs. In this sense, our EcoNETVIS web page is not actually freely accessible; however, it is almost so, since we announced the password at the seminar for the Thai public in February 2003.

We started the release without considering various sensitive issues, and some of these remain to be resolved. Access control and spillage control of image files, of which we do not hold the original copyright, are incomplete. Once a user downloads an image, the image is out of our control.

Another issue concerns the huge size of images. At present, we trim an image to fit the resolution size of the user's display, then transmit it in FlashPix format. So far, this method has proven feasible. However, a rapid explosion of traffic in the Internet has greatly reduced access speed. In daytime, data transmission is often terminated by a timeout signal. At the same time, professional users are not satisfied with a piece of an image. They are eager to browse both an overview and a detailed picture.

4) Improvements

We plan to introduce a different method of access as shown in Fig. 2. Any user can download any image file with full size and full details, but this VFZ format file is locked. Only rough image can be browsed without restriction. To browse in detail, the user has to access the web server to clarify the user verification and thereafter receives the key to open the file.

This method has the potential to solve the two issues mentioned in the previous subsection. Lock information is embedded in each downloaded file, preventing uncontrolled secondary distribution. At the same time, the user can download as a background job, or as a midnight job, to avoid the traffic jam in the Internet line. Even more, this method allows offline distribution with CD or DVD media.

On inconvenience that this method might cause to users is that they cannot browse details of the image offline. Nevertheless, we believe that this method offers more advantages than disadvantages.

5) Examples

The following are some example pages from the current system. After a user chooses a site from text-based index or by clicking the index map, a detailed site description appears with information on the corresponding topographic maps and aerial photographs (Fig. 3). Based on the geo-references, links are also provided, if related images are available. From links on the description page, the user can see trimmed images of

EcoNETVIS Site Description

Ban Muang Chak
บ้านเมืองจก

Ban Muang Chak Tambon Muang Yang Amphoe Chum Phuang Changwat Nahkon Ratchasima

บ้านเมืองจก ตำบลเมืองยาง อำเภอชุมพวง จังหวัดนครราชสีมา

อยู่ในบริเวณลุ่มน้ำมูล ระหว่างลำสะเทตและลำน้ำมูล พบเนินดินมีคูน้ำล้อมรอบรูปกลม ที่มีการขุดขยายทางด้านใต้ ทำให้น้ำคั่งดินกลายเป็นรูปเหลี่ยมวงรี และมีสระน้ำรูปสี่เหลี่ยมผืนผ้าทางด้านเหนือ บริเวณพื้นที่ทางทิศเหนือพบโบราณวัตถุ เศษภาชนะดินเผาชนิดหยาบแกร่ง ชนิดหยาบมีลายเชือกทาบ ลายขีดขีดและผิวเรียบชนิดแกร่งเป็นภาชนะแบบขอม และเครื่องเคลือบสีเขียวอมวล พบโครงกระดูกมนุษย์ในระดับ 1 เมตร เศษขี้แร่ และพระพุทธรูปสำริด

E 102°49'51" N 15°27'19" : UTM (267.3 , 1709.7)

Topographic Maps	Aerial Photo(s)
1:50,000 • L708 Series : 555711 • L7017 Series : 55391 1:250,000 • 1501S Series : ND48-1	22146 (07 Jan 1955) ***

Srisakra Vallibhotama, Lek-Prapal Viriyapant Foundation ศรัศิกร วรสิริโกดม, มูลนิธิเสก-ประไพ วัชรินทร์
Walailak Songsiri, Lek-Prapal Viriyapant Foundation วลัยลักษณ์ ทรงศิริ, มูลนิธิเสก-ประไพ วัชรินทร์
NAGATA Yoshikatsu, Media Center, Osaka City University

Fig. 3. Site Description

an aerial photograph (Fig. 4) and a topographic map (Fig. 5) with the location of the site at center.

In addition, thematic mapping indexes are provided. Fig. 6 is an example showing the distribution of sites that include the keyword “Khmer”, the name of the ancient Cambodian empire, in their description. Of course, these maps provide click and link.

3. Discussions

Our activity is thus practical but not at all model-making or theoretical. Applied technology will plug up holes in modern technology, and both will make progress. Collaboration between distant fields of science will provide fresh viewpoints for both fields.

Our trial created a big sensation when we held a seminar to introduce it to the public. It elicited both negative and positive opinions. We understand that some of negative views are based on academically and nationalistically sensitive considerations, and we should not ignore these negative opinions. We will carry our

EcoNETVIS Aerial Photo Viewer

Version 2.3
3rd August 2002
7JAN55-22146

Central point of this photo
E 102°49' 16"
N 15°26' 58"
UTM
(266.2, 1709.1)
Topographic maps
L708 : 555711
L7017 : 55391
1501S : ND48-1

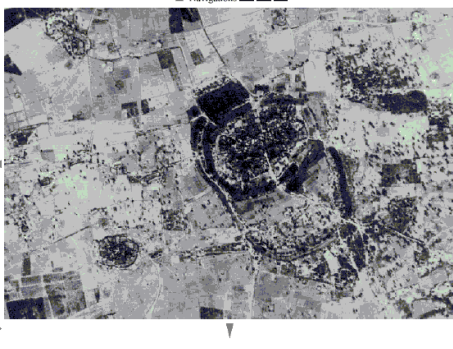


Fig. 4. Aerial Photograph with the Site Centered

EcoNETVIS Map Viewer
NAGATA Yoshikatsu
Media Center, Osaka City University

Series L708
555711
Ban Krabueng

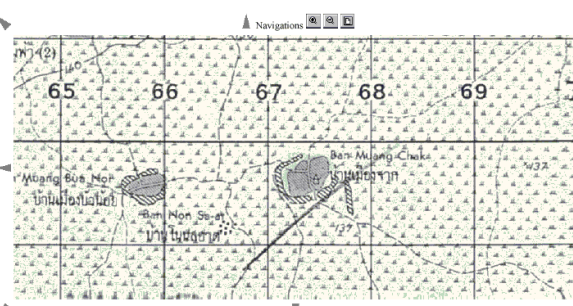


Fig. 5. Topographic Map with the Site Centered

collaborative activity forward so that our system can gain wider acceptance.

References

- [1] NAGATA Yoshikatsu, 1996. Changes in Rural Areas of Northeast Thailand in the Latter Half of the 1980s as Seen Through the Northeast Thailand Village Information System, International Archives of Photogrammetry and Remote Sensing, 16(B7): 516-521.
- [2] NAGATA Yoshikatsu, Walailak Songsiri, and Srisakra Vallibhotama, 2002. Development of the EcoNETVIS, a Time-series Spatial Information System, on Northeast Thailand, *IPSJ Symposium Series*, 2002(13), 225-232.

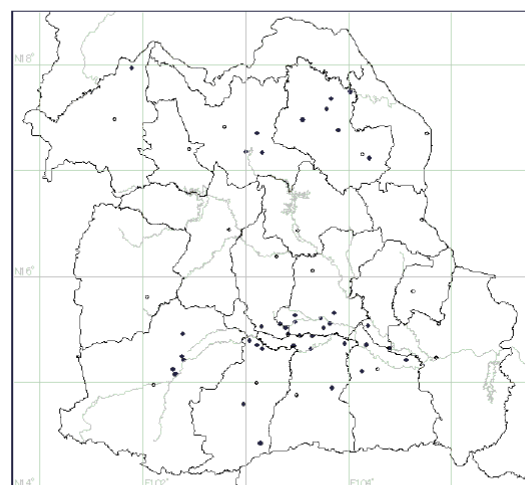


Fig. 6. Distribution of Sites Including the Keyword “Khmer”