

## ABSTRACTS-YEAR 2000

### RESEARCH STUDY

#### COMPUTER SCIENCE

##### RSPR-CS-00-1

##### DEVELOPING A DIGITAL MAP SYSTEM BY OBJECT-ORIENTED METHODS

Arttachai Ketrattanabovorn

Dr. Qi Yulu

At present, Information Management is very important. All businesses and organizations aim to this point and try to develop their information that is used for planning, management and decision in all strategies.

Digital Map System is a computer system collects information that represents, in digital form, information that can be shown on a map. Digital maps can be modified, added to, and edited at will on the computer. It is responsible for sharing resources about map information. But, sometimes the system does not respond well because some problems occur; for example, other details of information could not store efficiently, it is difficult to use and to check duplicate information, it cannot be easily and quickly to access from user. All make the system difficult to use and has low performance. It is necessary to solve the problems and also to improve the system for the high performance. So, the strategy of development will be considered and applied to increase system efficiency and solve these problems.

For Metropolitan Waterworks Authority (MWA), there are many kinds of information in organization. In this case, Digital Map System of MWA is considered to be case study in this research. Mapping and Drafting Division of MWA has responsibility to store maps and As-Built drawings about project information. In this research, the system is analyzed, designed, and application is developed for the new system to solve problems and increase performance.

##### RSPR-CS-00-2

##### INFORMATION SECURITY IN THE CONTEXT OF THE INTERNET

Rakesh Sabharwal

Prof. Ramakoti Sadananda

Internet is most popular network, as it is the huge source of information, cheap mean for the transmission, widely available and easy to use. In early years of internet, it was used mainly for publishing and transferring information, which was not very critical so the security was not a major concern. However during last decade number of systems operating in internet environment, which carry critical information, has grown rapidly. Information security has been very important issue for these systems. The availability of several new techniques and tools to unlawfully gain the information from internet has raised serious concern for security of systems using critical information. This research study attempts to study various issues of information security and means to contain them. Based on the study it gives suitable measures that would enable us to provide the security for the systems. Study shows how security can be achieved using protocols at internet, transport and application layer. We use a model to provide security using firewalls, which makes system effectively secure.

##### RSPR-CS-00-3

##### STUDY ON PARALLEL SORTING

Jugkree Palakawong-Na-Ayuthaya

Dr. Qi Yulu

The goal of this thesis is to explore the possibility of improving sorting performance using parallel computing. Normally, sorting is done on a single computer. The sorting time will directly depend on the sorting algorithm. Currently, there are many sorting approaches that may support parallel computing such as: quick sort, odd-even sort, merge sort, etc.

The merge sort has a unique characteristic, which makes it very easy to adapt to parallel computing (even though it may be slower than quick sort). Load balancing characteristic of merge sort is another factor that merge sort will be used throughout this research.

Reverse-order data sets of different sizes (0.5MB, ..., 4MB records) will be used as a test set for all the sorting. The above reverse-order data set will be divided by the number of processors allowed in the test. Each sub data set will then be executed by each processor. The test is done on a PC compatible computer. Each process will be treated as a processor. Only the master processor will be timed and the figure will be used to calculate the total sorting time for the test.

This research confirms that the parallel computing will benefit from the merge sort approach. The performance of the sort is increasing with the increasing number of processors but this research was limited to 8 processors.

##### RSPR-CS-00-4

##### MPEG AUDIO ENCODING USING PARALLEL PROCESSING TECHNIQUE

Chat Watcharapin

Dr. Qi Yulu

Many software/hardware MPEG audio encoding schemes have been proposed to reduce encoding time. At present, software scheme that is used to encode the MPEG audio is implemented by sequential algorithm and the real time encoding needed very high-speed computer. This approach still issues the limited encoding time performance due to the limited speed of

computer. Then it is interesting to improve the encoding algorithm by implementing the MPEG audio encoding in parallel processing system to break the limitation of encoding time.

In this study, the software based on parallel processing is proposed to improve the performance of MPEG audio encoding. The implementation algorithm is simulated on RedHat Linux version 6.2 with MPICH release 1.2.0 from Argonne National Laboratory [15]. Various numbers of processors are experimented and evaluated.

Experimental result, shows much improvement in the overall encoding time. The MPEG audio encoding and parallel processing can work well together due to the independent data characteristics of MPEG audio and the data management of parallel processing.

#### **RSPR-CS-00-5**

**A BILL PAYMENT SYSTEM VIA THE INTERNET: A CASE STUDY OF TELEPHONE ORGANIZATION OF THAILAND (TOT)**

Somchai Jittiphiphatkul

Dr. Vatcharaporn Esichaikul

Recent advances of electronic payment technology over the Internet have allowed users to purchase goods and services online and conduct financial transactions over the Internet. Currently, many aspects of electronic payment (e.g. credit card, debit card, smart card, and account transfer) have been implemented in Thailand. Some banks have provided electronic payment methods to serve their customers for purchasing and paying the bill over the Internet. Telephone Organization of Thailand (TOT), as a communication provider, currently offers bill payment channels: at TOT offices, bank counters, agent payment, and direct debit from bank account to serve its customers. As its policy, TOT attempts to provide more channels for bill payment.

This research proposes a new channel of bill payment for the Telephone Organization of Thailand (TOT), a bill payment system via the Internet. The system provides two main functions, namely, bill presentment and payment system. The study addressed two aspects: (1) the study of electronic payment methods existing in Thailand, their behaviors, and the trend of implementation over the Internet of each method, (2) the design of user interface for bill payment system via the Internet.

#### **RSPR-CS-00-6**

**AN ONTOLOGY DESIGN FOR THE UNIX OPERATING SYSTEM**

Teodoro A. Avergonzado Jr.

Prof. Phan Minh Dung

UNIX operating system is one of the most popular operating systems commonly used in manufacturing industries due to its portability and robustness. Nevertheless, certain problems are inherent in the system, which triggers solutions on the technology of ontologies.

The study of ontologies in the AI community contributed greatly in different fields of application. The recent enhancements challenged many researchers to improve the needs and requirements for the benefit of the wide array of users.

This research proposes an ontology design for the Unix operating system. However, the specific domain of interest focuses only on a particular topic, which is the installation of printers in Unix. Certain steps and procedures were considered in the analysis and design of the ontology.

XML was selected as the tool to implement the ontology complementing it with Java on Web Servers to replicate a client-server application. An XML query engine is utilized for the searching scheme.

#### **RSPR-CS-00-7**

**PAPERLESS ORGANIZATION: A CASE STUDY OF THE ASIAN INSTITUTE OF TECHNOLOGY**

Bui Thi Thanh Hai

Prof. Phan Minh Dung

Managing documents is one of the most important challenges facing IS managers nowadays. It is important because much of the valuable information in organizations is in the form of documents such as business forms, reports, letters, memos, policy statements, contracts, agreements, etc. Moreover, many of the important business processes in organizations are based on, or driven by, document flows.

This study is about designing a paperless organization where AIT will serve as a case study.

The study consists of three parts:

- The networking infrastructure needed for the implementation of a paperless organization is studied.
- The current state of the application of IS at AIT is analysed.
- An example of Electronic Memo Management system manages the memo flow is analysed, designed and implemented with ASP, HTML, and VBScript.

## **INFORMATION MANAGEMENT**

### **RSPR-IM-00-1**

#### **AN INTELLIGENT MESSAGE FILTER FOR E-MAIL SYSTEM**

Suchai Tirakotai

Dr. Vatcharaporn Esichaikul

This research develops an intelligent message filter for an e-mail system, which mainly applies to AIT e-mail server and AIT students as users. The intelligent message filter automatically sorts mail into appropriate mailboxes according to user profiles (user models). The system requires both explicit and implicit user models. The explicit user model requires users to tell the system about themselves and their interests and uninterests. For the implicit user model, the system uses machine learning techniques to generate user profiles, i.e. by observing and analyzing user behavior. The system also uses parsing methods to analyze the messages and weight calculations.

In the development of the system, the first task was to analyze problem domain "information overload", then the questionnaires were distributed to all AIT students and 82 students replied. The results from questionnaire also gave data about user interests and non-interests for the system to start with, since the system aims for AIT students as users and the system has no knowledge about users at the beginning. Then the system was developed using Microsoft Visual Basic version 6.0.

### **RSPR-IM-00-2**

#### **IMPLICATIONS OF GLOBAL INFORMATION TECHNOLOGY ON TRADITIONAL EDUCATION SYSTEM: THE CASE OF PESANTREN**

Bambang Winarko

Prof. Ramakoti Sadananda

Pesantren is a Moslem traditional education system in Indonesia which holds important roles in all aspect of life. One of the role is together with the government to provide out-school education system. As an education system, pesantren face the information technology which give negative or positive implication.

The research study on implication of global information technology on traditional education system, pesantren are aimed to study internet application, internet implication, and supporting and limitation factors of internet application in Pesantren. Research used secondary and primary data. Secondary data are collected from library of NGOs or Institutions related to pesantren, and the homepage of the pesantren, while primary data are obtained from interview with people related to the Pesantren.

The result showed pesantrens used internet application for information, advertising, and education purposes. Web site, electronic mail, list serve, Usenet newsgroups, chat room, searching, and link to other web sites are internet application used in pesantrens. The implications are connectivity and global reach, reduction of communication cost and time to obtain information, and enhancement of acceptability of santries on the world outside pesantren, abusing internet by accessing pornography sites, spreading destructive rumors, and decreasing santries-kyai relationships. Supporting factor of Internet application in pesantren is "open mind" attitude of kyai, santries, and pesantren management to adopt better new things. While the limited factors are Internet infrastructure availability, budget availability, human resources, and scaring of negative implication.